Embodying Mycenaean Cultural Identity in Late Bronze Age Central Greece: A Bioarchaeological Analysis

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ABSTRACT

This research is a bioarchaeological examination of the biocultural manifestation of Mycenaean cultural identity in the Late Bronze Age (ca. 1600-1100 BCE) rock cut chamber tomb cemetery of Golemi Agios Georgios ("Golemi") in central Greece. Biological correlates for Mycenaean cultural identity were identified from current archaeological narratives of Mycenean cultural identity. A biological profile including the minimum number of individuals, age, sex, cranial and dental non-metric traits, non-specific indicators of disease, activity markers, and evidence for cranial trauma was developed for each tomb. The results of these analyses were used to explore the extent to which the mortuary community of Golemi embodied the archaeologically defined Mycenaean cultural identity. Hierarchical Bayesian analysis was used to examine whether some tombs demonstrated significantly more or less of a given skeletal trait. Chi-square and Fisher's exact tests for independence investigated possible relationships between age, sex, social status, and various indicators of health. The results of all analyses were combined to identify potential spatial relationships between tombs in the cemetery.

The results of these analyses indicate that the individuals of Golemi do embody Mycenaean cultural identity, but the extent to which each tomb expresses this identity is variable. Contrary to the overt image of male dominance in Mycenaean cultural identity, females and males are equally represented in the cemetery and female individuals, on average, survived longer than did male individuals. The special treatment of some juveniles and their variable presence in tombs indicates that including juveniles was a highly individualized decision. A significant relationship between non-specific indicators of disease and status was observed suggesting a spectrum of social statuses existed among the tomb groups. The location of wealthy, healthy tomb groups next to relatively poor, less healthy groups may indicate that social

networks dictated burial placement rather than familial relationships, thereby reflecting the networked nature of Mycenean culture. Finally, the persistence of Golemi throughout tumultuous periods of the Late Bronze Age suggests that the community was able to successfully adapt to the changing social climate.

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CHAPTER 1: INTRODUCTION

In his quest to find the lost cities of Homer's Greece, Heinrich Schliemann's 19th century excavation of the ancient site of Mycenae unearthed the remains of what we now know to be a highly influential Aegean civilization. Subsequent archaeological excavations of Mycenae and other sites have continued to reveal the impressive extent of Mycenaean power and influence. Yet, despite our increased understanding of many aspects of Mycenaean culture, we know little about Mycenaean people themselves. This situation is largely due to the lack of contextualized analyses of skeletal remains, which can portray the physical realities of living and dying in the Late Bronze Age Aegean. Understanding the integrated aspects of demography, health, activity, and cemetery organization within Mycenaean Greece will deepen our knowledge of this important period of Greek prehistory while also providing a uniquely human way for modern people to relate to the past.

Tombs and cemeteries are among the most common sites excavated in Greece. Because burial practices and architecture are so intimately connected to cultural norms and ideology, they are often relied upon as indicators of cultural influence (Voutsaki 1998; Wright 2008a; Papadimitriou 2011). The adoption of the rock-cut chamber tomb type is one prevalent indicator used to trace the expansion of Mycenaean culture or "Mycenaeanization" (Davis and Bennet 1999); therefore, the examination of the human remains from these tombs provides an opportunity to study how local individuals socially and physically negotiated Mycenaean cultural identity.

Cultural identity is often conflated with the concept of ethnicity in archaeological research. While culture and ethnicity are strongly inter-related concepts, they have different interpretive connotations and require different types of data for analysis. The study of ethnicity

necessitates an emic perspective and an individual specific sense of belonging which cannot be discerned from skeletal remains and material culture alone (Barth 1969; MacSweeney 2009; Jones 2007). Cultural identity, on the other hand, is derived from a range of overlapping material and ideological characteristics that can be observed in the archaeological record. Its expression varies from site to site and region to region, but individuals find commonality and group-ness through key identifying markers. Because culture is embedded in the everyday activities of life as posited by Bourdieu (1977) through the concept of *habitus*, the contextualized human skeleton can provide important information about the embodiment of cultural identity and lived experiences.

The defining attributes of Mycenaean culture are based primarily on studies of the architecture, Linear B texts, pottery and other material objects from major centers and elite mortuary contexts in the Peloponnese, specifically the regions of the Argolid and Messenia. Although the primary features used to define Mycenaean culture have varied over the last century (Jazwa 2016), the rock cut chamber tomb is included in most if not all characterizations of Mycenaean culture. Major centers and numerous tombs have been located in central Greece, but it has received far less systematic study. Therefore, the analysis of the human skeletal remains from a rock cut chamber tomb cemetery in this understudied area provides data essential to understanding the adoption and manifestation of Mycenean cultural identity in central Greece. It also provides a way to better understand the relationship between a site in areas without a Mycenaean palace (northeast Phokis/East Lokris) and the nearest and likely most influential palatial power.

Drawing upon theory and method from Bronze Age Aegean archaeology, classics, sociology, and biological anthropology, this project examines the biological and cultural (i.e.

biocultural) expressions of Mycenaean cultural identity in a mortuary community of central Greece in the context of the establishment, acme, and demise of the Mycenaean civilization.

Research Questions

This study uses the fragmentary, commingled skeletal material excavated from 23 rock cut chamber tombs in the Late Bronze Age (ca. 1600-1100 BCE) cemetery of Golemi Agios Georgios in northeastern Central Greece to study the embodiment of Mycenaean cultural identity. There are two main questions that I will address in this dissertation:

1. To what extent does the mortuary population of Golemi Agios Georgios bioculturally manifest the archaeologically defined Mycenaean cultural identity?
2. How does Golemi Agios Georgios fit into the broader Mycenaean sociopolitical geography and cultural context?

I propose several guiding questions to address these broader, overarching questions. The first six are divided according to standard bioarchaeological categories: Demography, Health, Activity, and Trauma. The seventh question deals with the organization of the cemetery, which may also reflect aspects of Mycenaean cultural identity.

Demography

1. *What is the demography of Golemi and how does it reflect the social structures projected through Mycenaean cultural identity?*

   Based on archaeological and Linear B (text) documents from the Late Bronze Age, Mycenaean culture appears to be a patriarchal, male dominated society. Previous studies have argued that female individuals were not included as frequently in rock cut chamber tombs, which may be a reflection of this aspect of Mycenaean culture. This issue is

addressed through the identification of male versus female individuals represented among the Golemi skeletal material.

2. *Does the cemetery contain more young- and middle-aged male individuals?*

   The development of swords, their inclusion in tombs, and the construction of fortified citadels including imagery of warfare attests to the war-like nature of the Mycenaeans. For this reason, it is expected that if warfare was common during this time and the individuals of Golemi adhered to the warrior ideology of Mycenaean identity, young and middle age male individuals will make up a larger percentage of the mortuary sample.

3. *Do the tomb groups represent familial units as most scholars assume they do?*

   Scholars of Aegean prehistory have almost universally assumed that the rock cut chamber tomb contains the skeletal remains of a family unit, but the assumption has never been tested through the study of skeletal material. I am addressing this question through the analysis of demographic composition of each tomb as well as examining the distribution of cranial and dental non-metric traits.

Health Status

To what extent is the health status of the individuals at Golemi related to the archaeological features of the tombs and how does health status differ based on sex, age, and social status?

The relatively few studies of Late Bronze Age health have indicated that Mycenaeans in rock cut chamber tombs experienced a moderately good level of health. I propose to test whether or not the individuals of Golemi embodied good heath in association with wealthy grave goods. Good "health" is measured by non-specific indicators of disease and relative survivorship. Because health is a highly intersectional phenomenon, aspects of sex and age are also considered

alongside social status. I argue that the cemetery of Golemi contains a wide range of social statuses, which are differentially reflected through non-specific indicators of disease/stress.

Activity Level

Do the individuals of Golemi reflect high levels of activity through skeletal markers as might be expected given the emphasis on warfare and hunting in Mycenaean cultural identity?

The early skeletal representations of Mycenaean culture exhibited better health, taller stature, and more robust skeletons than previous populations. If individuals claiming Mycenaean cultural identity embody the high intensity physical activity involved with consistent military training and combat, the individuals will exhibit high levels of activity through severe entheseal changes, high amounts of degenerative joint disease, and platymeric proximal femoral morphology.

Trauma

Do the individuals of Golemi, especially males, exhibit high frequencies of cranial trauma?

There is ample evidence in the material culture and written documents from Mycenaean palatial centers to suggest that individuals from both high and low statuses participated in warfare (interpersonal violence). The examination of cranial trauma among the individuals of Golemi will elucidate how intensely, if at all, individuals from non-palatial locations were involved in warfare or interpersonal violence during the Late Bronze Age.

Cemetery Organization

Does the spatial arrangement of the tombs in the cemetery reflect social aspects of Mycenaean culture?

Mycenaean culture developed as a result of rising elites consolidating power through the formation of social networks. Linear B documents and archaeological data suggest that non-palatial individuals were able to build their own networks outside of the palatial system. I argue

here that the osteobiographical study of rock cut chamber tomb skeletons and contents can provide evidence for a networked organization of the cemetery, which is reflective of the larger organizational scheme of Mycenaean society.

Dissertation Organization

This dissertation is organized into nine chapters. Chapter 2 introduces and discusses the theoretical framework of embodiment, the use of social theory in bioarchaeology, and how both tie into studying cultural identity. Chapter 3 then describes the way in which skeletal indicators are used to study social processes and how they can be used within an embodied approach through osteobiographical analysis.

Chapter 4 contains six primary sections. The first introduces the chapter while the second discusses the definition and use of the term "Mycenaean" in the study of Mycenaean culture. The third describes the chronological terminology and dating being used throughout the dissertation. The fourth provides an in-depth historical overview of the Late Bonze Age of mainland Greece including the Prepalatial, Palatial, and Post-Palatial periods with special attention to how Mycenaean cultural identity developed throughout these periods. The fifth section describes how burial practices are related to the expression of cultural identity in Mycenaean Greece and the sixth identifies the specific biological correlates being used to study Mycenaean cultural identity in this dissertation.

Chapter 5 provides a more intensive contextualization of the site of Golemi Agios Georgios in the regions of northeast Phokis, East Lokris, and northwestern Boeotia, its potential relationships to the palatial powers of Orchomenos and Thebes, and the significance of its location along a river valley with access to a prominent trade route in the northern Euboean Gulf.

Chapter 6 describes the site of Golemi, the condition of the materials, and the osteological and statistical methods used to analyze the skeletal and archaeological remains of Golemi Agios Georgios. Results of these analyses are provided in Chapter 7, which produced a picture of a moderately wealthy, generally healthy mortuary community, but also revealed how the diversity of archaeological and biological traits among the tomb groups of Golemi exhibit a spectrum of social status and variable expressions of Mycenaean identity.

The discussion provided in Chapter 8 assesses the extent to which those in the cemetery of Golemi share some basic sense of common group identity. Each question is discussed by category regarding the mortuary population as a whole to determine ways in which they embodied or did not embody Mycenaean cultural identity as a community. Having explored cemetery wide trends, the diversity of status and identity expression are examined through an osteobiographical lens. The potential organizational schemas of the cemetery are described and discussed in the broader context of Mycenaean culture. Finally, the chapter ends by considering how Golemi Agios Georgios contributes to existing knowledge of central Greece, specifically in the regions of northeast Phokis and East Lokris.

As the final chapter, Chapter 9 summarizes the main conclusions derived from the study of the skeletal and archaeological remains of Golemi Agios Georgios and identifies both the limitations of this project and future research directions.

CHAPTER 2: THEORETICAL PERSPECTIVES - EMBODIED IDENTITIES

Introduction

The physical body represents the foundational mode of human experience because humans live their lives through and with their bodies. As a result, the body is both a contributor to and reflection of life, culture, and the many identities humans claim and perform throughout that life. In this chapter, I provide an overview of the foundational theoretical concepts I will use to contextualize and interpret the human remains from Golemi Agios Georgios.

"Biocultural" approaches are becoming more prevalent within biological anthropological study, but still need more explicit theorization and methodological application (Zuckerman and Armelagos 2011). Theorization of the body in the social sciences has created opportunities for more intentional bioarchaeological engagement with social theory (Shilling 2003; Csordas 1993, 1994, 2011; Joyce 2005, Glencross 2011). For this purpose, I introduce the main theoretical perspective for this dissertation, embodiment. The basic fact of having a physical body as the locus for lived experiences provides a starting point for understanding how identities can be embedded in daily physical activities and cultural practices (Csordas 1993, 1994; Robb 2016; Robb and Harris 2013; Harris et al. 2013). The concept of embodiment has been used in archaeological analysis of artifacts (Joyce 2003; Lesure 2005) but is just beginning to be explicitly used in bioarchaeological analysis of human remains (Torres-Rouff and Knudson 2017).

The concept of identity is folded into the study of embodiment because people embrace and embody many identities throughout life. Identity is an abstract, fluid, difficult to define, and often contradictory concept (Brubaker and Cooper 2000). I discuss the limitations and challenges of studying identity in archaeology. Social groups can be formed based on any number of social

identities and positions. Archaeological cultures are often discussed as if they were bounded entities with a set of specific cultural traits (MacSweeney 2009). However, site and regional variation illustrates that the adoption and expression of those traits varies according to the conditions specific to time and place (Jazwa 2016). In biological terms, it is as if the archaeologically defined cultural identity is the genotype and the site-specific varied expressions of that identity are the phenotype.

To end the chapter, I connect embodiment theory to the sociological concepts of the body self, social body, and body politic to explore how various embodied aspects of the body can be used to understand cultural identities (Scheper-Hughes and Lock 1987; Martin et al. 2013). Having provided an overview of these foundational concepts, the following chapter will explicitly address which aspect of the skeleton will be used in interpreting biocultural identities at Golemi Agios Georgios.

The Body

Without the physical existence of the human body, the human species and the various cultures and histories contained within it would not exist. This seems like a simple concept, but in theorizing "humanity," there is a history of elevating the "mind" over the "body" as if they are separate entities (Shilling 2003). Theorizations of the body in the social sciences over the last 50 years have attempted to deconstruct this duality and assert the fundamental importance of the body in understanding social phenomena (Foucault 1977; Crenshaw 1989; Joyce 2003; Shilling 2003). The processes of social identity formation, maintenance, and change have been a critical part of this theorization.

According to Robb (2016:i), the body is at least three things: "1) a physical object which both has its own structures and processes and which develops and responds to an environment…

2) an idea with a historical existence…; 3) an embodied subjectivity which is reproduced through practices, habits, routines and tastes." These three things are integrally intertwined and cannot be fully conceptualized in isolation from one another. The body is a physical object, a historically contextualized idea, and an embodied subject simultaneously. Therefore, any study of the body must take all three components into consideration.

The recent theorization of the body in the social sciences has attempted to illuminate the body as multiply constituted and produced (Shilling 2003; Zuckerman et al. 2014). Foucault (1977) envisioned two primary constituting forces of the body: productive and repressive forces. Productive forces generated specific bodies for the needs of society while repressive forces restricted bodies through limiting social structures that modified behaviors (Zuckerman et al. 2014). In this way the world is viewed as acting upon the body and bodies are seen as reacting to the power dynamics in place (Csordas 2011). Butler (1990; 1993) has conceived of the body as being constantly constructed and reconstructed through performance of various socially significant actions. In these ways the body is a representation of the lived experiences driven by social, economic, and environmental conditions. These and other approaches to the contextualized body promote a fluid, conditional, dynamic body, but fail to address the fundamental physical nature of the body as contributing to this process (Shilling 2003; Knapp and Van Dommelen 2009; Robb and Harris 2013).

The phenomenological perspective of the body first developed by Merleau-Ponty (1962) encourages us to think about the body as "being-in-the-world" physically, emotionally, and sensationally (Csordas 1994; Robb 2016). By viewing the body as being inextricably embedded in the world, it becomes necessary to consider the developmental processes as they occur together, affecting one another throughout. The ontological approach to studying the body

provides a way to incorporate the biological processes of the body with the cultural processes affecting the body. There are basic biological processes that link the human species together, such as having mass and matter, needing to eat, drink, defecate, and eventual death (Csordas 2011; Harris and Robb 2013). All human societies must deal with these processes in some way. Thus, the development of the human body and the lived experiences of that body must be considered when trying to understand the interaction of the body with culture and environment (Shilling 2003). Harris and Robb's (2013) conception of the "body world" brings these principles together. Body worlds are referred to as "practical ontologies" which translates into practical ways of being, involving ideas about what a person is, phenotypically and physically, and how they experience the world.

One particular example of the use of the "body-world" concept is the expression of politics in the body in Classical Greek sculpture. In this example, the body is central to the analysis, but deeply relies on the cultural and environmental context in which it was situated. To set up a clear understanding of how the body was involved in structuring society, Harris et al. (2013) discuss the "body world" of classical Greece for which gender and age were central components. The authors compare the development of sculpture of male and female subjects in the context of the shifting philosophical and political ideas of the time. Through this examination, Harris et al. (2013) conclude that the classical Greek body was inescapably gendered and aged as well as multimodal. Politics regulated the body, but the body also regulated politics as it provided a sense of identity as a specific kind of person who provides the foundation for community understanding of difference. Through the practices and use of the body, both politics and artistic style responded to habitus.

The ontological conception of the body as demonstrated in the "body worlds" of Harris and Robb (2013), is consistent with practice theory, which frames culture as the culmination of habitual, routine practices into social identities and structures (Robb 2016). *Habitus*, as defined by Bourdieu (1977), are those practices that are embedded in the individual as routine, daily practices shaped by cultural norms, social structures, and environmental conditions. Changes in these practices over time, intentional and unintentional, produce cultural and social change as explained in Giddens' (1984) theory of structuration. The developing body contributes to the continuation and transformation of culture through its own biological processes, which are also informed by cultural processes. Space and material culture influence physical movements and help define *habitus*, which then encourage specific forms of embodied experiences, skill, and movement (Harris and Robb 2013).

Some feel that by identifying universal biological human traits, the interpretation becomes overly deterministic (Thomas 2007). This criticism would be accurate if we said that culture was only developed through and in reaction to the ontology of the body. In their seminal study of sex and gender in archaeological analysis, Conkey and Spector (1984) illustrate how the contributions of women in history and prehistory had been confined to their biological roles and did not fully explore how their social contributions shaped society. In this way, researchers were not examining how biological features were participating in the structuring of cultural norms but relied on biological determinism, which limited the impact of female contributions to social development. In this case it is evident that both the biological attributes and cultural context should be considered to better understand the development of social structures. If we consider the body to be developing as part of a dialogue with cultural processes, it is evident that the

body's ontology is only one factor of many that produce the resulting cultural norms and social structures.

Bioarchaeology and Social Theory

The biocultural ontology of the human body falls within the purview of biological anthropology, which studies the evolution and development of the human body over time and space. Bioarchaeology is a subfield and specializes in exploring the evolution and adaptation of the human body in conjunction with specific intersecting historical, cultural, and environmental processes and conditions (Zuckerman and Armelagos 2011). It developed in response to the push for more problem oriented, population-wide, contextualized analyses of human skeletal remains outlined in "The New Physical Anthropology" (Washburn 1951; 1953; Buikstra 1977). It was an opportunity to move beyond craniometric typology, which, much like early anthropological and archaeological studies, had unfortunate and overt racist connotations. Even in an attempt to better socially contextualize Greek skeletal material through "social biology", Lawrence Angel (1946) still relied heavily on craniometric race typologies. Despite the new focus on problem-oriented questions in biological anthropology, bioarchaeology has struggled to fully incorporate biological aspects of the body with both theory and archaeological/historical context (Goldstein 2006; Knudson and Stojanowski 2008; Buikstra and Scott 2009; Zuckerman et al. 2014). There has been a recent push to better incorporate social theory into bioarchaeological research design with mixed success (Fowler 2004; Sofaer 2006; Buikstra and Scott 2009; Knudson and Stojanowski 2008; Agarwal and Glencross 2011; Martin et al. 2013; DeWitte and Stojanowski 2015; Zuckerman et al. 2014; Torres-Rouff and Knudson 2017).

Although there have been promising advances in the methodologies used in bioarchaeology, there is still much room for improvement when it comes to theoretical

development (Robb 2016; Zuckerman and Armelagos 2011; Buikstra and Scott 2009). The endeavors to operationalize various social theories within bioarchaeological research have been admirable, but it has been difficult to fully integrate the methodology and results with that theory. In many cases, the theory is described in detail, but the actual incorporation of the theory with the data seems superficial (Heathcote et al. 2012). It is as if the scholar is setting the theory on top of the data rather than using the theory to drive the questions and methodology used to interpret the data. Others engage more successfully with social theory pertaining to one aspect of identity like sex and gender but fail to take the impact of others into consideration like age and status (Gilchrist 2004; Agarwal and Glencross 2011).

There has been almost no development of theory from a purely bioarchaeological stand-point. An exception to this is Sofaer's (2006) osteoarchaeological theory of the body as material culture. In this theory, Sofaer explains why the body can be studied as a material object as well as a biological subject through the assessment of neutral skeletal markers. Although the markers she identifies are not wholly neutral,such as degenerative joint disease which is strongly correlated with age, her advocacy of the body as a material object opens new possibilities for the study of the body. Buikstra and Scott (2009) argue that Sofaer's (2006) approach creates a false link between the grave and the body. However, this critique seems to be more of a misconception of Sofaer's stance than a real weakness. Sofaer is not saying that the body should just be treated as material culture, but that similar principles apply. Material artifacts go through a process of development, which can be observed through close examination of the fabric of their makeup, their use, and their context. The body can be examined in a similar way because it too must go through a process of development that may continue past death. The actual weakness of Sofaer's approach is that she fails to adequately address the best ways to observe this development. It is

difficult to understand the cumulative effects of life in the body when the timing and specific development of those traits is unknown. For example, the link between degenerative joint disease/osteoarthritis and age is known (Listi and Manheim 2012), but other factors like activity levels and types, genetic proclivities, and trauma are also related to the development of DJD (Jurmain 1999). Thus, if an individual with DJD is advanced in age, the DJD might be attributed to age, activity, genetic, or all three. It may be possible to make educated guesses about the etiology of the DJD if the social, political, economic, and environmental contexts are known. Despite this weakness, it represents a strong effort to engage both biological and cultural processes in the interpretation of the body.

Attempts to incorporate social theory into bioarchaeological analysis have included studies of age and life course theory, sex and gender, social status and health, activity markers and behavioral reconstruction, selfhood, personhood, and embodiment. Many of these have been studied with the goal of elucidating aspects of social identity in the past. The increased interest in bioarchaeological "identity" is evident in several recent book publications including, "Bioarchaeology and Identity in the Americas" (Knudson and Stojanowski 2009), "Social Bioarchaeology" (Agarwal and Glencross 2011), "The Bioarchaeology of Individuals" (Stodder and Palkovich 2012), and "An Archaeology of Prehistoric Bodies and Embodied Identities in the Eastern Mediterranean" (Triantaphyllou and Papadatos 2016). There have also been numerous articles on the topic (Blom 2005; Tung and Knudson 2008; Stojanowski 2005; Sofaer 2006a, 2013; Gowland 2006; Nado et al. 2012; Knudson and Torres-Rouff 2009; Torres-Rouff and Knudson 2017).

One of the primary weaknesses in attempts to operationalize social theory in bioarchaeology has been the "methodology first" thinking. Instead of allowing theory to drive

methodological choice and interpretation, methodology has driven interpretation with a superficial application of theory. One telling sign of this is when listing approaches to the anthropology and archaeology of the body, Robb (2016) lists bioarchaeology as a separate approach, which is explained primarily through a list of methodologies followed by social aspects of culture they might elucidate. The other approaches on the list are theoretical approaches including phenomenology, embodiment, and practice theories. Following the logic of the list, bioarchaeology is a "theoretical approach," in and of itself. Robb (2016:iii) defines bioarchaeology as "fundamentally a study of the social body," not as a theoretical perspective. In fact, the other approaches listed could and should be used IN bioarchaeological research.

Bioarchaeologists are well-aware of the challenges we face in incorporating social theory into bioarchaeological research (Knudson and Stojanowski 2008; Buikstra and Ubelaker 2009; Zuckerman and Armelagos 2011). It is a complicated, difficult task. Knudson and Stojanowski (2008) illustrate the progress made with respect to social theory in archaeology. But, again, before they discuss social theory in bioarchaeology, they first address methodological advancements. One theoretical approach mentioned in almost every review of social theory in bioarchaeology is embodiment theory. As will be illustrated in the following section, embodiment provides the most promising theoretical starting point for explicitly using social theory in bioarchaeology.

Embodiment

The concept of embodiment is implicit in almost every bioarchaeological study (Blom 2005; Knudson and Stojanowski 2008) but has not been explicitly engaged with until recently (Zuckerman et al. 2014). There is a common-sense assumption that the attributes of the human skeleton represent or contribute to cultural processes and structures in some way. However, if

embodiment is to be useful as a theoretical perspective in bioarchaeological research, it must drive a research design. As Lesure (2005) puts it, methodology should be found through prescription (arguing from theory to method) and exegesis (finding explicit and implicit methods in other successful studies). Researchers should let the theory guide their choice of methodology. The issue is not necessarily the method, it is why the method is being used. Many bioarchaeological methods are sound and useful, but they lack direct theoretical connections to social constructions. The embodiment perspective provides a clear path to these connections.

Embodiment is one of the primary social theories dedicated to breaking down the mind/body duality as well as disciplinary divides (Csordas 1993, 1994; Strathern and Stewart 2011). The primary tenant of embodiment is phenomenology over semiotics (Csordas 1993). This means that the perspective is more focused on how the body is "living-in-the-world" rather than viewing the body as a blank surface to be inscribed with meaning (Csordas 2011). The main concepts of embodiment incorporate Merleau-Ponty's (1962) phenomenological view of perception, the concept of *habitus*, practice theory, and agency. Embodiment is not equivalent to the body, but rather involves the patterns of behavior inscribed on the body or enacted by people through the body (Csordas 1993; Strathern and Stewart 2011). The body is the primary locus of social change and lived experiences (Csordas 1994).

Embodiment brings attention to aspects of the body that can be easily forgotten (routine movements) or unwillingly experienced (disease/physical trauma) in addition to the more obvious physical bodily experiences (Krieger 2005; Csordas 1994). It allows the body and mind to be both subject and object by emphasizing "being-in-the-world" not as an "objectified abstraction," but as an "existential immediacy," which is conditional to the terms of existence and lived experiences (Csordas 1994:17). The body is not a "brute fact of nature" (Csordas

1994:10), but an agent capable of participating in the formation maintenance and transformation of social structure and culture (Dornan 2002).

Over the last 15 years, embodiment has become a major theoretical consideration in epidemiological research (Krieger 2005; Bauer 2014). There has been a push to recognize that the lived experiences of individuals adhering to different social identities and positions will embody health in different ways. In an explication of the theory in epidemiological research, Krieger (2005:350) claims that "bodies tell stories about the conditions of our existence, bodies tell stories that often match people's stated accounts, and bodies tell stories that people cannot or will not tell, either because they are unable, forbidden, or choose not to tell." Archaeological bodies cannot tell us their accounts in words, but their bodies can provide evidence to support, refute, or further problematize archaeological and historical accounts.

Embodiment can be used to develop and test hypotheses about why and how "historically contingent, spatial, temporal, and multilevel processes become embodied and generate population patterns of health, disease, and wellbeing, including social inequalities in health" (Krieger 2005:350-351). Embodiment is described as a process, reliant on bodily existence, and entailing both conscious and unconscious actions and decisions. The body is both a biological organism and a social being. The processes of these aspects of the body are different, but integrated (Krieger 2005). As a multilevel phenomenon, the embodied body exists, functions, and interacts at several biological and social levels, from the physiological interactions inside the body to the larger environmental and cultural ecosystems in which it participates (Krieger 2005). Finally, embodiment is able to confront the accepted or given narrative through life history analysis. In bioarchaeological contexts, this may look like the stress and disease markers on

skeletons of a commoner cemetery refuting the given historical narrative of "prosperity for all" like the South Cemetery at the famed site of Tel-el Amarna (Kemp et al. 2013).

Embodiment is, perhaps, the ideal concept with which to consider identity creation and expression. The concept of embodiment is made up of multilevel, contextually contingent processes that are literally rooted in the physical realities and processes of the body. Krieger (2005) illustrates that understanding the physical conditions of the body cannot be done so in isolation from the social, economic, and environmental conditions associated with that body. Embodiment promotes connecting the various levels of bodily function and existence from the micro to the macro phenomena. The processes of developing the multiple, intertwined social identities and social positions accrued throughout a lifetime is an ontological process. As discussed previously, the body is in a constant state of becoming. Thus, identities are in a constant state of becoming and transformation as well.

The multilevel, multiscalar emphasis of embodiment theory encourages the use of intersectional theory alongside it. Intersectional theory was developed by black feminist theorists as a way to overcome the problem of "non-additivity" of sex/gender and race/ethnicity (Crenshaw 1989; Bauer 2014). For example, in many studies of health, it was assumed that all women, regardless of race/ethnicity, socioeconomic status, religious background, etc. had similar health risks as a result of their sex. That risk would then be added to the risk associated with being black, white, etc. However, a black woman's lived experiences cannot be separated into "black" experiences and "female" experiences. They are experienced in the same body and must therefore be considered together. Identities are not additive, they are synergistic.

Ingold (1998) also critiqued the "additive" approaches to identity in social sciences as a product of the compartmentalization and specialization of different fields involved in the study

of identity. The development of identity studies has been compartmentalized into different subtopics like sex/gender, age, status, ethnicity, etc. under the assumption that the sum of the parts is greater than the whole, but in order to understand the whole, the parts must be studied separately. Ingold (1998) named this the "complentarity" approach and deeply criticizes it for being reductionist and essentialist. It ignores the fundamentally intersectional nature of identity. It is necessary to break down the divides between the different compartments and the different approaches to those compartments. Ingold (1998) deems this the "obviation" approach, which erases the divides and focuses on processes rather than distinct units. The "obviation" approach is essentially the embodied approach. It encourages a focus on process and development over a concentration on distinct "identities."

Embodiment has been used to study archaeological materials with some success (Lesure 2005; Joyce 2003; Knapp and Meskell 1997). Many of the studies stress the phenomenological aspects of the body which validate the body as the basis of the self and subject of perception (Joyce 2004; Joyce 2005). Masculinity, femininity, and age are seen as integral aspects of the embodied subject (Joyce 2003; Yates 1993; Trehern 1995). Joyce (2005) argues that phenomenological methods may be the only way to study embodiment in prehistory through avenues of research including exploring non-visual qualities of material culture and biological analyses. It is important to investigate the ways in which body practices and representations of bodies work simultaneously to produce various experiences of embodied identities which result in sex, age, and power differentials (Joyce 2005).

Archaeology and bioarchaeology have struggled to explore the expression of identities in material culture and human bodies because of essentialists notions of identity. Although it was recognized that identities should be treated holistically (Meskell 2007), it has been challenging to

meaningfully assess identities as multilevel and multiscalar phenomena. Torres-Rouff and Knudson (2017) provide an example of one of very few studies to explicitly use embodiment theory to study group and individual identities in the Chilean Atacama region. They identify immutable aspects of identity as biological relatedness and geographic origins (i.e. birthplace). Mutable social identities are defined as the intersection of biological sex and gender, age and life course, cranial vault modification, and social identities represented by mortuary contexts. In their analysis they examine identity on several levels including an analysis of several cemeteries, a closer examination of two Solcor cemeteries, and, then, an osteobiographical analyses of three individuals from one cemetery. The general patterns observed at the broader scale were given further detail on the smaller scales.

The examination of various embodied identities on multiple scales is rare in bioarchaeological research. Most studies tend to focus on one or two levels of analysis along with one or two biological trait complexes related to one or two social identities. Boutin's (2017) critique of Tourres-Rouff and Knudson (2017), draws attention to the fact that although the authors recognize the intersectional, fluid nature of social identities, they do not adequately engage with the concept and instead treat the identities as additive. However, Torres-Rouff and Knudson (2017) have made a step in the right direction towards effectively employing theoretically driven bioarchaeological research.

Defining Identity

As is evident from the discussion of embodiment and theory in bioarchaeology, identity is one of the primary foci. "Identity," as an analytical category, has taken on new meaning as social sciences like anthropology, archaeology, sociology, psychology, etc. have matured and reacted to social developments in the modern era. Modern use of the term "identity" is highly

attached to the concept of individuality, but this attachment is fairly recent (Insoll 2007). As a result, we must be cautious in using the term in the study of ancient populations lest we falsely attach modern meanings of identity to ancient peoples.

Part of the problem with studying identity, embodied or otherwise, is the complex often contradictory nature of the concept of identity (Brubaker and Cooper 2000). Identity as a word means little if it is not defined. In archaeological research, identities are defined in relation to social constructs of gender, sexuality, class, status, religion, ethnicity, etc. The term, "identity," is rarely defined in these contexts but has an assumed meaning of "groupness" when attached to a modifier such as "gender," "race," "class," etc. As noted earlier, these categories are often considered in isolation from one another, creating false divisions between them.

Meskell and Preucel (2004:121) define the study of identity as the "investigation of how individuals and collectivities are distinguished in their social relations with others." Diaz-Andreu and Lucy (2005:1), provide a broad definition for identity as an "individual's identification with broader groups on the basis of differences socially sanctioned as significant." While these definitions are accurate, they also illustrate how broadly the concept of identity can be conceived. Brubaker and Cooper (2000) argue that "identity" is used too broadly to have any true analytical value because it is often used in different and contradictory ways. They define two understandings of "identity," strong and weak, to demonstrate the contradictory usages of the term. The strong understanding is the common sense meaning of the term which emphasizes sameness over time or among people. This understanding is strongly adhered to within identity politics. It refers to a collective identity that depends on group boundedness and homogeneity. The weak understandings of "identity" are those that intentionally break from the common sense meaning of identity and emphasize the multiple, unstable, fluid and contingent nature of identity.

Because of the many ways identity has and can be used, it is necessary to clearly state the aspects of identity being studied, how they relate to one another, and what their limitations are.

It is difficult to study the "weak" understandings of identity within the archaeological record because they are emic by nature. They are subjective, self-identifications based on a personal sense of belonging (Diaz-Andreu and Lucy 2005). As a result, most of archaeological study of identity has focused on the strong understanding of identify as identified by Brubaker and Cooper (2000), emphasizing group sameness generally understood through shared material culture (MacSweeney 2009; Jones 1997). As such, the concept of identity has indirectly been part of archaeological research since the beginning of the discipline. The early days of culture-history were, at their heart, focused on defining the identifying attributes of certain cultures in certain contexts, albeit in a reductionist way that often conflated concepts of ethnicity, race, and culture (Graves-Brown et al. 1996).

The study of identities has gained momentum over the last few decades and there has been a significant focus, specifically, on ethnic identity. The attributes used to define group sameness in the archaeological record have most often been equated to ethnic and cultural identity as if they are the same thing (Barth 1969; MacSweeney 2009). However, ethnicity can be described as an identity based in both a specific place and genealogical affiliation, whether "real" (biological) or imagined (belief of relationship). This dissertation focuses on a broader conception of identity that encompasses those norms, practices, and beliefs that are associated with a place, mainland Greece, in this case (see Chapter 4).

Cultural Identity

Even though the term "cultural identity" is used with some amount of frequency in archaeological literature (Jones and Graves-Brown 1996, Diaz-Andreu 1996; MacSweeney

2009), there does not seem to be a cohesive definition for "cultural identity" explicitly stated in the archaeological literature. This is primarily because of the way "culture" has been so frequently interchanged with "ethnicity" and "nation" (Diaz Andreu 1996). It is even more difficult to define because "…the relationship between archaeological cultures and past peoples is based on teleological reasoning that culture is both representative of, and constitutive of, the nation or people concerned" (Jones 1996:65). This leaves exceedingly little room for heterogenous expressions of cultural identities that are informed by a variety of social, environmental, and biological factors.

Even as archaeology became more theorized in the 1960s and beyond through processualism and post-processualism, the understanding of culture has not shifted dramatically. Culture is still understood in fairly essentialist terms, defined by a shared set of ideas, beliefs, and practices that are then passed on to future generations, believed to result in the continuation of cultural tradition (Jones 1996:64). Within archaeology this "shared set of ideas, beliefs, and practices" are defined through material remains from which aspects of social structure and ideology are also derived.

Instead of viewing culture as a clearly delineated, bounded entity, culture should be understood as the artificial definition of a group for which cultural norms overlap in such a way to suggest commonality among the group. As Jones and Graves-Brown (1996:7) state, "the transient, but repeated, expression of group identity in different contexts and at different scales is likely to result in multiple, overlapping distributions of material culture assemblages." By examining culture in this way, there is no assumption of a bounded, homogeneous entity, but a fluid overlapping of cultural customs that can be recognized as both common culture and cultural diversity. Identifying with a certain culture means identifying with some or all of the traits used

to describe that culture. The culture is a very large "social group." The traits that define any group, including cultural groups, exist on a continuum (Jones 1997; MacSweeney 2009).

To put it in "biological" terms, it is possible to think of cultural identity as the "genotype" for the group. The genetic genotype is the specific sequence of base pairs within an individual's DNA. Phenotype is the physical expression of the genotype which is dependent on a myriad of environmental factors. In terms of culture, genotype represents the mix of specific cultural traits available to a given group. The way that those traits are expressed occurs through the lived experiences of a community incorporating local, regional, and broader sociopolitical, economic, and environmental conditions. This expression of traits could be conceived as the "phenotype." We know from the natural world that the phenotypic expression of genetic alleles can result in wildly different looking and acting organisms, despite their shared genetics (Krieger 2005). The same is true of cultural identity expressions.

Because archaeologists have created narratives for cultural groups based on material remains and social structures, it is possible to test the "homogeneity" of the traits used to define these cultures at any given site within the cultural sphere of influence. In this way, we test and explore the commonality, connectedness, and groupness within the site (Brubaker and Cooper 2000). It is possible to explore the commonality of the group based on overlapping traits expressed by individuals and groups (MacSweeney 2009). Then, we can explore the connectedness of that group with the overarching cultural identity traits.

Ways that people feel connected to one another often stem from shared practices. For this reason, two fundamental aspects of examining identity are practice and agency. Pauketat (2001:80) defines practice as the embodiment of people's *habitus*. Bourdieu (1977) provided the first effective theory of practice primarily based on the concept of *habitus,* which represents the

routine, daily practices that are instilled in an individual through socialization beginning at birth. These practices are developed through cultural norms, social and natural environment (access to resources), and economy (modes of production). Building on the concept of practice and *habitus,* Gidden's (1984) theory of structuration posits that practices such as those making up *habitus* both structure and are structured by culture in a discursive relationship. Societies are not necessarily unified collectivities and social reproduction does not necessarily mean that there is social cohesion (Giddens 1984). Examining the relationships between individuals, power structures, and social structures is important for understanding the process of structuration (Giddens 1984; Knapp and van Dommelen 2008).

The adoption of new cultural practices, such as a new tomb type, and continuation of older practices (i.e. pottery types) are conscious decisions made by individual actors, who are influenced by social norms and power structures. Individual agents perform actions, both intentionally and unintentionally, which shape cultural norms, identity, and social structures (Dornan 2002). According to Giddens (1984) agency is not the product of intentions people having in doing things, but rather it is there capability of doing those things in the first place. While there are aspects of society that are embedded within us at a young age, people, as agents, may choose to abandon or change some of those basic practices. Agents perform aspects of their identities, both cultural and personal, throughout life through habitual and non-habitual practices, which are embedded within various social communities (Knapp and van Dommelen 2008).

Because identities are performed within social collectivities, an important part of understanding agency within identity is to examine the relational aspects between individuals, groups, and structures, deemed "relational agency" (Robb 2010). It broadens the scope of analysis to include not only individual actors, but also other entities expressing agency such as

various social groups and structures. It is through relationships with others that identities are formed, solidified, and transmitted. Robb (2010) argues that archaeologists study activities, but people carry out projects. The difference is that the activities are moments in time while projects occur over long periods of time and require individual self-engagement – being a potter rather than just making a pot (Robb 2010). Projects can be inferred from the activities attested in the archaeological record. The types of projects and their role within the context of society provide indications of individual and group identities. Cemeteries and burial practices may be conceived as "projects" that individuals and group participate in. When tombs are used multiple times over the course of decades, the individual tomb becomes a project for a group of individuals. The placement of tombs in a cemetery indicate conscious decisions by the founding members of those tombs. Through these projects they express individual and group identities that can be observed in the archaeological record.

Assessing Group Identity

A primary question of this dissertation is how we study cultural identity at sites within a designated cultural sphere of influence. In the case of Golemi Agios Georgios, the site is within an area determined to be within the influence of the major Late Bronze Age Aegean culture, the Mycenaeans (Dakoronia 2003), not on the periphery where ethnicity and the cultural norms related to ethnicity are most visible. Instead of clashing against different ethnic groups, the individuals of Golemi Agios Georgios had to confront the "outside" influencing force of the elite class from whom the symbols of prestige and status were derived (Arnold 2001).

Given the limitations of studying and understanding ethnic identity in prehistoric archaeological contexts (Jazwa 2016; MacSweeney 2009), I have decided to focus on basic categories of identity most often used to define archaeological cultures. By that I mean those

traits that have been identified archaeologically as being the main traits associated with a given culture. However, I do not view these traits as providing the complete, static definition of that culture's identity. In this way, I am avoiding the positivist and essentialist tendencies of processualism. Rather, these are the traits most commonly associated with a time and place. The overlap of such traits within a given geographical area gives the *impression,* if not the reality, of cultural homogeneity. My goal is to investigate the extent to which a specific community expresses those identifying traits. The next step is to explore how the diversity of identity expression found within the community relates to the overarching cultural, political, and economic context. In this case I will be challenging the monolithic definition of "Mycenaean" identity in a site located far from the traditional "heartland" of Mycenaean culture.

Following the example of MacSweeney (2009) I will first establish whether or not there is a sense of group identity, rather than assuming that ethnicity was the foundational aspect of a group's sense of solidarity. If a sense of "group-ness" can be identified from the data, the underlying reasons for the sense of connection can be explored (MacSweeney 2009). Group identity can be based on a wide range of factors which may or may not include real or assumed common descent or "ethnicity." These factors have been defined as "practices of affiliation" by Yaeger (2000:125), which can be viewed in the archaeological record to varying degrees based on the material evidence available. Material culture alone is the least reliable indicator because its symbolic meaning is not explicitly defined but inferred by scholars. Highly symbolic, large scale group activities such as rituals or feasting and those factors explicitly stated in narrative documents provide better evidence for "practices of affiliation" (MacSweeney 2009). However, even if an "us" feeling cannot definitively be identified, it is still possible to examine how

various aspects of cultural identity manifest within a specific context. MacSweeney (2009) has identified this method as the "group identity approach."

Brubaker and Cooper (2000) encourage this type of approach to identity, in general, because it does not assume a certain type of group identity *a priori*. Instead, they propose that researchers focus on commonality, connectedness, and groupness. An identity is essentially the sense that one belongs to a category of people. Commonality is defined as sharing a common attribute. Connectedness represents the relational ties linking people together. Groupness is derived from a sense of belonging to a "distinctive, bounded, solidary group" (Brubaker and Cooper 2000:20). By considering these three categories, separately and together, it is possible to capture multiple levels of "identity."

The identities, group and individual, most often studied within the archaeological record pertain to social status, class, gender, age, occupation, religion, race, and ethnicity. These are viewed as basic aspects of cultural and individual identity (Meskell and Preucel 2004). The variation and intersection of these attributes has resulted in the wide range of cultural expressions evident in the archaeological record. Identities generally do not exist separate from one another but, rather, constantly interact with one another to shape and transform each other.

The Body-Self, The Social Body and The Body Politic

A useful way of understanding the body as the embodiment of social, cultural, and biological phenomena is the tri-part perspective developed by Scheper-Hughes and Lock (1987). As physical and symbolic artifacts, bodies are both biologically and culturally created. Due to the multifaceted nature of the body, the authors have broken it down into three, non-mutually exclusive, interacting "bodies." These bodies are the individual body or body-self, the social body, and the body politic. The theoretical bases for these three bodies lie in phenomenology,

structuralism and symbolism, and post structuralism respectively. Martin et al. (2013) have used this perspective to interpret the physical body as the embodiment of biological, social, and material worlds. I will summarize here the basic tenants of the perspective and which biological anthropological concepts have been attached to them.

The individual body, or body-self, is the personal, physical, lived experience of the body self. In biological terms it is primarily represented through the biological profile: age, sex, ancestry, stature (Martin et al. 2013). Age and sex have been highly influential in guiding cultural behaviors such as division of labor and access to positions of power. A consideration of age and sex in a bioarchaeological study must be done within the specific temporal and social context. Through the individual body, Scheper-Hughes and Lock (1987) address the mind/body dichotomy and the need to move beyond.

The social body is representational in that it is taken to symbolize nature, society, and culture. The healthy/sick dichotomy of the body is adopted in consideration of aspects of culture and society itself. The social body has been interpreted as being "good to think with" in that it can be used as a mental map to illustrate other natural, supernatural, social, and special relationships. The health of the body provides a metaphor for the health of society. The body is used as a cosmology and ordering principle, in the classification of natural phenomena, and in speaking about the external world. The embodied world reflects a "human" shape and feel.

Martin et al. (2013) define the social body as being primarily concerned with health and stress through an examination of the ways in which society affects health and well-being largely through structural violence, diseases, and poor health. The context of the body, body modification, and gender expression are also included with the "bioarchaeological" definition of the "social body." This interpretation of the social body is a slight misreading of Scheper-Hughes

and Lock's (1987) original discussion in that in the original article the authors set up the social body as reflecting the ways in which society uses the body to understand things about itself. The health of the physical body may thus be better categorized with the body politic.

The body politic represents the regulation, surveillance, and control of bodies throughout life as participants in society. The stability of society is taken to rely on its ability to control populations (social bodies) and discipline individual bodies. The body politic reflects the influence of power and control on the human body. When social order is threatened, symbols of self-control and social control are emphasized, which blurs the boundaries between individual and politics (Scheper-Hughes and Lock 1987). Societies control bodies through codes and social scripts which can then become extreme in some cases. Another form of expression may be increased attention to health and identification of more disease categories to create a "sick and deviant majority" (Scheper-Hughes and Lock 1987:26). Martin et al. (2013) relate the body politic to a person's social status, health, and risk of death as well as occupation and other activities. They attach the analysis of activity markers such as musculo-skeletal markers, osteoarthritis, violence, and trauma to a bioarchaeological understanding of the body politic.

In this dissertation the discursive relationship between culture and the body will be conceptualized through the co-examination of the body-self and the body-politic. The basic biological facts represented by the body-self drive certain cultural practices concerning the body such as those related to age and sex, which in turn affect how the body is affected by social structures and institutions. The body-politic affects the body through social structures, politics, and economy. The body-self and the body-politic, thus, create a feedback loop through which cultural norms and biocultural identities are formed, maintained, and transformed.

Chapter Summary

In this chapter I have illustrated how the body is a foundational aspect of human culture. It cannot be separated from the "mind," but must be considered alongside the mental processes that accompany lived experiences. The embodiment of the those lived experiences can be reflected in the physical, genetic, and chemical aspects of the human body, which are revealed through the study of the skeleton. The definitions of culture and ethnicity were examined in relation to one another and to archaeological research. It was demonstrated that ethnicity and culture are separate but integrated concepts and as such should be treated differently when studying identity in past populations.

In this dissertation, the theory of embodiment is used to investigate how physical aspects of the body, representing the "body-self" and the "body-politic", can be used to determine and understand individual and group identities as the expression of cultural identity as defined in the archaeological record. The next chapter will discuss the various skeletal traits used to interpret social/cultural identities and how they can be interpreted in the context of embodiment theory.

CHAPTER 3: SOCIAL BIOARCHAEOLOGY

Introduction

In this chapter, I outline the skeletal characteristics that I am using to study identity. Each skeletal trait examined can be interpreted within the concept of embodiment. These traits are subsumed within larger categories of analysis, which include paleodemography (age and sex), kinship markers, paleopathology (non-specific indicators of disease), activity markers (entheseal changes, osteoarthritis, platymeric index), and cranial trauma. The benefits and limitations of the traits are identified. Each group of traits is identified with either the body-self, the body-politic, or both as a way to connect them with the broader conceptions of the body within the theory of embodiment. It is apparent from the examination of these traits that the methodology used to assess each trait greatly affects how it can be interpreted and highlights the importance of the archaeological context for interpretation. By considering the described skeletal traits for all of the individuals from the cemetery it is possible to examine the extent to which a community embodies specific cultural identities.

Having explained the social correlates for each skeletal trait relevant to this dissertation, I discuss how the application of two theoretical perspectives, osteobiography and network theory, can provide frameworks for the cohesive interpretation of these skeletal traits as expressions of embodied cultural identities. Osteobiography is the examination of individual biographies as cultural narratives through the in-depth study of the human skeleton situated in a specific cultural context (Saul and Saul 1989; Robb 2002). I explain how osteobiography can be used to explore both group and individual identities in commingled contexts.

By separating individuals into tomb groups, it is possible to examine potential connections between tomb groups through both archaeological and skeletal similarities and

differences. Network theory is examined as a method useful for studying the connections between tombs in a cemetery in an application of the concept of relational agency between individuals and groups. Intra-cemetery organization has the potential to reveal underlying social organization through the agency of individuals and social groups.

Biological Correlates of Embodied Identity

The body, including the skeleton, is constantly transforming itself. The continuous renewing of our bodies on the cellular level attest to this. The malleability of the body can be physically observed in the plasticity of human bone (Agarwal and Beauchesne 2011). The development and plasticity of the body provide a way to examine how the body responds to different stimuli, cultural or otherwise, throughout life. The aging body provides a way to think about the changing body as it transforms over time, adapting to different biological and social conditions at various stages of life (Gilchrist 2004; Gowland 2015). Although it is possible to make the argument that everything about the body is fluid in some way (Geller 2009), it is possible to identify how certain cultures conceived of the body in specific contexts. This is important when trying to understand how the body might bioculturally embody the range of available cultural characteristics.

Throughout time and in various cultures, humans have decided certain aspects of the body are "fixed" such as sex which then guides how certain identities, like gender and sexuality, are performed throughout life. However, those "fixed" aspects of the body change over time as knowledge of the body develops and culture transforms with it (Shilling 2003). As a result, identical skeletal markers may have different meanings in different cultures. It is for this reason that the methodologies we employ in bioarchaeology must be treated as tools rather than

interpretive guides. The interpretation must be driven by the theory employed and context of the skeletal material.

Certain aspects of the body have been correlated with certain identities: sex – gender and sexuality; age – social status; health status – socioeconomic status; activity markers – lifestyle/occupation; trauma – lifestyle/occupation. As is evident, these markers are not mutually exclusive and can inform multiple identities just as multiple identities can affect the expression of certain markers. The following categories of analysis are used in this dissertation to represent certain aspects of multiple, overlapping identities. The biological correlates derived from these analyses are contextualized further in the following chapter to explore how they intersect in Late Bronze Age mainland Greece.

Paleodemography

Age and sex are considered to be the most basic aspects of an individual's biological profile (Buikstra and Ubelaker 1994;). While they do seem more "stable" than other aspects of the human body given their biological impact on the physical body, the way they are used to inform identities varies widely, depending on cultural, environmental, economic, and political conditions. They also illustrate how even the "basic" aspects of the biological profile cannot truly be separated from one another. Age and sex represent the fundamental parts of the "body-self" and often serve as the starting point for exploring issues related to the "body-politic" and the intersection of multiple identities (Scheper-Hughes and Lock 1987; Martin et al. 2013).

Sex and Gender

Sex is one of the foundational aspects of studying the human body in the archaeological record and a basic aspect of the human experience. In terms of applying social theory of the body to archaeological questions, sex and gender were the first topics to be explored (Conkey and

Gero 1984; Sorenson 1992; Yates 1993; Treherne 1995) Prior to the 1980s, sex and gender were thought to mean the same thing and as such both were viewed as binary: male/female; man/woman. The consideration of sex and gender as being different concepts began in archaeology with Conkey and Gero's (1984) examination of female roles in prehistoric societies and the treatment of women in archaeology, in general. They sparked the debate about if and how to identify "gender" versus "sex" in the archaeological record. There are two main conceptual positions: 1) sex and gender as separate concepts, one biological and one social, and 2) sex and gender both as social constructs. Most bioarchaeologists and many archaeologists view them as separate, but related, concepts with sex being the biological, genetic, and reproductive aspect of the body and gender representing a social construction of identity based on cultural norms often associated with biological sex (Diaz-Andreu 2005; Sofaer 2006b, 2013). In the view that sex and gender are inseparable concepts, sex is conceived of as socially structured just like gender. Proponents of this view reference Butler's (1990) theory of performativity, which posits that sexual differences were established through repeated actions imbued with meaning (Geller 2009).

Archaeological considerations of sex and gender have generally assumed a direct relationship between sex and gendered grave goods wherein: grave goods + sex = gender. Swords are for men, spindle whorls are for women; ergo, if a burial includes a male individual with a sword, they are a man. If a female individual has a sword, she exhibits "masculine" qualities. Sofaer (2006b) agrees that there are problems with both positions on the matter because of the way bioarchaeologists use sex in studies of gender. If sex and gender are treated as separate concepts, the argument for gender becomes tautological: sex is used to confirm or refute the "gender" of objects buried with the individual. Sex and gender exist in a discursive

relationship wherein the acting out of gender affects the cultural definition of sex and the biological component of sex affects the performance of gender (Sofaer 2006b).

The methods of sex estimation have been critiqued for being too binary – male vs. female skeletons (Geller 2009). Geller (2009) believes that bioarchaeologists judge the skeleton in essentialist terms based on whether or not an individual can bear children. This is somewhat true when considering the morphology of the pelvis; however, as will be discussed below, most other skeletal elements used for estimating sex are not scored based on reproduction-related features, but on size differences, which are the result of differing male and female physiological processes. Most bioarchaeologists accept the current sex estimation techniques because many biological and anthropological studies have illustrated the existence of sexual dimorphism in most populations, if only on different scales. Sofaer (2013) argues that the scales used for sex estimation are a measure of the researcher's certainty (male/probable male, unknown, female/probable female) rather than a continuum of sex expression from male to female. One could argue that those are essentially the same thing. However, bioarchaeologists mostly agree that it is possible to estimate biological sex from human skeletal remains which is the result of the physiological expression of sex during the life of an individual. While there are some genetic variations in sex genotypes (XXY, XYY, etc.), Sofaer (2006b, 2013) also points out that people do not see each other as genotypes and that most people phenotypically present as male or female. However, it would behoove bioarchaeologists to adopt Sofaer's outlook on gender and sex as a discursive, mutually constituting relationship rather than completely separate entities (Sofaer 2006a, 2013).

In the early days of gender studies, Sorensen (1992) made an important point. Before gender is assumed to be a significant identifying factor in any given culture, one must consider

whether it is actually relevant and if so, on what level and in what form. Furthermore, gender distinctions will vary based on cultural and environmental factors (Diaz Andreu 2005). What is considered to be "masculine" in one culture might be "feminine" in another culture. Both, however, are still generally associated with sex. Because sex and gender are fundamentally related, these issues must be considered in any bioarchaeological study of identity.

Methods of sex estimation are primarily based on the reproductive capabilities of the human pelvis and sex-driven differences in skeletal robusticity, primarily in the cranium. Walker (2005) found that the features used to estimate sex in the pelvis provided the correct sex in 90% of the individuals examined. However, he warned that age affected the features of older women in such a way that they might be mistaken for younger males. Age has a "sharpening" effect on the female pelvis wherein the features that used to be broad to allow for childbirth narrowed with age. In another study, Walker (2008) found that crania were less reliable indicators of sex, with wider margins of error and more population specific. He also found that older female crania, like female pelvises, became "more masculine" and were more likely to be mis-estimated as male. Walker (2008) warns that the regression equations used in his study should not be used for populations whose ancestries differ significantly from the reference population. This illustrates the need for population specific age estimation techniques.

The implications of the age effect on features used for sex estimation in the skeleton serve as warning to bioarchaeologists in two ways. The first is that every population is different and should be compared to the closest related population for the most accurate assessment of sex. The second is that age is integrally related to sex and so they are both critical to the formation of gender and age-related identities.

Age and Life Course Theory

Sex and gender were archaeology's first real foray into investigating socially constructed identities in the past. It dominated the theoretical landscape in archaeology and bioarchaeology for a couple of decades and some felt that the other foundational aspect of the biological profile, age, was undertheorized as a result (Gilchrist 2004). However, age has become a larger focus in archaeological and bioarchaeological analysis over the last decade (Gowland 2015). Age provides the perfect bridge for consolidating and blurring the lines between the various "components" of identity by attaching them to the life-course of the individual (Gilchrist 2004; Gowland 2006; 2015). Because aging is a biological reality, it is expected that an individual's identities will change and transform throughout his or her life both as a factor of age and in ways un-related to age. For example, a female individual who identifies as a woman may perform that gender throughout the course of her life. As she ages, the expression of femininity may change, but she still views herself as being a woman. Her social status is also related to her sex, gender identity, and age. In modern society, women are often viewed as less valuable at older ages because their seemingly diminished physical beauty and fitness (Twig 2004; Woodward 1999; Sontag 1978). This is why it is important to consider the entire life-course, rather than just certain periods of life. Age has traditionally been studied as age-cohorts, which has obscured important developmental details by limiting the examination to specific age groups (Gowland 2006).

Bioarchaeological developments in this area include Sofaer's (2011) consideration of the different types of age including biological/functional age, chronological age, and social age. These ages may or may not be aligned, but no assumptions can be made about any of them. They must be considered within the specific time and place of a particular culture. In the same vein,

Agarwal and Beauchesne (2011) consider the plasticity of the body throughout life beginning with development from conception and onwards. Their main position is that not everything is "carved in bone," as changes occur in the body throughout life beginning with initial development and continuing onwards. The body is a generative force and can affect cultural development as it changes in specific contexts of life (Agarwal and Beauchesne 2011). Glencross (2011) furthers this concept by advocating the study of injuries and trauma acquired over a lifetime. Trauma, from interpersonal violence, occupation, or accident, affects individual lives and may reveal important aspects of life associated with age, gender, status, or other "identities."

A consideration of contextualized life course enables researchers to reach beyond Westernized versions of age categories like "childhood," "adolescence," "adulthood," and what it means to be "old" (Gilchrist 2004). Each of these concepts is culturally contingent and historically situated. The concept of "child" has a certain meaning in Western societies, associated with a slew of ideas about how a child is supposed to act, what they wear, how they talk, and what they do, which may have no relevance to other cultures (Lucy 2005). Martin et al. (2013) critique bioarchaeologists for limiting the role of children by identifying them as "non-adults" rather than as contributing members of society. A bioarchaeological study of contextualized functional age over a life course provides a more culturally specific, meaningful information about age and identity than imposing modern ideas (Sofaer 2011).

Age is directly related to health in many ways beyond the natural progression of senescence. Early life conditions, including the uterine environment and the first 1000 days after birth, have been correlated with adult health (Gowland 2015). Skeletal indicators of childhood health in those who survive to adulthood can provide an indication of how childhood health affected adult morbidity and mortality (Armelagos et al. 2009). Furthermore, the social, cultural,

and environmental conditions of a mother's early life have been linked to the health of their offspring and their offspring's offspring (Gowland 2015; Hales and Barker 1992). Gowland (2015) suggests that it is possible to look at the skeletal remains of infants in the archaeological record to gauge the health of the mother even if there is no female associated with them. This interpretation is supported by the clinical data collected on mother/infant health in modern people. The research done in this area has been deemed the "Development and Origins of Health and Disease" (DOHaD). It is a solid example of how the lived experiences of one individual are physically embodied and have a measurable effect on the embodiment of lived experiences of subsequent generations, which demonstrates the importance of incorporating life course theory into the interpretation of health markers. It also encourages researchers to think beyond the life of the individual since "people are not biologically disparate but commingled: bodies within bodies" (Gowland 2015:537). In some way, commingled skeletal remains that are the intentional burial of individuals together provide a physical representation of this process. This is most evident in commingled individuals who are genetically related to one another.

The methodological challenges of age estimation are well known in bioarchaeological analysis. As Sofaer (2011) explains, bioarchaeologists estimate functional/biological age. This age does not always line up with the chronological age of an individual, which can result in misleading interpretations. Juvenile age estimation is less problematic than adult age estimation because it is based on developmental features including the size of the bones, fusion rates of the epiphyses, and dental development and eruption, which have been correlated with specific chronological ages (plus or minus a number of months) (Ubelaker 1987). However, it is still usually presented as age ranges rather than point estimations because it can vary from individual to individual (Irish and Scott 2015). On the other hand, adult age is dependent on degeneration of

various features. Part of the complications with adult age estimation stem from limited reference sample choices and a high degree of variation between individuals, even from the same population.

The aging techniques recommended in The Standards for Data Collection (Buikstra and Ubelaker 1994) consist of unidirectional scales with described stages of cumulatively worse degeneration that correspond to age ranges (Lovejoy et al. 1985; Meindle and Lovejoy 1989; Brooks and Suchey 1990; Todd 1921a,b). These aging techniques were developed on samples of primarily American black and white individuals with known sexes and ages. These methods have regularly been applied to other populations, which may or may not be similar to them with respect to ancestral background and lived experiences. This can cause something called "age mimicry" wherein the sample population's age distribution mirrors the reference population's age distribution (Hoppa and Vaupel 2002). It produces a skewed picture of the overall demography, which can throw into question the subsequent interpretations of paleoepidemiological and bioarcheological analyses.

Boldsen et al. (2002) developed a new method based in Bayesian statistics, known as transition analysis, in response to the challenges encountered with the traditional adult age estimation techniques. Instead of relying on a subjective interpretation of "degenerative stages" in the cranium and pelvis, the characteristics considered for each area assessed are scored individually. It provides a maximum likelihood estimation of the age with a 95% credible interval based on the given features. Because the method is based on probabilities rather than frequencies, it does not rely as much on a reference population. However, it is difficult to employ in commingled, highly fragmentary populations like that of Golemi Agios Georgios.

Being able to estimate age more accurately will always be beneficial in terms of correlating the biological process of aging with assessments of health, stress, and disease as well as the interpretation of social constructs associated with age. In many bioarchaeological studies age must be estimated in ranges because of poor preservation, missing elements, and fragmentation. While not ideal, it does not prevent using age to study identity over a lifetime. The exact chronological age may or may not have meaning in a given culture. For example, in Jewish culture, a girl or boy becomes a woman or a man when they turn 13. However, in many cultures a girl becomes a woman when she has her first menstrual cycle, a biological process that occurs at a range of chronological ages. In the Sambia, children are thought to be bisexual until puberty when boys must "bleed off" femaleness and acquire maleness through the procurement of semen as a simulation of girls starting their menstrual cycles (Herdt 1987 in Yates 1993). In this way, the achievement of a gender status is not predicated by age but through biological and ritual processes.

Various identities adopted in a lifetime are done so over a range of ages. These may correlate more with lived experiences than they do to chronological age (i.e. becoming a respected "elder"). Roksandic and Armelagos (2009) propose an 8-stage age category system to interpret age changes within a population. Because of the problems encountered in trying to assign specific chronological ages to biological changes in the body, the authors propose not assigning any ages at all. Rather, practitioners apply stages ranging from birth to old age. Each of these stages has a defining biological feature that marks the beginning and the end. There are no number age ranges assigned, as these are observed to be less useful in actual analysis. This method is based on the premise that all individuals go through a life cycle with distinctive biological changes, but those changes may not all occur at the same chronological age. The

weakness here is that not all cultures may correlate social identities or processes with the biological definitions of the age ranges. These ranges are useful for predicting what the biological experience of an individual was like, but the archaeological and environmental contexts are crucial for understanding how certain biological stages correlate with socially meaningful processes.

Kinship Analysis and Non-Metric Markers

Kinship has always been a basic aspect of ethnographic research in anthropology (Johnson and Paul 2016; See Evans-Pritchard 1951; Levi-Strauss 1969; Malinowski 1913; Morgan 1871; Radcliff-Brown 1952). Kinship was first conceptualized as deriving primarily from biological relatedness, but as sociocultural anthropology developed, it moved away from this genealogical conception of kinship to one that is developed through social processes (Johnson and Paul 2016). However, biological anthropologists have adhered to the biological conception of kinship because of the biological aspects of its analysis (Johnson and Paul 2016; Ensor et al. 2017). Although there have been methodological advancements for investigating intra-cemetery organization via kinship (Stojanowski and Schillaci 2006), there is still an assumption of a solely biologically related kinship group. Ensor et al. (2017) critiques bioarchaeological analysis of kinship for assuming that kin groups are more-or-less biologically homogenous, which ignores the social processes involved in creating a kin group which may include non-biologically related individuals. Bioarchaeologists also often assume that kin groups, especially spouses, are buried together or in close proximity to one another. While this may be true in some cases, it disregards the possibility that this may not be true for all cultures (Ensor et al. 2017). There has been some progress in theorizing kinship in evolutionary/biological

anthropology, but it has not had much impact on bioarchaeological research (Johnson and Paul 2016).

Regardless of the precise definition of "kinship," kinship relationships are often crucial to the structure of society and as such represent both an aspect of the "body-self" and the "body-politic." It is part of the body-self because it is not possible to change who an individual is genetically related to and through this plays a part in structuring social norms. It is also part of the "body-politic" because the structure of kin groups can be controlled by social processes that may or may not have anything to do with genetic relationships such as marriage customs.

It has been more difficult to assess genetically related kinship groups and/or family groups in mortuary populations because the methods available at the moment are severely limited by small sample sizes, inadequate preservation, and questionable correlations between non-metric traits and genetic relatedness. The data used to study kinship are essentially the data used in population genetics and biodistance studies: cranial and dental metric and non-metric traits. Craniometric data has a complicated history (i.e. racist typologies) but has been redeemed in the last 30 years in more problem-oriented research concerning population genetics, movement, and ethnogenesis (Stojanowski 2005; Relethford 1995; Steadman 2001; Torres-Rouff and Knudson 2017). Through this it has been statistically illustrated that craniometric and dental metric data can reveal relative biological distances between groups (Relethford and Blangero 1990).

On the other hand, non-metric traits have been less straightforwardly connected to biological relatedness (Ricaut et al. 2010). Non-metric traits are neutral features in the skeleton that are assumed to convey information about biological relatedness (Sjovold 1976-1977; Alt et al. 1997). In most cases, "biological" relatedness means "genetic" relationships like parent-child,

siblings, cousins, etc. However, kinship analysis cannot identify specific relationships short of using nuclear DNA analysis (Stojanowski and Schillaci 2006). The heritability of non-metric traits has been called into question as well (Carson 2006; Ricaut et al. 2010). Lack of pedigree data has made it difficult to assess the heritability of non-metric traits. However, one such study on a pedigreed Slavic population illustrated that most cranial non-metric traits did not appear to be highly heritable in the study population (Carson 2006). Only the rarest traits appear to be useful in revealing potential biological relationships (Alt and Vach 1995; Carson 2006). Therefore, it is prudent to rely only on the rarest traits when assessing intracemetery biological relatedness.

In biodistance studies metric and non-metric traits are usually compared across multiple populations. However, in kinship analysis, these traits are compared on a much smaller scale, which creates problems with the statistical reliability of the analysis. Stojanowski and Schillaci (2006) have provided the only comprehensive methodological overview for assessing kinship within a cemetery. Intra-cemetery analysis of kinship may make it possible to better define the social status of families, understand post-marital residence patterns, and identify micro-temporal units to examine generational changes (Stojanowski and Schillaci 2006). While this may be true, the methodological challenges presented by small sample sizes and fragmentary remains make it difficult to carry out.

Even if there were fewer methodological problems in carrying out kinship analysis, interpreting the results is also difficult. Post-marital residence is a common topic of interest in bioarchaeological analysis. Marriage systems direct gene flow and are therefore influential in both biological and cultural realms (Ensor et al. 2017). Determining patrilocality/virilocality vs. matrilocality/uxorlocality has been interpreted based on the biological heterogeneity/

homogeneity among males and females. The assumption is that those from the same descent group are more homogenous than those outside of the group. However, Ensor et al. (2017:740) posit that the social nature of descent groups should prevent internal homogeneity because those with "close biological relationships should be spread across descent group cemeteries, not concentrated within." In this way, it depends on the marital and burial practices of the groups buried in the cemetery. To better interpret the homogeneity/heterogeneity of the cemetery and/or groups within a cemetery, bioarchaeologist must use "biocultural data to identify and test how cemeteries were socially constituted to ideologically reproduce identities and social relations (Ensor et al. 2017:741)."

Kin groups are collective identities made up of individuals with a myriad of other identities that may or may not be shared with other kin members, but as a collective identity it provides a ready-made multilevel form of identity that can be used to explore the relationships between identities (Johnson and Paul 2016; Meyer et al. 2012). Kinship is both a social and biological concept and for this reason, it is necessary to examine mortuary contexts for both genetic and social connections between individuals. If individuals are buried together in an archaeological context that indicates shared practices, it is assumed that there is at least a social connection between them. Meyer et al. (2012) argue that this provides a way to study social aspects of kinship, especially when genetic or biological kinship is not established through biodistance analysis. The commingled human remains found in most Mycenaean chamber tombs provide a ready-made social group to explore.

Paleopathology and Status

Environmental conditions, social status, age, sex, genetics, subsistence strategies and many other overlapping, intersecting aspects of human life affect the health status of an

individual. Modern health professionals have begun to employ social theory like embodiment theory and intersectionality to understand how the various social and biological aspects of an individual's life can impact health (Krieger 2005; Bauer 2014). It is a complex issue in modern times, which means it is even more complicated to study in individuals long dead. Health is both related to genetic factors of susceptibility to disease as well as to the socio-political and economic systems governing access to resources and exposure to health risk. This makes "health" both part of the body-self and the body politic.

The study of disease in skeletal remains is known as paleopathology. In bioarchaeology it has been used to study the origins and development of diseases (paleoepidemiology) (Ortner 2003), explore health differentials based on sex and age (DeWitte 2009, 2010), as well as examine how social status can affect health within and between groups and populations (Pitts and Griffin 2012; Peck 2013). Socioeconomic/social status has one of the largest observable effects on health, providing privileged access to resources for some and restricting access for others (McEwen and Gianaris 2010). In prehistoric contexts, social status of individuals and groups of individuals is most often observed through mortuary monuments, artifacts, and practices.

Social status and inequality have long been foci of research in archaeology, beginning with the culture history approach and its assumption that rich finds were indicative of social stratification regardless of culturally specific contexts (Babic 2005; Arnold 2001; Schliemann 1880). The advent of the New Archaeology (i.e. processualism) and its focus on systems began the search for causal relationships between the data and interpretation through quantitative measures (Babic 2005). The rank of the deceased was considered a measurable communal effort based on the energy investment reflected through burial rites and monuments, but later

archaeological analysis has found this to be an over-generalized assumption (Babic 2005; Ucko 1969). Because the dead are buried by the living, their status in death may not have been the same as their status in life. It is for these reasons that the full archaeological context, beyond the mortuary record, must be taken into consideration.

Clinical studies have linked socioeconomic inequalities with identifiable differences in health status and disease susceptibility (McEwen and Gianaris 2010). Because there is clinical evidence to support health differences as a result of status differences, it is possible to make some assumptions about health differences observed in the archaeological record. However, part of the difficulty of studying health in the past is the inability to provide a universal definition of health even in the present (DeWitte and Stojanowski 2015). The World Health Organization (2018) defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." This definition of health is impossible to fully understand in the archaeological record. In most bioarchaeological studies examining "health," the actual focus of analysis is on markers of stress and disease (Reitsema and McIlvaine 2014; Temple and Goodman 2014). Stress and disease are equated to various types and patterns of skeletal lesions, which can be problematic to interpret as will be illustrated below (Wilson 2014; Wood et al. 1992). Even though they do not relay the whole picture, skeletal markers of stress and disease are understood to express at least a small aspect of health status. If this is made clear, I believe it is acceptable to use the term "health" in reference to studying these biocultural traits. In this dissertation, the term "health" is used to refer to stress and disease levels exhibited by the individuals of the Golemi cemetery as understood in their biological and cultural contexts.

The assumptions made about health should be problematized in relation to the myriad of factors integrated with status differences such as gender, age, access to health care, community

relationships, political economic environment, etc. (Reitsema and McIlvaine 2014). There have been attempts to test the relationship between status and health by comparing those individuals buried in elite circumstances to one another and to individuals in lesser-elite or non-elite burials (Schepartz et al. 2009; Pitts and Griffin 2012; Cucina and Teisler 2003). Pitts and Griffin (2012) found in a broad-scale study of 16 Late Romano-British cemeteries from rural villages, nucleated sites, and urban sites that pathological markers did not wholly reflect the status inequalities found reflected in grave goods/coffin materials. However, they did find patterns within sites suggesting that nonurban cemeteries with higher grave-good based inequality values had higher rates of infectious disease than urban sites and other cemeteries with lower grave-good based inequality values. Although this study did not specifically employ the concept of embodiment, their results indicate the embodiment of inequality to some extent in specific cultural and environmental circumstances.

As illustrated above in the discussion of age, life course theory can also be used to emphasize and illustrate the intergenerational effects of lived experiences on health in genetically related individuals. Many cemeteries and burial grounds are made up of several generations of people related to one another either by kinship, marriage, or community (excepting mass graves/massacre sites). This must be considered to truly understand health patterns within a cemetery and interrelated regions. In bioarchaeology, skeletal growth parameters have been correlated with various social processes like weaning and partaking in labor outside the house during the course of growth and development (Gowland 2015). Stature is a particularly useful measure of health as bone growth is highly affected by malnutrition and chronic stress as the body attempts to preserve more important bodily functions. Uauy et al. (2011) found that if a

mother's growth was stunted as a result of a suboptimal childhood environment, her offspring generally presented with poor health.

Although we are limited in our exploration of stress and disease in the human skeleton, they still represent important components of health and are powerful representations of embodiment. The mind and body feel most inseparable in experiences of sickness, suffering and healing. Sickness has been viewed as a "form of communication through which nature, society, and culture speak simultaneously" (Scheper-Hughes and Lock 1987). Studies have illustrated how mental, emotional, and physical stress can negatively affect health (Reitsema and McIlvaine 2014). Chronic stress has been shown to suppress both humeral and cellular immunity, thus increasing risk for disease and death (Segerstrom and Miller 2004). Low socioeconomic status has been associated with chronic stress and lowered immune responses (McEwen and Gianaris 2010). In this way, the human body can embody stress, which in turn makes it more susceptible to disease.

Non-specific Indicators of Disease/Stress

Many diseases do not leave noticeable marks on the skeleton. In the case of specific diseases known to leave evidence in the body, a differential diagnosis is conducted. This is most useful when done on individual skeletons because a disease can only be accurately identified from the pattern and location of the lesions. For this reason, it is impossible to conduct a differential diagnosis in a commingled context. It is possible, however, to measure some level of health through non-specific indicators of disease which can represent systemic disease and stress. Recent discussions of these markers and how they are interpreted suggest that they are indicators of stress as a physiological disruption of homeostasis in the body, which can accumulate over the course of a lifetime (Reitsema and McIlvaine 2014; Temple 2014).

Non-specific indicators of disease/stress were divided into two main groups for this dissertation. The first group indicates general, non-specific systemic stress or disease and includes linear enamel hypoplasias, cribra orbitalia, porotic lesions of the skull, and periostitis. As general indicators of stress/disease these markers can be caused by a number of different kinds of stress and/or disease. Linear enamel hypoplasias (LEH) can only develop during the development of dental enamel, which is exclusive to juvenile development (Goodman and Rose 1990; AlQahtani et al. 2010). LEHs are formed when ameloblastic (enamel forming) activity is halted for a short period of time and then resumed. They are most common in the maxillary incisors, mandibular canines, and the anterior teeth in general. Their occurrence is typically interpreted as representing a period of stress derived from disease, malnutrition, or undernutrition during growth and development (Goodman and Rose 1990). The connection between LEHs and periods of stress has been well established. Because they occur mostly in teeth forming during the early years of development (anterior teeth), LEHs have been used to support the Barker hypothesis/DOHaD which posits that prenatal, perinatal, and childhood experiences and environments can positively and negatively affect an individual's risk of death. Armelagos et al. (2009) used LEH data to compare LEH and mortality and found a significant correlation between high occurrence of LEH and earlier death. Because it is possible to estimate when each tooth is forming in an individual's life, it is possible to associate periods of stress with chronological ages by measuring the distance of the defect from the cemento-enamel junction (where the enamel and the tooth root meet) (Goodman and Rose 1990; Ritzman et al. 2007). The observation of LEH in a skeletal sample thus provides a way to track the progression of disease events in individuals' lives as well as assess how such events may have affected their health and life expectancy later in life.

Cribra orbitalia (CO) and porotic lesions of the skull (PL) are observed most frequently in juvenile skeletons. The lesions have generally healed by the time an individual reaches adulthood. It was formerly thought that both CO and PL form in the cranium only as a result of hyperactive erythropoiesis, the overproduction of red blood cells, in the diploe. The increased cell production causes an expansion of the diploe, creating microporosity on the surface of the bone of the cranial vault (PL) and on the superior orbital surface (CO). However, a recent study of CO and PL found that individuals with CO had significantly thinner diploe and thicker endo- and ecto-cranial cranial bone, which indicates that there may be different etiological causes for CO and PL (Rivera and Lahr 2017).

The causes for CO and PL were thought to be related to anemia and/or malnutrition, specifically iron-deficiency (Walker et al. 2009). In areas known to have endemic malaria, there is a high prevalence of individuals who are heterozygous for sickle cell anemia or thalassemia. These conditions prevent the disease from taking hold because it cannot be carried by the damaged red blood cells. Because of the assumed relationship between CO and PL to anemia, bioarchaeologists have frequently associated the high prevalence of CO and PL in areas known to have endemic malaria with genetic anemias (Bisel and Angel 1985). In areas that do not have endemic malaria, the common interpretation for PL and CO has been anemia caused by an iron deficient diet. Walker et al. (2009) challenged this interpretation by claiming that because the body needs iron to produce red blood cells, being deficient in iron would automatically reduce the body's erythropoietic ability and thus could not cause PL or CO. Instead, Walker et al. (2009) proposed that a deficiency in vitamin B12 is more likely to cause the lesions. This type of deficiency has been linked with neural and developmental problems, which Walker et al. (2009) propose may be linked to violence in some cultures.

While many scholars see the logic in this new interpretation, others are skeptical. Oxenham and Cavill (2010) responded to the proposal with evidence for increased erythropoietic activity in association with iron deficiency. McIlvaine (2015) further comments on Walker et al's (2009) claim by considering the paradoxical effect it may have on the interpretation of CO and PL. If iron deficient people cannot produce the necessary red blood cells, then there is some hidden heterogeneity that must be acknowledged. If PL is viewed as an adaptive response, a population with many chronic illnesses may exhibit a decrease in iron and no PL. As a result, PL would actually mean that there were healthier, stronger individuals present (McIlvaine 2013). Other causes of CO and PL have been linked to other nutritional deficiencies such as scurvy, but scurvy has often been overlooked as a potential cause of the lesions (Zuckerman et al. 2014b). To properly diagnose the cause of CO and PL on the cranium it is necessary to consider the cultural and environmental contexts of the individuals as well as the pattern of the lesions and other skeletal factors such as cranial vault thickness (Zuckerman et al. 2014b; Rivera and Lahr 2017). CO and PL illustrate the importance of studying the pathogenesis of non-specific indicators of disease.

Oral health is strongly associated with diet, general health, and quality of life (Sischo and Broder 2011; Shieham 2005; Benjamin 2010; Sabbah et al. 2007; Bogges and Edelstein 2006; WHO 2003). The oral environment is impacted by a number of inter-related factors including, but not limited to sex, age, diet, social status, genetics, and culture. Therefore, in order to most accurately interpret oral health in ancient populations, these factors should be taken into consideration. Given the absence of soft tissue, it is not possible to observe all indications of oral health in the skeleton such as gingivitis, ulcers, or gum disease. However, those that can be observed, such as caries, antemortem tooth loss/alveolar resorption, abscesses, and calculus, are

used as oral health indicators in modern contexts (WHO 2003) and are useful in the assessment of oral health in ancient populations (Lukacs 2012; Schepartz et al. 2009; Cucina and Tiesler 2003). Within biological anthropological research, it is generally assumed that more oral lesions are indicative of poorer oral health, which in turn reflects poor general health (Larson 2015; Ortner 2003). Socioeconomic status and diet are among the two most influential factors affecting oral health (Benjamin 2010; Sabbah et al. 2007; Cucina and Tiesler 2003).

Carious lesions are one of the most frequently used indicators in the investigation of health, status, and diet in past skeletal populations. Dental caries develops through the interaction of acid-producing bacteria and fermentable carbohydrates, which is significantly impacted by several other factors, including enamel integrity and saliva composition (Selwitz et al. 2007). Other risk factors for the development of caries include environmental, biological, physical, and behavioral factors. Diet and social status are among the two most influential factors impacting the prevalence of caries in a population (Sabbah et al. 2007). Social status has a significant effect on the types of food available to an individual, which directly impacts the risk of developing caries. Those diets that are higher in cariogenic foods such as grains and other carbohydrates are more likely to cause caries than those that are higher in animal proteins (Temple 2015; Cucina and Tiesler 2003). The interpretation of caries in relation to social status in any given culture depends on the social context of that culture. For example, wealthy individuals may have more caries as a result of a social preference for foods higher in sugars/carbohydrates which would cause a high rate of caries (Cucina et al. 2011). Alternatively, in other societies, low class individuals may have only had access to more cariogenic foods sources, therefore resulting in a higher frequency of caries (Cucina and Tiesler 2003). The archaeological context must be fully

considered in tandem with the skeletal evidence to determine why individuals might consume different diets or be more or less susceptible to carious lesions.

In some cases, diet may not be related to social status at all but may depend on lifestyle choices, genetic differences in susceptibility to caries, and risk factors based on sex (Stranska et al. 2015; Mant and Roberts 2014; Lukacs 2008). It has been observed in several ancient populations that females exhibit worse oral health than male individuals (Lukacs 2008; 2012; Boldsen 1997; Walter et al. 2016). Clinical studies have found that females may be more susceptible to caries as a result of physiological phenomena related to sex hormones, fertility, and reproductive history (Rakchanok et al. 2010). For this reason, the difference in the prevalence of caries between male and females may not be directly related to differences in social status or diet, but differences in biological and physiological properties of the body or a combination of these factors.

The prevalence of caries is directly related to the occurrence of antemortem tooth loss (AMTL), another trait used to assess oral health in ancient and modern populations (Lukacs 1995). AMTL is marked either by partial or complete alveolar resorption at the dental socket. However, caries is not the only cause of tooth loss as abscesses, dental attrition, and dental trauma can also cause tooth loss prior to death. The phenomenon is closely correlated with age, meaning that older individuals are more likely to have lost teeth prior to death (Gilmore 2013; Trombley et al. 2019). Antemortem tooth loss also impacts the observed rate of caries in an ancient skeletal population which may cause researchers to underestimate the actual rate of caries (Lukacs 1992; 1995). For this reason, it must be accounted for in the assessment of caries by estimating the number of teeth potentially lost antemortem as a result of caries (Lukacs 1995).

Dental abscesses are also closely related to caries prevalence, but they can also form as a result of severe dental attrition (Monse et al. 2010). A dental abscess occurs when a lesion forms in the alveolar bone adjacent to the affected tooth. Abscesses can be deadly because of their placement close to the blood supply of the maxilla and mandible, which can allow harmful bacteria from the lesion to spread to the rest of the body resulting in sepsis, essentially blood poisoning (Robertson and Smith 2009).

The final oral indicator commonly used to assess oral health in ancient populations is calculus. Calculus is the mineralization of a biofilm that forms over the surface of the dental crown. In archaeological samples it appears as a hardened substance adhered to the surface of the tooth near the cemento-enamel junction. The formation and rate of calcification of this biofilm is highly variable between individuals (Ackali and Lang 2018). Calculus formation is facilitated by increasing the alkalinity of the oral environment (Lieverse 1999). For this reason, the consumption of proteins, which do just this, have been correlated with the prevalence of calculus in ancient populations (Hillson 1979). However, there are several factors that affect the formation of calculus beyond diet like sex, gender, genetics, disease status, and bacterial load (Lieverse 1999). Calculus is still a rather understudied aspect of oral health but has recently garnered more interest as a source from which to study the chemical and genetic compositions of microbiomes trapped within the calculus, thus providing information about both diet and disease (Weyrich et al. 2015; Eerkens et al. 2018).

Osteological Paradox

The study of social status using indicators of stress and disease is common in bioarchaeological research as a way to understand biocultural adaptations to cultural, social, political, and economic conditions (Zuckerman and Armelagos 2011). It is assumed that these

markers are indicative of an embodied experience of stress and/or disease (Martin et al. 2013). However, the way bioarchaeologists interpret skeletal evidence for stress and disease is not as straight forward as previously thought because of something known as the "Osteological Paradox" (Wood et al. 1992). The Osteological Paradox is the concept that there may not be a linear relationship between the number and severity of skeletal lesions and health/mortality. Rather, the relationship between lesions and health should be considered in the context of other factors, such as population size, inherent risk of contracting disease/stress, and the selective nature mortuary populations. The interpretation of skeletal markers used as proxies for health is critical to developing a nuanced understanding of how the skeleton embodies lived experiences.

The traditional way of comprehending skeletal lesions/indicators of stress and disease in a mortuary population are "common sense" in many ways. Scholars assume that the more lesions a skeleton has the sicker that individual must have been and so are reflective of major contributing factors of the person's death. Along with this assumption, researchers take the collective status of the dead population as representative of the living population. Another underlying assumption is that all people within a population have a more or less equal chance of dying. For many years, these assumptions were not challenged within the field of biological anthropology, as they seemed to fit with scenarios such as the agricultural transition and the rise of complex state societies (Armelagos and Cohen 1984; Steckel and Rose 2002). As these events occurred, people accumulated more lesions, which have been interpreted as representing worse health.

Wood et al. (1992) reviewed the traditional assumptions in detail to examine how the living and dead populations may differ from each other and how paleopathologists and bioarchaeologists could better question and interpret the data they are collecting. Through this

process they developed “The Osteological Paradox.” The Osteological Paradox has three main components: population non-stationarity, hidden heterogeneity of frailty, and selective mortality. Each of these provides a different way of interpreting the skeletal data and are, in many ways, counterintuitive.

In traditional interpretations, it is assumed that the skeletal population represents a closed, stationary group with no immigration, emigration, population growth, or population decline. As is evident from living populations, this is rarely the case. The Osteological Paradox thus does not assume that a population is stationary, but rather interprets the changes in the demographic parameters as reflective of a non-stationary population. Fertility rates have been shown to have a larger effect on the average age-at-death than mortality rates do (Buikstra et al. 1986). Thus, if a population is increasing in size, there will be more babies, infants, and young children in the mortuary population because as more individuals are born, more of them will also die. A skeletal population with a lower average age-at-death and an increase of infants may not be showing worse health resulting in more infant deaths but may be illustrating better health as a result of increased fertility.

The second component of the Osteological Paradox has instigated more research than others (DeWitte 2009; Redfern and DeWitte 2011; DeWitte and Slavin 2013; DeWitte and Stojanowski 2015). Hidden heterogeneity of frailty means that within a population, individuals at specific ages will have differing risks of death, which will manifest in the skeleton differently. This observation directly challenges the traditional assumption that more lesions mean that the individual was frailer. This traditional assumption neglects the reality that if an individual has a lesion, he or she would have had to survive long enough to form the lesion. Thus, someone in the mortuary population exhibiting many lesions may, in fact, have been less frail than someone who

is exhibiting less or no lesions. This is where the paradox occurs. Those individuals with no lesions may represent the sickest or the healthiest portion of the population in that they may have died before forming any lesions or may have died from some other cause, not leaving marks on the skeleton, like an aneurism. In this way, the sickest and the healthiest individuals are indistinguishable. On the opposite side, those with lesions are known to have suffered from some disease or disorder and lived beyond the lesion formation for at least some time, suggesting that they may represent some of the healthier individuals of the sample.

Wood et al. (1992) reinterpret data from the agricultural transition from which many scholars have interpreted as indicative of worsening health as a result of the conditions of the transition. Instead, they propose that the increase in skeletal lesions could actually mean that the agricultural populations were healthier than hunter and gatherer populations. Goodman et al. (1984) found that one indicator of childhood stress, linear enamel hypoplasia, decreased over this transitional period. This could be interpreted to mean that individuals were experiencing less childhood stress and going on to live through other lesion creating events rather than dying more quickly from diseases before they were able to form lesions.

Finally, the third component of the Osteological Paradox is the observation of selective mortality. Selective mortality recognizes that the skeletal population represents those who were at the highest risk for dying as they are the ones who ended up dead. Thus, a cemetery population is representative of the sick and old, not the living population. Within selective mortality is proportional mortality, which recognizes the variation in causes of death. Death is caused in several different ways ranging from acute and chronic illnesses to accidents and interpersonal violence. Different people will be more or less susceptible to different kinds of death as a result of their inherent frailty and the social, political, and economic conditions of life.

Progress toward addressing the issues brought up by the Osteological Paradox have been somewhat slow, but recent advances in paleopathology, paleoepidemiology, and paleodemography have found some ways to specifically address the Osteological Paradox (Wright and Yoder 2003; DeWitte and Stojanowski 2015). Wood et al. (1992) challenged researchers to concentrate on four "tasks" as a way to address the concerns of the Osteological Paradox. Recognizing that bioarchaeologists are primarily "consumers" of method and theory rather than producers, they challenge bioarchaeologists to develop a better understanding of how cultural context affects heterogenous frailty and the level of selective mortality (Wood et al. 1992:358). DeWitte and Stojanowski (2015) interpret this as a call to refocus pathological research on biologically and culturally homogenous populations so as to minimize the effects of heterogenous frailty. DeWitte and Stojanowski (2015) also argue that there have been few attempts to operationalize this type of paleopathological study. In some ways, this is a fairly essentialist view of culture, but it could be effective in terms of attempting to break down heterogeneous frailty and selective mortality so that we can start building better methods for understanding populations from more "complex" cultures.

Among the other "tasks," though, is a call for more research on the pathogenesis of specific diseases and their relationship with the human skeleton. Future research directions involve understanding biomolecular processes behind non-specific stress markers, understanding epigenetic effects throughout the life course, and utilizing studies of microbiomes through coprolite and calculus analysis (Klaus 2014). The Osteological Paradox directly relates to how bioarchaeologists interpret skeletal remains and provides new ways of looking at the relationships between health, stress, and disease. In this way, it encourages the use of

embodiment theory to form testable hypotheses about how social processes affect these relationships.

Modeling Mortality

Understanding the relationship between disease/stress and demography has been especially critical for interpreting the presence of skeletal lesions and their relationship to health (Wilson 2014; DeWitte and Stojanowski 2015). Hazards analysis is a useful statistical tool for exploring the relationships between disease and stress markers and demography (age and sex). Wood et al. (1992) were part of the movement to develop models to study health trends related to age and sex as a way to test heterogeneity of frailty (Gage 1988, 1989, 1991; Konigsberg and Frankenberg 1992). This movement has continued over the last 20 years as use of the standard models has been refined and new approaches have been developed (Frankenberg and Konigsberg 2006; Konigsberg and Frankenberg 2002, 2013)

Hazards analysis uses the survivorship function to estimate the probability of an individual dying at a given age within a certain amount of time. It considers the mortality probability at each age based on the risks associated with changing age. The most useful model of mortality is called the Silar model, which has advantages for paleopathological study because it allows for a non-stationary population (Wilson 2014). The two hazard models subsumed under the Silar model are the Gompertz and Gompertz-Makeham models. The Gompertz model allows scholars to model the effect of age on risk of death (Gage 1988; 1989). The Gompertz-Makeham model includes a component that accounts for the chance of accidental or non-age-related death (Gage 1989, 1991). The Silar model thus involves three main components allowing for risk of death to be assessed: a component accounting for the specific risks of death associated with birth and childhood (juvenile), a component accounting for incidental death (accidental), and a

component accounting for risk of death associated with aging (senescence). Each of these factors contributes to an individual's frailty against which other components such as sex can be modeled as co-variants.

The mortality model for a given population provides valuable baseline information against which to compare the other biological traits being observed. Knowing average life expectancy as well as age-specific risks of death can inform an embodied interpretation of the multilevel identities contributing to the overall risk of mortality in that population. In this dissertation, I am using the Gompertz and Gompertz-Makeham models to model the mortality for the mortuary population of Golemi Agios Georgios. The commingled nature of the Golemi material prevents a more thorough investigation of age-specific risks of death as they relate to stress/disease markers because individuals with estimated age and sex could not be individuated in most cases. It is for this reason that the Silar model cannot be used with this data.

By modeling the mortality of a given archaeological skeletal sample, it is possible to see how many different factors affect health and mortality. The mortality of a mortuary population reflects the cumulative lived experiences that contribute to the various causes of death from disease to old age. Even though it is difficult to model the mortality of a severely commingled sample, it is possible to build a rough model of mortality and begin interpreting based on the given archaeological and environmental contexts.

Activity and Lifestyle

Embodiment theory posits that everything an individual does is somehow represented in the body. The habitual movements of the body, the regular use of certain muscles and joints, are part of the *habitus* of an individual. In biological anthropology and especially bioarchaeology, there have been many attempts to tie specific skeletal markers to certain activities, activity levels,

and overall lifestyles (Hawkey and Merbs 1995). The study of activity fits well within the parameters of the embodiment perspective. The various activities available to individuals in in part dictated by the social systems in place, which makes activity part of the body politic. Again, however, there is an aspect of activity that is dependent on the innate capabilities of the individual, the body-self. While there are serious problems with the most common methods used to study activity in archaeological samples, I have chosen to use some of them in this dissertation because the limitations of commingled remains prevent the application of more reliable methods. For this reason, only the "body-politic" aspect of activity will be illuminated and my data are interpreted very cautiously.

Entheseal changes are represented by bone alterations at muscle origin and attachment sites on the bone (Villote and Knusel 2013). Until recently, many scholars have assumed that robust changes at an entheses equaled prolonged use of the muscle attached at that site (Hawkey and Merbs 1995; Weiss 2004; Eshed et al. 2004; Villote et al. 2010; Palmer et al. 2016). However, the validity of using entheseal changes in this way has been heavily criticized because the etiology of entheseal changes is still unclear and not well supported by clinical data (Jurmain 1999; Villotte et al. 2010; Villote and Knusel 2013; Wallace et al. 2017). However, because they are fairly simple to observe and record with no specialized equipment, they are still used often in bioarchaeological research. I include entheseal changes in the analyses of the Golemi skeletal remains but interpret them with caution because of the limitations of our current knowledge. Any patterns revealed within the data must be considered in the context of other factors such as age and sex. The interpretation of entheseal changes at Golemi is made more difficult by the lack of individuated individuals. Significant differences between tomb groups may indicate activity,

genetic, or other unknown differences. The archaeological and biological characteristics will guide the interpretation.

Degenerative joint disease (DJD), also referred to as osteoarthritis, is the breakdown of cartilage and general destruction of the articular surfaces of a joint. These changes include eburnation, micro- and macroporosity, and the formation of osteophytes. The use of DJD has similar problems to those of entheseal changes. It has been assumed by many that the presence and degree of DJD in a joint indicates higher use of that joint. DJD has frequently been used to study "activity" in various archaeological populations (Palmer et al. 2016). However, DJD has been strongly correlated with age, especially in the spinal column (Jurmain 1999; Listi and Manheim 2012). Sex, genetics, weight, and trauma also affect the development of DJD in the body (Jurmain 1999). However, there has been some research to support that abnormal loading in the body can influence the development of DJD (Roach and Tilley 2007). I am only considering joint DJD in this study because of the high correlation between age and spinal DJD as well as the lack of individuated skeletons in the Golemi tombs. The pattern of DJD present may inform activity to some extent. Even though bone formation may differ between individuals, a pattern of DJD indicates shared lived experiences. They may not even be activities, but rather how those individuals experienced life living with osteoarthritis, if it was extensive.

The Platymeric Index (PI) is the ratio of the subtrochanteric maximum and minimum diameter measurements. It is thought to reflect differences in lower limb use (Wescott 2005). Recent research on the PI has found that it can be used as an indicator of ancestral differences in some cases (Tallman and Windburn 2015; McIlvaine and Schepartz 2015). However, it was also found that there is considerable variation within populations (McIlvaine and Schepartz 2015). Biomechanical principles illustrate that the bone reacts to loading stress by forming and

resorbing bone. Therefore, it is possible that intrapopulation comparisons of PI may yield information on the varied lived experiences of the individuals in question with respect to lower limb movements.

Trauma, Interpersonal Violence, and The Warrior Identity

Because the Mycenaeans portrayed themselves to be a war-like culture through the existence of weapons, warfare imagery, and fortified citadels (See Chapter 4) it is necessary to consider the presence and patterning of trauma among the mortuary population of Golemi Agios Georgios. Physical trauma can happen to the body in many different ways. In bioarchaeology and forensic anthropology, scholars study skeletal trauma types to better understand how they form because knowing how they form provides a way to make inferences about what kinds of activities could have caused the various trauma types. In many instances, trauma is viewed as a natural result of intentional interpersonal violence, whether it be on a small scale (one on one combat) or on a large scale (organized military fighting). The types and patterns of trauma may differ as a result of these activities (Milner et al. 1991; Steadman 2008). In societies that promote an aggressive, warrior-like persona in their art, architecture, and burial practices, it follows that the individuals of that society would exhibit higher than usual prevalence of trauma associated with interpersonal violence.

The invention of metal-based weapons in the Bronze Age of Europe was significant in the process of creating the individualized body. They represented extensions of the body and provided a new way of constituting the body through relations to weapons of life and death (Malafouris 2008; Harris et al. 2013). Warfare and interpersonal violence affect the body in specific ways that are not only traumatic in nature but also impact other biological processes like health, status, and gender roles (Milner et al. 1991). Studies have shown that patterns of trauma

in the skeleton can indicate interpersonal violence when cultural context is also taken into consideration (Milner et al. 1991; Steadman 2008; Jurmain et al. 2009; Martin and Harrod 2015).

The trauma patterns exhibited in skeletal remains will vary based on the available weapons, types of protective gear, and fighting styles. The locations of certain trauma types can be useful for assessing whether the trauma was the result of interpersonal violence or accidental (Steadman 2008; Jurmain et al. 2009). Non-lethal cranial blunt force trauma has been used to identify interpersonal violence between groups (Smith 2003; Steadman 2008). In native American cultures, projectile point wounds, scalping, and forearm fractures have also been used to indicate interpersonal violence (Milner et al. 1991; Steadman 2008; Jurmain et al. 2009). The physical and archaeological criteria for interpersonal violence manifests differently in prehistoric European cultures because of different material culture (swords and chariots), cultural practices (no scalping), and environmental conditions.

The portrayal of violence and warfare through material culture and the biological reality of interpersonal violence (i.e. trauma types and patterns) do not always go hand in hand. Instruments of warfare like swords, spears, and daggers have been used to indicate several different social identities including class, occupation, and gender depending on the context. The presence of weapons or tools that could be used as weapons does not necessarily mean that the individual possessing such items was trained to use them and lived the life of a "warrior." The warrior identity is therefore both a social construct and a biological phenomenon.

Western masculinity is often linked to traits associated with being a "warrior" in European cultures (Treherne 1995). The "warrior" identity developed primarily over the course of the Bronze Age along with the rise of the elite class and the creation of the sword, first introduced in the Aegean on Crete (Harris et al. 2013; Molloy 2008). The traits of a warrior are

culturally and socially constructed but correlate with physical characteristics. The appearance of the "warrior" was accompanied by the development of the warrior kit, which included a mirror and tweezers in addition to weapons (Harris et al. 2013). Because the warrior identity developed as part of the rising elite class the status of a warrior was elevated and linked to social standing in some way. If the archaeological materials of a culture suggest an overt war-like manner, it seem reasonable to assume that the individuals participating in the norms and *habitus* of that culture would exhibit material and biological evidence of the warrior lifestyle. One of the main ways to observe this is through a study of trauma patterns across several cemeteries within the same cultural sphere of influence (Smith 2003). It can still be observed in a single cemetery where the individuals are obviously grouped, thus providing grounds for comparison. In this context, it is also possible to look at the other distinct biological and archaeological features of the various groups to examine how they interact with one another (for example, social status, trauma, and health).

Osteobiography and Network Theory

The traits discussed above illustrate how social processes and identities can be embodied in the skeleton, but must be interpreted within the cultural, environmental, and temporal contexts specific to the remains being studied. It is possible to provide this interpretative framework through a method known as "osteobiography." Osteobiography is the examination of individual biographies as cultural narratives through a close study of the human skeleton situated in a specific cultural (archaeological) context (Saul and Saul 1989; Robb 2002). The use of osteobiography encourages the study of the embodied archaeological body because every aspect of the skeleton is taken into account and interpreted within its specific political, social, economic, and environmental context. Life history is an essential aspect of osteobiography

because it emphasizes the study of human experience throughout life and not just through life stages (Gilchrist 2000, 2004). The skeleton represents an accumulation of lived experiences within which age, sex, social status, health, and activities/lifestyles intersect to inform identities over the course of a lifetime.

Osteobiography has traditionally been used to investigate the biography of the individual (Robb 2002; Mayes et al. 2008; Stodder and Palkovich 2012; Castro et al. 2017). Torres-Rouff and Knudson (2017) recently employed it to incorporate the individual into a multiscalar study of identity. Their use of osteobiography provides a template for other researchers to incorporate the method into bioarchaeological studies of embodied identity. I will be following the example of Torres-Rouff and Knudson (2017) to some extent in the use of osteobiography.

Because the material of Golemi primarily consists of commingled material, it was not possible to individuate most of the skeletons. However, the material was divided into groups by chamber tomb by the individuals responsible for burying the dead. Based on the archaeological context of LBA Greece (See Chapter 4), I am assuming that the tomb groups are socially meaningful. Because they are socially meaningful, I have chosen to use them as the main unit of analysis. The social significance of commingled remains has been interpreted in various ways in terms of group identity, permeability of the body, community involvement, and ancestor worship (Voutsaki 2010a, b; Osterholtz 2015; Duncan and Schwarz 2014).

To account for the commingled nature of the skeletal material at Golemi, I expand the concept of osteobiography from that of the individual to include the entire tomb group. I assume that all bodies found within each group are representing a group osteobiography, which allows tomb groups to be compared with one another. This is a novel approach that attempts to explore collective identity. Even though the material is commingled, it is still possible to explore

individual lived experiences as well. A commingled collection of skeletal remains represents individual lived experiences through the unique attributes and markers of each element. For example, if a cranium exhibits blunt force trauma, that life event can be associated with the individual represented by that cranium. The same is true for a femur or other post-cranial bone showing evidence of infectious disease. In some cases, such as with crania, it is also possible to associate age and/or sex with those lived experiences. In this way, it is possible to identify and understand individuals to varying degrees based on these distinctive biological markers on single bones indicating personal, individual lived experiences. By including aspects of both the individual and the tomb group within the life history framework of osteobiography, the relationship between time scales can be explored: individual lifetime vs. tomb use time vs. Mycenaean cultural time. In turn, this provides a way to understand relationships within the cemetery on multiple levels.

Examining the collective osteobiographies of the tomb groups will provide a way to illustrate the diversity of cultural identity expression. The commonalities between tombs also provide an opportunity to explore potential relationships within the cemetery. If a pattern is revealed, a simplified version of network analysis will be utilized to understand its shape. Network analysis examines nodes and the connections between them (Collar 2015; Caridi et al. 2011; Kramer-Hojas 2016). Nodes are distinct social entities, which in this case will be represented by a single tomb group and their associated archaeological attributes. The connections between them, known as "edges," are represented by similarities or differences in the selected biological and archaeological features. Some nodes may generate more differences than others, thus becoming hubs. The location of these hubs within the cemetery is the most

important aspect of the analysis and will drive the pattern of connections throughout the cemetery.

Network theory provides a way to operationalize the underlying concepts of practice and agency theory. In Late Bronze Age Greece, tomb placement within a cemetery was likely an intentional action by one or more individuals (Mee and Cavanagh 1990). Because not all of the tombs were established simultaneously, the decision of where to place a tomb had to be done in relation to already established tombs. This decision was influenced directly or indirectly by the *habitus* of the time, environmental factors, and social structures. In this study, the individuals who established the tombs are recognized as influential agents in the formation, maintenance, and change of cultural practices, ideologies, and identities (Giddens 1984; Ortner 1984; Dornan 2002). For this reason, the arrangement of the cemetery then becomes a small network built by the decisions and actions of those individuals.

In Robb's (2010) discussion of "relational agency," the ability to act is made possible through engaging in relationships with people, places, and objects. By assuming that relationships are significant, network analysis provides a method by which to study the socially meaningful relationships between people and objects both in space and time (Brughmans 2013). Knappett (2011:10) points out that one of the strengths of network analysis is that networks can include both people and objects. Relational agency is at the heart of network analysis because it is through the actions between individuals and groups that networks are formed. Furthermore, is through those relationships that identities are formed and performed (Robb 2010).

The osteobiographies of the tombs provide the archaeological and skeletal data to compare tombs and derive potential relationships between them. The inclusion of skeletal data is an innovative approach to network analysis. In this way, it is possible to literally incorporate

human individuals/groups of individuals and objects associated with them into a network of relationships. Most archaeological studies of networks include only material culture, which limits the ability to see how lived experiences and embodied identities interact with the material culture networks (Collar et al. 2015). The theory of embodiment as outlined in the previous chapter makes it possible to compare tombs to one another. Assuming that the tomb group represents a socially significant unit, the individuals are thought to have participated in similar lifestyles with similar access to resources. Therefore, if a tomb is similar in skeletal features to those of another tomb, it is possible that those two groups of individuals shared similar lifestyles and access to resources. Because the mortuary context often provides the idealized version of an individuals or a group of individuals (Ucko 1969), the archaeological materials will illustrate shared practices and ideas, but not may not necessarily reveal the level of access to resources in life or provide information about lifestyle. Through osteobiography and network analysis, it possible to explore aspects of social organization as understood through the embodied expression of biocultural identities in human skeletal remains and their associated archaeological attributes.

Chapter Summary

In this chapter, I have identified the biological correlates commonly used to study identity in bioarchaeology. Divided into the categories of paleodemography, kinship analysis, paleopathology, activity, and trauma, I discussed how each can be used to understand social processes within cultural contexts. Through this, it was made clear that theses social processes interact in inseparable ways and so must be viewed through the lens of embodiment and intersectionality. The final aspect of this chapter demonstrates how an osteobiography and network theory can be used to examine how various traits interact with and affect one another.

CHAPTER 4: MYCENAEAN CULTURAL IDENTITY AND HISTORICAL OVERVIEW

Introduction

The primary purpose of this chapter is to establish the definition of Mycenaean cultural identity for this dissertation and how it can be studied through the archaeological and human skeletal remains of the cemetery at Golemi Agios Georgios. Before it is possible to define Mycenaean cultural identity, it is first necessary to discuss the origins of the term "Mycenaean," its current usage, and the problems associated with it. I then describe the absolute and relative chronologies that will be employed in this study.

Next, to establish the broad historical context of my work, I provide an overview of the development, rise, and collapse of the Mycenaean civilization, while discussing the archaeological and ideological elements of the three major periods of Mycenaean existence, the Prepalatial, Palatial, and Post-Palatial periods (ca. 1700/1600 - 1075/50 BCE). Throughout this historical context, I will identify the main attributes of Mycenaean cultural identity during the height of Mycenaean civilization, as represented by archaeological materials and interpreted by current scholarly research. These attributes were primarily driven by a sense of shared ideology derived from elite practices and represented through a warrior identity, conspicuous consumption, a distinct social hierarchy, shared iconography, and specific burial practices. This discussion will be followed by an examination of how Mycenaean cultural identity was expressed through the use of certain tomb types, burial practices, and grave goods. This in turn will set the stage for a discussion of the biological correlates of what is perceived to be Mycenaean cultural identity.

Because the skeleton represents the embodiment of lived experiences that are directly influenced by practices related to a specific cultural identity, it will be argued that it is possible to

use the human remains from Mycenaean tombs to explore cultural identity. I will identify specific ways in which Mycenaean cultural identity might be embodied in the skeleton using demographic evidence as well as data related to health, activity, and trauma.

Defining "Mycenaean"

In this section I will discuss the origin of the term "Mycenaean," its connotations over time, and its current usage. When Heinrich Schliemann unearthed the massive fortification walls and wealthy shaft graves at Mycenae in 1876, he believed he had found Homer's Mycenae, "rich in gold" (Hom. *Od.* 3.276) and home to the fabled King Agamemnon (Schliemann 1880). The wealth and grandeur of Mycenae were unlike anything else found on mainland Greece and thus signaled the discovery of a new culture believed to be the one recounted in Homer's epic poems. The term "Mycenaean" was derived from the site of Mycenae to describe the people inhabiting Late Bronze Age Greece as it was the first site to reveal evidence for this new Aegean culture (Tsountas and Mannat 1897).

Because there was such a strong desire to link this Late Bronze Age culture to that spoken of in the Homeric texts, early scholars were preoccupied with determining the racial/ethnic origins of the Mycenaeans in relation to historical Greek accounts of prehistoric tribes and races (Jazwa 2016; Tsountas and Mannat 1897; Taylour 1964). As with many early attempts to understand ancient cultures through archaeological materials, the Mycenaean culture was defined by a set of archaeological correlates that were then equated with an ethnic group or race (Schliemann 1880; Meyer 1884; Tsountas and Mannat 1897; Hall 1901; Taylour 1964). One early synthesis of Mycenaean culture claimed that the Mycenaeans likely had dolichocephalic (long and narrow) skulls, thus providing the first hypothetical physical description of Mycenaean people (Ridgeway 1901). Both the equation of culture and race with artifacts and the use of

cranial typologies as proxies for race were common in the days of the culture-history approach to archaeology, especially in the Mediterranean.

Once archaeological theory progressed beyond the culture-history approach with the advent of processualism or “New Archaeology” in the 1960s, scholars were less concerned with the ethnicity/race of the Mycenaeans and more interested in the various social systems at play in the archaeological record (Jazwa 2016). Around this time, Samuel (1966:1) broadly defined Mycenaeans as “the inhabitants of Greece in the Late Bronze Age” and he defined the adjective, “Mycenaean” as referring to “their culture as a whole or aspects of it.” The trend of using the term Mycenaean to represent all inhabitants of Greece and the broader Aegean in the Late Bronze Age has continued until fairly recently. As a result of this, the word, “Mycenaean,” became more of a temporal and geographical modifier than a cultural term (Jazwa 2016).

In their seminal 1999 article, Davis and Bennet re-evaluated the use of the term “Mycenaean” in the study of Aegean Prehistory. They criticized the use of the term as being at once too broad--referring to all inhabitants of Late Bronze Age mainland Greece--and too ethnically restrictive--as "Mycenaean" was widely understood as being synonymous with ethnically Greek. Davis and Bennet argued instead that only those who adopted Mycenaean elite culture should be considered Mycenaean. In their view, those who “became Mycenaean” or were “Mycenaeanized” were a fairly heterogeneous cultural group made up of different ethnicities, including both Greek and non-Greek speakers. The key component is that they adopted the elite defined ideology and material culture that had been formed out of diverse regional elite cultures in the Peloponnese in the course of the Prepalatial period. The creation of Mycenaean palatial systems accelerated the process of "Mycenaeanization" of culturally and linguistically diverse populations. Davis and Bennet's new definition of Mycenaeans as specific cultural groups that

had adopted a similar elite culture shifted how scholars understood and used the term "Mycenaean." The term no longer was equated with all inhabitants of Late Bronze Age Greece, but only with those elites who had adopted Mycenaean elite culture.

Soon after, Wright provided a more archaeological definition of the term that focused solely on material evidence: "By 'Mycenaean' I mean the assemblage of artifacts that constitutes the characteristic archaeological culture that originates on the mainland of Greece in the late Middle Bronze Age, finds its fullest expression in the palaces during the Late Helladic (LH) IIIA-B, and can be traced through the Post-Palatial LH IIIC period" (Wright 2004a:134). The assemblage of artifacts most often used to classify sites as 'Mycenaean' include monumental architecture, Cyclopean masonry, Linear B script, tholos tombs, rock cut chamber tombs, specific types of swords, seal stones, jewelry, pottery, and ceramic phi and psi figurines (Phialon 2011; Eder 2007; Papadimitriou 2001; Darcque 2005; Samuel 1966; Tsountas and Manatt 1897). Like Davis and Bennet (1999), Wright (2004a) does not assume that all inhabitants of the Aegean participated in Mycenaean culture in the LBA. By envisioning the possibility of degrees of expression, Wright allows for the potential co-existence of other, non-Mycenaean, cultural practices in the Aegean at various times throughout the LBA.

With respect to the possibility of a Mycenaean ethnic identity, Bennet (1999:224) already made the well-considered argument that in LBA Greece "ethnic groups probably did not exist as they are understood in the modern world." Rather, he posits that various sociopolitical or socioeconomic groups such as those in elite positions may have given themselves distinct names, but that these were not reflective of a real or imagined shared descent. Citing Bennet's conception of the Mycenaeans, Burns (2010:71) argues that it is better to use the term Mycenaean to describe a "sphere of interaction" rather than an ethnic identification. In other

words, in Burns' view, finding Mycenaean pottery or other types of goods does not mean that an individual or community had adopted the complete Mycenaean cultural identity (Burns 2010; Voutsaki 2010a). By recognizing a Mycenaean sphere of interaction, it is possible to assess the extent to which people interacted with the materials and cultural practices used to define that sphere. In this way Burns (2010) provides a way of conceptualizing how Wright's (2004a) definition of Mycenaean can be operationalized in the study of the Late Bronze Age Aegean.

Most authors who have written recent syntheses of Late Bronze Age archaeological research in mainland Greece have not provided explicit definitions of the term "Mycenaean" (Jazwa 2016; cf. Shelmerdine 1997; Shelmerdine and Bennet 2008; Cline 2010; Rutter, online). It has been recognized that there were areas of mainland Greece (e.g., Achaia, Arcadia, Northeast Corinthia) that did not adopt Mycenaean practices and material culture until later, if ever (Davis and Bennet 1999; Arena 2015; Tartaron 2010), but there is not a separate cultural distinction made for these individuals; instead they are generally referred to as "Helladic" people.

A renewed attempt to equate the term "Mycenaean" with a specific ethnic group and an elite social class was made fairly recently by Feuer (2011:529), who defines Mycenaeans as individuals who spoke a form of Greek, worshiped certain deities, were rulers or warriors (or related to them), lived in palaces or mansions, supported and propagated the *wanax* (king) ideology, were buried in tholos (beehive-shaped) or rock cut chamber tombs, and partook in aristocratic life with privileges and material benefits. This definition of "Mycenaean" as an ethnic term is highly problematic because, as discussed in Chapter 2, it is now well established that the lack of an emic perspective makes it nearly impossible to define ethnicity in prehistoric settings (Barth 1969; Bennet 1999; Jones 2007; MacSweeney 2009, 2014; Jazwa 2016). Furthermore, this definition of Mycenaeans limits Mycenaean culture to only elite individuals,

thereby equating culture with social class. Under this definition individuals who were not of the highest elite class and lived outside the palatial system cannot be considered to be Mycenaean.

Feuer's (2011) limiting definition brings attention to the fact that the attributes used to archaeologically identify Mycenaeans are almost exclusively derived from elite contexts. Given this reality, one must ask whether non-elite Mycenaeans existed and, if so, how we recognize them in the archaeological record. Studies of the funerary record and settlement data have led most current scholars to believe that there was at least a middle class that ascribed to Mycenaean cultural identity (Dickinson 1983; Wright 2008a; Darcque 2005; Cavanagh 2008). Emulation of palatial elite practices such as burial customs, use of an elite tomb type (i.e., the rock cut chamber tomb), and the use of typically Mycenaean pottery and other artifacts indicates attempts to claim Mycenaean cultural identity, especially in the Palatial period (Dickinson 1983; Wright 2004a). As I will argue in this dissertation, it even is possible that some groups of the lower class subscribed or at least aspired to be Mycenaean (see Chapter 9: Discussion).

For the purposes of this dissertation, I am using Wright's (2004) definition of the term "Mycenaean" as conceptualized by Burns (2010). Their interpretations are most useful for my purposes because the archaeological correlates associated with the term can be examined as a spectrum on a case-by-case basis to gauge the extent to which social groups and communities manifested "Mycenaean-ness," which is a term I will use interchangeably with Mycenaean cultural identity. Some sites, such as Iklaina, exhibit more Mycenaean or Mycenaean-like qualities than do other sites. This definition of Mycenaean also does not claim to include all inhabitants of mainland Greece and the Aegean, allowing for the possibility that a number of individuals, groups or communities may never have adopted or been influenced in any significant way by Mycenaean culture (Tartaron 2010; Shelmerdine 2011; Nakassis 2013).

Furthermore, in Wright's definition the term Mycenaean can be used to reflect changes in cultural materials and practices through time. The traits that define Mycenaean culture in the Prepalatial and Post-Palatial periods were much more variable than those used to define Mycenaean culture in the Palatial period but are still deemed to be "Mycenaean." For example, the use of the shaft grave is considered to be a Mycenaean trait in the Prepalatial period, but this tomb type is no longer used in the Palatial period. In Wright's definition, the term "Mycenaean" does not refer to an ethnic group, but rather to individuals who shared in a similar ideology that manifested itself in common cultural practices and use of similar materials in life and death.

Chronology

Before discussing the development of Mycenaean cultural identity in the Late Bronze Age, it is necessary to define the terms used to describe the chronology of the period as well as some of the issues involved in assigning absolute dates to relative chronologies. The chronology of the Aegean Bronze Age is divided into three major periods: Early, Middle, and Late, and these are further divided into phases (I, II, III) and sub-phases (IA, IB, etc.). These periods and phases were determined using relative chronologies based on ceramic typologies formulated from secure stratified contexts. Originally, this relative chronology of the Bronze Age Aegean was assigned to absolute date ranges through correlations with established Egyptian and Mesopotamian chronologies that had been dated on the basis of historical documents (Hankey and Warren 1989).

In the Bronze Age Aegean, specific labels are used to differentiate the chronologies of the major regions. The designator for mainland Greece is "Helladic," for Crete it is "Minoan," and for the Cycladic islands it is "Cycladic." Because this dissertation is focused on a site located on mainland Greece, I will use the mainland chronology and the term "Helladic" when referring

to specific phases or periods of time, for example, Late Helladic III. "Late Helladic" will be abbreviated as "LH" followed by the phase number and letter. As Wright's (2004a) definition of Mycenaean indicates, the Mycenaean culture begins in the late Middle Helladic/early Late Helladic I phase and continues through the Late Helladic IIIC period.

The absolute dates for the pottery phases of the Late Bronze Age in the Aegean are still a matter of much dispute among scholars (Friedrich et al. 2006; Manning et al. 2006; Wiener 2010; Höflmayer 2012; Cherubini et al. 2014; Manning et al. 2014). There is a "low" chronology and a "high" chronology that mainly relate to the start date and length of the Late Bronze I and II phases. The difference between the two chronologies derives from the absolute date when the volcanic eruption of Santorini, the island group to which Thera belongs, is believed to have taken place. The eruption has been dated through ceramic typology towards the end of the LC I phase in the Cyclades, which is roughly contemporary with the LM IA phase on Crete and the LH I phase on the Greek mainland. The traditional "low" chronology uses absolute dates derived from the correlation between Aegean ceramic typologies and Egyptian/Mesopotamian typologies. In this chronological framework, the Theran eruption has been assigned an absolute date range of ca. 1560/1550-1535/1525 BCE (Warren and Hankey 1989:215), which more recently has been narrowed to ca. 1525 BCE (Wiener 2010). As a result, the proponents of the "low" chronology place the start of the Late Bronze Age in the Aegean at ca. 1600 BCE (Warren and Hankey 1989:169; Cherubini et al. 2014; Wiener 2010).

The "high" chronology relies on an earlier dating of the volcanic eruption, which is based on radiocarbon dates, dendrochronological studies, and the analysis of ice-cores that provide a fairly consistent range of absolute dates for a major volcanic eruption in the temperate zone of the northern hemisphere sometime between 1645 and 1627 BCE, which the proponents of the

"high" chronology claim must be the Theran eruption (Betancourt 1987; Bronk Ramsey et al. 2004; Friedrich et al. 2006; Manning et al. 2006; Manning et al. 2014). Placing the eruption of Thera at this time means that the beginning of the Late Bronze Age must be moved to ca. 1700 BCE rather than ca. 1600 BCE. This higher begin date of the Late Bronze Age in turn affects the lengths of the LM IA, LM IB, and LM II phases as well as the corresponding LC and LH phases. The high and low chronologies for the Late Helladic phases are represented in Table 4.1.

Whereas the debate about the absolute date of the Santorini/Thera eruption is ongoing, there is a basic consensus among scholars that the LH IIIA/LM IIIA phases began around 1400 BCE (Shelmerdine 2008:5-6, Figure 1.2). Since the cemetery of Golemi Agios Georgios, which is the focus of this dissertation, was in use from the LH IIB phase into LH IIIC (Dakoronia 1993; 1995) the absolute dates of this cemetery are not affected by the lengthening of LH IIB by ca. 20 years if the high instead of the low chronology is used. Thus, the choice of absolute chronology is not crucial for the purposes if this dissertation. In order to avoid misunderstandings as I discuss the development of the Mycenaean culture in earlier phases of the Late Bronze Age, I will refer primarily to the ceramic and cultural phases rather than the absolute dates. The cultural phases are represented in Table 4.2.

The Late Bronze Age period of Greece has been divided into chronological phases but can also be divided into phases of development with respect to the Mycenaean culture. The end of the Middle Bronze Age and roughly the first half of the Late Bronze Age (MHIII/LHI – LH IIIA1) is referred to in several interchangeable ways including the Early Mycenaean Period, the Prepalatial Period, and the Formative Period (Kilian 1988; Cavanagh and Mee 1998; Voutsaki 2001; Van de Moortel 2007; Wright 2008a,b; Shelmerdine 2008). The following period, dating from LH IIIA2 through LH IIIB2, is known as the Palatial Period. After the destruction of the

Table 4.1. Relative chronology with the low and high absolute chronologies of the Late Bronze Age. All dates are BCE (after Vitale in Van de Moortel et al. 2019, Table 2)

Relative Chronology	**Absolute Chronology**	
	Low Chronology	*High Chronology*
LH I	c. 1600 – 1510/1500	c. 1700/1675 – 1635/1600
LH IIA	c. 1510/1500 – 1440	c. 1635/1600 – 1480/1470
LH IIB	c. 1440 – 1390+	c. 1480/1470 – 1420/1410
LH IIIA1	c. 1390+ – 1370/1360	c. 1420/1410 – 1390/1370
LH IIIA2	c. 1370/1360 – 1330/1290	c. 1390/1370 – 1330/1315
LH IIIB1	c. 1330/1290 – 1185/1180	c. 1330/1315 – 1200/1190
LH IIIB2		
LH IIIC	c. 1185/1180 – 1065	c. 1200/1190 – 1075/1050

Table 4.2. Cultural Phases. For the LH absolute dates, see Table 4.1 above; for the high chronology of MH III, see Manning 2010, table 2.2, pg 17.

Cultural Phase	**Ceramic Phases**	**Absolute Dates (High/Low)**
Prepalatial Period	MH III/LH I – LH IIIA1	Ca. 1750/1600 – 1390/1360
Palatial Period	LH IIIA2 – LH IIIB	Ca. 1390/1360 – 1200/1180
Post-Palatial Period	LH IIIC	Ca. 1200/1180 – 1075/1050

Mycenaean palaces at the end of LH IIIB, a new period began, which is known as the Post-Palatial Period, encompassing the LH IIIC phase. For the purposes of this dissertation, I will use the terms Prepalatial, Palatial, and Post-Palatial to discuss aspects of Mycenaean cultural identity and the phases of use at Golemi Agios Georgios.

Historical Overview

Prepalatial Period (MH III/LH I - LH IIIA1)

Most of the data available for the Prepalatial period are derived from elite mortuary contexts. The earliest and best-preserved examples of Early Mycenaean culture are the Grave Circles A and B at Mycenae (MH III/LH I-LH IIA). Their identification as markers of a new mainland elite culture was based on the introduction of several new archaeological features. These include the construction of a monumentalized tomb type, the shaft grave; the inclusion of incredible wealth; imports from other areas; and the mixture of Minoan characteristics with

mainland features. The Minoan civilization on Crete was the most prominent Aegean culture at this time and their influence on the development of Mycenaean culture is particularly clear in the Grave Circles, which included Cretan made imports as well as locally made imitations of Minoan pottery, stone vases, jewelry, stone seals, gold signet rings, and other artifacts. However, the Grave Circles also exhibited distinctly mainland features such as the shaft grave as a tomb type, the inclusion of gold face masks, and the abundance of weaponry (Burns 2010). The skeletal remains located inside these tombs belonged to men, women, and children who appeared to be healthier, more robust, and taller than those of the preceding Middle Helladic cemetery (Mylonas 1973; Angel 1973; Dickinson 1977). Although the Grave Circles at Mycenae were the first obvious indication of the new culture on mainland Greece that can be called Mycenaean, research has since shown that this new elite culture in this early stage encompassed a marked degree of cultural variation in several aspects, including use of different monumental tomb types, grave goods, and elite buildings. As Wright remarks, the Mycenaean culture in the Shaft Grave period, or early phase of the Prepalatial period, is defined more by its diversity than by its cohesion (Wright 2008b).

The creation and spread of new tomb types in the early Prepalatial period embody the diverse development of Mycenaean culture during this time. Some of the new elite graves were rooted in traditions from the Middle Helladic period, but were modified and monumentalized in the Prepalatial and Palatial periods (Phialon 2011; Petrakis 2010; Voutsaki 2010a, c; Wright 2008a; Dickinson 1977). There are four main elite tomb types in use during the Prepalatial period: the shaft grave, the built chamber tomb, the tholos tomb, and the rock cut chamber tomb. The shaft grave was used primarily in the early Prepalatial period (MH III/LHI-LH IIA). It was a monumentalized version of the MH cist tomb, which was a rectangular pit dug into the ground

lined with stone side slabs or masonry and topped with a cover slab (Cavanagh and Mee 1998:43-44). The shaft grave extended much more deeply into the ground than the cist tomb in order to accommodate several successive burials, but it maintained a similar rectangular shape and, like the cist tomb, it was entered from above. The most impressive examples of this tomb type are those located in the Grave Circles at Mycenae (Mylonas 1973; Dickinson 1977).

The Built Chamber Tomb (BCT), an elite tomb type introduced in the Middle Helladic period, but used most extensively in the early Prepalatial period, was a free standing tomb type consisting of a passageway leading to the tomb (*dromos*), the doorway of the tomb (*stomion*), and the burial chamber (*thalamos*), constructed with stone slabs or rubble (Papadimitriou 2001:2). BCTs are much more variable in form than the other elite tomb types (Papadimitriou 2001:203). Like the other elite tomb types they were used for multiple interments. BCTs began in MH II but most date to MH III-LH IIA, and some are used as late as LH IIIA. Papadimitriou (2001:166-168) found that they were mostly introduced into the pre-Mycenaean environments of Attica, Argos, Central Greece, Thessaly, Achaea, Kephallenia, Keos, and Delos, but appeared at the beginning of the Prepalatial period in other regions like Messenia and Mycenae. They were used alongside monumental Mycenaean tomb types in some locations but are not considered to be "Mycenaean" nor necessarily "monumental" (Papadimitriou 2001:203). Their experimental nature reflects the variability in the expressions of status and power seen during the Prepalatial period (Papadimitriou 2001; Voutsaki 1998). The BCTs are thought to reflect the rise of an elite class that adhered to practices more closely linked to the Middle Helladic period and may reflect a process of social stratification in the early phases of the Late Bronze Age that are not necessarily related to Mycenaeanization (Papadimitriou 2001:207; Van de Moortel 2016).

The other two elite tomb types that appeared on the Greek mainland in the early Prepalatial period--the tholos tomb and rock-cut chamber tomb (RCCT)--were arguably adopted, with changes, from Minoan Crete. Both have been closely associated with the development and spread of Mycenaean culture (Tsountas and Manatt 1897; Dickinson 1977; Dabney and Wright 1990; Papadimitriou 2001; Boyd 2002; Wright 2008a,b). Both types first appeared in Messenia, in the southwest Peloponnese (Bennet and Galanakis 2005; Boyd 2002:58-62; Davis and Bennet 1999; Cavanagh and Mee 1998). Like the BCT, the tholos tomb and RCCT had three basic structural parts: the *dromos*, *stomion*, and *thalamos* or tomb chamber. The mainland tholos tomb had a round chamber built of rubble or cut stone blocks and set into the side of a hill. It always was covered by a *tumulus*, or earthen mound. The tholos tomb represents the most monumental tomb form on mainland Greece in the LBA. It appeared in Messenia in the late MH III phase, and spread to the eastern Peloponnese and Attica by LH IIA (Cavanagh and Mee 1998:44; Mee and Cavanagh 1984). The rock cut chamber tomb (RCCT) was dug into the bedrock of the side of a hill or mountain. RCCTs are located outside of settlements and individual tomb orientation is determined by the natural geography of the hill or mountain (Smith et al. 2017; Wright 2008a; Gillis 1996; Blegen 1937). The first RCCTs were established in Messenia and Laconia in MH III/LH I, but the tomb type appeared in other parts of the mainland almost immediately (Bennet and Galanakis 2005; Boyd 2002:58-62; Cavanagh and Mee 1998:54-55; Hankey 1952). The early forms of the RCCT are regionally variable, which may indicate that it developed independently in different areas (Bennet and Galanakis 2005; Boyd 2002:58).

Both the tholos tomb and RCCT were used for multiple interments during the Prepalatial period. Tholos tombs contained the remains of primarily adult, elite individuals of both sexes (Smith et al. 2017; Iezzi 2005; Cavanagh and Mee 1998:131). Early osteological studies have

suggested that male individuals were more prevalent in tholos tombs in the Prepalatial period (Blegen et al. 1973:103, 135; Cavanagh and Mee 1998:51-52), but more recent research contradicts this assessment (Smith et al. 2017; Schepartz et al. 2009; Iezzi 2005; Papathanasiou 2002-2005). Although a familial relationship has been assumed among those buried in most monumental tomb types of the Prepalatial period, Cavanagh and Mee (1998:52) argue that the "tholos should not be uncritically characterized as a family tomb." RCCTs were less expensive to construct in terms of labor and materials than the tholos tomb. The contents of RCCTs demonstrate a wide range of wealth and status. Some have goods comparable to the contents of tholos tombs, but more contain less wealthy grave goods (Wright 2008a; Cavanagh and Mee 1998). Because RCCTs were often used over the course of several generations, it is difficult to determine which individuals might have been buried first in most cases. However, it is assumed by most scholars that the RCCT contained the remains of a family unit (Wright 2008a; Cavanagh 2008; Cavanagh and Mee 1998; Blegen 1937; Wace 1932).

Both tholos tombs and RCCTs were used by elites in the early Prepalatial period (LH I) to exhibit wealth and status (Cavanagh and Mee 1998; Voutsaki 1995, 2001). Their contents are comparable in quantity and quality, and the fact that the chambers of some RCCTs are circular in plan like those of tholos tombs (e.g., at Pellana near Sparta) suggests that there was considerable overlap in their social status (Boyd 2002). Cavanagh and Mee (1998:56) state that "impressive offerings" appear in every tomb type during the Prepalatial period, which demonstrates the competitive nature of the mortuary landscape. In areas where both tholos and RCCTs were in use such as Messenia, Laconia, the Argolid, and Attica, it has been suggested that the tholos tomb was primarily used for the highest elite (Davis and Bennet 1999; Bennet 1995).

In addition to mortuary evidence, some settlement data are available for the early Prepalatial period. The transition from the Middle to Late Helladic period is marked by an increase in the number of settlements (Wright 2008b). Many were founded in places with no previous occupation, whereas previously established sites such as Asine began to expand their territories. All this is indicative of a large increase in population during the LH I phase (Wright 2008b). As sites increased in number and size, nucleated centers appeared in regions such as the Argolid and Messenia in the Peloponnese and in Attica and Boeotia in central Greece. Such centers included Pylos, Malthi, and Kakovatos in Messenia, Mycenae, Tiryns, and Asine in the Argolid, Tsoungiza in the Nemea Valley, Eleusis, Athens, and Kiapha Thiti in Attica, Eleon and Thebes in Boeotia, and Mitrou in East Lokris (Rupp et al. 2018; Burke and Burns, online; Van de Moortel and Zachou 2012; Eder 2009; Darcque 2005; Wright et al. 1990; Wright 1990). Many of these centers have produced evidence for elite buildings.

The nucleation of settlements and rise of elite structures, in concert with the appearance of elite tomb types, signals that there were new social processes at work. The social organization of the previous Middle Helladic community had been driven primarily by family and kinship relationships (Voutsaki 2010c; Wright 2008a, b), but the organization of the Late Helladic community appears to have been defined by the rise of leaders and their direct lineages (Wright 2004a, 2008a, b). The emergence of leaders then gave rise to an elite class who drove the development of the ideology that has come to define Mycenaean culture in the later Prepalatial and Palatial periods (Davis and Bennet 1999; Acheson 1999; Wright 2004a,b). Galaty and Parkinson (2007) argue that the Mycenaean states of the subsequent Palatial period "were secondary, first generation states" formed as a result of competing Prepalatial chiefdoms who were inspired by contacts with the Minoans and other Eastern Mediterranean states. In contrast

with the Minoans, however, the Mycenaeans developed a networked elite rather than a corporate elite society. Networked elites operate through an exclusionary and centralized strategy of "chiefly competition" which results in the development of a distinct hierarchy of elite families who practiced reciprocal gift exchange to foster elite relationships and maintain power (Parkinson and Galaty 2007). On the other hand, a corporate elite society is more de-centralized and inclusive with a heterarchical organization strategy that focuses on shared power, production of staple foods, communal ritual, and public construction (Parkinson and Galaty 2007:116; Feinman 2000:214). There is a broad continuum of social organization between networked and corporate elite strategies.

Other scholars see the early Prepalatial leaders of the Greek mainland as "Big Men" rather than as chiefs (Wright 2004a, 2008a,b). A primary component of the "Big Man" ideology that was crucial to the reputation of a leader was his ability to hunt and wage war (Acheson 1999; Wright 2004a, 2008; O'Brien 2013). Already in the shaft graves at Mycenae, this attribute was a key characteristic of male Mycenaean cultural identity. The inclusion of bronze swords and other weaponry in elite graves such as those at Mycenae symbolically illustrate the importance of warfare at this time. The ability to hunt and fight were useful skills because they provided individuals with special access to wealth (Dabney and Wright 1990). Moreover, through these skills, leaders would have been able to gather followers outside of their immediate kin group (Wright 2004a). Some mainland leaders in southern Greece were able to gain wealth and status through contacts with Minoan palatial societies on Crete, which dominated the southern Aegean in the early Prepalatial period (Maran 2011; Wright 2008b). After the destruction of the Minoan palaces at the end of the LM IB phase, roughly contemporary with LH IIA on the Greek mainland, the Mycenaeans were able to exploit the resulting power vacuum.

They took over the major trade routes of the Aegean, which provided even better access to exotic resources from around the Aegean and the East Mediterranean. Additionally, as the dominant southern Aegean elite culture, the Minoans provided a template from which the incipient mainland "Big Men" were able to draw as they formed their own cultural identity in the course of the Prepalatial period (Maran 2011; Burns 2010). The wealth gained by mainland elites through trade or warfare with entities outside of mainland Greece prompted the use of the mortuary realm to create status, through what is known as "conspicuous consumption" (Voutsaki 1995, 1998, 2001, 2010c). Conspicuous consumption is the display of wealth and status items as a way to illustrate to others that the individuals burying the deceased could afford to remove such valuable items from economic circulation (Voutsaki 2001). This practice is apparent in the monumentalizing of tombs, as described above.

Displays of power and status were a significant aspect in settlement as well as funerary contexts. Wright (2004a) has convincingly argued how communal feasting must have been a fundamental part of the development of Mycenaean cultural identity, as it allowed leaders to exhibit their power, wealth, and hunting/warfare abilities to their factions. Feasting required control or access to land and animal resources, which most likely led to disputes over land (Wright 2004a, b; Acheson 1999). Warfare and shows of force were especially important during this time as they served to reinforce newly established social hierarchies and help develop sociopolitical complexity (Acheson 1999; O'Brien 2013). The development of warfare in the course of the Prepalatial period is demonstrated not only by the appearance of weapons in elite graves, but also by the establishment of fortified settlements in Messenia (Malthi, Peristeria, Pylos), the Argolid (Mycenae, Argos), and Attica (Kiapha Thiti, Brauron; Wright 2008b).

The later phases of the Prepalatial period (LH IIB-LH IIIA1/2 Early) saw further consolidation of power as well as the standardization and spread of cultural customs in large part through regional and interregional warfare (Bennet 1995; Acheson 1999; Davis and Bennet 1999; Eder and Jung 2015; Van de Moortel, forthcoming). The patterns of construction and destruction of monumental tholos tombs as well as the destruction and abandonment of sites around Mycenaean centers indicates that conquest played a critical role in the rise of the leaders of these centers (Bennet 1995; Davis and Bennet 1999; Van de Moortel and Vitale, forthcoming; Van de Moortel, forthcoming). These conquests at times were followed by large scale construction projects such as the construction of palaces and harbors, which would have required large, controllable work forces ostensibly acquired through conquest. Davis and Bennet (1999) and Van de Moortel (forthcoming) argue that these workers were likely prisoners-of-war procured by the forces of the victorious elite leader.

To accomplish effective military actions and enforce control of labor, the rising leader would have had to accumulate followers through both military prowess and socioeconomic connections (O'Brien 2013; Deger-Jalkotzy 2008; Wright 2004a,b; Acheson 1999). As leaders became more prominent in their own communities, they began to form alliances and coalitions with those outside of their immediate territories so that the elite class controlled access to valuable resources (Wright 2004a, b). Leaders formed a network using trade and gift exchange to solidify relationships through peer-polity interaction (Renfrew and Cherry 1986). As the elites from different areas began to interact more regularly, the material expression of Mycenaean cultural identity became more standardized (Wright 2004b).

In the course of the LH II phase, a clear hierarchy in tomb types emerged in the Peloponnese and parts of central Greece. In most Mycenaeanized regions tholos tombs and

RCCTs were the most common tomb types as shaft graves went out of use. It is thought that the monumental structure of the tholos was used to display the wealth and power of the top elite at Mycenaean centers, whereas RCCTs were employed by lesser elites (Davis and Bennet 1999; Cavanagh and Mee 1998; Bennet 1995). Only top elites at Thebes, in southern Boeotia, used RCCTs instead of tholos tombs (Cavanagh and Mee 1998). BCTs became rare but remained in use through LH IIIA (Papadimitriou 2001:5, 166). All these elite grave types were easily distinguished from the tombs of the lower classes who still used pit, cist, and pithos graves (Cavanagh and Mee 1998:43-44). In the Argolid, wealth deposition reached its climax in the LH II phase (Voutsaki 2001). At Mycenae, six of the nine tholos tombs were constructed at this time (Wace 1921-1923; Hood 1960; Boyd 2002). At several other sites, such as Dendra, Argos, Schoinochori, Kokla, Aria, and Galataki in the Argolid, Aigon and Kallithea in Achaea, Pellana in Laconia, Ayios Ilias in Aetolia, Kalapodi in northern Phokis, and Zeli Agios Georgios and Golemi Agios Georgios in East Lokris, new RCCT cemeteries were created in LH II in previously unoccupied places, starting with the establishment of one or a few RCCTs (Cavanagh and Mee 1998; Acheson 1999; Dimaki and Papageorgiou 2015). At the moment it is unclear whether the individuals who established these new tombs were local elites rising to power or agents sent from the larger, established centers of power (Phialon 2011; Van de Moortel 2007:245-246; 2016:106-107; Acheson 1999). Eder and Jung (2015) have argued that the spread of standardized tomb types and other forms of material culture indicate the expansion of the military power and influence of Mycenae throughout most of the Aegean during this time. Other scholars see the rise of independent chiefdoms or peer-polities that voluntary adopted Mycenaean elite culture (Renfrew and Cherry 1987; Davis and Bennet 1999; Wright 2004b).

Tombs with swords, armor, and other weapons known as "warrior graves" were widespread during the late Prepalatial period as well (O'Brien 2013; Dakoronia 2007; Deger-Jalkotzy 2006; Voutsaki 2001; Acheson 1999; Preston 1999; Driessen and MacDonald 1984). One of the most famous warrior graves is a LH IIB RCCT at Dendra, in the Argolid, which contained a full set of bronze armor and a boar's tusk helmet along with weaponry (Åström 1977). The nature of warrior burials was regionally variable in terms of the types of weapons and grave goods deposited. For many modern scholars, the primary criterion for identifying a Mycenaean warrior grave is the inclusion of a sword that typically is ornately decorated and may not have been used in life (Molloy 2010; Smith 2009). However, others point out that even if individuals were provided with a "warrior identity" through the inclusion of swords and other weaponry, it should not be assumed that such individuals actually had been fighters during their lifetime (Georganas 2018; O'Brien 2013; Molloy 2010; Smith 2009; Whitley 2002). Warrior tombs appeared in the Argolid, Messenia, Achaea, central Greece, Thessaly, and Crete, and most were established in the LH II – LH IIIA1 phases (Eder and Jung 2015). Eder and Jung (2015) see the existence of warrior tombs as further evidence that the center of Mycenae expanded its military power and influence throughout most of the Aegean at this time.

As elites were consolidating their resources, they also appear to have established some degree of control over craft specialization and production. This led to more centralization of settlements and the construction of specialized buildings so that staples could be stored and exchanged for wealth to grow and maintain network ties (Wright 2008b). There is evidence of special construction of elite centers in the late Prepalatial phase under the later palatial buildings at Tiryns (LH IIIA1; Maran 2001) the Menelaion (LH IIB-IIIA1; Catling 2009) and Ayios Vasileios (LH IIB-LH IIIA2/LH IIIB1; Vasilogamvrou 2015; Kardamaki 2017) near Sparta,

Pylos (LH II-IIIA; Nelson 2017), Iklaina (LH IIB-LH IIIA; Cosmopoulos 2018), Kakovatos (LH IIB; Eder 2009), Eleusis (LH II), Thebes (LH II/IIIA; Dakouri-Hild 2001), and Mitrou in East Lokris (LH IIB-LH IIIA1; Van de Moortel and Zahou 2012). These elite buildings exhibit considerable variation in size, shape, and building techniques at this time, which demonstrates the still somewhat heterogeneous nature of Mycenaean elite culture in the late Prepalatial period (Wright 2006; Darcque 2005).

Palatial Period (LH IIIA2-LH IIIB)

The construction of palaces and fortified citadels by the extant, victorious elites in the Peloponnese and central Greece mark the beginning of the Palatial period on the mainland. Mycenaean palatial polities became the most powerful entities in the southern Aegean, and they developed an administrative system using Linear B script to document transactions. At this time, the main features of Mycenaean culture had become more or less standardized. These were derived from an amalgamation of the most pervasive regional elite practices from the Prepalatial period and formed the Mycenaean *koinè*, or common elite culture.

The standardization of Mycenaean cultural practices in the Palatial period is readily observed through the similarities in the architectural features of the palaces. Similarities between the palaces include the use of Cyclopean masonry, fortification walls, a central megaron, a tripartite rectangular structure, that served as a throne room, a central court in front of the megaron, a secondary megaron, and figured wall paintings (Wright 2006; Rutter, Lesson 20, online). However, each palace had unique features as well, indicating regional differences and individuality. The palace at Pylos lacked fortification walls, Tiryns had two additional courtyards, and Mycenae had a monumental stair case leading up from the Lion Gate to the palace (Rutter, Lesson 20, online).

Palaces were established in the Argolid (Mycenae, Tiryns, possibly Midea and Argos), Messenia (Pylos), Boeotia (Thebes, presumably Orchomenos), Thessaly (Dimini/Iolkos), and presumably Attica (Athens). With the palatial systems in place it was possible for rulers to control access to trade routes and certain types of elite industries such as perfume, ornate textile, and chariot production (Killen 2001). Mycenaean palaces also acquired the ability to organize the large labor forces needed to work in those industries and to carry out large engineering feats such as the digging of an artificial harbor near Pylos (Davis and Bennet 1999) or the drainage of the Copaic basin near Orchomenos (Knauss 2001; Kountouri et al. 2013; Van de Moortel, forthcoming).

The areas that surrounded the palaces and presumably were controlled by them were highly influenced by Mycenaean culture, as is seen through the adoption of Mycenaean architecture, pottery, tomb types, and burial practices (Cavanagh and Mee 1998; Phialon 2011). In mainland Greece, Mycenaean culture was adopted by most of the Peloponnese and central Greece up to the northern border of the modern region of Thessaly (Eder and Jung 2015). On Crete, Linear B tablets found at Knossos and Chania and other archaeological materials demonstrate that there was a strong Mycenaean administrative and military presence in LM IIB-LH IIIB (Rutter, Lesson 18, online; Eder and Jung 2015; Preston 1999; Bennet 1990). Many Aegean islands exhibited signs of Mycenaeanization as well (Vitale 2012).

Mycenaean Social Structure in the Palatial Period

Along with the construction of palaces came the formalization of the social hierarchy and elite ideology, the implementation of the palatial political economy, and a shift in the use of military power. Much of the information we have on the socioeconomic role and administrative operations of the palaces is derived from Linear B texts. Linear B is a pre-Greek script developed

from the as yet undeciphered Linear A script used by the Minoans. The Linear B texts illustrate the presence of a complex social hierarchy both inside and outside of the palace walls (Killen 2007; Nakassis 2013; Olsen 2014). There appear to be three broad social groups: the palatial elite (primary elite/royalty), the regional elite (secondary elite/lesser elite), and the lower classes (common people). Nakassis (2013) has convincingly argued that there was more nuance within the social hierarchy than is indicated by this division. He demonstrated that within the broad categorizations of social hierarchy at Pylos there was a continuum of statuses that could have been achieved, which may have blurred the boundaries between status groups. This implies that there could have been a middle class, i.e., those of moderate wealth who would have had enough resources to build an RCCT but perhaps not include many, if any, grave goods of high quality. Some of those middle class people may have attained their wealth and status through connections to the palace (see below).

Generally, the highest-ranking members of society were associated with landholding, religious activities, and military activities (Nakassis 2013). The *wanax*, or king, was the figure at the head of the palatial system as well as the religious arena (Kilian 1988; Wright 2004a). The ideology surrounding the wanax was at the core of Mycenaean ideology as a whole. He and his lineage together with the administrators directly beneath the *wanax* formed the palatial elite class (primary elite). The second in command, the *lawagetas,* was the next highest ranking member of Mycenaean society. He may have served as military, religious, and administrative leader (Nakassis 2013; Shelmerdine and Bennet 2008). Although the titles of other palatial officials are known, it is unclear what functions they served (Shelmerdine 2008 and Bennet 2008; Killen 2008). A group known as the *heketai* ("followers") have been identified as a high-status group within the administration (Nakassis 2013; Shelmerdine and Bennet 2008). They have been

mentioned in association with military efforts, the procurement of female slaves, and the performance of religious duties (Shelmerdine and Bennet 2008; Driessen and MacDonald 1984). Another group is the "collectors" who do not seem to have official titles and who may not have been administrative officials at all (Nakassis 2013) but may have been associated with the palatial administration through elite lineage (Shelmerdine and Bennet 2008).

The regional elite class (secondary elite) was comprised of what appears to be provincial governors and community leaders (Nakassis 2013). At the top of the hierarchy were the provincial governors (*damakoroi*) who were appointed by the *wanax*. Following these were the district leaders (*koreter* and *prokoreter*) who also may have been appointed by the *wanax*. Major religious officials appear to have fallen within this regional elite category, including priestesses and other female religious leaders. These officials were given the use of land by the palaces for their religious duties. Even though female religious officials did not own land, they controlled palatial lands as landholders (Nakassis 2013; Olsen 2015). Below the provincial and district leaders were the "service men" (*telestai*) who seem to have been associated with the *damos*. The meaning of the term *damos* is not certain, but it potentially refers to a community or administrative body (Nakassis 2013; Shelmerdine 2011). The *telestai* controlled agricultural land belonging to the palace and were expected to contribute goods to the palace in return. They also served as spokesmen for the *damos*. Finally, the *gwasileus* was a locally based "chief" who does not seem to fit within the palatial administrative structure. Nakassis (2013) posits that the position may have been hereditary and concerned with production of goods and supervising palatially contracted work groups.

Several scholars have proposed the existence of a middle class in Mycenaean society (Nakassis 2013; Shelmerdine 2013, 2011; Shelmerdine and Bennet 2008; Killen 2006; Palaima

1999). These would have been more modest but still well-to-do landowners/holders and traders well as the wealthier among the herders, soldiers, and craftsmen, such as supervisors of large or multiple flocks, bronze working supervisors, perfume makers, weapon makers, and chariot builders (Nakassis 2013; Shelmerdine and Bennet 2008; Killen 2001). Certain of these craftsmen were designated as "royal," which may have provided them with elevated status above the middle class. It also is conceivable that individuals in a range of industries were able to procure a moderate level of wealth and status through both palatial and non-palatial economic markets, and thus rise from lower to middle class. Furthermore, some individuals appear to have performed more than one role, thereby increasing their ability to attain higher status within the palatial socioeconomic system (Nakassis 2013). Such individuals mentioned by name in Linear B texts provided key goods and services, such as taking care of royal livestock, participating in industries requiring skilled labor (such as perfume and chariot making) and providing the needed flax and grains for the palaces. Given the multiple roles some individuals held with respect to these tasks, it was possible that they were of the regional or local elite class even though they did not have official administrative titles (Nakassis 2013). In addition, there were occupations that were vital to the functioning of Mycenaean society, but are rarely mentioned in Linear B texts, such as bakers and potters, which may have allowed individuals to adequately provide for their families as well as accumulate socio-economic status, and allow for burial in an RCCT (Shelmerdine and Bennet 2008). Given the lacunas in the textual evidence, it is impossible to know whether such people belonged to the lower or middle class. It is widely agreed that a private economic sector existed outside of the palatial socioeconomic system that would have allowed individuals to provide for themselves without much, if any, involvement with the palace (Killen 2001; Shelmerdine 2013; Parkinson et al. 2013). In this way, many individuals could

have provided a comfortable middle-class life for themselves and their families without ever being mentioned in the written (palatial) records.

Less is known about the lower classes of society, but it is reasonable to assume that they consisted of free people of modest means as well as servants and slaves who were dependents of the palace and presumably of local elite households (Killen 2007; Nakassis 2013; Olsen 2015). The most commonly mentioned lower-class position in the Linear B texts was the textile worker, thereby attesting to the importance of the textile industry for the palaces (Killen 2001; 2006; Nakassis 2013; Olsen 2015). The next most common occupations were those that dealt with the maintenance of the palace and care for the palatial elite, such as cooks, water suppliers, flour grinders, bath workers, and *amphiqoloi* ("personal attendants?"; Olsen 2015). It is possible that some individuals working in palatial industries such as the textile industry were slaves, as there are records from Knossos referring to the buying and selling of *doerai*, a word which has many connotations but must refer to slaves in those contexts (Killen 2006:90). Most of those listed as dependent on the palace for most or all of their subsistence needs were women and their children who were not identified by name but generally as a group with a designated occupation and/or ethnicity (Olsen 2015). Men are rarely described as being fully dependent on the palace for subsistence. However, Linear B texts document the adolescent and adult male children of female dependents potentially as a way to assign them to work groups, which indicates that some men were at least partly dependent on the palace as well (Killen 2006; Olsen 2015). In addition to people working directly for the palace, there also appears to have been a system of corvée labor referred to in Linear B texts, which required communities to provide men to work for the palace as rowers, soldiers, craftsmen, etc. in return for palatial land, goods, services, and protection (Killen 2015; see below). It is unclear what the status of such men was, but they were likely of

the lower classes (Killen 2015; Driessen and MacDonald 1984). In addition, many individuals of the lower class are likely to have existed in the private sector without ever appearing in written records.

It is unclear whether middle- or lower-class people working as dependents of the palace would have lived only in the palatial settlements or also further away, in non-palatial communities, *i.e.*, settlements that did not have a palace themselves but belonged to a palatial polity. Linear B texts from Pylos indicate that there were textile workers stationed in the vicinity of the palace or secondary administrative centers, but it is not clear whether this means that they lived in palatial or non-palatial settlements (Olsen 2015; Bennet 2011; Killen 2008; Chadwick 1988). Since palatial territories--if we accept the peer-polity theory--were not that large, it may be reasonably assumed that at least some palatial dependents lived in non-palatial communities belonging to the palatial polity. It also is conceivable--and this relates directly to the study at hand--that favorite palatial servants living in non-palatial communities and treated as family, such as Odysseus' cherished wet nurse Eurykleia in Homer's *Odyssey (Od.2.361,23.49)*, would have been buried in RCCTs potentially with the ruler's family or provided with their own RCCTs. Furthermore, it is reasonable to assume that regional and local elites tied in with the palaces (Nakassis 2013) would have had lower-class servants or slaves as well and allowed their favorites to be buried in their own family RCCTs, or even gave them their own RCCTs.

Mycenaean Economy in the Palatial Period

For many years it was thought that the palaces were the central and dominant force in the Aegean economy, but recent research of Linear B records and archaeological data has led several prominent scholars to conclude that the economy was a more decentralized system in which the palaces were significant participants (Voutsaki and Killen 2001; Halstead 2001; Whitelaw 2001;

Galaty and Parkinson 2007; Nakassis 2010; 2013; Parkinson et al. 2013). The primary concern of the palaces appears to have been building symbolic capital and profit (Nakassis 2010; Galaty and Parkinson 2007). For this reason, Nakassis (2010:139) identifies reciprocity and symbolic exchange as the most significant components of the Mycenaean political economy. Rather than serving as the primary redistributive center for staple goods, as was previously thought, palaces mainly would have used staple goods to support the production of prestige items, provide rations for workers in palatial industries and palatial servants, and to procure food, drink, and pottery vessels for feasting events that were used as a way to confirm the existing social order (Nakassis 2010; Wright 2004a). Staple goods are defined as basic household items such as food, livestock, pottery, and simple textiles. Prestige items are high-value goods such as manufactured products acquired through local craft production, local taxation, and local as well as foreign exchange (Nakassis 2010). At this time, the palaces had contacts with Egypt, the Levant, Anatolia, Italy, Sicily and—indirectly--the Baltic region through which they imported materials and participated in elite gift exchange (Burns 2010). The palaces are thought to have controlled the distribution of most imported materials and goods to other parts of the mainland and the broader Aegean (Voutsaki 2010; Burns 2010; Sherratt 2001; Voutsaki 2001). Similarly, the palaces controlled industrial production of certain types of prestige goods such as perfumes, high-quality textiles, chariots, and metallurgy, which involve a high degree of craft specialization (Killen 2001, 2008; Nakassis 2013). Prestige items, acquired or produced, were used in gift exchange with foreign leaders and local elites to bolster political alliances and ensure loyalty, whereas feasts, often religious in nature, were used to demonstrate the abilities of the palaces to provide, build community ties, and reinforce social hierarchies (Nakassis 2010; Wright 2004a,b; Galaty and Parkinson 2007; Parkinson et al. 2013; Shelmerdine 2011; Halstead 1992). There are some

prestige items such as high-quality painted pottery that were likely not controlled by the palaces, which means that not all tombs that yielded such pottery would necessarily have needed to have had palatial connections (Whitelaw 2001; Knappett 2001). However, if prestige goods controlled by the palace are found in palatial-era tombs, they are indicative of a direct or indirect connection with the palace.

Rather than dominating the staple economy, it appears that the palaces participated in it as consumers to procure goods and services to meet their needs (Nakassis 2010; 2013; Shelmerdine 2011; Voutsaki 2001; Halstead 1992). This was partly accomplished through corvée labor, a system through which palatial powers were able to conscript labor from individuals in exchange for goods and services (Killen 2015). This type of labor was likely instrumental in providing a way for the *wanax* to maintain a military force, provide palatial ships with rowers, and carry out public works such as building palaces, citadels, fortifications, etc. (Killen 2015). Linear B texts provide evidence for corvée labor in which it is documented that individuals entered into contracts with the palaces to receive palatial resources (land, animals, food, etc.) in exchange for providing military services to the palace (O'Brien 2013; Nakassis 2013; Driessen and MacDonald 1984). The Pylian texts indicate that both the *damos* (rural community or administrative body) and elite landowners were required to provide men for the army or navy, such as rowers for the coast guard (O'Brien 2013; Deger-Jalkotzy 1999; Killen 1983). Alternatively, or additionally, landholders payed part of their harvest to the palace as a tax for the use of palatial land and for other items provided by the palace, such as agricultural animals (oxen, sheep, flax seed, etc.; Halstead 1992; 2001; 2002; 2007).

The palace had several fundamental needs that it met through taxation and corvée labor, such as providing resources for those who were partially and completely dependent on the palace

for subsistence. The palaces acquired wool and flax to supply their extensive textile industries and gathered supplies for communal feasts (Nakassis 2013; Shelmerdine 2011; 2013; Wright 2004a; Halstead 2004; 2001; 1992). Linear B evidence suggests that the palaces entered into contracts with individuals and communities to meet these needs (Halstead 1992, 2001; Nakassis 2013; Shelmerdine 2011). For example, because growing flax is a difficult, intensive process, Halstead (2001) suggests that palaces allotted plots of land to people on the condition that some of the land be used to grow flax. The community may then have benefited by being able to grow more food for subsistence relief or to trade for feasting supplies (Halstead 1992; 2001; 2007).

The ability of individuals to negotiate transactions with the palace to their benefit is significant for understanding the decentralized economic system and social structure of the Palatial period (Nakassis 2013: Shelmerdine 2013; 2011). Studies of the Linear B tablets suggest that the palace did not necessarily have over-arching rules of taxation for the entire territory, but rather imposed different types of taxation depending on the relationships it cultivated with specific people and communities in order to acquire needed goods and services (Shelmerdine 2008; 2013; Halstead 2001; 2007). The Linear B tablets from Pylos name specific people in such transactions, including land owners, herders, soldiers, smiths, and various craft specialists such as textile, perfume, and chariot producers (Nakassis 2013). Many individuals voluntarily engaged with the palaces through prestige and staple related industries and some did so through multiple industries simultaneously (Nakassis 2013; Shelmerdine 2011; Halstead 2001; Voutsaki 2001). For example, Nakassis (2013) identified 30 individuals who were both smiths and herders and/or landowners. He believes that these individuals were likely of high status and served as supervisors of work groups for the palace (Nakassis 2013). Because individuals and communities who interacted with the palatial system may have been able to negotiate the extent to which they

wished to be involved with the palaces, it is plausible that this may have resulted in a continuum of integration with and expression of Mycenaean cultural identity (Davis and Bennet 1999; Shelmerdine 2011). Shelmerdine (2011:28) believes that the Mycenaean state should be viewed as a "complex nexus of relationships (of the palace) with towns, groups, and individuals" rather than a monolithic bureaucracy. An individual or community did not have to be completely enmeshed in the palatial system in order to benefit from it (Nakassis 2013; Shelmerdine 2011; Killen 2008).

Of interest to the present study, which deals with a RCCT cemetery located at some distance to the nearest palatial settlement (Orchomenos), various studies indicate that the palace had tighter control over the area in its vicinity than over lands that were further away (Killen 2008; Small 2007; Tartaron 2005). Renfrew (1975:12-16) estimated that the average size of individual territories of polities engaging in peer-polity interaction was ca. 1500km^2 with a 22km radius, which is a day's walking distance. Linear B texts from Pylos, Thebes, and Knossos suggest that these palaces tightly controlled nearby lands and communities but had relationships with only some communities located further away (Sherratt 2001; Tartaron 2005; Killen 2008:166; Shelmerdine 2011; Nakassis 2013). It is not clear whether areas in which the palaces had less influence could be considered as belonging to a palatial territory. Rather, the borders of Mycenaean influence appear flexible, potentially shifting as the palatial forged relationships with new individuals and communities through trade and conquest. Tartaron (2005) makes the case that the settlement of Glykis Limin in Epirus was involved with the Mycenaean palatial system but the paucity of Mycenaean type artifacts in the surrounding area of Epirus suggests that the region as a whole was not "Mycenaeanized." Likewise, some communities in Achaea and parts of the Corinthia appear not to have adopted Mycenaean culture at all or may have done so only

in part (Tartaron 2010; Arena 2015). Although some argue that Achaea was never fully integrated into the palatial system (Arena 2015), Papazoglou-Manioudaki and Paschalidis (2017) have uncovered Mycenaean settlements in the region, and there are RCCT cemeteries with Mycenaean characteristics (Papazoglou-Manioudaki and Paschalidis 2017; Arena 2015; Cavanagh and Mee 1998). As in Epirus, it is possible that only some parts of Achaea had adopted Mycenaean cultural practices and identities while other areas did not choose to express palatial connections through material means.

The porous, fluid, and contractual nature of the palatial system envisioned by many current scholars would imply that many communities, and especially those in regions located further away from the palace, were not tied to the palatial economy. Moreover, all communities controlled by the palace must have been able to procure basic commodities outside of the palatially controlled industries (Galaty and Parkinson 2007; Parkinson et al. 2013; Shelmerdine 2013; Aprile 2013). For instance, studies at Pylos (Whitelaw 2001) and Iklaina (Shelmerdine 2013) have convincingly demonstrated that pottery production was carried out by independent producers, who distributed their goods to the palaces as well as to non-palatial settlements. At Iklaina there are no apparent status differences among the household pottery found in elite and non-elite contexts throughout the site, which again suggests that individuals of a range of statuses were able to obtain the basic, utilitarian pottery of daily life without the involvement of the palatial system (Shelmerdine 2013).

Mycenaean Funerary Practices in the Palatial Period

The mortuary landscape was still an important avenue for the expression of cultural identity in the Palatial period. Tholos tombs continued to be restricted to the most elite individuals since they have been found only at palatial centers and they are very rare in

comparison to RCCTs (Rutter, Lessons 19 and 21, online; Cavanagh and Mee 1998). Given their spatial distribution and much greater rarity in the Palatial than Prepalatial period, it is possible that large tholos tombs were confined to members of the royal family in major palatial centers such as Mycenae, whereas a few local elites in more peripheral areas, such as on the islands of Kephalonia, Zakynthos, Naxos, Euboea, and Mykonos, utilized the tholos on a smaller scale (Cavanagh 2008:331).

In contrast, the numbers of RCCTs and RCCT cemeteries exponentially increased throughout the mainland and in the broader Aegean at this time (Cavanagh and Mee 1998; Van de Moortel 2007). The limitation of the tholos tomb to the top echelon of society and the concurrent expanded use of the RCCT is widely understood to indicate two trends: 1) Mycenaean influence spread more rapidly in the Palatial period; and 2) a larger proportion of the population began to use the RCCT. Evidence for the use of the RCCT among a wider range of social classes, including possibly the middle class, is derived from the greater degree of variability among grave good assemblages (Cavanagh and Mee 1998; Voutsaki 1995, 1998, 2010; Mee and Cavanagh 1984, 1990; Dickinson 1983). For example, some unplundered tombs have been found to contain only a few ceramic vessels whereas others had ceramics, jewelry, weapons, and ornaments (Cavanagh and Mee 1998; Lewartowski 2000). Moreover, tomb type does not always correlate with level of wealth, as simpler tomb types, such as cist graves 8, 19 and 22 at Asine, can be as wealthy or wealthier than the poorest RCCTs, and include similar types of grave goods (Shelmerdine and Bennet 2008; Lewartowski 2000; Cavanagh and Mee 1998; Dickinson 1983).

One may wonder, then, why some wealthy individuals in the Palatial period chose to be buried in cist tombs whereas most other people, wealthy or less wealthy used RCCTs, as this is

the most common tomb type found during this period. It is implied by many scholars that the use of the RCCT indicates a claim of connection to the palatial system since all RCCT cemeteries in the Peloponnese, central Greece, and Crete are deemed “Mycenaean.” For instance, the notable differences in the quality of goods between different tombs and different cemeteries is interpreted by them to mean that some groups or communities may have had closer connections to the palatial administration than others did (Blegen 1936; Wace 1932; Gillis 1996;Wright 2008a; Smith et al. 2017). The existence of moderate to poor RCCTs would then indicate that they belonged to middle-class people or, as I propose here, even lower-class people, who desired to express their relationship with the palace and were allowed to do so. Conversely, the presence of wealthy cist graves could mean that these belonged to well-off individuals who either chose not to express a relationship to the palatial system or did so through grave goods rather than tomb type. Grave 8 at Asine contained the skeleton of a horse, a rare occurrence in any LH tomb and is not necessarily exclusive to the Mycenaean palatial system, even though the horse is considered to have been an elite animal. The presence of gold jewelry in Grave 19 at Asine, which was an imported material, suggests that these individuals had contact with the palatial system, which controlled the distribution of most imported items. However, rather than implying direct "largesse," it is conceivable that these individuals had acquired the gold indirectly, through a relationship with someone who was part of the palatial system, and without being themselves part of that system. Pit and cists tombs declined in popularity in the Palatial period, but their continued use along with that of the Built Chamber Tomb suggests that some individuals at both upper- and lower-class levels adhered to more traditional types of tombs even in the Palatial period, possibly expressing their independence from the palace (Papadimitriou 2001:207-208; Van de Moortel 2016).

As described previously, recent Linear B studies indicate that both elites and individuals from the middle and lower classes were involved with the palatial system. If RCCTs indeed expressed a relationship to the palace, this would explain why there were more RCCTs and a greater diversity of wealth inside them during the Palatial period. Individuals may have tried to demonstrate their relationships with the palatial system not only through adoption of the RCCT but also by including grave goods given to them through palatial "largesse" (Voutsaki 2010c). I propose that these grave goods would include items made from imported materials, such as jewelry made of gold, silver, bronze, ivory, and amethyst (Burns 2010), as well as goods that indicate participation in activities associated with elite palatial practices and status identifying behaviors such as feasting/drinking (kylikes and other drinking vessels); the use of perfumed oils (alabastra or small stirrup jars: Murphy 2013; Wright 2004a; Halstead 2001; Whitelaw 2001; Killen 2001); the use of seal stones, which were administrative instruments (Eder and Jung 2015; Eder 2007); and the use of gold signet rings, which belonged to the highest palatial officials or those closely associated with them (Eder and Jung 2015). Such items demonstrate conspicuous consumption, a Mycenaean practice, and indicate connections with the palatial system.

RCCT Cemetery Organization in the Palatial Period

Given the great effort that went in to creating RCCTs and their burial contexts, it seems unlikely that the placement of such tombs in a cemetery was not socially meaningful in some way (Cavanagh and Mee 1990). Appearances were a significant part of the Mycenaean mortuary environment from the construction of the tombs to the funerary rituals to the contents of the grave (Boyd 2016; Papadimitriou 2011; Voutsaki 1995; 1998; 2001; 2010; Cavanagh and Mee 1998; Mee and Cavanagh 1990; Dickinson 1977). As this is the case, it seems likely that the

gathering of such tombs into cemeteries was a meaningful and intentional act in the LBA Aegean.

Few scholars have explicitly addressed the question of cemetery organization in the Late Bronze Age. Tsountas (1897), Blegen (1936), and Wace (1932) believed that RCCT cemeteries represented various kinship or clan groups, assuming that each tomb group represented a family unit. The modest size of many cemeteries, containing 10-20 tombs, indeed would allow for the possibility of clan or kinship groups. However, other cemeteries contain many more tombs, such as that of Tanagra near Thebes, which has 200+ RCCTs. If each tomb represented a family unit, it would be unlikely that all of the tombs in such large cemeteries had kinship connections. Rather the groups/families buried in the RCCTs may have had other types of social connections. Wright (2008a:149) suggests as much when he states that the existence of multiple RCCT cemeteries around the Mycenaean settlement of Tsoungiza "seems to represent a profound change in social order" that is not based primarily on "local subsistence and kin-ordered identity."

The organization of tombs within the RCCT cemetery itself has received limited attention. Mee and Cavanagh (1990) were the only scholars to have examined the spatial organization of tholoi and RCCTs both in the landscape and within cemeteries. In assessing the cemeteries at Prosymna in the Argolid, they determined that wealth was not the primary structuring principle of the cemeteries, as wealthy and poor tombs were spatially intermingled. Furthermore, the cemeteries did not appear to have been arranged according to the date of tomb establishment, meaning that the tombs do not spread out from the oldest tombs, but older and younger tombs are scattered among one another. To explain this pattern, or, rather, lack of

pattern, Mee and Cavanagh (1990:232) posit that the tombs may have been arranged "according to an organizing principle of Mycenaean society" such as kinship relations.

Mee and Cavanagh (1990) suggest that the commingling of tombs varying in size, wealth, and date in the same cemetery indicates loose political alliances whereby the poorer associated themselves with the wealthy in death. In their view, it is possible that the cemetery represents an extended kinship group, a network of families/groups connected through patron/client relationships, or more likely, a combination thereof. Following up on this, Wright (2008:150) argues with respect to the Palatial period that since the male individual "made his way in the world now by means of his relation to the economic and political center of the palace" there was a shift in mortuary practices wherein tombs were grouped "in terms of new divisions within the community." Such organization still allows for organization according to ancestral lineages but opens up the possibility for cemetery organization based on other types of social relationships. Mee and Cavanagh (1990) point to the Linear B tablets as evidence for hierarchical divisions that suggest that local associations and alliances bound families of different wealth and status together. Concrete examples of such relationships are provided by Nakassis (2013), who argues that men mentioned multiple times in the Pylian Linear B texts were not necessarily responsible for carrying out various tasks personally, but were responsible for ensuring that the tasks were ultimately accomplished, meaning that they could have delegated such tasks to relatives or otherwise affiliated individuals. The delegation of such tasks would have led to local associations and alliances that bound individuals of different statuses together and may have been expressed in the mortuary realm through cemetery organization. If this was the case, it would explain the lack of tomb clustering based on wealth or chronology as observed by Mee and Cavanagh (1990) at Prosymna.

Mycenaean Warfare in the Palatial Period

The use of force remained an active part of Mycenaean culture in the Palatial period, but there arguably was a shift in the way military power was projected in settlements and tombs. Archaeologically, shows of force now were conveyed more through the fortification walls of citadels and other fortified structures than through imagery or grave goods (O'Brien 2013; Hiller 1999; Deger-Jalkotzy 1999). The building of fortifications increased toward the end of the Palatial period indicating more emphasis on defense and war-related activity. For instance, in the latter half of the LH IIIB phase, Mycenae extended its fortifications walls twice and constructed an elaborate access to an underground water supply. Similar concerns for strengthening fortifications and establishing access to underground water sources are seen in the citadels of Tiryns and Athens. These developments are widely interpreted as preparations for siege warfare, potentially signaling unrest that would contribute to the end of the Mycenaean civilization (Deger-Jalkotzy 2008). Such enormous undertakings, at the same time, represented a grandiose public display of power.

Imagery of warfare is less frequent now than in the Prepalatial period, but when it does occur it is confined to the palaces and appears to have been used to send a particular message of strength (Davis and Bennet 1999; Hiller 1999). For example, the wall painting in Hall 64 at Pylos depicting Mycenaean warriors with swords and spears fighting an enemy force may have been an intentional reminder of recent conquests (Davis and Bennet 1999). The restriction of warrior imagery to palatial contexts suggests that military power was directly and officially associated with the palaces as an integral part of "being Mycenaean" or, at least, being a palatial elite (Acheson 1999; Davis and Bennet 1999; Deger-Jalkotzy 2006; 1999; O'Brien 2013). It also

suggests that the palaces wished to project the image that only the *wanax* and/or palatial elite had the military might to maintain power.

According to most scholars, Linear B texts indicate that the palaces were heavily involved in the production and distribution of bronze weaponry including chariots, armor, swords, spears, arrowheads, and javelins (Palaima 1999; Deger-Jalkotzy 2006; 1999; Driessen and MacDonald 1984). This may mean that they controlled people's access to weapons for warfare. In other words, they would have been able to arm those who would be fighting for them while also preventing those would fight against them from accessing the same weapons. Controlling access to bronze weaponry also suggests control of bronze sources. This position was most recently supported by Blackwell (2018), who argued that because of the decline in bronze in the archaeological record and appearance of more bronze hoards toward the end of the Palatial period, the palaces likely controlled access to bronze sources at that time. However, he is uncertain as to whether the palaces had as much control over bronze supplies earlier in the Palatial period, in part because of the scarcity of metal workshops in or near the palaces (Blackwell, pers. comm. June 2019).

This prevalent view of palatial control over weapons production and distribution has been challenged by two scholars, O'Brien (2013) and Nakassis (2013), but their arguments are not entirely convincing. Nakassis believes that the palaces did not monopolize bronze distribution in the Palatial period because the quantities of bronze provided to smiths in Linear B texts were small and would not have been sufficient for the smiths' livelihood. In a similar vein, O'Brien (2013) argues that it was the community's job to supply swords and other armaments to soldiers contracted by the palaces because Linear B texts mention chariots and body armor more than swords, spears, and other hand weapons. Nakassis' argument is not very strong, however,

because the small quantities of bronze provided to smiths at the end of the Palatial period may be a sign of the reduced availability of the material at that time, and it is possible that smiths participated in other industries to supplement their livelihoods. Nakassis (2013) provides evidence for smiths also being landholders and herders. O'Brien's (2013) argument, on the other hand, did not describe an alternative method for procuring weapons beyond suggesting that the communities provided them. Furthermore, Linear B texts do not provide a complete record of Mycenaean palatial administrative activities. The greater occurrence of chariots and armor may be serendipitous.

Whether or not palatial rulers monopolized the production and distribution of weapons, there is evidence to suggest that a broader swath of the population engaged in military activities than in the Prepalatial period because rulers now had a formal corvée system to procure military labor from the lower classes. Linear B texts identify military activities such as sending soldiers to guard coastal regions of Pylos (*o-ka* texts at Knossos, Chania, Pylos, Tiryns: O'Brien 2013; Shelmerdine 2008; Palaima 1999; Acheson 1999; Driessen and MacDonald 1984). The distribution of swords to soldiers as recorded in Linear B texts indicates that more individuals were using swords than previously. Molloy (2008; 2010) provides support for the broader usage of the sword at this time through his observation that the shape of the sword became more utilitarian, shorter and more robust, which made it more suitable for group combat. This, in Molloy's view, indicates that lower class soldiers were using such swords in their military service for the palace. Some circumstantial support for the notion that the non-elite, common soldier, now engaged in combat is provided by Smith (2009), who found that the male individuals from Palatial period RCCTs in Athens whose burials did not include weaponry and

wealthy grave goods were actually more likely to exhibit signs of interpersonal violence in their skeletons.

In contrast to the evidence for the expanded use of weapons in life, there is a marked decrease in the number of swords and weaponry found as grave goods in Palatial-period tombs, which indicates that there may have been restrictions on who could be buried as a warrior (Cavanagh and Mee 1998:126; O'Brien 2013; Lewartowski 2000). To explain this, Deger-Jalkotzy (2006; 1999) has suggested that claiming warrior status in the mortuary context was the prerogative of only the palatial elite, as demonstrated by the limitation of warrior themed items, images, and architecture to the palaces (see above). In this view, those buried with swords in Palatial-era RCCTs would have made a strong claim of identification with Mycenaean cultural identity as portrayed by the palaces. At the same time, lower class individuals serving as soldiers for the palace may not have been able to claim the warrior identity in death because of palatial restrictions. This would accord well with Smith's observations in Athenian RCCTs (see above).

I would argue that the observed reduction of swords and weapons in tombs during the Palatial period provides support for palatial control over bronze as well as over the production and distribution of weapons. Given the apparent increase in sword use and lower class combat alongside a decreased sword presence in the mortuary record, it seems to me that it is possible that a soldier who was employed and outfitted by the palace was not permitted to be buried with his sword except in special circumstances, which would have been decided by the palace. There are no records in Linear B texts of swords being returned to the palaces (Palaima 1999; Driessen and MacDonald 1984), but the return of palatially provided armaments may explain their paucity in graves.

Although the warrior ideology is less apparent through grave goods in the Palatial period, it seems that individuals still identified with Mycenaean warrior ideology in other, less tangible ways, thereby demonstrating its importance as part of Mycenaean cultural identity. For example, Palaima (1999) and Deger-Jalkotzy (1999) note that words or roots of words with military and warrior connotations are commonly part of Mycenaean personal names. The word *lawos* translates to 'collective male fighting force,' *ares* is 'war spirit,' and *thars-* is 'courage', all of which were incorporated into personal names (Palaima 1999:371). Both male and female names contained warfare related roots as seen in the female name "Wi-ja-da-ra," derived from the male name "Wi-ja-da-ro" which means "he who has men thanks to force/strength" (Deger-Jalkotzy 1999:123). Such names belonged to individuals with seemingly high socio-economic status but also to some thought of as having lesser status such as shepherds and bronze-workers (Palaima 1999). Given the emphasis on war-related themes in personal names of both elite and non-elite individuals, it seems likely to me that individuals would have included swords in their graves if they could, but they were restricted in their ability to do so. As a result, we are limited in the ways through which we can observe the manifestation of the Mycenaean warrior identity in the mortuary record even though we know it was an important part of being Mycenaean. On the other hand, the observation of skeletal trauma and activity markers related to warfare (see below) can provide some information about how those who claimed Mycenaean cultural identity in death may have embodied warrior ideology in life despite the material limitations on their mortuary display.

Mycenaean Religion in the Palatial Period

A final component of Mycenaean culture in the Palatial period was the increased role of religion in society, as indicated by the greater frequencies of cult iconography and other

archaeological remains related to cult. Linear B texts indicate the importance of ritual feasting, sacrifices to deities, and the performances of religious figures who also formed part of the elite class (Nakassis 2013; Kilian 1988). The highest religious figure was the *wanax* himself. It is widely believed that the military ideology of the Prepalatial period was given religious connotations as the power structure and belief systems began to solidify (Whittaker 2001). As the Palatial period progressed, images of warfare on seals were replaced by images of griffins and lions, the new official iconography (Deger-Jalkotzy 1999). Deger-Jalkotzy (1999) argues that the power of the Mycenaean king was more reliant on his divine powers than on his military abilities during this time. It is likely, however, that both the divine and military aspects of the *wanax* were important in maintaining power and control over the palatial system and way of life. Warfare was embedded in religious aspects of Mycenaean Palatial society as seen in the manifestation of "warrior goddesses" in various frescoes and seal stone images (Rehak 1999). In this way, warfare and divine power were intertwined, suggesting the necessity of both.

There is archaeological and textual evidence for cult activity both inside and outside of the palaces (Nakassis 2013; Lupack 2011). The cult center on the citadel at Mycenae has provided the most evidence of cult practices on the mainland (Lupack 2011). However, Linear B texts indicate the existence of sanctuaries outside the palace wall, and this was recently confirmed through the excavation of an extra-palatial Mycenaean sanctuary at Kalapodi, in northern Phokis, which was located only 5-6 km from the cemetery of Golemi that is the topic of the present study (Niemeier 2016). Linear B evidence suggests that individuals at the sanctuaries could not have survived on the offerings sent by the palaces alone, which suggests that they received support from outside the palaces (Lupack 2011:210). Sanctuaries may have employed non-palatial individuals, such as herders, farmers, and craftsmen, to "help with the care of the

animals and the production of goods," exchanging sanctuary "surplus" for non-sanctuary produced items (Lupack 2011:211). Lupack does not make it clear what "surplus" materials would have been available to the local communities but does suggest that religious personnel were able to increase their own status through such exchanges. Overall, Lupack (2011) argues that sanctuaries existing beyond the palace walls were not wholly subjugated to the authority of the palaces nor dependent on them for their daily needs, but they operated independently and thus played a major role in Mycenaean political economy. As such, the sanctuaries were accessible both to people within the palatial system and to others, including people who were not located at the palatial centers but subscribed to Mycenaean cult beliefs and practices. As independent players in the social, political, and economic environment of the Late Bronze Age Aegean, sanctuaries may have followed the pattern illustrated by individuals in Linear B texts: they may have been able, at least to some extent, to dictate their own relationship with the palatial system and they may provided access to individuals, religious or otherwise, to both wealth and the divine.

Post-Palatial Period (LH IIIC)

The Mycenaean palatial system collapsed at the end of the LH IIIB phase (ca. 1200/1180 BCE), at which time every palace was destroyed or abandoned. Similarly, several settlements were destroyed or abandoned throughout the mainland, particularly in Messenia, the Argolid, and Boeotia (Rutter, Lesson 28, online). There have been a number of explanations put forth for this collapse, but there is very little consensus on the topic (Deger-Jalkotzy 2008). Rutter (Lesson 28, online) has summarized the main themes of the explanations as economic factors, climate change, internal social strife, outside invasion, and changes in the nature of warfare, all of which likely contributed to the collapse in some way. Rather than continuing to search for the cause of

the collapse, current scholarship is more concerned with what occurred afterwards in terms of people's relationship to Mycenaean culture and identity (e.g., Maran 2001; 2006). It is now known that Mycenaean culture did not immediately disappear after the destruction but persisted in various ways in different parts of the Aegean for a significant amount of time. This period of time is known as the Post-Palatial period, encompassing the LH IIIC ceramic phase (ca. 1200/1180-1075/1050 BCE). The Post-Palatial period has been characterized as one of significant instability as a result of the collapse of the palatial administrations (Deger-Jalkotzy 2008).

After the destruction of the palaces, Pylos was essentially abandoned and Messenia was largely depopulated, but Mycenae still saw some use and Tiryns appears to have revived to some extent (Maran 2006; Crielaard 2006; 2011). At Mycenae, earlier structures were repaired and there is evidence for continued religious activity, but it was no longer a center of power (Deger-Jalkotzy 2008). At Tiryns, Building T was constructed in the ruins of the Palatial megaron and the *Unterburg* ("lower citadel") was extensively rebuilt. Building T is a narrow megaron with a central colonnade that integrated aspects of the Palatial megaron, including the location of the throne (Maran 2001). Maran (2006) posits that Building T was mostly likely a communal hall where members of leading families gathered under the authority of a ruler. He argues that the builder of Building T, presumably a new leader, used certain Mycenaean palatial symbols to create new status and identity, such as the throne and the shape of the megaron as well as an altar in the attached courtyard (Maran 2001). This appropriation by new leaders of the place that formerly was the throne room of the *wanax* illustrates the desire for connection with the past. Further evidence of this is the hoard of *keimelia* ("heirlooms") found in the southeastern section of the *Unterburg.* This collection of items consists of Mycenaean objects dating to the Prepalatial

period as well as feasting equipment and other objects dating to the later Palatial and Post-Palatial periods. The valuable and 'antique' items represented by this collection are thought to have been important for the elite ideology of the Post-Palatial period (Deger-Jalktozy 2002). It is thus possible that the *keimelia* of Tiryns had been placed there by one of the ruling families of Tiryns in the Post-Palatial period (Maran 2006). Maran (2006) sees both Building T and the *keimelia* as attempts by the settlement's new leaders to gain legitimacy in new social and political circumstances rather than as an attempt to restore life to its former social order. This is evident in the architecture of Building T through the absence of a central hearth as was customary in the Palatial megaron even though the throne itself was preserved as a feature. Maran (2006) notes that this deviation from Mycenaean custom suggests that the new leader was likely a *primus inter pares* in a society run by aristocrats rather than a king/*wanax* with disproportionately elevated status. The divine mystery embodied in the hearth-*wanax* ideology, posited by Wright (2006) for the Palatial period, was no longer relevant.

Concurrent with the destructions and abandonments of many regions in the Peloponnese and central Greece, there was a movement of people eastward to the eastern Attic coast, Euboea, the Aegean islands, and the East Aegean coast, as well as westward to Achaea in the northwest Peloponnese and the island of Kephallonia (Crielaard 2006; Deger-Jalkotzy 2008; Arena 2015). These areas and the region of the North Euboean Gulf, including East Lokris and northeast Phokis, which had been in decline during the Palatial period, now revived, and RCCTs continued in use (Deger-Jalkotzy 1991; 1994; Van de Moortel and Zahou 2012; see Chapter 5). There also is some evidence for reoccupation at Thebes in the LH IIIC period, as exhibited in the continued use of RCCTs and some resettlement of the site, but it was no longer a thriving community (Deger-Jalkotzy 2008). Generally, the evidence from settlements and cemeteries indicates that

social ranking and elite behavior continued beyond the collapse of the palaces albeit on a smaller, more compressed hierarchical scale.

In the northwestern Peloponnese, the region of Achaea seems to have flourished. This region experienced the most dramatic increase in warrior tombs (i.e. tombs with weapons) in mainland Greece, with most tombs found in the cemeteries of the Patras and Dyme regions in Western Achaea (Deger-Jalkotzy 2006). Scholars have posited that the increase in tombs and their distribution indicate that Achaea was organized into multiple small autonomous polities, each controlled by a local leader (Deger-Jalkotzy 2006; Moschos 2002). Arena (2015) proposes that the lack of complete palatial domination in Achaea during the previous period may have allowed those who lived there to take advantage of the power vacuum left by the collapse of the palatial system. Most of the weapons in these tombs were of Central European types, which strongly suggests that Achaea was instrumental as a link between the Adriatic and the Aegean; this may have contributed to the prosperity of the region (Deger-Jalkotzy 2002, 2006).

In the Post-Palatial period the tholos tomb form was abandoned in most parts of the Aegean, with the exception of some small tholoi constructed in Thessaly and on Crete (Cavanagh and Mee 1998). Conversely, RCCT cemeteries in areas like Achaea, Attica, Phokis, East Lokris, and Thessaly continued to be used and several new RCCTs were established such as the warrior tombs in Achaea previously discussed. At least 80 new tombs were established in the cemetery of Elateia in northern Phokis (Crielaard 2011). Van de Moortel (2007:250) reports that at least nine of 14 cemeteries that were active in the Palatial period in East Lokris continued into the LH IIIC period, including the site of Golemi Agios Georgios, the subject of this dissertation. An entirely new RCCT cemetery was established at Perati in east Attica. The tombs in the Perati and Elateia cemeteries contained several imported goods and high levels of wealth, which

suggest continued contact with the broader Aegean world (Deger-Jalktozy 2009; Crielaard 2011; Murray 2018). Although the RCCT is a Mycenaean tomb type, shifts in burial practices are indicative of the formation of new cultural practices (Murray 2018; Deger-Jalkotzy 2009). For this reason, the use of the RCCT in LH IIIC may not necessarily have signified a claim to Mycenaean identity. It is possible individuals may have continued to use RCCTs simply out of habit, since it takes time for customs to change (Bourdieu 1977; Giddens 1984). The reorganization of cemeteries and the practice of more diverse mortuary rituals indicates a new level of cultural freedom (Deger-Jalkotzy 2008).

As demonstrated best in Achaea, warrior tombs became much more numerous in the Post-Palatial period. Newly established exclusively in RCCTs, other LH IIIC warrior burials have been found in Elis, Attica, western Phokis, Thessaly, and Cycladic islands, which illustrates the resurgence of the warrior identity as a claim to status and leadership. Deger-Jalkotzy (2006:172) cites the Homeric world in which every "free and noble man" had the right to bear a spear and a sword to display his military prowess as a useful parallel for the abundance of weaponry and the warrior identity in the Post-Palatial archaeological record. The Naue II sword type, introduced in LH IIIB, was the most lethal sword of the Aegean at this time and was most prevalent in LH IIIC warrior tombs (Molloy 2010; 2008; Deger-Jalkotzy 2006). It should be noted, however, that although warrior tombs were more frequent at this time, even the largest cemeteries only contained one or two warrior tombs (Killian-Dirlmeier 1998). Moreover, these tombs were clustered together with other elite tombs within the cemetery, which is not a pattern observed in the Palatial period, when wealthy, poor, old, and new tombs had been commingled (Kilian-Dirlmeier 1998; Mee and Cavanagh 1990). I suggest that the clustering of warrior tombs indicates that social rank was dictated more by relationship to dead warriors than in the previous

period. In addition to the continued production of high-quality metal weaponry, there is evidence for sustained use of the chariot (Crielaard 2011). The increased frequency of warrior tombs has been interpreted as evidence for the general instability of the Post-Palatial period (Deger-Jalktozy 2006). As in the Prepalatial period, warfare may have been one of the best methods through which individuals were able to establish themselves as leaders and gain followers (Deger-Jalkotzy 2006).

Further evidence for the warrior ideology of the time is found in pictorial representations of military themes on pottery, and especially on large ceramic kraters, which must have functioned as center-pieces of male drinking events. These include depictions of contemporaneous weaponry, chariot riding, soldiers marching, and the first naval battle scenes in Aegean art (Deger-Jalkotzy 1999, 2006). No warrior tombs have been found in the Euboean Gulf area in this period, but the site of Kynos on the Euboean Gulf has yielded four fragments from three kraters painted with naval battle scenes (Dakoronia 1987; 2006). Significantly, Mycenaean pottery portraying sea battles also has been found in coastal areas of Anatolia (Liman Tepe, Bademgediği Tepesi, Cine-Tepecik) and on the islands of Kos (Seraglio) and Cyprus as well as in the southern Levant (Mountjoy 2005; Dakoronia 2006; Aykurt and Erkanal 2017). The warriors on these vessels have been associated with the "Sea Peoples," seafaring groups of various ethnicities attested in Egypt, Anatolia, Greece and the broader Eastern Mediterranean, who have been credited with contributing to the destruction observed throughout these regions at the end of the Bronze Age (Mountjoy 2005; Wachsmann 1998). The distribution of these naval battle kraters indicates that inhabitants of Post-Palatial Greece maintained contacts with the broader Aegean, and they joined the ranks of the Sea Peoples (Deger-Jalkotzy 2008).

The end of the Mycenaean culture is attested in the destruction and abandonment of several sites in the course of LH IIIC Middle and Late (Deger-Jalkotzy 2008). Kynos experienced a major destruction in LH IIIC Middle/Advanced, as did Tiryns, Lefkandi, Aigeira and many other sites. Mitrou in East Lokris sees the nature of the settlement shift from urban to rural at the transition of LH IIIC Middle to Late (Van de Moortel and Zahou 2012). There appears to be a general decline in the number of settlements in the Argolid, Laconia, Euboea, and Attica as well as on several islands in LH IIIC Late, which is followed by a new wave of abandonments by the end of that phase (Deger-Jalkotzy 2008). Perati experienced a decline in the number of burials and was eventually abandoned, but cemeteries in Arcadia, Elis, and Achaea continued in use until the end of LH IIIC, when they, too, were abandoned (Deger-Jalkotzy 2008; Eder 2006). By ca. 1075/1050 BCE, Mycenaean sites had either been abandoned or had changed in nature, and this has been accepted by most scholars as the end of the Mycenaean cultural period of the Aegean and the beginning of the Early Iron Age (Deger-Jalkotzy 2008).

Expressing Mycenaean Cultural Identity through Burial Practices

In order to be useful for archaeological analysis, cultural identity must be specifically defined for the time and place in which it is being examined. When individuals in the mortuary record demonstrate an affiliation with the material traits that are used to define a particular cultural identity, it can be assumed that they claim part of a shared ideology that encompasses similar beliefs, practices, and material culture (Jones and Graves Brown 1996). To this point, Ucko (1969) rightly cautions regarding the use of mortuary contexts to directly infer social status and identity because different cultures have used mortuary contexts in different ways. For this reason, it is necessary to elucidate why it is valid to use mortuary data to discuss social status in a

particular culture. The development of Mycenaean culture, as seen in the previous section, illustrates that the mortuary realm served as a significant tool for the expression of social status throughout its existence.

For the purposes of this dissertation, Mycenaean cultural identity is defined as the shared ideology originating on mainland Greece in the Prepalatial period that emphasized an organized, socially stratified society driven by the beliefs and customs of the palatial elite. This ideology included the creation of status through the male dominated acquisition and display of wealth (conspicuous consumption), a significant emphasis on male hunting and military abilities or on a Minoan-type ideal of female beauty, the worship of common deities, the distinct separation of the palatial elite from other social strata, and a strong sense of individuality (see below). These attributes were displayed materially through monumental architecture, the practice of feasting, the use of specific tomb types (the tholos and RCCT), the deliberate inclusion of wealthy, high status grave goods expressing a relationship with the palace, such as seals or exotic imports, the emphasis on warfare through symbols, artifacts, and fortifications, and cult related architecture and artifacts.

Because tomb type has been used as one of the major identifying features of the Mycenaean culture and the mortuary environment has been shown to be crucial for creating and displaying status and identity throughout the Late Bronze Age (Voutsaki 1995; 1998; 2001; 2010c; Papadimitriou 2001; 2011; Cavanagh 2008; Lewartowski 2000; Darque 2005; Tsountas and Manatt 1897), the burial practices and contents of Mycenaean tomb types provides a way to observe the variable expression of Mycenaean identity. Although social stratification was more solidified at the highest level of Mycenaean society in the Palatial period, the variation observed within and between the structures and contents of cemeteries indicates that there was a wide

range of statuses beneath the upper echelon and that the grave was still a place of identity creation and expression (Dickinson 1983; Wells 1990; Gillis 1996; Cavanagh 2008).

The form of both the tholos tomb and RCCT addressed the new-found need to display wealth in the form of grave goods and tomb construction while also conveying information about the funerary ritual (Papadimitriou 2011). Papadimitriou (2011) argues that the process of adopting the three part system--*dromos* (passageway), *stomion* (doorway/mouth), and *thalamos* (burial chamber)--deemed the "holy triad" by Gallou (2005)--reflects changes in the funerary ritual of the Prepalatial period related to socio-economic processes affecting all levels of society. Death transitioned from a private to public affair in the Prepalatial period and became socialized accordingly (Papadimitriou 2011; Gallou 2005; Cavanagh and Mee 1998). In Papadimitriou's view, the tripartite format became embedded as the cultural norm because of its ability to supply a permanent access point to engage in funerary ritual and attached symbolic beliefs (Papadimitriou 2011). The adoption of this practice in areas outside of Messenia and the Argolid signals a fundamental change in the way individuals viewed death and themselves.

The development of the chamber for collective burial contributed to the shift in social structure and stratification. Previously, in the Middle Helladic period, the tumulus with its individual pit, cist or jar burials had been the only form of collective burial through which individuals could illustrate connection to one another (Papadimitriou 2011; Petrakis 2010; Cavanagh and Mee 1998). In contrast to the tumulus, each of the new grave types introduced in the Middle and Late Bronze Age (i.e. the shaft grave, built chamber tomb, tholos tomb, and rock cut chamber tomb) incorporated the idea of "group-ness" through multiple consecutive burials in the same space, not just the same area (Papadimitriou 2011; Boyd 2015). In contrast to the shaft grave, the other three new grave types were above-ground and thus more visible.

Research has shown that to accommodate those consecutive burials in Mycenaean tholoi and RCCTs, the tombs were opened and reopened several times (Karkanas et al. 2012; Karkanas 2017). The recently deceased individual was interred in the chamber, on the floor or in a pit/cist dug into the floor. The position of the body is variable, but most were placed extended on their backs (Argolid, Laconia, Messenia) or contracted on either their backs or sides (Achaea, Elis, Attica, Boeotia, Euboea, Phokis, East Lokris, Aetolia, and Kos; Cavanagh and Mee 1998). Beyond the fairly generic descriptions of "contracted" or "semi-contracted," differences in positions of the hands and legs are not well known among the various regions. The tomb was then closed by constructing a stone barrier in the *stomion* and filling the *dromos* with soil.

When another individual died, the tomb was re-opened by removing the soil from the *dromos* and unblocking the *stomion* (Smith et al. 2017; Karkanas et al. 2012). The previously interred individual (or individuals) were moved or transferred in some way to the side of the chamber or into a pit or cist in the chamber or *dromos* (Cavanagh and Mee 1998; Cavanagh 2008). In many cases, it appears as though the bones were merely pushed aside to make room; however, the taphonomy (depositional processes) of human remains in RCCTs and tholos tombs is not well understood (Jones et al. 2018). After the remains of the previous individual(s) were moved, the next deceased individual was laid out in the tomb. The result of these successive burials was that multiple individuals were interred in the same grave and after initial burial became mixed with the remains of formerly buried individuals. Several scholars have proposed that some tombs were cleaned or purified at the end of their usage (Blegen 1936; Cavanagh and Mee 1998; Cavanagh 2008; Smith et al. 2017). This would explain why some non-looted tombs did not have many, if any, human remains despite the presence of fragmented grave goods (Smith et al. 2017). Other non-looted tombs have been found completely empty. Wace (1932)

proposed that such empty tombs may have been prepared for burial, but never used, whereas Persson (1931) suggested that such tombs were cenotaphs, tombs intentionally left empty to honor those who had been buried elsewhere or whose bodies were irretrievable.

The transition from primarily single inhumations in Middle Helladic pit, cist, and jar graves to collective burials in Mycenaean tholos and RCCT tombs represents a new emphasis on collective identities (Boyd 2015; Papadimitriou 2011; Voutsaki 2010a,b; Wright 2008a, Cavanagh and Mee 1998). Since the discovery of tholoi and RCCTs, it has been assumed that the groups of individuals held within them represent a familial group or household, but this has never been proven through skeletal analysis (Wace 1932; Blegen 1936; Dickinson 1977, 1983; Cavanagh and Mee 1998; Wright 2008a; Voutsaki 2010a,b). If the individuals in each tomb were indeed related to one another via kinship or marriage, Wright (2008a) suggests that the RCCT represented an ideological shift from an ancestry-based community to a more narrowly defined, family-based community. Thus, the structure of society no longer would have been dictated by relationships to a specific ancestral lineage but instead would have been organized according to the wealth and status of more recently established families or households (Voutsaki 2010a; Wright 2008a). Rather than relying on the innate status of an ancestral lineage, each male family leader would have been responsible for making the appropriate connections to build his and his family's prestige (Wright 2008a).

Boyd (2015) recognizes an apparent disconnect between attempting to express individual status and identity and the group sense of a collective burial. To this point, he criticizes Voutsaki (1995; 1998) and Wright (2008a) by arguing that the collective burial was not the best avenue for demonstrating individuality and creating status because the individuals and the goods buried with them were subsumed within the collective burial group, emphasizing the group sense more than

the individual. He and other scholars have posited that the practice of collective burial was a continuation of Middle Helladic traditions and so should not necessarily be considered "Mycenaean" (Boyd 2015; Phialon 2011; Papadimitriou 2011). However, I believe that it is possible that the RCCT represented both the individual and the group. If the male head of the household was the individual responsible for the acquisition of status and power for his family as Wright (2008a) suggests, then the use of family tombs rather than larger collective burials could be seen as an expression of individuality in the mortuary record. Because an individual's success was critical for providing status for his immediate family and the means to bury its dead, the family group could be viewed as an extension of the individual and their social success. The collective burial could even be understood as one "individual," or rather one individual family which has gained a certain amount of success in life. Furthermore, because tombs appear to have been used for multiple generations, each successive male descendent and/or family leader may have been charged with adding to the prestige of the family through subsequent burials. This would have served simultaneously the purposes of honoring ancestors and creating or sustaining status for the individual and family group.

Moreover, the architecture of the tomb as well as the grave goods and arrangement of the body within the grave can be understood as an idealized representation of the dead individual because s/he was interred by the living (Ucko 1962; Georganas 2018). Even though the types of grave goods included in Mycenaean tombs were similar, there is not a standard set that could be taken to mark Mycenaean identity (Cavanagh and Mee 1998). Boyd (2015:211) describes the range of goods deposited in Mycenaean Palatial-era tombs as limited and primarily concerned with the decoration and anointment of the body of the deceased as well as with ritual drinking. The variability in the quality and quantity of goods, both within the same cemetery and between

cemeteries, illustrates the diverse approaches to conspicuous consumption on the individual and group levels. Since the burial of an individual was a religious and symbolic event, the diversity of goods included in the tomb can be understood as conveying a personalized conception of how to express idealized identity (Papadimitriou 2011; Gallou 2005).

The study of Mycenaean funerary rituals likewise often assumes that the individuals in a tomb were related. Gallou (2002) describes death as a crucial aspect of developing Mycenaean religion and a cult of the dead through ancestor worship. Grave Circle A at Mycenae provides a significant example of the importance of ancestor worship in the Palatial period. Although it was only in use during the early Prepalatial period, the builders of the palace at Mycenae renovated the circle and further monumentalized it in the Palatial period while also constructing three large tholos tombs in the vicinity of the citadel (Dickinson 1977; Gallou 2005; Wace 1932). They even included Grave Circle A as well as the cult center within the citadel walls (Dickinson 1977). Gallou (2005) suggests that the construction of these monumental structures to the dead and the gods indicates a desire to demonstrate sanctity, connection to powerful ancestry, and the glory of the past. The call on ancestral tradition was a political move and emphasizes the importance to Mycenaean cultural identity of ancestors who rose to power through conquest. This desire for association in death with the ancestors is thought to have spread to the lower elite and lower classes, as is indicated by the development of more and larger RCCT cemeteries in the Palatial period (Boyd 2015; Cavanagh and Mee 1998; Mee and Cavanagh 1990; 1984). Furthermore, as discussed in the previous section, it has been suggested that cemeteries were organized not on the basis of wealth distribution, size, or architectural feature but on kinship and/or patron-client associations (Wright 2008a; Mee and Cavanagh 1990; 1984).

Biological Correlates of Mycenaean Cultural Identity

Having identified the archaeological and ideological attributes that have been used to define Mycenaean cultural identity, it is necessary to discuss also the biological correlates for these attributes as they are represented in the bodies interred within these tombs. As outlined in Chapters 2 and 3, the skeleton provides evidence for understanding lived experiences, which includes the performance of cultural practices that express cultural identity. It is possible to examine the skeletal remains of individuals to investigate the biological realities of living in Late Bronze Age mainland Greece. To determine which biological indicators might be affiliated with Mycenaean cultural identity, it is necessary to extrapolate from the overall archaeological picture presented above. The primary skeletal attributes that I will focus on include demography, health status, activity status, and cranial trauma. In the following section, I will discuss how each of these can be interpreted to represent Mycenaean cultural identity as it has been presented in this dissertation.

Paleodemography

Because RCCTs are the focus of this dissertation, I will focus on the evidence from and expectations for RCCTs with respect to demography. As discussed in the previous section, most scholars assume that the RCCTs contained familial units or households. DNA analysis of Grave Circle A at Mycenae suggests that at least two individuals from the shaft graves were related, but the evidence is far from certain (Bouwman et al. 2008). With respect to burials from RCCTs, no one has tested the assumption of family relatedness either osteologically or genetically.

Osteologically, kinship relationships can be observed both through demography and osteology (Stojanowski and Schillaci 2006; Alt and Vach 1995). Logically, if a tomb represents a familial unit, males, females and juveniles should all be well represented. Given the high

mortality of ancient populations (Chamberlain 2005), ca. 50% of the individuals should be juveniles and there should be a one to one ratio of males to females. This is assuming that the Mycenaean society buried married couples together along with their offspring. It is possible that other types of burial patterns were practiced (Eshed et al. 2017; Johnson et al. 2016). To test the potential genetic relationships between individuals, cranial and dental non-metric traits can be observed. As described in Chapter 3, non-metric traits are neutral traits in the skeleton that are passed on from parent to child (Sjøvold 1976-77; Alt and Vach 1995; Carson 2006). Those who are genetically related to one another should have more traits in common with one another than they do with other groups of individuals.

The demography of RCCTs is not well understood. Most assessments of sex and age have been derived from grave goods and from bone size difference observed by archaeologists in the field. Until recently, scholars used the results of very few studies to claim that male individuals were more represented in Mycenaean burials than were female individuals and juveniles (Cavanagh 2008; Cavanagh and Mee 1998; Mee and Cavanagh 1984). It was assumed that this was the result of both poorer preservation of female/juvenile remains and the lower social status of female/juvenile individuals, precluding them from burial in RCCTs (Lebegyev 2009; Cavanagh and Mee 1998). This claim corresponded to the widely held belief regarding Mycenaean cultural identity as male-dominated. However, more recent studies conducted on RCCT cemeteries by bioarchaeologists have convincingly demonstrated that the ratio of males to females is more or less equal (Triantaphyllou 2017; Schepartz et al. 2009; Papathanasiou 2002-2005; Iezzi 2005). This finding supports the interpretation that family groups were buried in RCCT tombs. It is important to keep in mind, however, that relatively few cemeteries have been

fully studied; thus, it is possible that there are different demographic patterns based on different environmental and cultural circumstances.

Juvenile demography is even less well understood than adult demography in LBA Greece. Muskett (2009) and Lebegyev (2009) have commented on the apparent age-dependent exclusion of juveniles in certain types of graves. Muskett (2009) argues that very young individuals, aged from birth to two, seem to have been mostly excluded from burial in complex grave constructions such as shaft graves, chamber tombs or tholos tombs. The few studies conducted on human remains from RCCTs appear to corroborate this finding to some extent as they have demonstrated that the number of juveniles in RCCTs is much lower than expected for mortuary populations. Rather than representing the expected 50% of a mortuary sample (Chamberlain 2005), juveniles from RCCT cemeteries analyzed make up approximately 20% of the sample (Mee and Cavanagh 1984; Triantaphyllou 2017), which suggests that not all juveniles were interred in RCCTs. However, this picture of the proportion of juveniles to adults in RCCTs may be misleading for two main reasons. The first is that juvenile bones are small and fragile, and in most grave excavations of the past and in some modern contexts, osteologists were not present to direct the collection of those remains, so it is possible that many juvenile bones simply were not recovered. The second reason is that because so few RCCT cemeteries have been fully studied by bioarchaeologists, the representation of juveniles in RCCT cemeteries relies on information from a small data set that may not adequately demonstrate the broader RCCT demographic trends. Yet, in spite of the potential undercounting of juveniles by excavators of RCCTs, the few excavations that have been carried out in Mycenaean settlements suggest that many juveniles indeed had been excluded from burial in RCCTs and instead had been interred in intramural burials within the settlement.

Although there are limitations in the data, the evidence for juveniles included in RCCTs indicates that at least some were given special mortuary treatment (Smith and Dabney 2012; Cavanagh and Mee 1998:129). At the cemetery of Prosymna, Blegen (1936) noted two tombs (XVI and XXIX) that appeared to have been used exclusively for children based on the small size of the bones. Additionally, two tombs (Vorias Tomb 2 and Ayias Ilias Tomb A) at Volimidhia and seven tombs at the cemetery of Ialysos on the island of Rhodes have been reported to have contained only children as well (Cavanagh and Mee 1998:73, 75). However, these reports must be treated with some caution because these skeletal materials have not been studied by an osteologist and the remains of small females can be mistaken as being those of juveniles by those who have not been trained in osteology. More reliable reports regarding the special treatment of at least some juveniles come from other RCCT cemeteries, such as Berbati in the Argolid and Ayia Sotira in Nemea, where juveniles had been buried in niches in the dromos of the tomb (Cavanagh and Mee 1998; Smith and Dabney 2012), in contrast to adults who are generally not found in niches. In these same cemeteries, however, juveniles also have been found in the chamber of the tomb among adult remains, which indicates that the practice of burying juveniles in niches was variable (Smith and Dabney 2012; Cavanagh and Mee 1998:129).

Smith and Dabney (2012) argue that some young juveniles, including infants, at Ayia Sotira received special consideration also through grave goods because they were buried with hundreds of micro-beads, which were not found with any adult burials. It does not appear that the beads were included because the juveniles were of high status, as relatively few items of great value were found in the cemetery as a whole. Smith and Dabney propose that this practice may have been derived from Middle Helladic mortuary practices because juvenile burials from the

Middle Helladic cemetery of Asine, likewise in the Argolid, included valuable jewelry at a time when grave goods were fairly scarce. The inclusion of such jewelry in Middle Helladic burials has been interpreted as measures of protection for the deceased children (Nordquist 1987; Ingvarsson-Sundstrom 2008; Cavanagh and Mee 1998), and perhaps the same motivation played a role in the Palatial-era RCCT cemetery at Ayia Sotira. The variable application of burying juveniles with jewelry or beads in the Middle and Late Helladic periods shows that this practice was not universal even within the same cemetery. Therefore, given the inconsistent inclusion of juveniles in tombs and the various ways in which they were buried, it appears that some selection processes were at work. Likewise, the fact that only some juveniles had been included in the Grave Circles at Mycenae, and only two had very wealthy, ornate body decorations, is strongly indicative of selective processes (Cavanagh and Mee 1998:129; Mylonas 1973; Dickinson 1977). I will discuss this possibility further in my discussion of the cemetery at Golemi Agios Georgios in Chapter 8.

Health Status

The health of an individual is tied to many different genetic, environmental, and cultural factors. Skeletal health and its relationship to status, sex, and age have been discussed in more detail in Chapter 3, but I will discuss here how these various aspects of skeletal health might be correlated with aspects of Mycenaean cultural identity. Social status is one of the more visible aspects of an RCCT cemetery because of the size and shape of the tomb as well as the grave goods included within it. The significant effect of social status on health has been clearly demonstrated in both modern and ancient populations as discussed in Chapter 3. If RCCT cemeteries contained only individuals of high elite status, one may assume that most of the individuals in the cemetery would exhibit relatively good health. Indeed, one can draw a

comparison with Angel's 1973 study of the individuals buried in the top-elite Grave Circles at Mycenae, which established that these individuals were healthier and more robust than individuals from the earlier Middle Helladic period. A study of dental health in Palatial period tholos tombs, RCCTs and pit graves at Pylos likewise has shown that the individuals buried in the tholos tombs, assumed to be top-elite, had better dental health than the others (Schepartz et al. 2009; see below). If, on the other hand, RCCTs were used by people of a wide range of social statuses, one may expect greater disparity in health between tombs of the same cemetery.

Because of the commingled and fragmentary nature of the skeletons and grave goods in RCCTs as the result of ancient burial practices and ancient as well as modern looting, I will compare the skeletal remains of whole tomb groups to one another in the assessment of health. If we assume that the individuals included within an RCCT indeed represent a family unit over multiple generations who all have attained or been ascribed similar levels of status, it can be expected that they would exhibit similar levels of health. Even if the tomb group does not represent a familial unit, they may represent members of the same social class and would have had access to similar kinds and quantities of resources and thus have similar health statuses. Alternatively, if it appears that some bones belonging to one individual or a subset of individuals within a tomb display considerably more skeletal lesions indicative of disease and stress, one could hypothesize that this tomb included individuals beyond the nuclear family who perhaps were members of the household as servants or potentially slaves and had less access to certain nutritional resources, or lived a life of harder labor. The possibility cannot be excluded, however, that these more stressed individuals belonged to one or more generations of the family that had fallen on harder times.

Life expectancy is associated with health as it is assumed that healthier individuals live longer lives. However, there are several factors contributing to life expectancy that cannot fully be accounted for through the analysis of human remains, such as genetic factors that are inherently variable in humans, as well as behavioral factors, such as participating in warfare or other dangerous occupations, and physiological differences between males and females (i.e., childbirth). In spite of the risks of childbirth, studies have shown that female individuals live longer than male individuals in almost every culture throughout the world, regardless of location, socioeconomic status, or behavioral patterns once they have survived childbearing years (Adler and Stewart 2010; Seifarth et al. 2012; Austad and Fischer 2016). Such age discrepancy by sex has not yet been confirmed for Mycenaean cemeteries, but it is likely to be the case given world trends and should thus be factored into the analysis of health status. Because so few studies have been conducted on individuals from RCCT cemeteries, the average life expectancy of those buried in them is relatively unknown. Triantaphyllou's (2017:252) study of the individuals (n=10) from the Palatial-era RCCTs of Ayia Sotira found that the average adult age-at-death was under 35 years of age. Iezzi (2005:113-114) likewise estimated an average adult age-at-death for individuals (n=143) from four Palatial-period RCCT cemeteries in East Lokris (Tragana-Agia Triadha, Atalanti-Spartia, Kolaka-Agios Iannis) and Phokis (Modi), as between 33 and 39 years. Schepartz et al. (2009), dealing with very fragmentary bones from the Palatial period RCCTs of Pylos, were able to estimate adult ages for the individuals only as 18-30 or 31+, making it difficult to calculate life expectancy. Given the shortage of analyses of skeletal populations from the Prepalatial, Palatial, and Postpalatial periods, it is difficult to predict what the average life expectancy for each period may have been.

The historical overview above dealt with the ways in which individuals could attain different levels of status in Mycenaean society as well as with how status is thought to have been expressed in tomb contexts. I expect that tombs with relatively high quantities and qualities of grave goods, assumed to represent greater wealth or higher status, will contain individuals of older ages with fewer indicators of disease. However, if such individuals have more lesions, it may indicate that they were able to survive more periods of stress and disease as a result of better access to resources, as posited by the Osteological Paradox (See Chapter 3). The exception to this might be younger male individuals who lived as warriors and may have been killed through interpersonal violence (see below). Wealthier tombs also should have indications of good juvenile health, meaning that such individuals should exhibit significantly less evidence for stress or disease during skeletal development or if they do exhibit more evidence for stress and disease they should also exhibit older ages. Individuals from tombs exhibiting less wealth may not have had access to the same or similar nutritional resources as those with more wealth had and, as a result, might be expected to show more signs of disease during both development and adulthood as well as have a lower average age of death. Some bioarchaeological analyses of Mycenaean skeletal populations indeed suggest wealth- and status-related differences. For instance, the study of dental health based on tomb type at Pylos, mentioned above, found that people buried in tholos tombs had fewer caries, LEH, and antemortem tooth loss than those buried in RCCTs and pit tombs (Schepartz et al. 2009).

Alternatively, given the networked nature of Mycenaean palatial society, it is possible that individuals buried in Palatial-era RCCTs may not have been personally wealthy but served or were some way connected to the palace or to individuals who had relationships with the palatial economy, and in this way were able to live well with resources provided through their

networks (Nakassis 2013; Halstead 1992; 2007). If this was the case, middle- and lower-class individuals also may exhibit a good or fair state of health, expressed through older ages at death and potentially lower numbers of skeletal lesions; although, given the Osteological Paradox, they may exhibit more frequent lesions alongside older ages. Furthermore, middle and lower-class people living entirely outside the palatial economy may have lived well via the non-palatial economy. There is no definitive evidence to suggest this was not the case, but the under-studied nature of Palatial period skeletal assemblages leaves much room for exploration.

Diet significantly relates to both socioeconomic status and health since access to food sources is affected by one's socioeconomic status and can be observed through dental health indicators as discussed in Chapter 3. Diets higher in certain types of foods such as carbohydrates, found in grains and other plants, are linked to higher prevalence of caries, antemortem tooth loss, and abscesses (Temple 2015; Humphrey et al. 2014; Hillson 2008; Cucina and Teisler 2003). With respect to Mycenaean populations, Petroutsa and Manolos (2010) found on the basis of staple isotope analysis of carbon and nitrogen that individuals (n=138) from four LBA RCCT cemeteries in Phokis (2), Elis (1), and the Corinthia (1) shared a fairly homogenous diet of C3 plants and animal protein with little contribution from marine sources. Differences in nitrogen values between those in wealthy and poor tombs in northeast Phokis (Kalapodi and Zeli Agios Georgios) suggested that wealthy individuals had more access to animal proteins than did those in poor tombs, which demonstrates status differences in diet. This study is especially important for my own work as both cemeteries are located within 6 km from the RCCT cemetery of Golemi Agios Georgios, which is the subject of the present study. Examples of people with less access to animal proteins would be lower-class individuals, dependent on the palaces for subsistence, such as the female textile workers and their children, who were provided grain

rations (Olsen 2015; Nakassis 2013; Killen 2008). Linear B texts show that even those who received more rations in return for being work group supervisors were still only receiving grain, a cariogenic source of food that lacks some vital nutrients (Olsen 2015).

Animal proteins have been associated with the elite class (see above) but may not have been restricted to the elite and those related to them. For example, herders who operated inside or outside of the palatial system likely had access to protein sources. Thus, access to healthy food sources may not necessarily be correlated with social status or wealth but might be dependent to some extent on people's occupations. Schepartz et al. (2009) report that in spite of the overall correlation of dental health to wealth at Pylos, one of the wealthiest RCCTs contained the most individuals with poor dental health relative to the rest of the cemetery. To explain the paradox between the wealth and health status of these individuals, Schepartz et al. posit that the individuals may have relied more on a carbohydrate rich diet and less on animal proteins. Alternatively, they suggest that the inclusion of wealth in the tomb was a pretense introduced by this family in order to project a higher social status in death than it had enjoyed in life (Schepartz et al. 2009:170). Finally, it is possible that the individuals of this tomb had a greater genetic risk of developing caries (Viera et al. 2014). However, it is important to remember that these explanations are not mutually exclusive.

Health is an intersectional phenomenon that is affected by several overlapping and intertwined aspects of the human experience, as has been detailed in Chapters 2 and 3. In addition to socio-economic status, sex is a crucial component of health in both biological and social ways. Little is known about the dynamics between males and females in Mycenaean culture. In most cultures, both past and present, females live on average longer and have worse health than males do (Seifarth et al. 2012). There are both biological and behavioral reasons for

this, but the etiology of the phenomenon is still fairly unclear. As a seemingly male dominated society, Mycenaean culture may have privileged male individuals with respect to nutritional resources, and especially animal proteins, and this may have left its marks in the skeletal record. A study of dental health and status among the Classic Maya, a male dominated society, established that elite males exhibited significantly fewer carious lesions than both sexes of low status as well as elite females. This likely was the result of an elite male diet higher in animal protein and more refined foods as compared to a more carbohydrate-based diet of the lower class and elite females (Cucina and Teisler 2003). Some studies suggest that sex-based discrepancies in health existed in the Mycenaean Palatial period as well. Schepartz et al. (2009) found that females in Palatial era RCCTs of all wealth classes at Pylos exhibited more dental pathologies than their male counterparts, which could mean that females had less access to animal proteins. Similarly, Iezzi (2009) found that among a sample (n=123; F = 61, M = 62) from four Palatial era RCCT cemeteries in East Lokris (3) and northeast Phokis (1) females exhibited relatively more evidence of metabolic disease and nutritional stress than did male individuals. However, much more evidence is needed to establish clear patterns for individuals from RCCTs. Given the potential that people with a variety of socio-economic statuses and access to a variety of nutritional resources were buried in an RCCT cemetery, or even to some extent within a single RCCT, it is unclear what patterns should be expected.

Activity Markers

As illustrated in the historical overview above (Chapter 4: Historical Overview), individuals participating in Palatial-era Mycenaean culture may have taken part in many different types of activities based on a variety of factors such as social status, sex, and occupation. It is expected that higher-class individuals did not engage in the same level of hard labor as those in

the middle- and lower-classes likely did, because both palatial and regional elites were primarily occupied in administrative or supervisory roles. That is not to say that some male elites would not have been involved in strenuous physical activity such as hunting and warfare. It is possible that relatively more elite males would show marked evidence of such activities in the Prepalatial and Post-Palatial period when competition between the rising elites was fiercer. In the Palatial period, palatial and regional elites probably participated in military activity as well, but perhaps in relatively fewer numbers since there appear to be fewer individuals claiming elite warrior status in grave contexts.

Although markers in the skeleton generally cannot reveal specific activities (See Chapters 3 and 6), they can be used to infer patterns of relatively higher and lower levels of activity within a skeletal population. Angel (1973) described the skeletons of the Shaft Graves at Mycenae as being particularly robust, suggesting that they engaged in high levels of physical activity to achieve this robusticity. Given the numbers of swords and other weaponry deposited with these individuals, he concluded that they most probably lived warriors' lives with high levels of physical activity. Such activities might produce more robust muscle attachments in the arms and shoulders from wielding weapons as well as denser cortical bone, changes to femoral morphology as a result of riding horses or damage to the vertebral column from riding horses or chariots through rough terrain (Eng 2016; Wescott 2005; Hawkey and Merbs 1995). For example, one individual from Grave Circle A at Mycenae is described as being very tall with "marked muscularity," large hands and feet, and as having "marked arthritic changes of the vertebral column, hypertrophic exostoses on all tendon attachments and starting ossification of rib cartilages" (Angel 1973:383). Some or all these skeletal observations might be related to warlike activities given the pattern of the markers alongside the inclusion of weaponry in the

grave. However, age must also be considered in the interpretation, as it has been strongly correlated with several of the observed skeletal markers. This individual from Grave Circle A was estimated to be 45 years old, which is old enough to exhibit skeletal changes related to age. Osteoarthritis in the vertebral column is strongly correlated with age as is the ossification of rib cartilage (Anderson and Loeser 2010; Listi 2012; Teale et al. 1989; Iscan et al. 1984; 1985; McCormick 1980). “Hypertrophic exostoses on all tendon attachments” may also be the result of age, a genetic proclivity for bone formation, or disease, since several clinical studies have demonstrated that entheseal changes (musculoskeletal markers) such as these are generally not reflective of activity level (Wallace et al. 2017; Rabey et al. 2015; Villotte and Knusel 2013; Villotte et al. 2010).

Unlike in the Prepalatial period, in the Palatial period there is no good correlation between the presence of weapons in burials and skeletal markers that can be related to warfare. On the contrary, Smith's 2009 study of human bones from Palatial-era RCCTs in Athens revealed that those associated with weaponry in their burials were less likely than those without weapons to exhibit the physical signs of having been warriors, such as robust muscle attachments, increased osteoarthritis, and trauma that might be attributed to violence and high physical activity. This means that individuals who did not display warrior status in death could indeed have participated in a military lifestyle. This case study eloquently illustrates how the interpretation of the military status of buried individuals in the Palatial period should be based on an examination of both grave goods and skeletal markers and not just of grave goods alone.

Many middle and lower-class individuals likely had jobs that required much physical labor, such as farmers, herders, smiths, textile workers, foot soldiers, or rowers on warships. A farmer’s job in Late Bronze Age Greece would have consisted of many different demanding

tasks including walking, lifting heavy loads, and working the land with hand tools. There is no skeletal data on farming specifically from the prehistoric period of Greece, but trauma data from a medieval farming community in Britain illustrates the dangers of farming based on the observation of frequent long bone fractures (Judd and Roberts 1999). Not only men, but also women and juveniles may have participated in farming activities, and this especially if the family was too poor to hire hands. Herders in Late Bronze Age Greece did much physical activity as well, such as walking across rough, challenging terrain every day and fighting off wild animals threatening their flocks. Again, it is conceivable that women and juveniles from poorer families were herders as well. Soldiers are expected to exhibit some similar signs of activity as high-class warriors in that they would have trained with similar types of weaponry, but they would have traveled and fought on foot rather than ridden in chariots or on horses, which would have produced different skeletal effects. If an individual only participated in military activities for a portion of their lives in adulthood, it is unlikely that such activities would be measurably expressed in the skeleton. The reason for this is that skeletal markers of activity are much more likely to be observed if an individual participated in high levels of strenuous activity during growth and development (Jurmain 1999; Shaw and Stock 2009). Furthermore, skeletal markers from military training as a juvenile might be similar to those found in individuals participating in other strenuous occupations during skeletal development. However, soldiers and warriors are more likely to experience warfare related trauma, which is discussed below. In comparison to a farmer, herder or soldier, a smith would have been more stationary, but his activities put heavy physically demands on the upper body, arms, and shoulders, which can be expected to have left its marks. Moreover, a smith may also have participated in farming, herding, or military activities (Nakassis 2013; Rowlands 1971). Given the heavy physical demands of the job, smiths

most likely were males, as demonstrated by personal names indicative of gender in Linear B texts (Nakassis 2013).

Lower-class occupations such as that of a potter or textile worker must have been less physically demanding than the ones discussed previously, but they still could have produced skeletal markers. For instance, textile workers may exhibit degenerative joint disease or arthritis in the hand bones as a result of repetitive carding and spinning. We know that in palatial contexts, mostly female individuals served as textile workers (Olsen 2015). It is unknown whether only females were involved in textile manufacture in non-palatial contexts, and whether this was true in the Prepalatial and Post-Palatial periods as well. However, records from historical periods in ancient Greece suggests that this was the case (Barber 1995). Potters were likely to have been fairly sedentary as well, even though it cannot be excluded that they walked some distances to find suitable clay and other ingredients for their products. Even though Linear B texts mention only male potters, it is conceivable that females were also involved in this industry. A recent study by Agelarakis of an Iron Age female skeleton (ca. 900-650 BCE) from Eleutherna on Crete found unilateral robusticity on the right side in addition to marked osteoarthritis in hips and knees, which he interpreted as evidence for regular engagement in ceramic making activities (Price 2018). It was not specified whether these activity markers were the product of making ceramics on a wheel or by hand. However, this study has not yet been published in a peer-reviewed venue and thus must be treated with caution. Moreover, inferences such as these that are based on an analysis of multiple parts of an individual skeleton are usually impossible in an RCCT because of the commingled nature of the remains.

Lower-class females, in addition to participating in professional activities, likely took on the domestic responsibilities of raising children, keeping the house, and preparing food. Such

responsibilities must have involved physically demanding activities that may have left skeletal markers, such as lifting heavy loads (e.g., carrying water jars) and doing repetitive tasks for a long time (e.g., grinding cereals). Also, lower-class children can be expected to have participated in the household in addition to helping out in professional settings. Studying the remains from RCCT cemeteries with a focus on activity markers may make it possible to see significant differences between individual tomb groups within the same cemetery as well as between RCCT cemeteries.

Cranial Trauma

Given the importance of the warrior identity in Mycenaean cultural identity in the Prepalatial, Palatial, and Post-Palatial periods, trauma to the skeleton must be specifically addressed. Although trauma can occur through variety of activities, trauma to the cranial vault and cranio-facial area in particular suggests involvement in inter-personal violence (Jurmain 2009; Steadman 2008; Milner 1991). Post-cranial trauma is more difficult to assign to the category of inter-personal violence since many fractures could have been caused by accidents as well. It seems probable that males adhering to Mycenaean cultural identity had a higher chance of engaging in inter-personal violence and therefore being injured or killed in combat than other members of the population. Acheson (1999) suggests that the higher ratio of male to female individuals, the relatively young ages of the male individuals, and the presence of trauma on male skeletons in the Grave Circles at Mycenae is evidence of their involvement in warfare and of their warrior status as portrayed through the inclusion of weaponry in the tombs.

Although fewer warrior tombs have been identified in the Palatial period than in the Prepalatial and Post-Palatial periods, the existence of the corvée system for recruiting soldiers, as attested in Linear B texts, and personal names representing themes of warfare, suggest that

individuals still adhered to aspects of the warrior identity throughout all levels of palatial society. The inclusion of weaponry alone is not a good indication, however, of whether an individual physically engaged in warfare or interpersonal violence in the Palatial period. This is illustrated by Smith's (2009) study of Palatial-period RCCT burials in Athens, which indicates that individuals buried without weapons exhibited more cranial and post-cranial trauma than those buried with weapons. Indeed, there is a pattern in the Aegean throughout the Bronze Age (Early, Middle and Late) on Crete and mainland Greece of individuals buried without weaponry exhibiting signs of interpersonal violence through trauma (Georganas 2018; Betancourt et al. 2008; McGeorge 1984).

The wounds exhibited on the crania of individuals without weaponry in their tombs may give some indication of the types of weapons they were fighting against at the very least. There is evidence for the use of several different types of weaponry in Linear B texts and in imagery (Nakassis 2013; Hiller 1999; Driessen and MacDonald 1984). In addition to swords, individuals likely fought with spears, javelins, bows and arrows, knives, daggers, and slings. Although not as effective at killing, slings would have been the easiest weapon to make and would not have required raw materials controlled by the palatial system. Smith (2009) posits that one individual from a Palatial-era RCCT in Athens may have experienced a perimortem sling bullet wound. There is evidence for individuals using slings on the silver siege rhyton from Grave Circle A as well (Molloy 2008; Hiller 1999). Slings would have provided individuals with an easy way engage in interpersonal violence and participate in warrior ideology.

Such findings suggest that individuals who for some reason did not claim warrior status in death engaged in interpersonal violence, which is a pattern found elsewhere in Europe as well (Georganas 2018; Harke 1990). For this reason, it is possible that individuals in RCCT

cemeteries without weaponry could still exhibit skeletal signs of warfare through cranial trauma. Because of the way that the warrior identity was integrated as part of Mycenaean cultural identity, it is expected that several individuals buried in an RCCT cemetery should have cranial trauma. The rates of cranial trauma will be compared to cultures in which warfare was known to have played a significant part, such as in the pre-Columbian Andes (Arkush and Tung 2013).

Archaeological and Linear B evidence indicate that only adult males engaged in military efforts, and thus male individuals are more likely to exhibit cranial trauma than females or juveniles. However, it is possible for females or juveniles to have been injured as a result of a raid or attack on a settlement, as evidence of weapons-related trauma on female crania from the cave ossuary of Aghios Charalambos on Crete (EM III-LM IIB) suggests (cf. Georganas 2018; Betancourt et al. 2008). Linear B documents do not record any such raids, but the destruction of many settlements at the end of the Prepalatial and Palatial periods as well as in the Post-Palatial period, would lead one to expect that many male, female, and juvenile civilians died from war-related trauma (Eder and Jung 2015).

Importance of Context in Interpretation

To determine the significance of biological markers within an RCCT, it is necessary to consider markers of health, activity, trauma together with grave goods, which are indicators of socio-economic status. For instance, if the tomb appears to be low status and the individuals inside it exhibit markers of high physical activity along with increased occurrence of non-specific indicators of disease, those individuals are likely to have been of a lower class. On the other hand, if the tomb contains high status goods and the individuals are relatively free of lesions and attained older ages-at-death except for younger men exhibiting trauma consistent with interpersonal violence or warfare activities, the occupants were likely of a higher class. If

those buried in the RCCT represent a broad range of wealth in terms of grave goods, and display evidence for a variety of occupations and health conditions, the individuals of that tomb likely demonstrate a variety of social statuses.

Chapter Summary

In this chapter I provide a discussion of the definition of the term "Mycenaean" and describe the chronological terms and dates being used in this dissertation. In the next section, I discuss the three main periods of the Mycenaean culture as they pertain to the developments on mainland Greece including the Prepalatial, Palatial, and Post-Palatial periods. Within each time period, I describe and discuss the major aspects of Mycenaean culture and how it changed over time in the context of each period. Having established the main attributes of Mycenaean cultural identity throughout the Late Bronze Age, I discuss how the burial record was used to express cultural identity during these times in the form of architecture, burial practices, and grave goods. Finally, I identify the biological correlates for Mycenaean cultural identity being considered in this dissertation.

CHAPTER 5: MYCENAEAN CENTRAL GREECE AND THE CEMETERY OF GOLEMI AGIOS GEORGIOS

Introduction

The primary objective of this chapter is to introduce the subject of this dissertation, the late Prepalatial, Palatial, and Post-Palatial rock-cut chamber tomb (RCCT) cemetery of Golemi Agios Geogios, and contextualize it within the region of central Greece, and primarily northeast Phokis, East Lokris, and Boeotia. I will first describe its geographical location and its topographical relationships to the most significant Late Bronze Age sites in the area. I will then provide a brief background to the Late Bronze Age archaeology of the regions of northeast Phokis and East Lokris and explore their relationship to the palatial powers of Boeotia--Orchomenos and Thebes. Within this overview, I will comment on the shifting burial practices of the region, including the introduction of the rock cut chamber tomb and the adoption of Mycenaean practices in the late Prepalatial period.

Topographical Location of Golemi Agios Georgios in Central Greece

Central Greece is a term used to broadly refer to the regions of Attica, Boeotia, Phokis, East Lokris, Aetolia, Thessaly, and Euboea (Figure 5.1). In this dissertation, I focus primarily on East Lokris, northeast Phokis, and Boeotia in east-central Greece. East Lokris consists of two coastal areas along the northern Euboean Gulf, which are referred to in ancient texts as Opountian and Epiknemidian Lokris. Both are bordered to the south by the Kallidromos mountain range and its eastern extension. Opountian Lokris consists of the plains of Atalanti and Tragana-Proskynas and their surrounding hills, and stretches over the coastal hills further east until Larymna and Mount Ptoon. Epiknemidian Lokris lies to the west, and comprises primarily the area that goes from Mt. Knemis to the Thermopylae.



Figure 5.1. Map of Central Greece (Wikipedia Commons)

Opountian and Epiknemidian Lokris are separated by the Dipotamos river valley, which in the historical period belonged at times to Opountian Lokris and at times to Phokis (Figure 5.2; Papakonstantinou and Zachos 2013); this valley has been dubbed the "Phokian Corridor" by Fossey (1990). Phokis is a much larger region encompassing the northern two thirds of the Kephissos valley, which runs in-between Mount Kallidromos and Epiknemidian Lokris to the north and Mount Parnassos to the south; Phokis extends over the area of Mount Parnassos to the Corinthian Gulf. The northeast part of Phokis links Epiknemidian and Opountian Lokris as well as the Dipotamos Valley to the Kephissos valley and northwest Boeotia. East of Phokis is Boeotia, which is a large region extending east to the Euboean Gulf, north to the border of Opountian Lokris, and south to the Corinthian Gulf and the border of Attica. Many scholars believe that in the Palatial period it contained two palatial settlements, Thebes and Orchomenos.

The Late Helladic RCCT cemetery that is the subject of this dissertation is located near the chapel of Agios Georgios in the territory of the modern village of Golemi, and will henceforth be referred to as “Golemi.” The settlement to which the cemetery belonged has not yet been identified. Being situated in the coastal hills west of the Atalanti plain, Golemi is conventionally accepted as being part of Opountian Lokris (Van de Moortel 2007). However, its specific location on the eastern side of the Dipotamos river valley leaves the possibility that already in the Late Bronze Age it was considered to belong to Phokis (Kounouklas, personal communication; Dakoronia, personal communication). Certainly, the north-south valley would have provided a convenient accessway for the people of Golemi to the Euboean Gulf as well as to northeast Phokis, Epiknemidian Lokris, and Opountian Lokris.

Evidence from RCCTs in northeast Phokis and East Lokris suggests that there were differences in the contents of RCCTS between the two regions (Dakoronia 2003; see below).

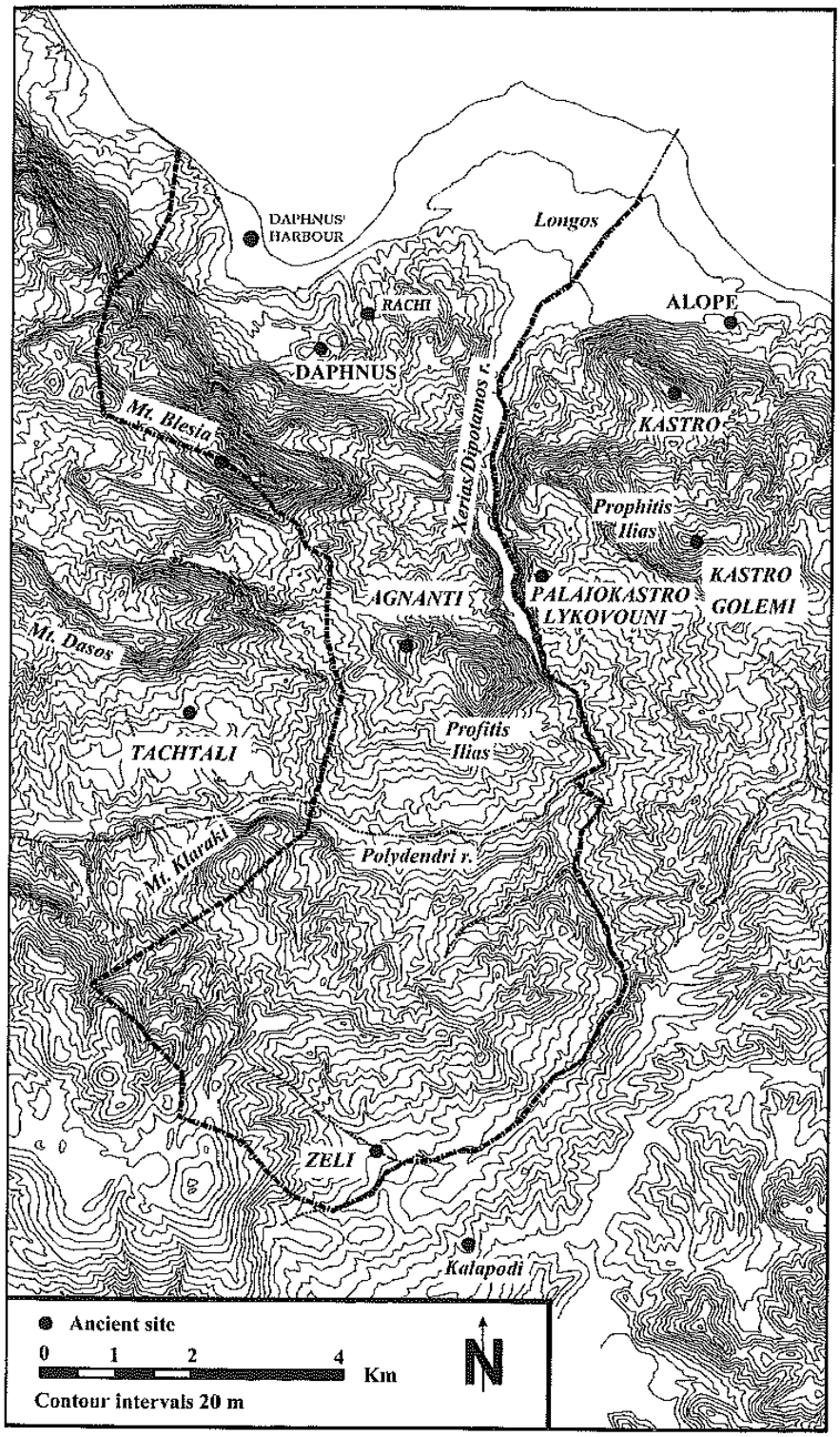


Figure 5.2. Map of the Dipotamos Valley (After Papakonstantinou and Zachos 2013, Figure 3.1, pg. 202)

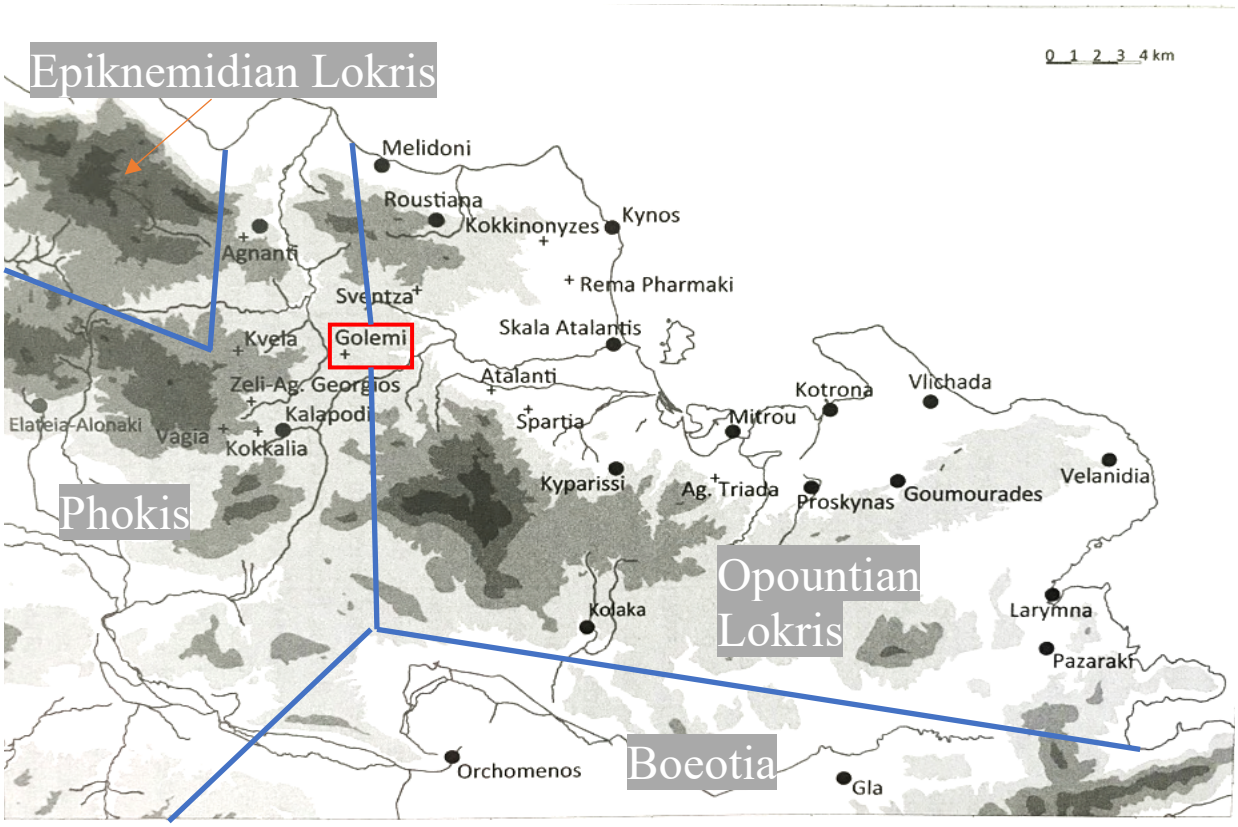


Figure 5.3. Map of Opountian Lokris, northeast Phokis, and northern Boeotia (after Kramer-Hajos 2016, Figure 1.3)

Since I was given permission only to study the skeletal remains from Golemi, and not the tomb architecture or grave goods, I cannot comment on whether Late Helladic Golemi belonged to East Lokris or northeast Phokis. It is possible that future study of these aspects of the RCCTs at Golemi might demonstrate that it belonged to one of those two regions or exhibits a mixture of the two regions.

No Mycenaean palaces have been found in East Lokris or Phokis, but there is ample evidence for Mycenaeanization in both regions (Niemeier 2016; Phialon 2011; Van de Moortel and Zahou 2012; Vitale 2012; Dakoronia 2009a,b; 2007; 2003). Orchomenos and Thebes in northern and southern Boeotia, respectively, are the closest known Mycenaean palaces. The

cemetery of Golemi is located approximately 23 km from Orchomenos and 54 km from Thebes, as the crow flies. Because Orchomenos is much closer than Thebes, essentially within a day's walk, it is likely that Golemi fell within Orchomenos' sphere of influence and control during the Palatial period. Evidence from settlements and other cemeteries in East Lokris and northeast Phokis support the dominance of Orchomenos in the region during the Palatial period as will be discussed in more detail below. Given its location in the Dipotamos river valley, Golemi may have played a significant role in providing Orchomenos and northeastern Phokis with access to maritime trade routes in the Northern Euboean Gulf in both the Prepalatial and Palatial periods. After the collapse of the palatial system at the end of the LH IIIB phase, Golemi continued in use and may have benefited from trade relations with flourishing Post-Palatial northeast Phokian sites such as the sanctuary of Kalapodi in the hills north of the Kephissos river valley and the settlement of Elateia in the Kephissos valley.

Mycenaeanization of Central Greece

Prepalatial Period

The trajectory of development in central Greece followed a similar path to that of southern Greece, with evidence for a rising warlike elite class taking control in the early Prepalatial period (cf. section 4.4). Whereas most evidence for this phenomenon is derived from mortuary data, the excavations at the coastal site of Mitrou, located in Opountian Lokris, and more specifically in the Tragana-Proskynas plain just east of the Atalanti plain, has provided information for the emergence of a local elite that transformed its settlement from a fairly egalitarian village into a hierarchical town (Van de Moortel and Zahou 2012; Van de Moortel 2016). Presumably in central Greece, as in regions further south, some elites became more powerful through victories in war and were able to extend their influence over larger territories

throughout the Prepalatial period, until only two elite groups remained that founded Mycenaean palatial states at Thebes and Orchomenos. The process of Mycenaeanization in Boeotia, East Lokris, and northeast Phokis shows regional variation. Most of the data for this process are derived from cemetery sites, but more recently excavated settlements have shed more light on this variability.

The future palatial site of Thebes in Boeotia was the first to adopt the RCCT in Boeotia, Phokis, and East Lokris. The earliest tombs date to LH I and some provide evidence for the existence of an elite warrior class through the inclusion of swords and wealthy, imported goods (Aravantinos 1995; Cavanagh and Mee 1998:48). The imported goods in the tombs demonstrate broad connections within the Aegean and the Balkans (Aravantinos 2015; Burns 2010). Thebes is well-located at the nexus of an overland route between the southern Euboean Gulf and the north end of the Corinthian Gulf, engaging with both significant sea routes (Sherratt 2001). Its power and influence were thus established early in the Prepalatial period of central Greece.

The future palatial site of Orchomenos is located approximately 35km to the northwest of Thebes and is much closer to the regions of northeast Phokis and East Lokris than Thebes, making it the most likely source of Mycenaean influence for the region (Eder 2010; Van de Moortel and Vitale, in press; Van de Moortel, in press). Like Thebes, it is located in a strategic position at the crossroads of several important trade routes such as land routes through the Kephissos valley and maritime routes in the northern Euboean Gulf to the north and the Corinthian Gulf to the south (Eder 2010). Shaft graves and cist tombs excavated in the area indicate that Orchomenos covered a large territory during the Prepalatial period. The grave goods suggest that the site was very wealthy and that Orchomenos may have shared a connection to the leaders at Mycenae based on similarities of its grave goods with those found in Grave Circles A

and B (Kountouri 2009). It is interesting to note that while Thebes was quick to adopt the RCCT, no RCCTs have been associated with Orchomenos at any time period; instead, its Prepalatial elites appear to have been buried in shaft graves and cists (Kountouri 2009).

Further north, in northeast Phokis and East Lokris, the first three sites to adopt the RCCT are located within 6 km of one another near the Mycenaean sanctuary site of Kalapodi (Niemeier 2016; Dimaki 2013; Dakoronia and Dimaki 1998; Van de Moortel 2007), which is situated in northeast Phokis approximately 17 km northwest of Orchomenos. The earliest RCCT cemetery, Kalapodi-Kokkalia, consisting of four tombs, dates to LH IIB – LH IIIA1 and has been associated with the first temple structure of the sanctuary, which was established in LH IIIA1 (Figure 5.3; Dimaki and Papageorgiou 2015; Dimaki 2013; Niemeier 2016; Dakoronia and Dimaki 1998). The wealthy grave goods found in three of the four tombs indicate that these tombs belonged to an elite group. Niemeier (2016) believes that those buried in these tombs belonged to the elite group that controlled the sanctuary. The presence of swords and other weaponry in two of the four tombs suggest that the individuals controlling Kalapodi were warlike (Dimaki and Papageorgiou 2015; Dakoronia and Dimaki 1998). The other two cemeteries were established in LH IIB to the northeast of Kalapodi and the cemetery of Kokkalia, each with two RCCTs (Fig. 5.3). Zeli Agios Georgios is 3 km from Kalapodi and less than 1 km from Kokkalia and sits on the west side of the Dipotamos River Valley, whereas Golemi Agios Georgios is 6 km from Kalapodi and sits on the east side of the valley. Zeli and Golemi are located approximately 5 km from one another. No settlements have been associated with Zeli or Golemi at this point, but their close proximity to each other and to Kalopodi-Kokkalia as well as their shared early adoption of the RCCT suggest some sort of connection with the sanctuary at Kalapodi (Dimaki 2013).

In the LH IIIA1 phase, RCCTs were established at two more locations in northeast Phokis and East Lokris. In the Kephissos Valley, the RCCT cemetery of Elateia-Alonaki was established at a distance of ca. 10 km from Kalapodi (Figure 5.3; Deger-Jalkotzy 2009), but it is unclear how many tombs were created in LH IIIA1 because the cemetery continued into later times and has not yet been published. In Opountian Lokris, a single RCCT was constructed at Livanates-Kokkinonyzes (Figure 5.3); it is the only RCCT to have been established in the Prepalatial period in this region outside the Dipotamos or Kephissos valleys. The tomb is likely to have belonged to a Late Helladic settlement at Livanates Palaiokastra, even though no prehistoric remains have yet been discovered at the settlement site (Dakoronia 1986; 1990; 1996). Its large chamber size and long dromos distinguish it from other tombs of the same and later periods in East Lokris (Van de Moortel 2007). The significance of the site of Livanates Palaiokastra is still unknown, but the size of the mound suggests that it was an important settlement (Van de Moortel and Vitale, in press).

The adoption of the RCCT in the Prepalatial period is seen by most scholars as a sign of Mycenaeanization, as discussed in Chapter 4 (Phialon 2011; Wright 2008a; Tsountas and Mannat 1897). The broader adoption of the RCCT in LH II observed throughout mainland Greece is seen as an intensification of the process and as signifying increased competition between elite entities (Cavanagh and Mee 1998:48; Voutsaki 1995; 1998; 2001). The reasons for the establishment of RCCTs at Zeli, Golemi, and Kalapodi in the LH IIB phase are not well understood. Two possibilities come to mind: 1) they are the tombs of local elites who voluntarily adopted a Mycenaean tomb type and burial practices; or 2) the tombs belong to non-local individuals from a palatial polity, who brought the tomb type with them. In support of the second hypothesis, Eder and Jung (2015) believe that warrior graves are symptomatic of Mycenaean

conquest. In a similar vein, Van de Moortel (2016: 107) raises the question of whether the Prepalatial RCCTs of East Lokris and northeast Phokis represent Mycenaeanized non-local elites coming to settle in the area. If this is the case, the existence of two warrior tombs at Kalapodi-Kokkalia indicate that the individuals from the tombs may have conquered the area around Kalapodi and were competing for power with others in the region. The establishment of at least two other cemeteries in the vicinity, Zeli and Golemi, may represent the spreading power of Kalapodi or another influencing palatial polity who accessed the Dipotamos Valley through the Euboaen Gulf.

Orchomenos, on the other hand, appears to have been a rival rather than the influence that brought the RCCT to the area as is suggested by the fact that Kalapodi was destroyed at the beginning of the Palatial period, presumably by Orchomenos (see below). The lack of RCCTs at Orchomenos is peculiar given the likely close relationship with Mycenae in both the Prepalatial and Palatial periods (Eder 2010). As mentioned above, wealthy shaft and cist graves have been excavated from Orchomenos dating to the early Prepalatial period, but no other graves except the tholos have been associated with Orchomenos during the Palatial period. It is significant that despite active looting activities over the past 20 years, there have been no salvage excavations of RCCTs around Orchomenos. From this, I am inclined to think that if RCCTs do exist in the vicinity of Orchomenos, they are few and far between. However, an intensive survey of the area may well prove this inclination wrong.

Instead, it is more likely that the elites of Kalapodi and the Dipotamos valley either came from or were connected to the elites of Thebes, whose early use of the RCCT was discussed above. Alternatively, they may have been connected to Mycenae via Kirrha, a Phokian harbor on the north coast of the Corinthian Gulf, and overland trade routes to northeast Phokis. Thebes

seems to be the most likely influence for this area because of the lack of RCCTs at Orchomenos and the possibility that Mycenae and Orchomenos had close ties in both the Prepalatial and Palatial periods (Eder 2010). Based on the evidence from Golemi, I discuss the potential connections to palatial powers in the Dipotamos Valley more fully in Chapter 8.

The fact that none of the Prepalatial RCCTs from northeast Phokis and East Lokris have been published, and their LH IIB remains have been found commingled with later materials of the Palatial or Post-Palatial periods, makes it impossible to investigate on the basis of grave goods whether the RCCT was introduced by non-local immigrants or by Mycenaeanized local elites. Such a question can only be addressed through a biochemical study (strontium and oxygen isotope analysis) of the skeletal remains from the earliest tombs. Preliminary strontium isotope analysis of dental samples from several tombs at Golemi Agios Georgios suggests that at least one individual from a tomb dated to the LH IIB phase though radiocarbon dating may have been non-local (Stiles, unpublished data). Such evidence provides very tentative and limited support for the non-local introduction of the RCCT. Further radiocarbon dating along with strontium isotope analysis of skeletal material from the RCCTs at Kalopodi-Kokkalia, Zeli, and Golemi needs to be carried out in order to further investigate this issue.

In contrast to the RCCT evidence, the settlement of Mitrou offers fairly secure evidence of the Mycenaeanization of a homegrown elite. The excavations at Mitrou have established that its elite developed an indigenous elite culture in the early Prepalatial period, which strongly suggests that it controlled an independent polity. This polity continued into the late Prepalatial period (Van de Moortel and Zahou 2012; Van de Moortel 2016). At the beginning of the Late Helladic period there was a major shift in settlement reorganization including the establishment of clean, orthogonal roads, the construction of large building complexes, and the separation of

tombs from the settlement (Van de Moortel and Zahou 2012). The presence of amber, gold, silver, electrum, faience, and a Balkan style horse bridle made of deer antler dating to LH I indicates that Mitrou had far-reaching trade connections prior to Mycenaenization (Maran and Van de Moortel 2014).

The construction in the LH I phase of large, well-constructed Built Chamber Tomb 73 within an elite complex, Building D, demonstrates the power held by the leaders likely responsible for the organizational changes and trade connections at Mitrou (Van de Moortel 2016). Tomb 73 predates the establishment of RCCTs in East Lokris and Phokis. The LH I contents of Tomb 73 included one or more boar's tusk helmets, arrow heads, gold and silver nails, and an amber bead, which indicate that the original occupants of the tomb were warlike and had significant access to wealthy, foreign goods, thereby illustrating the newly established ideology of power of the rising elite class (Van de Moortel 2016). While many local elites throughout southern and central Greece presented themselves as warlike and wealthy in LH I, it does not necessarily mean that they were Mycenaeanized. However, their development of practices like conspicuous consumption contributed to what is later considered to be standardized "Mycenaean" (Davis and Bennet 1999). The later contents of the Tomb 73 suggest that its elite individuals had adopted the entire package of Mycenaean burial practices in the LH IIB and LH IIIA1 phases since at that time they included typical Mycenaean type tomb pottery such as fine pattern-painted alabastra and a piriform jar (Van de Moortel 2016; Vitale 2012). Thus, the tomb and its contents indicate both an adherence to more traditional, local practices (use of the BCT, construction of large roads with restricted access) as well as the adoption of Mycenaean grave goods (Van de Moortel 2016; Papadimitriou 2001). The enlargement of the tomb in LH IIB appears to indicate an increase in elite power (Van de Moortel and Vitale, in press). Additionally,

Vitale (2012) reports a drastic increase in Mycenaean pottery imports and local imitations of Mycenaean pottery at Mitrou during LH IIA, which he suggests were introduced by the elites of Mitrou. Taken together, Van de Moortel and Vitale (in press) believe that these events illustrate the increasing, voluntary Mycenaeanization of Mitrou's elite during this time. Van de Moortel and Vitale (in press) note that none of the RCCTs dating to the Prepalatial period in East Lokris are as large or as well constructed as the enlarged Tomb 73 at Mitrou during the LH IIB-LH IIIA1 period. This may suggest that the elites at Mitrou were a relatively powerful force at this time in comparison to others in the area, but it may have also made them a target for attack and subjugation by an outside power.

End of the Prepalatial Period and the Palatial Period

A series of destructions during the LH IIIA period at several sites in East Lokris and northeast Phokis followed by major construction and engineering works in the area of Orchomenos in the LH IIIB phase indicate a significant shift in power and suggest that Orchomenos may have taken control of the area (Van de Moortel, in press; Van de Moortel and Vitale, in press; Eder 2010; Dakoronia 1991). In Opountian Lokris, the coastal settlement of Kynos, which may have been the harbor of Livanates-Palaiokastra, exhibits a thick destruction layer in LH IIIA1 and experiences a gap in occupation from LH IIIA2 to LH IIIB1 (Van de Moortel, in press; Dakoronia 1991). It must be pointed out, however, that only a 6 sq.-m area of the settlement was excavated to this depth, so the history of the settlement in this period is not well understood. Mitrou was destroyed in LH IIIA2 Early and its elite centers as well as Tomb 73 went out of use (Van de Moortel and Zahou 2012; Van de Moortel et al. 2019). Mitrou still shows signs of occupation in the form of a significant amount of Mycenaean pottery found at the site, and there is evidence for ritual activity related to Tomb 73 in LH IIIA2, but not in LH IIIB1

or LH IIIB2 Early (Van de Moortel et al. 2019; Van de Moortel and Vitale, in press). Similarly, Kounouklas (forthcoming) has observed that coastal settlements in Epiknemidian Lokris were generally abandoned in LH IIIA1. In northeast Phokis, the sanctuary at Kalapodi was destroyed near the end of LH IIIA2 but rebuilt in LH IIIB (Niemeier 2016:305). The associated RCCTs of Kalapodi-Kokkalia reportedly lack LH IIIB material, which suggests that they were abandoned at about the time the sanctuary was destroyed (Dimaki and Papageorgiou 2015).

The destruction of these settlement and sanctuary sites is followed by a major feat of engineering accomplished in LH IIIB: the draining of the Copaic Basin and the construction of a series of fortifications, including the massive fortified citadel of Glas (Kountouri et al. 2012; Van de Moortel, in press; Iakovides 1998; Knauss 1991). Because of the close proximity of the system of dykes and fortifications to Orchomenos, these works most likely were accomplished by the palatial leadership of that site (see below). The timing of these events has led Van de Moortel (forthcoming) to argue that Orchomenos took over East Lokris as a way to gain access to the northern Euboean Gulf; in LH IIIB1 the palatial authority of Orchomenos would have procured labor from its conquered territories for large construction and engineering projects such as these. Once drained, the Copaic basin would have provided a large, extremely fertile agricultural space that would have given Orchomenos significant advantages in intra-Aegean agricultural trade-networks (Eder 2010; Van de Moortel forthcoming). To protect this valuable land, the immense fortification of Glas was constructed on the eastern end of the basin in LH IIIB1 using Cyclopean masonry, which was a palatial building technique (cf. Chapter 4; Iakovidis 2001). A series of fortifications were also constructed around the perimeter of the basin to guard all points of access (Kramer-Hajos 2016:115-125; Van de Moortel, forthcoming).

The accomplishment of these conquests and building projects indicates that Orchomenos had become quite powerful indeed. Although the identification of a palatial building at Orchomenos is still not certain, other evidence from the area has confirmed its status as a palatial power. The most significant evidence is the grand tholos tomb nick-named the Treasury of Minyas, which was built at Orchomenos around the same time as the drainage project with specifications and techniques almost identical to those of the tholos tomb at Mycenae known in historical times as the Treasury of Atreus (Eder 2010). The similarities between the tombs and the fact that the Treasury of Minyas is the only tholos tomb to have been built in Boeotia, East Lokris, or northeast Phokis indicates that Orchomenos likely had a special relationship with Mycenae, as was already suggested by similarities in grave goods from the Prepalatial period (see above). These features combined with the existence of Glas and its related fortresses, as well as the enormous undertaking represented by the drainage of the Copaic basin attest to the validity of Orchomenos as a palatial power.

While sites along the northern Euboean Gulf in Epiknemidian and Opountian Lokris, such as Kynos and Mitrou, experienced reduced activity or abandonment during most of the Palatial period, data from the cemetery sites of Golemi and Zeli and the area further south, namely in the Dipotamos and Kephissos valleys, seem to tell a different story. Lack of settlement data from the RCCT cemetery sites makes it difficult to fully compare the two areas, but the pattern of RCCT development and growth in the Dipotamos and Kephissos valleys indicates a different relationship to the Mycenaean palatial system. Rather than going out of use like the Kokkalia cemetery at Kalapodi, the cemeteries of Zeli and Golemi exponentially expanded in size in the Palatial period, growing from two tombs each to 32 and 31 tombs, respectively, in the Palatial period (Van de Moortel 2007). However, a new cemetery was established near Kalapodi

at Vagia consisting of two tombs (Dakaronia 1985). Additionally, new cemeteries were established along the Dipotamos Valley including at Agnanti-Kritharia (5 tombs) and Zeli-Kvela (8 tombs; Van de Moortel 2007; Dakoronia 1990; 1992; 2003; Spyropoulos 1972). In the Kephissos Valley of Phokis, the cemetery of Elateia grew in size and new cemeteries were established at Modi-Skamna (3 tombs), Amphikleia (20 tombs) and Sykia (Figure 5.4; Dakoronia 2009a; Deger-Jalkotzy 2009; Cavanagh and Mee 1998; Spyropoulos 1977; Schober 1941:478). Furthermore, a new sanctuary was built at Kalapodi, which Niemeier (2016) believes was likely controlled by Orchomenos.

In Opountian Lokris, the RCCT cemetery of Livanates-Kokkinonyzes continued and new cemeteries were established at Kolaka-Agios Yannis (12 tombs), Livanates-Rema Pharmaki (1 tomb), Megaplatanos-Sventza (7 tombs), Atalanti-Spartia, and Tragana-Agia Triadha (9 tombs) located 3 km from Mitrou; however all of these are much smaller than those of Zeli (32), Golemi (31), and Elateia (ca. 50; Deger-Jalkotzy 2009; Van de Moortel 2007). Van de Moortel (in press) has suggested that while the inhabitants of Mitrou were being used as labor in the Copaic basin, non-local individuals, potentially from Orchomenos, may have resided at Mitrou. If this is true, the individuals buried in the RCCTs of Agia Triadha located within view of the site may have held such individuals. However, the fact that these tombs have not been published and preliminary reports date their pottery to LH IIIA2/B makes it impossible for now to investigate this possibility.

The relationship of Epiknemidian Lokris (west of the Dipotamos Valley) to the palatial system during the Palatial period is relatively unclear. During the Palatial period there is evidence of a general abandonment of coastal sites in the region (Kounouklas, forthcoming). At Mitrou there is a sudden lack of imported basalt from Lichadonisia, a volcanic island group

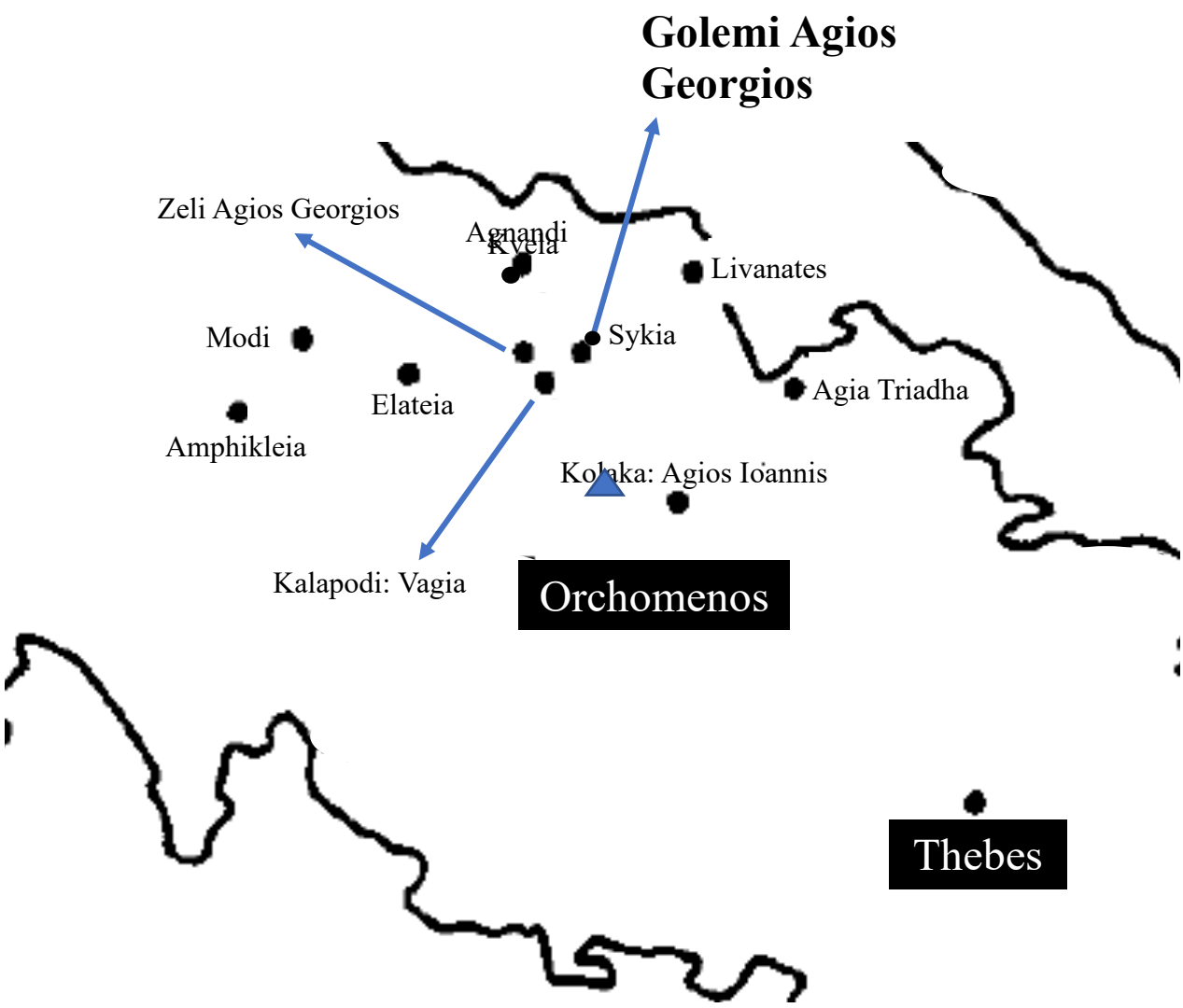


Figure 5.4. Palatial Period RCCTs in East Lokris and Northeast Phokis (Black Dots = RCCTs; Blue Triangle = Tholos Tomb) (After Cavanagh and Mee, 1998, Fig. 6.3, pg 216).

between Euboea and Epiknemidian Lokris (Anderson 2016; Van de Moortel and Vitale, forthcoming). Since basalt from Lichadonisia was common before and after the Palatial period, Van de Moortel and Vitale (forthcoming) suggest that the trade route between this area and Mitrou ceased during the Palatial period. Based on this evidence, it is possible that Epiknemidian Lokris may have been a contested area between palatial powers at this time (Van de Moortel and Vitale, forthcoming).

There are several possible explanations for the differential developments in RCCT cemeteries observed in Opountian Lokris versus northeast Phokis, including the possible "Phokian Corridor." In this respect it is important to note that Dakoronia (2003) observed significant differences between the Late Helladic RCCTs of East Lokris and those of northeast Phokis in the Palatial period. She found that on average, the tombs of East Lokris were poorer than those of Phokis. Whereas the Lokrian RCCTs lacked gold, bronze, and weapons, and showed a relative dearth of seal stones as well as a more limited range of pottery shapes, the tombs of northeast Phokis contained many gold objects whose themes and designs indicate palatial connections, as well as an abundance of bronzes, weapons, and seal stones, and a broader range of pottery shapes. These differences prompted her to ask whether East Lokris was less Mycenaean than Phokis, and whether the two regions had a different relationship with the palatial administrative system.

In East Lokris, the evidence from Mitrou suggest that it housed a controlling elite class which developed during the Prepalatial period that may have been destroyed by a rival elite group at another site in East Lokris or, more likely, by the rising palatial power of Orchomenos (Van de Moortel and Vitale, forthcoming). For this reason, East Lokris may have contained independent polities competing for power against Orchomenos and each other in the Prepalatial

period. When they were destroyed and likely conquered by Orchomenos, they may have been replaced by outside elites sent by Orchomenos or else by local individuals who were willing to align themselves with palatial interests (Van de Moortel, forthcoming). RCCT cemeteries do not appear in East Lokris until after the destruction of settlements such as Mitrou and Kynos. As Dakoronia pointed out (see above), the RCCTs of East Lokris are poorer than tombs in northeast Phokis, which suggests that they either did not wish to include wealthy grave goods in their tombs, they were not able to because of a lack of resources, or were not allowed to by new overlords (cf. Chapter 4). On the other hand, the early adoption of RCCTs in and around Kalapodi exhibits an early association with Mycenaean culture in northeast Phokis. The greater wealth exhibited in the tombs as a whole during the Palatial period may signal a greater degree of cooperation and participation with the palatial authority. The differences between the two areas in terms of burial practices in the Prepalatial vs. Palatial periods suggest that those in areas that adopted the RCCT in the Prepalatial period seem to exhibit a different type of relationship to the palatial system during the Palatial period than those who adopted the RCCT later.

As argued above (chapter 4), it seems likely, as many scholars have implied, that individuals buried in Palatial-era RCCTs belonged to families who were connected with a palatial system and desired to express this relationship; I have argued that they also were allowed to do so by the palace. In the Dipotamos Valley, including at Golemi, individuals buried in RCCTs are likely to have included people who worked directly for the palace as local administrators and landholders with obligations to the palace, and probably also in military functions, since this valley may have been a border area of the palace of Orchomenos (see above). In addition, they may have included merchants and traders given their geographical access to trade routes in the Euboean Gulf. In this capacity they may have worked for the palace

on a full-time or part-time basis. If this was the case, one might expect them to have a significant number of imported items in the RCCTs since such items would have been valuable for creating and expressing status in the mortuary context. Because the palaces may have controlled most or all precious imports (See Chapter 4: Historical Overview), the inclusion of such items in RCCTs may demonstrate this connection to the palaces. The presence of gold, bronze, and amber in the tombs of northeast Phokis (including at Golemi and Zeli) and not those of East Lokris in the Palatial period demonstrates that those in the Dipotamos valley did have increased access to imported goods, thereby indicating that those in northeast Phokis may have had deeper ties to the palatial socioeconomic system (Dakoronia 2003). In addition to palatial administrators, military personnel, and merchants, other people in the Dipotamos valley who would have had the means and the permission to build RCCTs may have been farmers, herders, craftspeople, and various types of palatial servants who would have been closely related to the palace (see chapter 4).

End of the Palatial Period and the Post-Palatial Period

As discussed in Chapter 4, the end of the Palatial period was a violent time throughout mainland Greece. Already in LH IIIB2 Early (ca. 1230-1210 BCE) the citadel of Glas was destroyed (Iakovides 2001; Van de Moortel et al. 2019). The date of the destruction horizon at Orchomenos is not yet been known, but in view of its close connections to Glas, it is likely that it was destroyed at the same time. Some scholars have proposed that Thebes conquered both places (Van de Moortel and Vitale, forthcoming). The archaeological evidence supports this hypothesis to some extent as the palace at Thebes survives longer than Glas or, presumably, Orchomenos. Moreover, there is evidence from Mitrou to suggest that the site was taken over by Thebes in LH IIIB2 Late. Alongside a renewal of architectural and ritual activities in LH IIIB2 Late there is an increased presence of Theban imported pottery as well as local imitations of Theban pottery

shapes. There is also evidence to suggest that Mitrou had an important, palatial style building during this time since roof tiles, rarely found outside of palatial contexts or secondary palatial centers, were found mixed with high quality ceramics, including pottery of Theban character. Van de Moortel and Vitale (forthcoming) propose that Thebes took control of Mitrou as a way to gain better access to the trade routes of the northern Euboean Gulf.

Thebes was destroyed at the end of LH IIIB2 Late along with the other palaces throughout mainland Greece. The destruction of Thebes appears to have impacted the settlement of Mitrou as well. The new structures of the LH IIIB2 Late phase were abandoned and the façade of Tomb 73 was destroyed around this time (Van de Moortel et al. 2019; Van de Moortel and Vitale, forthcoming). However, the settlement of Mitrou recovers once again early in the Post-Palatial period, seeming to prosper even more than in the late Palatial period while Thebes was essentially abandoned after a massive and fiery destruction of the palace (Aravantinos 2015; Cavanagh and Mee 1998).

Despite the widespread destructions and abandonments seen throughout Greece at the end of the Palatial period, the areas around the northern Euboean Gulf including East Lokris, northeast Phokis, and Euboea appear to have been revitalized rather than devastated after the collapse of the palatial socioeconomic system (Deger-Jalkotzy 2008). The settlements of Mitrou and Kynos in Opountian Lokris, Lefkandi on Euboea, and the cult sanctuary at Kalapodi in northeast Phokis experience periods of renewal and prosperity in the LH IIIC Early to Middle Phases (Van de Moortel and Zahou 2011; 2012; Niemeier 2016). Unexcavated sites with possible Palatial-period settlements in East Lokris such as Agia Aikateririni-Melidoni and Kastraki also appear to have continued into the LH IIIC period (Van de Moortel 2007).

At Mitrou and Kynos there is evidence for the construction of new substantial buildings in LH IIIC. At Mitrou, new buildings were set on top of Prepalatial structures. The LH IIIC structures at Kynos were much sturdier and better constructed than those of the preceding LH IIIB2 phase (Dakoronia 1990a,b; 1993; 1995a,b; 1996; 2000). They have been identified as residential complexes with storerooms and workshops (Dakoronia 2009a). Kynos was an important harbor serving as a supply stop for sea travelers and a place of trade. The settlement was thriving and had trade contacts beyond the mainland. A potter's workshop along with numerous quantities of pictorial pottery have been found, which had been manufactured locally (Dakoronia 2009a). This pictorial pottery included the famous sea-battle kraters (see Chapter 4), which indicate the development of a naval warrior class at Kynos and may thus depict the unrest and increased levels of warfare during this time. The marine warriors depicted on the kraters have been associated with the Sea Peoples active during and after the collapse of the palaces (Mountjoy 2005).

At Kalapodi, the sanctuary was rebuilt once again in LH IIIC, and set on the foundations of the Palatial period sanctuary. There is evidence for a great deal of ritual activity including ritual eating and drinking (i.e., feasting) as well as the deposition of many votives of several different shapes and materials. Similarities in painting styles and subjects on ceramics suggests that the sanctuary had a strong relationship with Kynos (Niemeier 2016). Based on this connection, Niemeier (2016) posits that the sanctuary may have been a meeting place for the new aristocrats of the Post-Palatial period.

The continuation of most RCCT cemeteries in Opountian Lokris and northeast Phokis during the Post-Palatial period supports the image of growth and prosperity at this time and also implies that the destruction of the palatial system did not greatly affect those in the settlements

associated with them. Continuity is seen at the cemeteries of Livanates-Kokkinonyzes, Livanates-Rema Pharmaki, Megaplatanos-Sventza, and Atalanti-Spartia in Opountian Lokris; Golemi Agios Georgios, Zeli Agios Georgios, and Agnanti-Kritharia in the Dipotamos Valley; and Elateia, Modi, and Amphikleia in northeast Phokis (Dakoronia 2009b; Van de Moortel 2007). Many of these cemeteries, including Golemi Agios Georgios, have not been systematically studied and so it is difficult to say how exactly they changed in the Post-Palatial period. In Opountian Lokris, it seems that tombs contained a higher proportion of steatite seal stones in LH IIIC than in previous periods (Dakoronia 2009a). Dakoronia (2009b) has argued that the population of northeast Phokis may have seen an overall growth because of an increase in the amount of skeletal remains found in the RCCTs. She also suggested that they were economically robust because of the numerous bronze items buried with them. The skeletal remains are described as being those "of healthy and well-nourished individuals, with a long average life span and a low rate of infant mortality" (Dakoronia 2009b:296). She also comments on the continued practice of burying individuals in a contracted position, which she posits reflects the persistence of a "Mycenaean mind-set" or exhibits a desire on the part of the new leaders to legitimize themselves by maintaining a material relationship with Mycenaean burial practices.

The cemetery of Elateia in northeast Phokis is an interesting example of the continuity and transformation of Mycenaean cultural identity in this area as it not only continued into the LH IIIC phase but grew substantially (Deger-Jalkotzy 2009). The Mycenaean settlement of Elateia has been located in the vicinity, but it has not yet been excavated. By the LH IIIC period, the RCCT cemetery contained 91 tombs which consist of two types of RCCTs. The first is the traditional Mycenaean tomb with a substantial dromos, stomion, and chamber containing

multiple commingled individuals, some of whom were buried in pits in the dromos or chamber. The second type is much less skillfully built with a much-reduced chamber which is "hardly more than a hole in the rock," a roughly constructed stomion, and a short dromos (Deger-Jalkotzy 2009:306, 308). Thirty of the 91 tombs were constructed in the LH IIIC phase, but it is unclear from the available publications how many were of the first type and how many were of the second. However, the increase in tomb number may indicate a rise in population size. The grave goods in the first tomb type were generally quite wealthy including gold jewelry and many bronze items such as a Late Mycenean type sword, as well as a boar's tusk helmet (Deger-Jalkotzy 2009). The second type of tomb contained poorer goods. This difference, according to Deger-Jalkotzy (2009), illustrates the existence of social stratification in LH IIIC. Pottery and imported goods attest to far-reaching relationships with other regions of the Greek mainland, the Aegean, and the Adriatic. The cemetery showed signs of prosperity through the Submycenaean and Early Protogeometic periods, declining in wealth toward the end of the Protogeometric period.

In the Dipotamos Valley, Golemi and Zeli continued through the LH IIIC period and potentially into the beginning of the Submycenaean period (Dakoronia 1993:225). The cemetery of Agnanti-Kritharia, which is located closer to the mouth of the valley, was established in the Palatial period, but most of the pottery from the tombs dates to the LH IIIC phase (Papakonstantinou and Karantzali 2013; Spyropoulos 1970). However, like most RCCT cemeteries in the area, it has not been systematically studied or published.

Regardless of this lack of information, the persistence of these cemeteries in the Dipotamos valley, northeast Phokis, and Opountian Lokris through the LH IIIC period suggests that the individuals there were not displaced by other populations nor fell into decline at the end

of the Palatial period, but rather continued and even prospered. The fact that they continued to follow Mycenaean traditions such as burial in RCCTs with Mycenaean-type grave goods indicates that they continued to ascribe to a Mycenaean identity. Only closer study of the materials in these cemeteries will reveal the extent of their connections to the rest of the Euboean Gulf and the broader Aegean.

Chapter Summary

In this chapter, I provided a description of the location of Golemi Agios Georgios in central Greece, which included a discussion of its liminal position between northeast Phokis, Epiknemidan Lokris, and Opountian Lokris along the Dipotamos Valley. I briefly describe the development of Mycenaean culture in central Greece with a focus on Boeotia, northeast Phokis, and East Lokris. The palatial sites of Orchomenos and Thebes are discussed in relation to the developments at sites such as Kalapodi, Mitrou, Kynos, and Glas. Special attention is given to Mitrou as it provides evidence for a rising indigenous elite class that became Mycenaeanized over the course of the Prepalatial period. This is contrasted with the early establishment of rock cut chamber tombs near Kalapodi and in the Dipotamos River valley. Finally, I explore the revitalization of East Lokris and northeast Phokis and its relationship to Mycenaean identity in the Post-Palatial period.

CHAPTER 6: MATERIALS AND METHODS

Introduction

This chapter provides details of the osteological and statistical methods employed to assess the manifestation of Mycenaean cultural identity and local cemetery organization using both biological and archaeological data from the rock cut chamber tombs in the cemetery of Golemi Agios Georgios. The individual rock cut chamber tomb and its contents represent the unit of analysis for this dissertation both because of the cultural significance of the rock cut chamber tomb as a representation of the social status and identity of an individual family unit in Mycenean culture (See Chapter 4) as well as the commingled nature of both archaeological and biological remains. The archaeological data were collected from excavation diaries kept by the Archaeological Ephoreia of Phthiotida and Eurytania (henceforth, "Diaries, unpublished") in Lamia, Greece and reports published in the Greek journal *Archaeologikon Deltion* (henceforth, *AD*). From these I was able to collect preliminary information about the architecture of the tomb, types and quantities of grave goods, and positions of the skeletal remains within the tombs. In this section, I will explain the extent to which information was available from these sources, its limitations, and how I intend to use it for analysis.

Next, I detail how data were collected and analyzed from the osteological material excavated from each tomb. The basic data collected from an individual human skeleton are referred to as the biological profile. In the case of Golemi, I have created a biological profile for the collective skeletal material from each tomb, which provides a way to compare the tombs to one another. The biological profile for this dissertation includes the minimum number of individuals (MNI), age, sex, pathology, trauma, health, and activity markers. As part of my study of the demography (age and sex), I use hazards analysis to construct mortality profiles for the

adult individuals of the cemetery as well as provide a comparison of survivorship based on sex. To address the question of potential kinship relationships within the tombs and cemetery as a whole, the relative frequencies of non-metric cranial and dental markers are considered.

To assess these features and the extent to which the traits of the biological profile represent Mycenaean cultural identity in the cemetery of Golemi, I used a variety of frequentist and Bayesian statistical methods. The frequentist methods (t-tests, chi-square tests, and fisher's exact tests) were used to tests hypotheses developed as ways to answer the guiding questions posed at the beginning of this dissertation. In such cases where sex and age could be determined for a particular trait, specifically dental traits, a chi square test was performed to determine whether there was a significant relationship between sex and/or age and the prevalence of the trait in the cemetery. As a way to statistically consider the archaeological and biological data together, chi square tests were also used to test potential relationships between archaeological symbols of wealth and/or connections to the Mycenaean palatial socio-economic system and bioculturally meaningful attributes such as those representing health status and participation in inter-personal violence. The archaeological traits were identified based on their archaeological significance as detailed in Chapters 4 and 5. The biological traits were identified based on their prevalence in the cemetery and their potential significance with respect to archaeological features (i.e., good wealth being correlated with good health).

The Bayesian methods (Hierarchical Bayesian Analysis) were not used to test specific hypotheses, but rather to identify tomb groups that exhibited relatively high or low distributions of certain traits. The results of these analyses provided a way to comment on the variation of trait representation as compared to tomb archaeology of the individual tombs. This information was then used to identify patterns of spatial distribution throughout the cemetery.

Archaeological Data Collection and Analysis

The Ephoreia of Pthiotida and Eurytania of the Greek Archaeological Service excavated thirty-one rock cut chamber tombs from the site of Golemi Agios Georgios between 1985 and 1997. A series of excavations were conducted in response to persistent illegal looting in the area, an unfortunately common problem in Greece. The tombs are represented on the site map (provided by the Ephoreia of Pthiotida and Eurytania) included in Fig. 6.1. The site map does not include Tomb XXVII but the location of the tomb has been estimated from its description in the excavation diaries and added to the map for the purpose of this dissertation. More recent excavation of an RCCT approximately 400 meters southeast from the known cemetery suggests that the cemetery is much larger than its current boundaries indicate (Dimaki 2013); however, this tomb was not known to me at the time of study and so is not included in this dissertation. I applied for permission to access the diaries through the American School of Classical Studies. I was granted the permit to view in February 2016. Because the cemetery excavation data have not yet been published, specific dates and attributes of individual grave goods are mostly unknown. The cemetery has been roughly dated from Late Helladic II through Late Helladic IIIC (ca. 1500-1100 BCE, see Chapter 7). Skeletal material was located in twenty-three of the thirty-one tombs.

Because this dissertation is interested in how biological features interpreted from the skeleton can represent cultural identity in tandem with the archaeological material, only tombs with skeletal material were included in the analysis of both archaeological and biological data. The tombs were designated with Roman numerals during excavation. This dissertation will follow these designations of the tombs with four exceptions, Tombs 85.I, 85.II, 88.I, and 88.II. These tombs are referred to by the year they were excavated followed by the Roman numeral tomb number as the numbering system was restarted in 1988 after the initial excavation of tombs

in the cemetery in 1985 thus resulting in two "Tomb I's" and two "Tomb II's." The tombs studied for this dissertation include the following 23 tombs: 85.I, 85.II (AD 40 (1985)[1990]), 88.I, 88.II, III, IV, V, VII, IX, X, XI, XII, XIII, XIV, XV, XVI (AD 43 (1988)[1993]), XX (AD 44 (1989)[1995]), XXIV, XXV (AD 46 (1991)[1996]), XXVI (AD 47 (1992)[1997]), XXVII (AD 51 (1996)[2001]), XXVIII, XXIX (AD 52 (1997)[2002]). *AD* refers to *Archaeologikon Deltion* while the two years following the number of the volume designate the formal year of publication and the actual year in which the report was published, respectively.

The archaeological data for each tomb were collected from the tomb specific entry in the *AD* as well as the diary entries in the unpublished excavation diaries and placed into a newly created Excel database. The architectural features I included are dromos length, tomb shape,

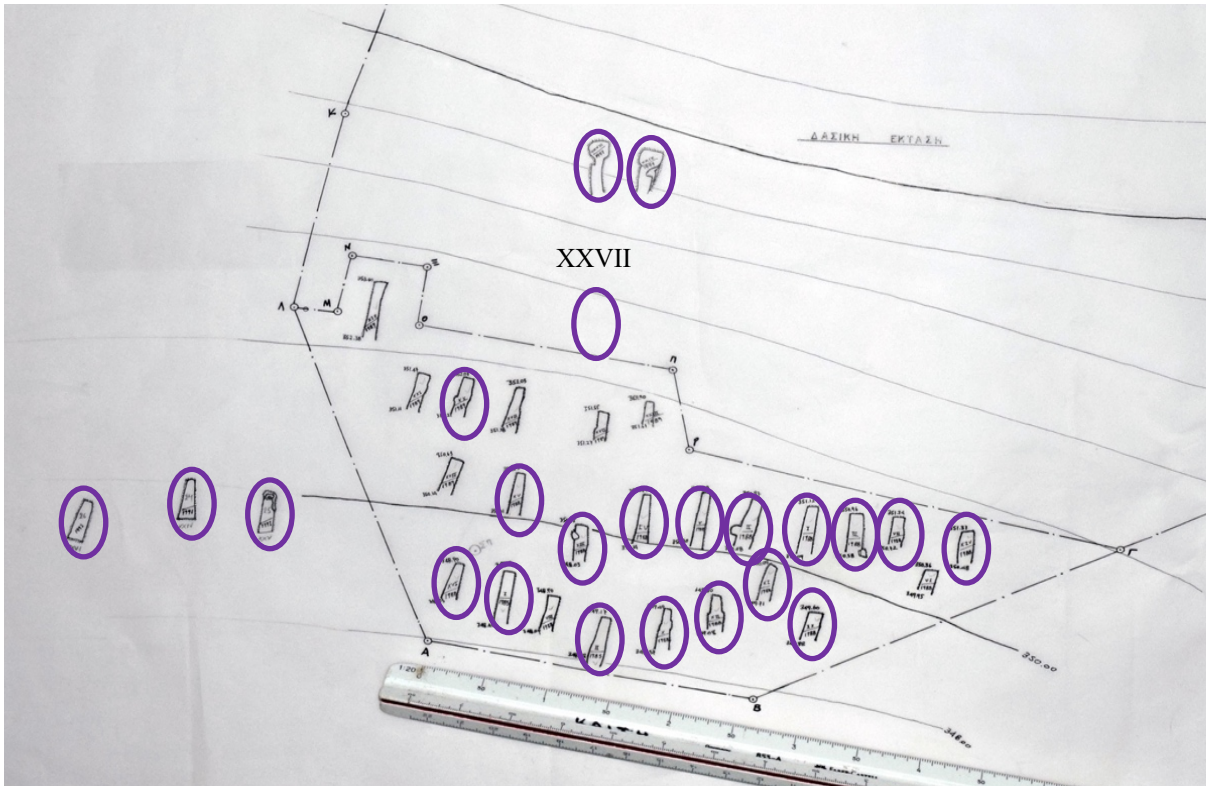


Figure 6.1. Site Map of Golemi. Tombs under current study circled in purple (n=23)

tomb size, presence/absence of in situ individuals, and presence/absence of pits. Tomb size was calculated from the chamber wall lengths, which were reported as north, south, east, and west.

The grave goods were separated into broad categories within which certain goods were singled out if identified more than once. The pottery category includes the total number of ceramics identified by the excavators, but in many cases the total number of ceramic vessels of the tomb is unknown as a result of lack of pottery analysis. However, some vessels were specifically identified among the pottery including the alabastron, pyxis lid, stirrup jar, oenochoe, cup, jug, jar, and amphora. The other two broad categories of grave goods are bronze items and beads. The bronze items were both grouped as a category and recorded as separate types of objects when possible. The bead category was recorded according to material type when possible but were mostly grouped together for analysis. Other categories of items include seal stones, spindle whorls, bone pins/needles, shells, and imported materials. In some cases, the type of object and/or its material was unclear. If this was the case, it was left out of the analysis and put into the category of "other" in the data base.

Osteological Material

The osteological remains of the rock cut chamber tomb cemetery of Golemi Agios Georgios were studied at the Malcolm H. Wiener Laboratory for Archaeological Science at the American School of Classical Studies in Athens, Greece during the summer of 2014 and the academic years of 2015-2017. As the material was previously unstudied, all bone material available was washed, identified, documented, and photographed.

The material in the tombs varied considerably with respect to state of preservation and degree of fragmentation. Most of the material exhibited fair to poor preservation and moderate to high degrees of fragmentation. For this reason, some analyses were not possible to conduct on

this material thereby limiting the amount of information gleaned from the sample. Lack of individuated skeletons meant that it was not possible to assess most biological conditions in conjunction with demography such as observing the prevalence of periostitis among males versus females or determining whether the presence of the condition impacted mortality and survivability. In some cases, like with the oral health traits, it was possible to roughly estimate sex and age. In these cases, further analyses were conducted. Other limitations of the data will be discussed in the course of describing the various methodologies used to conduct the analysis of this material.

Statistical Analyses

The following statistical analyses will be used to explore patterns found in the archaeological and osteological data when appropriate. Having described these methods, I will identify when they will be used in the subsequent categories of analysis. Frequentist and Bayesian methods were used to address different aspects of the guiding questions identified in Chapter 1.

Frequentist Statistical Methods

Frequentist statistical methods provided a way to test whether certain aspects of the data could or were affecting the bioarchaeological interpretation of the patterns observed among the material at Golemi. The three tests used in this dissertation were: Student's t-test, chi-square test, and Fisher's exact test.

The Student's t-test uses the Student's t-distribution to test the null hypothesis that the mean values from two data sets are not significantly different from one another. It assumes that the data are normally distributed and have the same variance. Because excavation of Golemi was a rescue operation requiring swift excavation over the course of several summers, there are

significant gaps in some of the archaeological data for some tombs such as documentation of tomb size and shape. Since no other aspect of the Golemi cemetery has been studied, the data are incomplete. Several tombs had been robbed in modern times, which limits the usefulness of the archaeological data. To account for the effects of looting on the prevalence archaeological and skeletal material, Student's t-tests were performed to determine whether or not there was a significant difference between looted vs. non-looted tombs with respect to the mean number of grave goods as well as minimum number of individuals. The results of these analysis were used to determine whether certain tombs could be included in subsequent analyses and interpretations. The Student's t-test as also used to assess whether there were any differences between the proximal shape of the femoral diaphysis based on side (left/right) and sex (male/female), which determined how the platymeric index could be used to interpret activity levels among the individuals of Golemi.

The chi square test for independence is a statistical test commonly used to determine whether there is a significant relationship between two categorical variables recorded based on the mathematical fit between the expected frequency of occurrence and the observed frequency of occurence. In chi square analysis, the null hypothesis is that the two categories being tested are not related to one another. The difference between the expected and observed values is calculated to determine the value of the test statistic, χ^2. The probability of obtaining this chi square value then provides the p-value for the test. The significance level for these analyses is set at $\alpha = 0.05$, which means that if the p-value is equal to or less than this value, the null hypothesis is rejected, suggesting that the two variables are related. One of the primary assumptions of the test is that each cell value of the contingency table equals five or more. For instances in which one or more cell has a value lower than five, a Fisher's exact test will be used instead.

The Fisher's exact test is similar to the chi square test but is designed to deal with low sample sizes and does not assume that the data are normally distributed. Rather than assessing the relationship between data sets by calculating a test statistic, like χ^2, the Fisher's exact test estimates the probability of obtaining the observed data by comparing the proportions of one variable against those of the other variable. The null hypothesis is that the proportions are the same. Both the chi square and fisher's exact test provide ways to determine whether two sets of data are significantly different from one another. The "significance" is determined by whether the p-value is below a pre-determined level, 0.05, in this case. There is considerable debate out the utility of p-values in hypothesis testing. For the purposes of this dissertation, tests that result in p-values of less than 0.05 are considered statistically significant, but that it is also possible that tests with results greater than 0.05 should not necessarily be discounted. The context of the data is important for its interpretation.

Although the commingled and fragmentary nature of the Golemi material made it difficult to associate specific skeletal indicators with sex and age, it was possible to estimate age and sex in some mandibles and crania which provided observable dental indicators. Because health status is an intersectional phenomenon, it is important to understand how indicators of health, like oral attributes, may be related to age and sex. For this reason, the relationships between sex, age and health markers were assessed through chi square analysis when there was a 5% or larger difference between the percentages represented in each category. The results of these analyses are directly related to the interpretation of how male and female individuals of Golemi manifested and experienced Mycenaean cultural identity at various stages of life.

Another series of chi square or Fisher's exact tests were conducted to compare the relationships between tombs contents and specific biological features to address the extent to

which the individuals of Golemi physically reflect status differences. The null hypothesis in each of these tests is that there are no significant differences among the indicators of health between tomb groups exhibiting high and low degrees of wealth and status archaeologically. In this dissertation, the seal stone is assumed to represent some kind of connection to the palatial system. For this reason, the individuals in tombs with seal stones may display less indicators of stress and disease. Similarly, bronze distribution may have been heavily controlled by the palatial system in the Palatial period (see Chapter 4), which suggests that the presence of bronze indicates higher status and access to better or, at least, different subsistence resources. Because pottery is found in almost every tomb, it does not necessarily signal a relationship with the palatial system and so is not included in this analysis.

Hierarchical Bayesian Analysis

Hierarchical Bayesian analysis (HBA) was used to model and compare the relative rates of occurrence of each trait per tomb while also accounting for differences in sample sizes (Fordyce et al. 2011). Because the number of individuals and bone fragments varies considerable from tomb to tomb, it is difficult to compare the various traits between the tomb groups based on percentages. Tombs with lower numbers of individuals and fragments will provide a deceptively high percentage of the trait. By using HBA, it is possible to use the distribution of the traits in each tomb to derive the average probability of distribution for the trait in the cemetery. Then, the tomb specific rates of occurrence are compared against this cemetery wide probability of occurrence to determine if they are significantly different. The data from the tomb informs the prior against which the probabilities of distribution of each trait and in each tomb are compared. Through this analysis it is possible to assess the probability of certain biological traits appearing in tombs in unusually high or low numbers given the overall distribution of the trait in the entire

cemetery population. In this way, the tombs can be reliably compared even if one tomb only has 20 observable fragments and another has 500.

The probability of a trait appearing in a given tomb at a given rate is calculated and compared to the average probability of the trait occurring among all of the tombs in the cemetery as a whole for every biological trait. Both the cemetery wide and individual tomb probabilities are calculated based on the distribution of the trait throughout the cemetery (Fordyce et al. 2011). A 95% credible interval is calculated both for the cemetery wide probability and the individual tomb probabilities. The mean probabilities and 95% CIs for each tomb as compared to the cemetery wide values are plotted to visually assess where each tomb falls. Those tombs that exhibit probabilities and CI ranges at the edges or outside of the 95% credible interval for the cemetery wide rate are considered to be notably different than the other tombs in the cemetery.

HBA was only performed on biological traits because it was not necessary to account for different sample sizes of artifacts based on the availability of a particular artifact or feature. Similarly, HBA was not used for skeletal traits that had low representation in the cemetery (less than 30 individuals with the trait) since basic descriptive statistics were sufficient to explore their distribution within the cemetery. Tombs that did not have observable individuals were left out of the analysis. For this reason, the number of tombs represented in each HBA varies. All HBAs were conducted in R using the bayesPref package (www.r-project.org; Fordyce et al. 2011). To my knowledge, this type of analysis has not been used to compare biological traits among commingled skeletal samples in any previous study so brings a new level of analysis to small, fragmentary bioarchaeological contexts.

Paleodemography

Minimum Number of Individuals

The paleodemographic profile of the cemetery was constructed to assess relative numbers of individuals per tomb, males, females and juveniles recovered from the cemetery. The first step for constructing a mortality profile of a cemetery population is the estimation of the minimum number of individuals (MNI) per tomb and for the whole cemetery. To determine the minimum number of individuals (MNI) present in the Golemi cemetery, I calculated the MNI for each tomb separately and then combined the tomb MNIs to arrive at the cemetery total. For this analysis, I assume that the remains of one individual are not present in more than one tomb.

For this dissertation, the MNI was assessed per tomb based on several factors including the most commonly represented element, pair-matching, size differences, and the presence of apparent juvenile remains (i.e., juvenile mandible, unfused epiphyses, etc.). A zonation system developed by Knusel and Outram (2004) was used for identifying and counting elements and portions of elements. The zonation method was derived from methods for identifying and counting animal remains. The zones correspond to identifying features on each element which enables more accurate counts. The zone designations from this method were followed for all post-cranial elements. The cranial zones were further divided to provide more precise estimations of number of distinct individuals based on cranial bones. The frontal bone zones, 1 and 2, which divide the frontal bone into left and right halves, were further divided into quadrants, 1a, b, c, d and 2a, b, c, d. The parietal bones, the occipital, and maxillae were each divided into quadrants as well. The temporal bones were divided into halves, the petrous portion/auditory meatus and the temporal squama.

Calculating MNI in commingled contexts can be done in several ways. Adams and Konigsberg (2004) identify the most commonly used MNI estimation methods as the following. (L = left, R = right, P = pairs).

1) Max (L, R)
2) (L+R)/2
3) L+R-P

The first is the most commonly used of the three estimation methods. It estimates MNI based only on the most prevalent side from the most commonly occurring element. It does not take pairs of elements into account and does not include juvenile remains that might not be represented by the element used to estimate MNI. For this reason, it will underestimate the number of individuals represented by the material under consideration. The second method uses the total number of lefts and rights of the most commonly occurring element and averages them to estimate MNI. This method underestimates MNI even more than the first method because the average of a paired element will always be less than the maximum number of one side (Adams and Konigsberg 2004). Like the first method, it also does not consider juvenile material that might not be included with the most commonly occurring element. It also does not account for paired and unpaired elements. The third method, also known as Horton's (1984) Grand Minimum Total (GMT), uses the paired and unpaired elements to estimate MNI. Because it relies on pair-matching by an osteologist (visually and/or metrically), it is possible that the MNI will be an overestimation of the number of individuals represented by the material.

Adams and Konigsberg (2004) advocate estimating the Most Likely Number of Individuals (MLNI) for a commingled context because estimates the actual number of people originally in the context. It is based on the Lincoln index, an estimation method used in zooarchaeological contexts, which is useful for commingled skeletal contexts because it accounts

for sample bias that occurs through taphonomic processes (Chapman 1951; Adams and Konigsberg 2004). This approach estimates a maximum likelihood for the MLNI based on the probability of getting P number of pairs given a certain number of lefts, rights, and the true number of individuals from which they came. The equation is (Adams and Konigsberg 2004: Equation 8):

$$N^* = [((L+1)(R+1)/(P+1)) - 1]$$

Adams and Kongisberg (2004) tested each of the MNI techniques against the MLNI and found that the MLNI was usually the closest estimate to the actual number of individuals in the context given that the element used had a high recovery rate. The estimations derived from Horton's GMT provided the next closest estimations. However, like all other MNI methods, the MLNI dos not account for juvenile individuals not represented by the element used for the estimation.

Because none of the above methods do not directly account for juveniles or unpaired elements, I developed a method to derive a "contextualized" MNI after Steadman (2008). The contextualized MNI was calculated as:

$$cMNI = Pairs + unpaired\ L + unpaired\ R + juveniles$$

If there was a question as to whether a bone paired with another bone, the element was not included in the estimate. Essentially, it was treated as if it did pair with the other bone, rather than counting it as a separate individual. Of the three methods discussed above, Horton's (1984) Grand Minimum Total formula is the most similar to that of the contextualized MNI because it indirectly accounts for unpaired elements by subtracting the paired elements from the total number of elements. The three traditional MNI methods and the MLNI were also calculated to observe the differences between the five estimations. The MLNI will be used as the standard

against which to compare the others because it accounts for the taphonomic biases inherently part of a commingled context.

Sex Estimation

Sex estimation is predicated on the concept of sexual dimorphism, which means that in the human species males and females tend to differ morphologically. On average males are larger and more robust due to evolutionarily driven anatomical differences (Coleman 1969; Walker 2005, 2008). As a result, males tend to be larger in terms of stature with larger, more robust skeletal morphology and different pelvic attributes. The difference varies from population to population with some being more dimorphic than others (Walker 2005, 2008; Ubelaker and DeGaglia 2017). To estimate sex, I relied on the standards recommended in Buikstra and Ubelaker (1994). These included diagnostic features of the os coxa and cranium. Because the shape of the female pelvis is heavily influenced by the physical demands of childbirth, the diagnostic features of the pelvis are generally more reliable than those of the cranium which are less correlated with functional traits of the body and more associated with size and robusticity (Walker 2005, 2008). When assessing commingled material, it is necessary to consider the pelvis and cranium as separate entities because they can rarely be re-associated with one another.

The features observed for the os coxa included the ventral arc, subpubic concavity, the ischiopubic ramus ridge (Buikstra and Mielke 1985; Phenice 1969), the greater sciatic notch (Walker et al. 1988; Walker 2005), and the preauricular sulcus (Milner 1992) when available. All of the features are generally associated with the size of the pelvic opening. Females require a wider, rounder opening to allow for the passage of a baby's head through the birth canal. As a result, in female pelvises, the subpubic concavity is at a wide angle, the ischiopubic ramus ridge is narrower to allow for maximum ventral extension of the pubis, and the greater sciatic notch is

wide. The ventral arc and preauricular sulcus are generally present in females but not in males. The ventral arc is a ridge of bone on the ventral surface of the body of the pubis. If it is found on male pelvises it is more medial than when it occurs on female pelvises (Anderson 1990). The preauricular sulcus is located inferior to the auricular surface. It varies in width and depth among females but is usually absent in males (Buikstra and Ubelaker 1994). Males have less rounded, more angular features. The subpubic concavity is more acute, the ischiopubic ramus ridge is wider, and the greater sciatic notch is narrow.

Because the cranium is not involved in childbirth, its features are distinguished primarily by their degree of robusticity. Males tend to exhibit more robust features and females tend to exhibit more gracile features. The features recommended for observation in Buikstra and Ubelaker (1994) include the nuchal crest, mastoid process, supraorbital margin, supra-orbital ridge/glabella, and the mental eminence (Ascadi and Nemeskeri 1970). These features are rated on a scale from 1 to 5 with 1 being more gracile and 5 being more robust. In highly sexual dimorphic populations, all of these features would be more robust in males and more gracile in females. However, as populations vary in their degree of sexual dimorphism, some traits may yield ambiguous results. There appears to be a low degree of sexual dimorphism among the Golemi individuals which resulted in higher frequencies of unknown sex individuals. The cranium often produced conflicting traits. For instance, an individual with a robust, male looking glabella could have a thin and gracile supra-orbital margin. Walker (2008) found that older female individuals tend to exhibit more robust, “male”-like traits than younger females, which may influence the estimation of sex in commingled contexts. However, Nikita and Michopoulou (2018) found that the glabella was the most sexually dimorphic trait in a study of cranial sexual

dimorphism in Greek populations. Therefore, in this case, glabella was weighted more heavily in the estimation of sex.

Sex was estimated for the mandible when possible. The primary features used for mandibular sex estimation were the mental eminence, mandibular ramus flexure, gonial eversion, and the depth from incisors to the mentum. The mental eminence was scored from 1 to 5 following the scoring system of Ascsadi and Nemeskeri (1970). It is smaller and less prominent in females than males. The mandibular ramus flexure and gonial eversion were evaluated using methods from Loth and Henneberg (1996). The mandibular ramus flexure is more obtuse in females than males, which are generally closer to a 90-degree angle. The sex estimations from the mandible should be treated with caution as some traits like the mandibular ramus flexure and gonial eversion vary considerably based on the population being observed (Kemkes-Grottenthaler et al. 2002). Estimating sex from the mandible allows further analysis of oral indicators of health and diet.

Femoral circumference at midshaft and tibial circumference at the nutrient foramen were also used to estimate sex. When dealing with commingled remains, using femoral and tibial circumferences can reinforce and provide sex estimations for additional individuals in the sample. Black's (1978) research found that males were more likely to have femoral circumferences measuring over 81mm while female femoral circumferences were smaller than 81mm. Using this measurement as a general benchmark, I separated the femora into "male" and "female" based on femoral circumference when the measurement could be taken. If the measurement was at 81mm +/- 1mm I did not assign a sex to the femur given that there have been no studies of femoral circumference measurements on a Greek population. Symes and Jantz (1983) did a similar study on the measurements of the tibiae including the circumference at the

nutrient foramen. They found that in Caucasian individuals, males had an average circumference of 95.97mm and females had an average circumference of 84.34mm. Based on this data, they set the sectioning point at 90.16mm. As with the femora, I separated the tibiae into "male" and "female" using this benchmark. If the measurement was 90mm +/- 1mm, I did not assign sex to the tibia. A limited examination of modern Greek bones from a pre-industrialized population from central Greece found these benchmarks to be more or less accurate for designating male vs. female (personal study by author).

Age Estimation

Sex estimation also relies on the age of an individuals. Walker (2008) found that the sex estimation markers in the cranium and pelvis become more robust and angular as females age, which can lead to erroneous sex estimations. The fragmentary, commingled remains of Golemi required that sex and age be estimated from isolated elements (i.e. just the pelvis or cranium) in almost all of the cases which introduces some error in both age and sex estimations. Recognizing these limitations, I primarily estimated adult age from the auricular surface and the pubic symphysis of the os coxa as these were the most commonly preserved elements available for age estimation. Both of these surfaces undergo degenerative changes as an individual grows older. The degree of degeneration is used to broadly estimate age. The auricular surface was scored according to the recommendations of Lovejoy et al. (1985) and Meindl and Lovejoy (1989). The pubic symphysis was scored using the phase description of both Todd (1921a, b) and Brooks and Suchey (1990). If the auricular surface and pubic symphysis were present on an os coxa (rare), both were considered in the final age estimation. The age range reported for individuals with both areas present included the age range defined by both scores.

Cranial suture closure and dental wear were used to estimate age when available as well to provide more, if less reliable, age estimations. Cranial age was estimated using cranial suture closure as described by Buikstra and Ubelaker (1994:32) which is a composite method of derived from those of Baker (1984), Mann et al. (1987), Meindl and Lovejoy (1985), Todd and Lyon (1924, 1925a, b, c). Cranial suture closure is less reliable than the features of the os coxa because suture closure is highly variable between individuals (Key et al. 1994). As a result, only very broad ranges can be estimated from this method. Likewise, dental wear was used to broadly estimate age in the dentition from mandibular and maxillary fragments in the absence of better age diagnostic features (Brothwell 1989).

There are issues with estimating age based on the auricular surface, pubic symphysis, and cranial suture closure as many have pointed out (Bocquet-Appel and Masset 1982; Hoppa and Vaupel 2002; Milner et al. 2008). One of the main problems is that the estimated ages and morality profiles of an unknown population mimic those of the reference population on which the aging methods were developed, a phenomenon known as "age mimicry." In response to this issue Boldsen et al. (2002) developed a method known as "transition analysis" which is a statistical method of age estimation based in Bayesian statistics. Instead of relying on a subjective interpretation of the cumulative pelvic and cranial indicators, it breaks each area down into zones which are individually scored. From these scores a maximum likelihood estimate is calculated which provides a point estimation for the age with a 95% confidence interval. This method is most reliable when the os coxa, pelvis, and cranium from one individual are all scored. Because the Golemi material is fragmentary and commingled, it was not feasible to conduct transition analysis. Instead of calculating point estimations of age for each individual, each element scored for age estimation was given a 10 year age range. These ranges were then put

into four primary age groups: Young Adult 18-30, Middle Adult 30-40, Prime 40-50, Old 50+. These category designations were chosen based on those commonly used in bioarchaeological analysis. Because of the ambiguity of the age attributes on some elements, the Young/Middle (25-35) and Middle/Prime (35-45) categories were added. These overlap with the Young, Middle, and Prime categories. If an individual spanned an age range of 20 or 30 years, the average of that range was used to place them into a category.

Juvenile age can be more accurately estimated because it is based on the growth and fusion of the bones and dental eruption rather than degeneration of certain features. In this dissertation, juvenile age was most often determined by measuring or estimating the maximum length of a given long bone with one or more unfused epiphyses and comparing them to bone specific maximum length age estimations in Scheuer and Black (2000). The epiphyseal fusion provides a broad range when other features cannot be observed since fusion occurs in various elements at different times of growth and development. Juvenile dentition eruption is a more reliable indicator of age as the eruption of both deciduous and adult teeth are less affected by disruptions in growth due to stress, disease or malnutrition; however, the formation of adult teeth is the least affected by these things and provides the most reliable estimation of juvenile age (Ubelaker 1987). In some rare cases, juvenile mandibular dentition was available for observation in the Golemi material, in which case dental formation and eruption was used to estimate juvenile age based on the method developed by Ubelaker (1989). As with the adult individuals, the juveniles were placed into age groups defined as: Fetal/Infant < 0 – 2, Young Child 2-6, Older Child 6-10, Adolescent 10 – 18. The juvenile age categories are arbitrarily decided in many studies since the social connotations for them are not always known (Halcrow and Tayles 2008). Such is the case with the juvenile categories of the Golemi sample, which I chose to

roughly follow different stages of juvenile development (Roksandic and Armstrong 2011). If an individual's age was estimated at the limit of the age range, they were placed in the younger age category. For example, if the individual was estimated to be 2 years old, they were placed in the "infant" category. In this way, the placement of individuals into categories was uniform. The terms "infant," "child," and "adolescent" are used only to designate age categories and are not meant to refer to any cultural or social definitions of the terms.

Assessing Demography

The MNI for the entire cemetery provided the total number of individuals against which to compare demographic attributes. I examined demographic data to determine the frequencies of males vs. females, adults vs. juveniles, and relative differences between age groups according to sex. The first aspect of demography examined was the ratio of males versus females across the cemetery. The ratio is reported in two ways. The first reports the number of males and females estimated from crania and pelvises. The second ratio reports the number of males and females estimated by combining sex estimations from femora and tibiae with those from the crania and os coxae.

To estimate the first ratio, the ages and sexes of the os coxae and crania were considered together. I then roughly matched crania with os coxae of the same age range and estimated sex to represent "an individual." If a pelvis was in the age range of a cranium from the same tomb and roughly matched the sex estimation, they were paired together so as to not overestimate the number of males, females, or age groups of either sex in the tomb. Unpaired crania and pelvises were counted as additional individuals. These estimates were used to build the morality profile and conduct hazards analysis for the sample (see below).

To estimate the second ratio, the number of male and female individuals estimated from the crania and pelvises were compared to the sex estimations derived from the femoral and tibial circumferences. For example, if a tomb contained three males and two females based on cranial and pelvic material but the femoral and tibial measurements indicated the presence of four males and three females, the latter numbers were recorded. This ratio was used to determine if there were any significant difference between male and female representation in the tombs and throughout the cemetery.

The second aspect of demography considered was the ratio of adults and juveniles. Individuals were counted as juveniles if age could be estimated as 18 years or younger. If there was a question as to whether a bone represented an adult or juvenile individual, it was included in the adult category. For this reason, the number of older juveniles is likely underestimated. The ratio of adults to juveniles was recorded for each tomb individually.

The third aspect of demography investigated were the distributions and proportions of individuals with both age and sex estimated. The total number of males and females for each age category were recorded for each tomb. The proportions of individuals per tomb are considered in comparison to the proportions of the cemetery as a whole. Hierarchical Bayesian analysis was used to identify tombs that had unusually high or low proportions of males, females, or juveniles as compared to rate of occurrence in the rest of the cemetery.

Modeling Mortality

Given the difficulties in estimating age in adult individuals even in non-commingled contexts, the average age-at-death estimations should be treated cautiously (Bocquet-Appel and Masset 1982; Buikstra et al. 1986). Using the mid-points of the age ranges for each aged individual, the average age-at-death was calculated for all aged individuals, including juveniles.

In addition to this, the average adult age was calculated using aged individuals older than 18 years of age. The average juvenile age was calculated from the ages of individuals 18 years or younger. The average age-at-death was calculated for known male and female adult individuals.

Using R, a limited survivor analysis was conducted to illustrate the mortality curve of the Golemi sample based on the age estimations derived from the age ranges. To do this a Kaplan-Meier plot was generated to show the probability of an individual surviving to a certain age. Each downward step represents the decreasing probability of survival as an individual ages. Because it was possible to estimate age and sex for some bones, a Kaplan-Meier plot was produced for both males and females to illustrate their different survival probabilities based on the available data.

The averages derived from the estimated ages of the individuals most likely over- or under-represent the true mean age at death. For this reason, hazards analysis was also used to estimate mean age-at-death. The hazards model was constructed using the Gompertz model (Gage 1988, 1991; Wood et al. 1992; Konigsberg and Frankenberg 2002, 2006, 2013). The Gompertz model estimates the probability of death at a given age using two parameters: adult mortality and the age-dependent risk of death (Gage 1989). Hazards analysis is beneficial in that it is able to incorporate the uncertainty of age estimations into the model while accounting for differences in individual risk of death (Wood et al. 1992; Frankenberg and Konigsberg 2006). Because it was not possible to associate specific individuals with pathologies represented on post-cranial bones in most instances, it was not possible to include pathology as a variable when estimating parameters for the Gompertz model.

Using these as the age estimates, the parameters from each model were optimized using the “optim” function in R. The hazard model is considered successful if it reached convergence

(maximization). To assess which model fit the data best, the Akaike Information Criterion (AIC) was calculated using log-likelihood values for each model. The smaller AIC value indicates the better fitting model. Given the circumstances of the sample these age estimates provide only a rough idea of the mortality patterns of Golemi, which means that these models should be interpreted cautiously and conservatively.

Three separate hazard analyses were conducted to assess the overall mortality pattern of the sample and the differences between male and female mortality. First, all adult individuals were analyzed using both the Gompertz and Gompertz-Makeham models. Then, males and females were modeled separately using both models to determine which represented the data best. Differences between the curves illustrate differences in mortality patterns. In addition to providing the survivorship curves, the models provide a way to estimate mean age-at-death for the entire adult sample and separately for each sex using numerical integration of survivorship.

Cranial and Dental Non-Metric Traits

Cranial and dental non-metric data are used to explore whether the Golemi tombs consisted of genetically related individuals such as nuclear family. Non-metric traits are neutral characteristics of the bone which may be genetically controlled and thus passed from parent to child (Sjovold 1976-1977; Alt et al. 1997). If this is true, a family will exhibit more non-metric trait similarities with each other than with those outside of the family (Alt et al. 1997). Thus, in the case of Golemi, those within a tomb should exhibit more similar non-metric traits than those outside of the tomb if tomb placement was based on genetic familial ties.

Cranial traits are less reliable than dental traits because of the plasticity of the cranium and phenotypic variation influenced by environmental factors (Alt and Vach 1995). Because data were scarce for this site I observed as many traits as possible to increase sample size. I recorded

the cranial traits according to Buikstra and Ubelaker (1994:87-92). In total, fifteen traits were able to be observed consistently across the cranial material (Table 6.1). Twenty-two dental traits were recorded according to the Arizona State University Dental System (Table 6.2; Turner et al. 1991). Not every trait could be recorded for each individual. Mandibles were more numerous than maxillae among the material which meant that there is more non-metric data for mandibular dentition than maxillary dentition. Furthermore, I was unable to associate crania with mandibles in most cases, which prevented the association of cranial and mandibular non-metric traits in the same individual.

Because of the commingled nature of the material, each trait was considered separately. The non-metric traits represented in any given skeletal sample are going to be population specific (Carson 2006). No research has been conducted on the prevalence of non-metric traits in a Greek population. Because it is less likely that un-related individuals will share "rare" traits, it is assumed that those with such traits are more likely to be related to one another than those without the traits (Alt and Vach 1995). The "rarity" threshold is decided by the researcher such as in Prevedorou and Stojanowski (2017) where it is set at 6%. In the case of Golemi, a trait is considered "rare" if it occurs in 15% or less of the observable individuals. I decided to employ a higher rarity threshold so that I could examine the distribution of certain rare traits throughout the cemetery in addition to examining which traits appeared in the same tombs together.

Hierarchical Bayesian analysis was conducted for traits observable in more than 30 individuals in the cemetery population to determine if certain tombs contained relatively higher or lower number of individuals with the traits as compared to the cemetery wide average probability. Those tombs with probabilities falling on the edges or outside of the 95% CI of the

Table 6.1. Cranial Non-Metric Traits Recorded (Buikstra and Ubelaker 1994:87-92)

Trait	**Recording Method**
Metopic Suture	Present/Absent
Supraorbital Notch/Foramen	Notch/Foramen
Parietal Foramina	Present/Absent
Sutural Bones (Ossicles)	Present/Absent
Inca Bone	Present/Absent
Condylar Canal	Present/Absent
Divided Hypoglossal Canal	Present/Absent
Superior Sagittal Sulcus Flexure	Right/Left
Foramen Ovale Incomplete	Present/Absent
Foramen Spinosum Incomplete	Present/Absent
Pterygo-Spinous Bridge/Spur	Present Absent
Psterygo-Alar Bridge/Spur	Present/Absent
Tympanic Dihiscence	Present/Absent
Auditory Extosis (Torus)	Present/Absent
Mastoid Foramen	Present/Absent

Table 6.2. Maxillary and Mandibular Traits Recorded (Turner et al. 1991)

Maxillary Traits	**Mandibular Traits**
Shoveling	Shoveling
Labial Convexity	Double Shoveling
Double-shoveling	Premolar Lingual Cusp Variation
Tuberculum Dentale	Anterior Fovea
Canine Mesial Ridge	Groove Pattern
Metacone	Cusp Number
Hypocone	Protostylid
Cusp 5	Cusp 5
Carabelli's Trait	Cusp 6
Parastyle	Cusp 7
Peg-Shaped Incisor	
Congenital Absence	

cemetery population were considered in conjunction with other skeletal traits to determine if there is a confluence of traits that might point to familial relationships.

Paleopathology

Pathological markers on the skeleton were used to determine heath status for the individuals of the cemetery as a whole and for each tomb group. Diversity in occurrence of pathological markers can be indicative of differences in health status and risk of death between tombs. Limited variation among the health statuses of the tomb groups would be indicative of similar access to resources or that there was some control over tomb burial limiting it to those with a certain level of access to nutritional resources. Paleopathology of the cemetery was assessed through an examination of prevalence of non-specific indicators of disease/stress and oral health.

Although these traits were divided into two primary subcategories, they were all considered separately so that the prevalence of each trait could be assessed independently. For some traits, the prevalence was calculated using two types of data, MNI data and fragment/tooth data, so as to more fully capture the presence of the trait. The traits that were calculated in two ways include periostitis and all of the oral traits. The first method of calculation entailed calculating the MNI of the individuals expressing the trait divided by the MNI of observable individuals. For example, if a tomb had 8 bones exhibiting periostitis and the most prevalent element was a left tibia, the left tibia was used to calculate MNI observable for periostitis for that tomb.

For the oral traits, the MNI of each trait and the observable individuals was calculated using individuated dentitions, usually the mandible. The rate for each trait was calculated per tomb and then all the tomb rates were combined to arrive at the cemetery wide rate of occurrence

of that trait. The second method calculated the rate as the number of fragments or teeth exhibiting the trait out of the total number of fragments or teeth observed. The one exception to this general rule of calculation was antemortem tooth loss/alveolar resorption. To arrive at the total number of observable "teeth" all teeth and tooth sockets were counted.

Non-Specific Indicators of Disease/Stress

Not all evidence for disease or stress in the skeletal system indicates a specific disease, disorder, or stress event. Rather some skeletal markers/lesions suggest the presence of a non-specific infectious disease or denote a period of disease or nutritional stress in an individual. As such they are useful in measuring an overall picture of health in individuals and populations. As was discussed in Chapter 2, these must be interpreted in light of the osteological paradox, keeping in mind that the mortuary population is not reflective of the living population. They generally represent the sickest, weakest members of a community who may have had higher risk of death than those who survived them. The non-specific indicators of disease used in this dissertation include cribra orbitalia, porotic lesions of the skull, linear enamel hypoplasia, and periostitis.

Cribra orbitalia and porotic lesions of the skull indicate the presence of disease and/or nutritional stress at some point in an individual's life (Walker et al. 2009). Porotic lesions of the skull form on the vault of the cranium and manifest as concentrated areas of porosity, primarily on the occipital and posterior parietal bones. This porosity develops in response the hypertrophic production of red blood cells in the cranial diploe. Cribra orbitalia is a similar phenomenon in the orbital roof. Because of the fair to poor preservation of most of the skeletal material, cribra orbitalia and porotic lesions of the skull were recorded using methods of Steckel et al. (2006:13-14), which are three stage systems from 1 to 3 based on the density and size of the porosity. As

there were usually taphonomic changes obscuring the clarity of the lesions in the bones, active vs. healing/healed stages were recorded when possible but not included in the analysis. For the purposes of the hierarchical cluster analysis and determining prevalence in the cemetery population as a whole, cribra orbitalia and porotic lesions of the skull were coded as "presence/absence."

Linear enamel hypoplasia (LEH) is often used to explore issues of frailty and disease episodes in an individual. LEHs are formed with the ameloblastic (enamel forming) activity is halted for a short period of time and then resumed, creating a horizontal line from mesial to distal aspects of the crown. They are most common in the maxillary incisors, mandibular canines, and the anterior teeth in general. Their occurrence is generally interpreted as representing a period of stress such as disease or malnutrition during growth and development. The formation of enamel has been found to be sensitive to such instances and as such is useful for assessing generalized stress of a population (DeWitte 2010; DeWitte and Belvalec 2011). LEH was recorded by examining each tooth macroscopically for horizontal grooves on the anterior surface of the crown following the methods recommended by Buikstra and Ubelaker (1994:56-57). Multiple LEHs per tooth indicate more incidents of stress or disease in an individual's life. The number of individuals exhibiting LEH indicates relative prevalence of childhood stress and/or disease both per tomb and throughout the cemetery.

The final non-specific indicator of disease included in this dissertation is periostitis, which is bone formation on the periosteal surface of bone as a result of systemic infection. Periostitis can also be used to conduct a differential diagnosis to identify specific infectious disease in individuated skeletons, but it is impossible to do this in commingled contexts. Periostitis can also be caused by soft tissue damage or trauma such as an ulcer on the skin or a

blow to the shin. In the commingled contexts of Golemi, periostitis was used as a general measure of health for the tomb group and mortuary population as a whole.

The methods developed by Steckel et al. (2006) were used to record the presence and type of periosteal reaction. This includes the location, size, and type of reaction, which could be described as woven bone or sclerotic bone. Woven bone forms a new layer atop the normal cortical bone, underneath the periosteum. With healing, the bone becomes sclerotic, which appears flattened and somewhat incorporated into the underlying cortical bone (Buikstra and Ubelaker 1994). To simplify the statistical analysis of cemetery organization, periosteal lesions were recorded as present/absent. However, the degree of reaction is noted in the assessment of individual tombs as the patterns of organization are discussed. Finally, if the periostitis was obviously associated with a fracture or soft tissue damage (i.e. a bony callus), it was not counted with the non-specific indicators of disease.

Oral Health

Aspects of oral health included in this study were antemortem tooth loss (AMTL), caries, calculus, and abscesses. The biological implications of these attributes are discussed in Chapters 3 and 4.6. All oral attributes were scored according to the standards defined by Buikstra and Ubelaker (1994:54-56). AMTL was recorded as present if the tooth was not present and the socket exhibited alveolar resorption in part or in total. Caries, defined as cavities on the crown or rout of the tooth, were scored via the modified system of Moore and Corbett (1971) recommended in Buikstra and Ubelaker (1994:55; Table 6.3).

Because caries and antemortem tooth loss are highly correlated (Lukacs 1992, 1995), the rate of AMTL was important for calculating the prevalence of caries in the Golemi population.

Table 6.3. Documentation of Carious Lesions (after Buikstra and Ubelaker 1994:55, Moore and Corbett 1977)

Score	**Description**
0	No Lesion Present
1	Occlusal Surface: all grooves, pits, cusps, dentin exposures, and the buccal and lingual grooves of the molars
2	Interproximal Surfaces: includes the mesial and distal cervical regions
3	Smooth surfaces: buccal (labial) and lingual surfaces other than grooves
4	Cervical Caries: originates at any cemento-enamel junction (CEJ), except the interproximal regions
5	Root Caries: below the CEJ
6	Large Caries: Cavities that have destroyed so much of the tooth that they cannot be assigned a surface of origin

The observed caries rate and corrected caries rate were calculated using the formulae in Lukacs (1995: 153, Figure 1). The observed caries rate is equal to the number of carious teeth divided by the total number of teeth observed. The caries rate corrected to account for AMTL caused by caries was calculated as follows:

1) Estimated number of teeth lost due to caries = Number of teeth lost antemortem x proportion of teeth with pulp exposure due to caries
2) Total estimated number of teeth with caries = estimated number of teeth lost due to caries + number of carious teeth observed
3) Total number of original teeth = number of teeth observed + number of teeth lost antemortem
4) Corrected Caries Rate = total estimated number of teeth with caries + total number of original teeth

It is assumed that the proportion of carious teeth with pulp exposure represents the rate of teeth lost antemortem as a result of caries and not something else like periosteal infection, trauma, or dental attrition (Lukacs 1995).

If left untreated, caries can create abscesses which are drainage canals in the alveolar bone at the root of the tooth. Abscesses were recorded as present/absent and buccal/lingual if present (Buikstra and Ubelaker 1994:55). Dental calculus is the buildup of plaque on the surfaces of the teeth. It primarily affects anterior teeth, but it can also occur on molars and premolars. Calculus was scored on a scale from 0 to 3, 0 being absent, 3 indicating a large amount was present (Brothwell 1981).

Activity Markers

Although skeletal makers cannot reveal specific lifestyles, certain markers may indicate differences in activity levels and certain broad categories of activities within a skeletal assemblage. Entheseal changes, femoral morphology, osteoarthritis/degenerative joint disease, and cranial trauma were recorded to provide a picture of activity levels at Golemi.

Entheseal Changes

Entheseal changes have been heavily used to reconstruct past activity patterns, but their reliability to accurately reflect activity has been called into question based on clinical data suggesting otherwise (Jurmain 1999; Rabey et al. 2015; Wallace et al. 2017). Entheseal changes are generally defined as bony changes at muscle origin and attachment sites on the bone (Villote and Knusel 2013). Entheseal changes have also been called musculo-skeletal markers (Hawkey and Merbs 1995), enthesopathies, and muscle markers. In this study, I collected data on entheseal changes when possible. I did not differentiate between fibrous and fibrocartilaginous markers so as to increase the number of observable features. Because individuals could not be individuated for the most part, the entheseal changes were considered by tomb and all together. They were not differentiated by marker or bone, but rather an absence/presence approach. If one tomb appeared to exhibit significantly more bones with entheseal changes (controlling for number of fragments

available for observation), it was examined more closely along with the robusticity of the entheseal changes on each bone. Hierarchical Bayesian analysis provides a way to compare the rates of EC occurrence in tombs while also accounting for the fact that some tombs may have had more observable elements like femora and humeri than other tombs did.

The prevalence of entheseal changes (EC) in the cemetery was represented per individual (MNI) and per fragment. For the MNI estimation, the element representing the most individuals with EC was used to calculate the prevalence in each tomb. The total MNI with EC and the total MNI observed from each tomb were then added to arrive at the cemetery-wide totals. Because it was possible to estimate sex for femora and tibiae based on diaphyseal circumferences, the prevalence of males versus females was taken into account for the femur and tibia.

Degenerative Joint Disease

Degenerative joint disease (DJD) was recorded using the methods of Steckel et al. (2006) for both vertebral and non-vertebral joints, primarily hip, knee and elbow. If a tomb exhibited an unusual amount of vertebral DJD, it was examined more closely along with the other features of the tomb beginning with demography to check for age bias. If a tomb had several individuals for whom age could be estimated and there were several older individuals, the high amount of vertebral DJD could be correlated with the age of those individuals. If there were primarily younger individuals in the tomb with a high amount of vertebral DJD, it might reflect a pattern of activity among those individuals.

Non-vertebral Degenerative Joint Disease (DJD) was assessed in several ways. First, the MNI of the elements with the highest number of affected fragments for each tomb were combined to provide the total MNI for non-vertebral DJD for the entire cemetery. This was compared to a total observable MNI, which was calculated by adding the observable MNIs of the

elements used to assess DJD from each tomb. The second assessment compared the total number of fragments affected to the total number of fragments observed to understand overall fragment representation.

Platymeric Index

The platymeric index (PI) of the femur is a simplified measurement of cross-sectional morphology. It reflects biomechanical loading stresses on the femur which contribute to changing the morphology of the proximal diaphysis (Ruff 1999). The PI is calculated from the subtrochanteric minimum and maximum diameters. This index has been associated with subsistence activities such as bearing heavy loads, horseback riding, and regularly traversing hilly or mountainous terrain (Wescott 2005; McIlvaine and Schepartz 2015). For this study, both cemetery wide values and tomb specific averages were calculated for comparison. Tombs whose averages significantly differed from the cemetery average indicate some level of difference in activity levels across the cemetery.

A Student's *t*-test was used to determine whether the mean PIs of the right versus left femora were significantly different. Because sex could be estimated from femoral circumferences in some cases, the PIs for the males and females were separated and statistically compared through a t-test. If the results of the previous t-test indicated that there was no significant difference between the left and right PI means, they were pooled to increase the sample sizes of each sex.

Cranial Trauma

The presence of significant amounts of cranial trauma among a population may suggest a tendency to frequently engage in interpersonal violence or "warrior" activity, a trait ostensibly related to Mycenaean culture through the "warrior" identity and lifestyle (See Chapter 4; Angel

1973; Milner et al. 1991; Steadman 2008; Jurmain et al. 2009; Smith 2009). Both cranial and post-cranial trauma were recorded for type of fracture (post-cranial), shape of fracture (cranial), healing status, and location on the bone according to Buikstra and Ubelaker (1994:119-120). However, because post-cranial trauma could be related to accidents or other activities or to interpersonal violence, it was not considered to contribute to the potential representation of engaging in a "warrior" lifestyle at Golemi.

The MNI for cranial trauma was observed for each tomb and then combined to form the data set for the entire cemetery. The frequency of trauma was derived by dividing the number of skulls exhibiting trauma by the number of skulls observed for trauma. The crania with evidence of trauma were then separated by sex and age to observe any potential patterns. I also identified the various types of trauma exhibited, the most common type of trauma as well as the primary locations of the trauma (vault vs. craniofacial).

Operationalizing the Biological Profile

A set of fragment inclusion and exclusion rules were derived to create the data sets used for the above analyses. One of the main aspects was determining which element fragments to include in the overall "Number of Individuals Observed" for the MNI data and overall "Number of Fragments Observed" for the fragment/tooth count data. This determination was based on the likelihood of a certain trait appearing on a specific element portion. For example, because periostitis does not usually appear on the occipital in this population, it was excluded from the total fragment count. In the course of documenting each fragment, several could not be identified. As such, they were classified as "unidentified fragments." Other fragments could only be identified as part of a certain element but could not be sided and did not add to the number of individuals represented in the tomb and so were grouped as "os coxa/cranial/etc. fragments" or

"long bone fragments." When the total number of fragments observed for each category of analysis were calculated, these groups were not included.

Criteria

The criteria demonstrated in Tables 6.4-6.7 were used to determine trait representation per tomb via individuals (MNI data) and fragments/teeth (Fragment/Tooth data). Loose teeth were included in both the affected category and the total number observed category when they were definitively from a separate individual. All traits were compared to the MNI of the tomb which was estimated as the minimum number of individuated dental arches in the tomb. The number of teeth with caries and/or calculus were compared to the total number of teeth found in the tomb.

Chapter Summary

In this chapter I have defined the biological profile described how the foundational data was collected for it including paleodemography, paleopathology, activity markers, and trauma. Within this, I describe how each will be assessed through the estimation of trait frequencies, chi-square tests, and/or hierarchical Bayesian analysis. I provide details about how the bone and tooth fragments were counted to derive two data sets that could be used to operationalize the biological profile to address the main questions and sub-questions of this dissertation.

Table 6.4. Criteria for cranial and dental non-metric traits

Trait	Criteria
Cranial	• Trait present in 15% or less of the observable individuals • For those traits that are bilateral (parietal foramen, temporal traits, etc.), I considered both sides when possible, but pooled results if fragment was sufficiently individuated.
Dental	• Trait present 15% or less of the observable individuals • Divided by Maxillary and Mandibular Dentition • MNI calculated separately for Maxillae and Mandibular Dentition

Table 6.5. Criteria for assessing non-dental indicators of disease/stress

Trait	Criteria
Cribra Orbitalia	• Number of orbits exhibiting trait from most numerous side (Example: if there are more left orbits than right orbits with cribra orbitalia in a single tomb – the number of left orbits is recorded as the number of individuals with CO in the tomb) • MNI calculated from the same side
Porotic Lesions of the Skull	• Number of distinct individuals exhibiting trait on any portion of the cranial vault • Total MNI calculated from number of individuated cranial vaults
Periostitis	• The following elements were not counted as observable fragments: all vault fragments (frontal, parietal, occipital, temporal), teeth, vertebrae and ribs. • All other fragments were included in the total observed fragment count
Linear Enamel Hypoplasia (LEH)	• Number of teeth exhibiting any LEH -Total number of teeth from entire tomb considered for comparison • Number of individual exhibiting any LEH – Compared to total number of individuated dental arcades with teeth

Table 6.6. Criteria for assessing dental traits

Trait	Criteria
Antemortem Tooth Loss (AMTL)/Alveolar Resorption	• Teeth missing with complete or partial alveolar resorption • Teeth in situ with alveolar resorption
Caries	• Teeth exhibiting active tooth decay on any surface of the tooth
Abscess	• Teeth in situ with abscess canal • Sockets with abscess canal
Calculus	• Teeth exhibiting any amount of calculus

Table 6.7. Criteria for assessing activity markers

Trait	Criteria
Entheseal Changes	• The following elements were observed: Femur, Tibia, Fibula, Humerus, Ulna, Radius, Clavicle • Any fragments for which entheseal changes could not be observed were excluded. This includes areas on which there is no observable muscle origin or insertion, or the fragment was too small for observation.
Non-Vertebral Degenerative Joint Disease	• All major joint fragments observed • Compared to the total number of fragments which make up these joints • Joint with highest representation of DJD was used in the analysis of tombs based on MNI of DJD. • Example: if the trochlea of the humerus exhibited the highest number of individuated fragments with DJD out of all the joints, it would represent the MNI of individuals with DJD for that tomb. This MNI was then compared to the total MNI for that element for which the articular surface was observable. • Joints considered: Shoulder, Sternoclavicular Joint, Elbow, Wrist, Hip, Knee, Ankle, TMJ.
Platymeric Index	• All femora with measurable subtrochanteric (anterior-posterior and medio-lateral) dimensions included • Average PI calculated for each tomb
Trauma	• All elements considered • Excludes teeth and vertebrae in total number of fragments observed and when calculating MNI for number of individuals observable for trait • Hierarchical cluster analysis only considers cranial trauma which is compared to the cranial MNI, not cranial fragment counts

CHAPTER 7: RESULTS

The following chapter provides the results of the cemetery-wide archaeological, paleodemographic, paleopathological, activity, and trauma analyses. I begin by providing the archaeological attributes of the cemetery, including tomb architecture, size, and shape, as well as the presence of individuals *in situ* and secondary burial pits/niches. The effects of looting on the distribution of grave goods are addressed to provide context for the discussion of the grave goods in the next section. The broad categories of the grave goods are discussed in terms of the quantities, qualities, and distribution throughout the cemetery. Specific tombs are identified when they contain notable quantities or types of goods or share certain types of grave goods with other tombs.

In the second section, the osteological results are presented. Prior to discussing the details of these analysis, the effect of looting on the number of individuals in each tomb is accounted for. The osteological results are then broken down into three main categories: demographic, non-specific indicators of disease, and activity markers. The results of the paleodemographic analyses include the estimations of minimum number of individuals, sex and age, an assessment of kinship relationships, and the results of the hazards analyses. The non-specific indicators of disease category include two main sub-categories: general indicators and oral health indicators. The activity markers category includes an assessment of entheseal changes, degenerative joint disease, the platymeric index, and cranial trauma. Within each of these categories, the results of the t-tests, chi square tests, Fisher's exact tests, and hierarchical Bayesian analyses are reported when relevant. Finally, potential relationships between archaeological materials and biological attributes are explored through chi-square tests of independence.

Archaeological Material

Chronology

As previously stated in Chapter 5, the dates of the Golemi tombs are based on the basic ceramic analysis reported in the Archaeologikon Deltion which will henceforth be referred to as "AD" followed by the volume number and year of publication. The dates provided are relative dates corresponding to the chronology discussed in Chapter 4. In *AD* 43 (1993:225), Dakoronia suggests that the cemetery was in use from LH IIB to the last phase of LH IIIC. Van de Moortel (2007) reports that Tomb 85.II bean in LH IIB because of the presence of a squat alabastron (FS83) (AD 40 [1990]:170, fig.11, pl57a); Tomb XV likewise began in LH IIB based on the identification of another squat alabastron pictured (AD 43 [1993]:226, pl. 126a). One of the tombs, Tomb XXVI, has been dated much more narrowly to LH IIIB1-2 (AD 47 [1997]:208) based on fragments of an alabastron with a fine ring base as well as stirrup jar fragments from the same time period.

Preliminary radiocarbon dating of seven dental samples from five tombs provides broad absolute dates for Tombs 85.II, XIII, XV, XXIV, and XXV (Stiles, unpublished data). Radiocarbon dating via accelerated mass spectrometry (AMS) was performed at the Center for Applied Isotope Studies at the University of Georgia. The data were analyzed using OxCal Radiocarbon Calibration (https://c14.arch.ox.ac.uk/oxcal.html). The date ranges are illustrated in Figure 7.1. The radiocarbon dates of the two samples from Tomb 85.II support the early start date of the tomb to some extent, ranging from ca. 1500-1300 BCE, with the highest peak between 1450 and 1370 BCE, coinciding with the end of LH IIA to LH IIIA1 in the low chronology and with LH IIB-LH IIIAI in the high chronology (see section 4.3). The date from Tomb XV fell between 1300 and 1100 BCE (roughly LH IIIB in both chronological systems),

which suggests either that the tomb was not in use in LH IIB or that the individual used for analysis was a later burial. The sample from Tomb XIII provides a range of ca. 1420-1260 BCE, corresponding with LH IIB-LH IIIIB1 in the low chronology and LH IIIA1-LH IIIB1 in the high chronology. The individual tested was found in a pit with several other individuals in the dromos of the tomb and not in the chamber, suggesting that this is a date for an earlier period of use in the tomb. The sample from Tomb XXIV provides the earliest date range, ca. 1500-1400 BCE, or LH IIA-LH IIIA1 in both chronological systems. This tomb was highly disturbed and so little can be said about the stratigraphy of the tomb. Finally, the two samples from Tomb XXV provide a range of 1400-1200 BCE (ca. LH IIIA1- LH IIIB2), but the higher percentage falls of the range between ca. 1330 and 1220 BCE, or LH IIIB1-2 Early in both chronologies. The individuals from this tomb were all found *in situ*, suggesting simultaneous burial.

Dates from tombs without skeletal data and thus not being considered for this dissertation (Tombs XVII, XVIII, XIX, XXII) can provide some additional chronological information about the cemetery as a whole. *AD* 44 (1995) reports the following dates: Tomb XVII was in use during LH IIIA2-IIIB2; Tomb XVIII dates to LH IIIB1; Tomb XIX has been dated to LH IIIB1-IIIC Early; and Tomb XXII dates to LH IIIC. These all fall within or just after the Palatial period.

Tomb Architecture

The architectural aspects of the tombs included in this study are the dromos length, the shape of the chamber, the area of the chamber and the presence of pits/niches indicative of secondary burial in the chamber or dromos. The measurements for the length of the dromos and the lengths of the chamber tomb walls were found in the excavation diaries for some, but not all tombs (Diaries, unpublished). Table 7.1 indicates the tombs for which the dromos and chamber

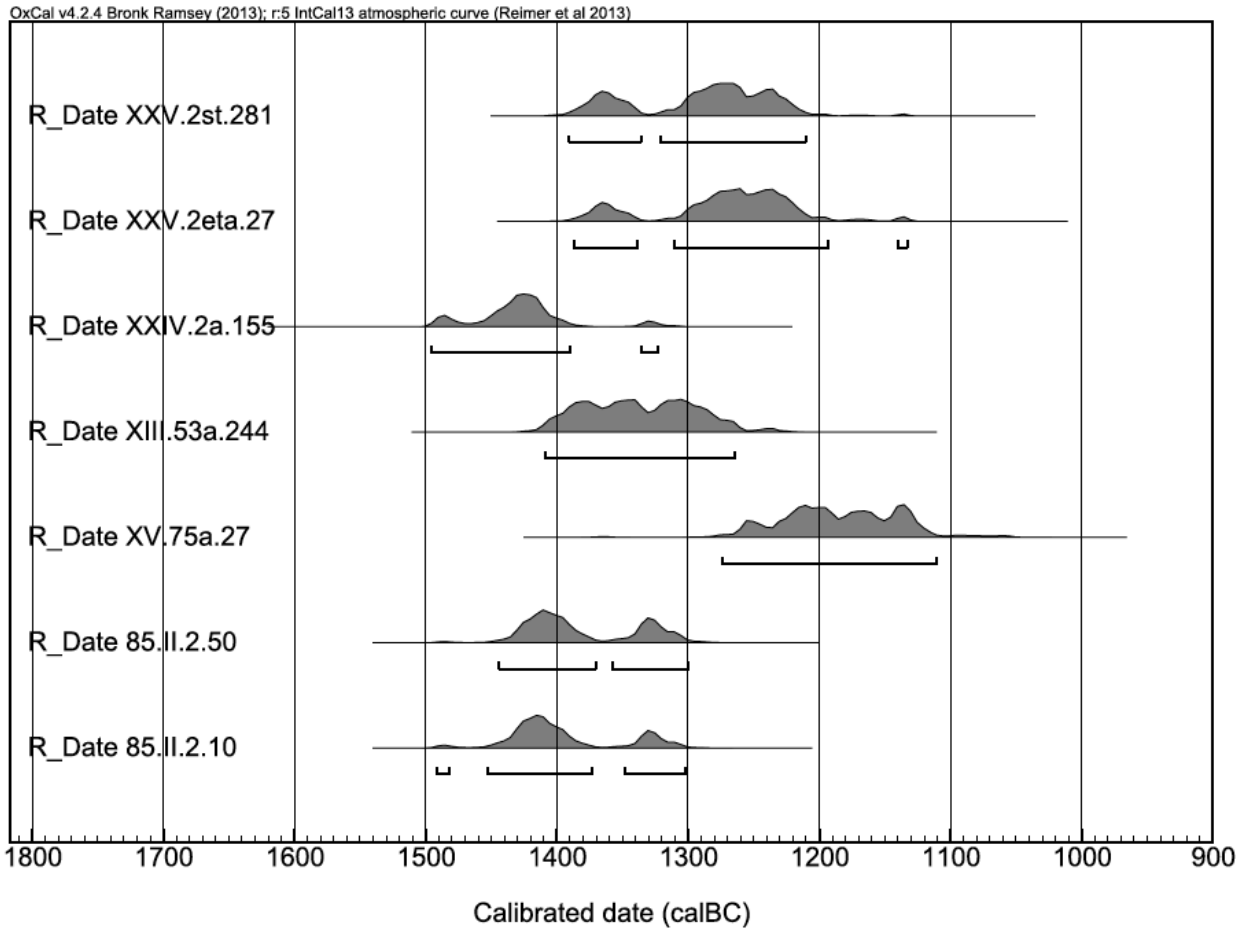


Figure 7.1. AMS Radiocarbon Dates for Tombs XXV (2), XXIV (1), XIII (1), XV (1), 85.II (2) (CAIS 2016)

measurements were available. The average dromos length of the tombs with measurements (n= 12) is 3.36m. Tomb 88.I has the longest dromos at 4.95m. Tombs XXV has the shortest dromos at 1.25m. The shape of the chambers varied throughout the cemetery. The chamber shape was reported for 14 of the 23 tombs. The most common shape was a trapezoidal shape (n=4). The second most common shapes were square (n=3) and rectangular (n=3) chambers. Two tombs were circular or oval in shape and one tomb had an irregular shape. The average chamber area of the tombs for which measurements were recorded (n = 14) is 3.01m^2. The area of the chamber was calculated using the reported measurements for the sides of the tombs. The tomb with the largest chamber is 88.II (6.02m^2) and the tomb with the smallest chamber is XI (0.52m^2).

Pits or niches were reported for four (88.II, III, XIII, XVI) of the 23 tombs. Each of these tombs had one pit or niche in the dromos. Tomb 88.II contained a niche in the dromos sealed off with a stone slab, which contained the remains of several individuals as well as one artifact, a pair of tweezers. In addition to the pit in the dromos, Tomb XVI had a shallow pit in the chamber itself, but it did not contain any skeletal remains or artifacts (Diaries, unpublished).

Body Position

Because it was customary for those burying their dead in rock cut chamber tombs to place individuals on the floor for decomposition (Cavanagh 2008), the number of individuals found *in situ* as primary burials was recorded. Five (85.II, IV, IX, XIII, XXV) of the 23 tombs contained individuals *in situ*. Four of those five tombs had not been looted. The number of individuals found in each tomb and the position of their bodies (if known) is shown in Table 7.2. It is possible that other tombs had *in situ* individuals that were not recognized at the time of excavation or that had been disturbed by looting. Looting activity also affected the number of individuals discovered *in situ*.

Table 7.1. Architectural Features of the Golemi Tombs

Tomb	Dromos Length (m) (n = 12)	Chamber Shape (n = 14)	Chamber Area (m^2) (n = 14)	Pit/Niche Present?
85.I				No
85.II				No
88.I	4.95		2.76	No
88.II	4.5		6.02	Yes
III			3.44	Yes
IV		Square	2.66	No
V	4	Trapezoid	2.95	No
VII	2.5	Square	1.46	No
IX	2.8	Irregular	3.13	No
X	3.7	Trapezoid	3.95	No
XI	2.8	Trapezoid	0.52	No
XII	3.3	Square	3.25	No
XIII	2.9	Circular	1.70	Yes
XIV				No
XV	3.8	Square	1.70	No
XVI	3.8	Oval	4	Yes
XX				No
XXIV		Rectangular		No
XXV	1.25	Rectangular		No
XXVI		Rectangular		No
XXVII		Trapezoid	4.58	No
XXVIII				No
XXIX				No
Average	3.36		3.01	

One tomb should be particularly noted, Tomb XXV. The excavator reports that this tomb was found undisturbed with six individuals *in situ* in the chamber. The individuals, likely all adults, had been laid out side-by-side on their right sides, knees flexed to the east and arms folded across the chest with the crania to the south and the feet to the north. Through osteological analysis of the skeletal material, three more individuals were identified from this tomb, all juveniles (Ages: ca. 2 years, 6 years, and 7-9 years). Although the remains were commingled in the process of excavation, it was possible to re-associate some remains based on ages and sexes. It appears that the 2-year-old and 7-9-year-old were buried near or on top of an adult male and a probable adult female. The 5-6-year-old was found with an old female (60+). All six individuals were located on the west side of the tomb. The remaining three individuals, all adult males, were located on the east side. Figure 7.2 depicts the excavator's initial impression of the individuals *in situ*. The juvenile individuals are thought to have also been *in situ* as well because of the high number of juvenile fragments recovered as well as the pattern of green staining along the right side of the infant, which likely was derived from a bronze fibula (metal clasp) found in the chest area of the associated adult individual according to the excavators sketch (Figures 7.3, 7.4).

Table 7.2. Individuals in situ and Body Position

Tomb	**Looted?**	**# of Individuals *in situ***	**Body Position**
85.II	No	1	Unknown
IV	No	2	Unknown
IX	Yes	2	Unknown
XIII	No	2	Contracted Lower Limbs
XXV	No	7-9	Contracted

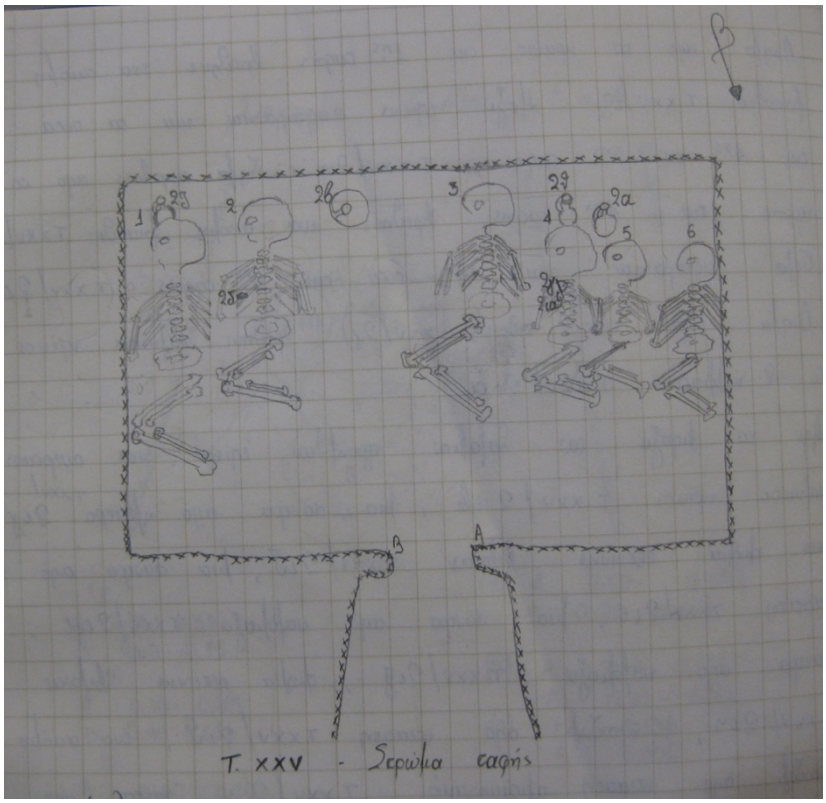


Figure 7.2. Excavator's drawing of Tomb XXV showing six individuals in situ



Figure 7.3. Infant (ca. 2 years old) from Tomb XXV (photo by author)



Figure 7.4. Green staining (white arrows) on infant from Tomb XXV (photo by author)

Looting

Before discussing the types and quantities of grave goods found in the cemetery, the occurrence of looting in the cemetery must be discussed. Of the 23 tombs with skeletal material considered here, the chambers of 11 tombs had been looted while the other 12 were undisturbed. The distribution of grave good types among the looted and non-looted tombs is shown in Table 7.3. A Student's t-test was performed to determine whether there was a significant difference in the mean number of grave goods in the looted vs. non-looted tombs. The results of the test indicated that there was not a significant difference ($t=1.3658$, $df = 21$, p-value = 0.1864). The average number of goods per grave for the non-looted tombs (n=12) is 41.5 items and the average number of goods per grave for looted tombs (n=11) is 11.8 items. In the non-looted

Table 7.3. Non-looted versus Looted Grave Goods

Grave Good	Non-Looted (n = 12)	Looted (n = 11)	Total
Total Pottery	40	17	57
Alabastron	9	3	12
Pyxis	2	0	2
Stirrup Jar	6	3	9
Seal Stones	7	4	11
Total Bronze Items	55	19	74
Bronze Fibulae	5	1	6
Tweezers	2	1	3
Spindle Whorls	41	47	88
Total Beads	337	35	372
Bone Pins	6	4	10
Shells	3	2	4
Imports	8	1	9
Gold Beads	2	0	2
Silver Hoops	2	0	2
Amber Beads	4	1	5
Other	7	2	9
Total	498*	130	628
Average Goods per Tomb	41.5	11.8	27.3

*Only the 2 silver hoops from the imported category added for total goods because the gold and amber beads were counted in the bead category

group, Tombs 88.I and XIII contribute approximately 74% (394) of the total 498 grave goods.

When the items from these tombs are removed from the total sum of the non-looted tomb group, the total number of grave goods is 139 and the average number of items per tomb is 13.9 items. This is closer to the average number of grave goods per tomb in the looted tombs. In the looted tomb group, Tombs 88.II, XVI, and XXVI, each had over 30 items which contribute approximately 71% (99 items) of the total 140 grave goods. This indicates that certain tombs in both the looted and non-looted groups contained the bulk of the grave goods in both tomb groups. This may suggest that there are distinguishable differences in displays of wealth and status even among the looted tombs or, alternatively, that some tombs were more thoroughly looted than others. For this reason, only non-looted tombs are considered for certain analyses even though there is technically no significant difference between grave good numbers between the tombs.

From these data displayed in Table 7.4, it is apparent that the non-looted tombs have significantly more pottery, bronze items, and beads. All other categories are comparable between the two groups. The bronze items and beads of the non-looted tombs were found in three main tombs: 88.I, XIII, and XIV. Smaller items were less likely to have been noticed by the looters. Objects like seal stones and spindle whorls appear to be evenly distributed between the two groups.

Pottery

The main categories of pottery identified in the excavation diaries were alabastra, pyxis lids, stirrup jars, oenochoai, cups, jugs, jars, and amphorae (Diaries, unpublished). The distribution of these pottery types is shown in Table 7.5. The most numerous vase type was the alabastron (n=13), but jugs were a close second (n=12).

Table 7.4. Grave Goods per Tomb: Non-Looted and Looted

Non-Looted Tombs	**Total Goods**	**Total Goods minus Beads**		**Looted Tombs**	**Total Goods**	**Total Goods minus Beads**
85.II	13	10		85.I	7	2
88.I	245	13		88.II	31	18
III	1	1		IX	3	3
IV	2	2		XI	7	4
V	5	4		XII	10	9
VII	4	4		XVI	33	33
X	14	10		XXIV	2	2
XIII	134	56		XXVI	30	18
XIV	39	39		XXVII	4	4
XV	18	11		XXVIII	2	2
XX	2	2		XXIX	1	1
XXV	22	18				
Total	**499**			**Total**	**130**	

Stirrup jars and alabastra have both been designated as "Mycenaean" type vessels by Kilian (1990) and thus cultural markers. However, the production and distribution of pottery does not appear to have been controlled by the palaces and may therefore not represent any sort of significant connection to the palatial system. Alabastra, jugs, and stirrup jars are commonly found in RCCTs in every region (Cavanagh and Mee 1998). At Golemi, alabastra were found in six tombs (85.II, VII, IX, XIII, XV, XXVII) and stirrup jars (n=9) were found in six tombs (88.I, 88.II, XIII, XIV, XXV, and XXVI). Because the pottery has not been fully studied, it is possible that the pottery fragments from the tombs will reveal more of each pottery type.

Beads

Beads were by far the most numerous grave good found in the tombs at Golemi (Table 7.6). They represent 372 of the total 533 grave goods. The number of beads found in each tomb varies widely from none to over 200 (Table 7.6). Only eleven of the 23 tombs contained beads. Of the 372 beads found, 314 are located in two tombs: 88.I (n = 233) and XIII (n = 81). Most of the beads in 88.I are small stone beads. The beads from all other tombs vary in size, shape, and materials. Because they have not yet been studied, I will not try to differentiate between them unless they are made of a notable material or are highly represented in the sample. The source materials include glass-paste, faience, glass, steatite, carnelian, amber, and gold as identified from the archaeological repots and the excavation diaries (Diaries, unpublished). Although glass-paste and faience were not imported materials, the techniques used to craft the beads were similar to those used for higher quality materials like gold and silver and so may represent palatial craftmanship (Maran 2013).

Table 7.5. Pottery Distribution

Tomb	Looted?	Total Pottery	Ala-bastron	Pyxis Lid	Stirrup Jar	Oen-ochoe	Cup	Jug	Jar	Amphora
85.I	Yes	0	0	0	0	0	0	0	0	0
85.II	No	4	2	0	0	0	0	0	0	0
88.I	No	2	0	1	1	0	0	0	0	0
88.II	Yes	5	0	0	2	0	0	0	0	0
III	No	1	0	0	0	0	0	0	0	0
IV	No	1	0	1	0	0	0	0	0	0
V	No	0	0	0	0	0	0	0	0	0
VII	No	3	2	0	0	0	1	0	0	0
IX	Yes	3	3	0	0	0	0	0	0	0
X	No	1	0	0	0	0	0	0	0	0
XI	Yes	1	0	0	0	0	0	0	0	0
XII	Yes	1	0	0	0	0	0	0	0	0
XIII	No	15	2	0	2	0	1	7	2	1
XIV	No	3	0	0	2	1	0	0	0	0
XV	No	5	3	0	0	0	0	1	0	1
XVI	Yes	1	0	0	0	0	0	0	0	0
XX	No	1	0	0	0	0	0	0	0	0
XXIV	Yes	1	0	0	0	0	0	0	0	0
XXV	No	4	0	0	1	0	0	3	0	0
XXVI	Yes	2	0	0	1	0	0	0	0	0
XXVII	Yes	1	1	0	0	0	0	1	0	0
XXVIII	Yes	1	0	0	0	0	0	0	0	0
XXIX	Yes	1	0	0	0	0	0	0	0	0
Total		**57**	**13**	**2**	**9**	**1**	**2**	**12**	**2**	**2**

Table 7.6. Distribution of spindle whorls, beads, bone pins/needles, shells, imports, and other

Tomb	Looted?	Spindle Whorls	Total Beads	Bone Pin/Needle	Shells	Imports	Other
85.I	Yes	2	5	0	0	0	0
85.II	No	4	3	0	0	0	1
88.I	No	5	233	0	1	0	2
88.II	Yes	3	13	1	0	0	0
III	No	0	0	0	0	0	0
IV	No	0	0	0	1	0	0
V	No	0	1	0	0	0	0
VII	No	0	0	0	0	0	0
IX	Yes	0	0	0	0	0	0
X	No	5	4	1	1	0	2
XI	Yes	0	4	0	1	1	0
XII	Yes	2	1	1	1	0	0
XIII	No	18	81	2	0	2	2
XIV	No	0	0	0	0	2	0
XV	No	4	7	0	0	0	0
XVI	Yes	22	0	2	0	0	2
XX	No	1	0	0	0	0	0
XXIV	Yes	0	0	0	0	0	0
XXV	No	4	8	3	0	4	0
XXVI	Yes	14	12	0	0	0	0
XXVII	Yes	3	0	0	0	0	0
XXVIII	Yes	1	0	0	0	0	0
XXIX	Yes	0	0	0	0	0	0
Total		**88**	**372**	**10**	**5**	**8**	**9**

Because these beads have not been studied, the extent to which such techniques were used for the materials at Golemi are not known. There are at least four carnelian beads from three tombs (88.I, XIII, XV). Carnelian is a semi-precious stone that was used for seal stones and beads as well as other objects. Juvenile burials have been associated with the use of carnelian beads (Konstantinidi 2001; Smith and Dabney 2012). Carnelian may have been imported but there are local sources on the island of Kimolos and in the Peloponnese (Stamatatou 2004), for this reason they were not included in the "imported" category. Two tombs (XI, XXV) contained a total of five beads made from amber. Amber was a material imported from the Balkan region to the north. Dakoronia (2003) has found that amber beads are common among RCCT burials in Phokis, but not in East Lokris. Given the small quantities found in these tombs (XI = 1; XXV = 4), these items may have been passed down as heirloom objects.

One tomb (XIII) contained two gold beads. Gold is also an imported material and it was likely strictly controlled by palatial centers in the Palatial period (Aprile 2013; Nakassis 2013; Burns 2010). The gold beads in Tomb XIII were found in the pit from the dromos, which suggests that they were intentionally placed there as part of a secondary burial of the remains. Since these have not yet been published, I will refrain from describing them in detail. Molded beads with floral or geometric designs were made of glass-paste in place of those made of more expensive materials like gold (Dakoronia 2009). Many glass-paste beads were found in the Golemi tombs, including several from Tomb XIII.

Spindle Whorls

Fourteen of the 23 tombs with skeletal materials contained a combined total of 88 spindle whorls made of steatite. Apparently, these were not perceived as valuable by the looters, as the looted and non-looted tombs contained almost equal numbers of spindle whorls (looted = 47,

non-looted = 41). Three tombs yielded significantly more spindle whorls than other tombs: XIII (18), XVI (22), and XXVI (14). The other 11 tombs have 5 or less spindle whorls. These items may have been functional (i.e. weaving) or decorative (i.e. for clothing, hair, etc.) (Hughes-Brock 1999). Because of the association with weaving and textiles, they are most often associated with females in the archaeological record.

Bone pins and shells

Bone pins and shells were not recovered in large quantities, but they are not necessarily uncommon in the Golemi cemetery. Bone pins or needles were found in six tombs (88.II, X, XII, XIII, XVI, XXV). A total of 10 whole or partial needs are represented. Tomb XXV contains the most with three. Tombs XVI and XIII each contain two pins and the remaining tombs provided one each. Since bone was commonly available, bone pins are not likely to have been precious objects. Like spindle whorls, bone pins/needles are associated with textile work and decoration, and usually gendered as female. Shells, whole specimens and shells perforated for use as beads, were found in five tombs (88.I, IV, X, XI, XII). Of the six shell items, two were beads and both were located in tomb X. Tomb XI also contains an amber bead and Tomb XII has bronze items as well as two seal stones. Again, since shells would have been commonly available at the shore of the Euboean Gulf, it does not seem that shells are necessarily correlated with a particular status or wealth level.

Seal Stones

The cemetery yielded 11 seal stones in total among seven tombs, of which four had not been looted (V, XV, XIII, and XIV) and three had been looted (IX, XII, and XXIV) (Table 7.7). Most of the seal stones (n = 8) were made of steatite, a soft stone, and probably belong to the Mainland Popular Group, given the soft stone material, which are likely representative of a

Table 7.7. Distribution of seal stones and bronzes

Tomb	Looted?	Seal stones	Total Bronze	Bronze Finger Rings	Bronze Deco-rative Rings	Bronze Spiral Rings	Fibula	Tweezer	Bronze Fragments
85.I	Yes	0	0	0	0	0	0	0	0
85.II	No	0	1	1	0	0	0	0	0
88.I	No	0	2	0	0	0	0	1	0
88.II	Yes	0	9	7	0	0	1	1	2
III	No	0	0	0	0	0	0	0	0
IV	No	0	0	0	0	0	0	0	0
V	No	3	1	1	0	0	0	0	0
VII	No	0	1	0	0	0	0	1	0
IX	Yes	0	0	0	0	0	0	0	0
X	No	0	0	0	0	0	0	0	0
XI	Yes	1	0	0	0	0	0	0	0
XII	Yes	2	2	0	3	0	0	0	0
XIII	No	1	15	0	8	2	2	0	3
XIV	No	1	33	0	27	4	2	0	12
XV	No	2	0	0	0	0	0	0	0
XVI	Yes	0	6	0	2	0	0	0	4
XX	No	0	0	0	0	0	0	0	0
XXIV	Yes	1	0	0	0	0	0	0	0
XXV	No	0	3	0	2	0	1	0	0
XXVI	Yes	0	2	0	2	0	0	0	0
XXVII	Yes	0	0	0	0	0	0	0	0
XXVIII	Yes	0	0	0	0	0	0	0	0
XXIX	Yes	0	0	0	0	0	0	0	0
Total		**11**	**75**	**9**	**44**	**6**	**6**	**3**	**18**

secondary palatial administrative class (Eder 2007; Eder and Jung 2015; Younger 2010).

Tomb V contained the most seal stones (n = 3), including two made from steatite and one from rock crystal. Tomb XII contained two seal stones of which one was steatite and one was glass. Glass and rock-crystal were higher quality materials, which may indicate that they belonged to individuals who had higher status within the palatial administrative system (Eder 2007). The remaining tombs (IX, XV, XIV, XIII, XXIV) contained only one seal stone each, made from steatite or an unknown stone material in one case (XXIV).

Imports

For this dissertation, imports are considered items made of materials that would have had to be imported from elsewhere (Burns 2010; Wright 1997). Since no provenance analysis has been conducted on the pottery or other items such as those made of glassy materials, I will consider as imports only objects made of bronze, gold, silver, and amber. Bronze items are the second most represented category of grave goods in the cemetery. 11 tombs contained at least 74 bronze items, but the majority of these items were confined to four (88.II, XIII, XIV, XVI) of the 11 tombs. Of the non-looted tombs, seven contained bronze, but only two (XIII, XIV) contained more than three pieces of bronze. The main types of bronze items identified in the tombs were spiral rings, decorative rings, finger rings, fibulae, and tweezers. There were several unidentified bronze fragments (n=21) found in several tombs, but these were not included in the total count of bronze items. Decorative rings were the most common type of bronze item found in six tombs (XII, XIII, XIV, XVI, XXV, XXVI).

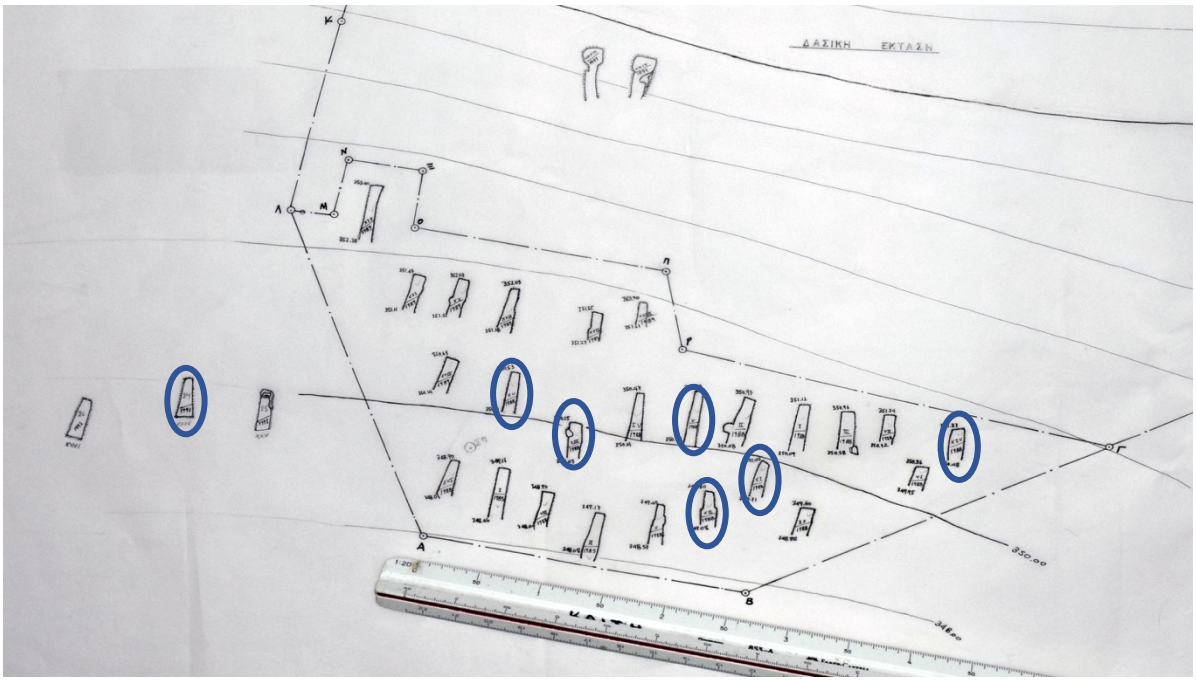


Figure 7.5. Distribution of Seal Stones

Tomb XIV contained the most bronze items, 26 of which were decorative rings, but contained relatively few grave goods otherwise. Three tombs (85.II, 88.II, V) contained the nine finger rings of which seven were located in tomb 88.II. There were six spiral rings found in two tombs (XIII, XIV). The fibulae were found in four tombs (88.II, XIII, XIV, XXV). It is possible that the presence of fibulae in tombs indicates a later date for the tomb as fibulae are generally not found in the Aegean before LH IIIB (Alexander and Hopkin 1982). Three pairs of tweezers were discovered in three different tombs (88.I, 88.II, VII). The tweezers found in Tomb 88.II were found along with skeletal material in a niche in the dromos which had been sealed off with a stone slab. The other two tweezers were found in the chambers of the tombs.

The final bronze item deserves special attention. A bronze sickle-shaped dagger was found in Tomb 88.I along with the tweezers. This is the only potential "weapon" found in the

entire cemetery. The tweezers and the dagger represent the only two bronze items excavated from Tomb 88.I. The tomb was not looted, which indicates that these are representative of the grave goods left in antiquity. The osteology of the tomb, which will be discussed later, suggests that this tomb is unique in several ways.

Only four tombs contained the other three types of imported materials: Tomb XI (one amber bead), Tomb XIII (two gold beads), Tomb XIV (two silver rings), and Tomb XXV (four amber beads). The gold and amber beads were previously discussed in the "beads" section. The only other imports were two silver rings found in Tomb XIV. These were not finger rings, but decorative rings according to the words used to describe them in the diaries. Because they have not been studied, the categories for these rings are tentative. Tomb XIV also contained the highest number of bronze decorative rings (n=26). Of the tombs with imports, three appear to be relatively wealthy: Tombs XIII, XIV, and XXV. Tomb XI was looted and so may have contained more prestigious items prior to looting, but it is also the smallest tomb of the cemetery with a chamber area of 0.52m^2.

Other

The Golemi cemetery contained several items that were not placed into a "main" category. Two tombs (X, XVI) contained stone blades, one made of obsidian (X) and one made of flint (XVI). The size and shape of the blades are unknown and so it is difficult to say whether they were used as tools, weapons, or both. Three tombs (85.II, X, XIII) contained bone objects. Two of these objects were not identified by the archaeologist, but one had pigment on it. The third item was identified as a bone hoop. Finally, Tomb XIII contained a glass-paste rosette, likely made to emulate the golden rosettes found in more affluent graves like those in the shaft graves of Grave Circle A at Mycenae (Schliemann 1880).

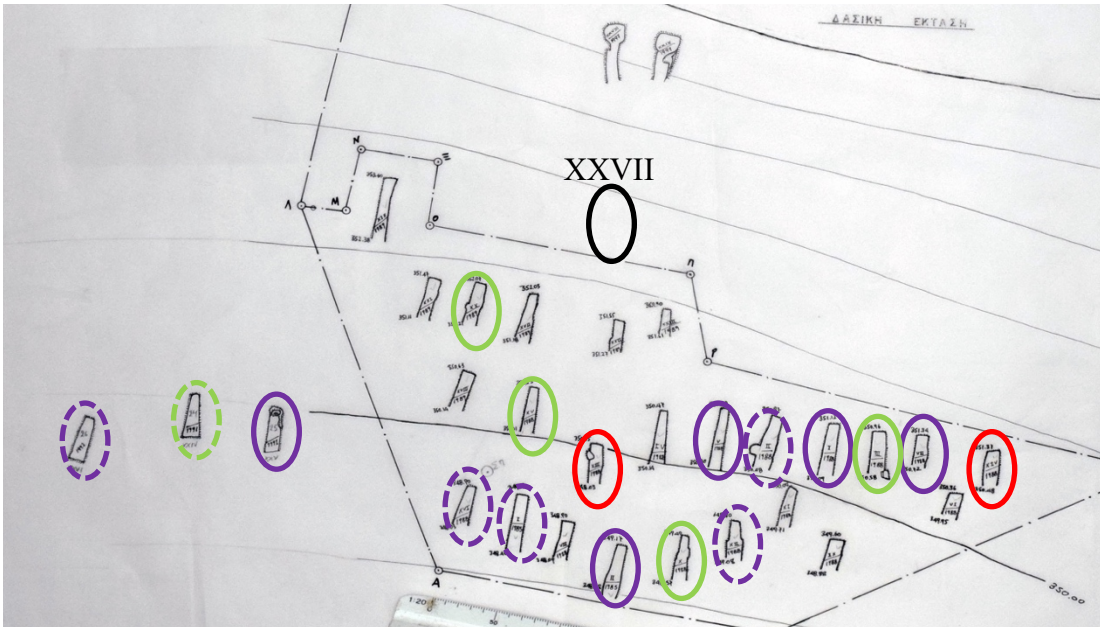


Figure 7.6. Distribution of Bronze (Green = No Bronze; Purple = Some Bronze (9 pieces or less); Red = High Number of Bronze Items (15 or more))

Biological Attributes – Skeletal Analysis

In this section, I present the results of the osteological analysis of the human skeletal remains from 23 rock cut chamber tombs of Golemi Agios Georgios. From these tombs a total of 4901 bone fragments or bone groups (consisting of fragments of the same type of bone that were unidentifiable beyond element (os coxa) or bone type (long bone)) were identified and inventoried in a database. The breakdown of fragment identified per tomb is shown in Table 7.8. There are four main groups according to fragment number. Tomb XIII contain the most bone fragments (n = 834). Four tombs, 88.I, VII, XVI, and XXV, have between 400 and 550 fragments/groups each. Four tombs, 88.II, III, XXVI, and XXVII, each contain ca. 250-350 fragments/groups. The last group consists of the 13 remaining tombs, 85.I, 85.II, IV, V, IX, X, XI, XII, XIV, XV, XX, XXVIII, and XXIX, which contain less than 200 fragments per tomb. The data for each skeletal attribute is documented in the Appendix in Tables A1-A3.

Table 7.8. Number of Bone Fragments/Groups Identified per Tomb

Tomb	**Fragments Identified**
85.I	35
85.II	55
88.I	473
88.II	275
III	269
IV	86
V	24
VII	442
IX	71
X	62
XI	31
XII	43
XIII	834
XIV	61
XV	29
XVI	456
XX	12
XXIV	189
XXV	542
XXVI	335
XXVII	354
XXVIII	167
XXIX	56
Total	**4901**

Paleodemography

Minimum Number of Individuals

The first step of this analysis was the estimation of the minimum number of individuals (MNI) for the cemetery. As explained in Chapter 6, the MNI was first calculated for each tomb and then all of the tomb MNIs were added to arrive at the total cemetery MNI. Three different MNI methods were used to estimate the number of individuals present in each tomb. The Most Likely Number of Individuals (MLNI) was also calculated. Finally, a contextualized method derived by the author was used to estimate the number of individual present in each tomb, known as the "contextualized MNI." The results are presented in Table 7.9 and Figure 7.7. The "element" column represents the element used to estimate MNI for the first four methods.

The highest estimation (258) was from the contextualized MNI method that uses pair matching, size differences, and age differences to estimate MNI. The traditional method of estimation, MNI, uses the maximum representation of one side of one element yields the second to lowest estimation (201). The MLNI (Most Likely Number of Individuals) provides the second highest estimation (239.9). This method estimates how many individuals were in the tomb originally rather than the minimum number of individuals present in the material. The MLNI does not account for juvenile remains that might not be counted with the most represented element in each tomb. Since the contextualized MNI does account for juvenile remains, it seems likely that the contextualized MNI represents the closest estimation of the actual number of individuals interred in each tomb. For this reason, the contextualized MNI (cMNI) was used for subsequent analyses.

The tomb with the highest cMNI is Tomb XIII with 31 individuals. The diaries report that two individuals were found *in situ*. These have been associated with the remains from Group

58a, one adult and one juvenile. The remaining individuals were located in piles around the chamber of the tomb and in a pit located in the dromos in front of the *stomion*. Six other tombs 88.I, 88.II, VII, XVI, XXVI, and XXVII, all have 17 or more individuals. These are considered the "large" tombs of the cemetery because they have the greatest number of individuals represented in them, not because of the size of the tomb. The second group of tombs is comprised of five tombs, III, X, XXIV, XXV, and XXVIII, which contain between nine and 13 individuals. Tomb XXV is somewhat unique in this group because it contains the second most bone fragments behind Tomb XIII (542 fragments) but contains only nine individuals. The reason for this is because at least seven individuals were discovered *in situ,* which means that they were not moved from their original burial locations. Primary burials are likely to retain more elements than individuals who experienced secondary treatment or burial. The third and final group of tombs is comprised of 11 tombs, 85.I, 85.II, IV, V, IX, XI, XII, XIV, XV, XX, XXIX, which contain between two and six individuals in each.

Given that 11 of the 23 tombs in the cemetery were looted, it was necessary to test whether looting affected the number of individuals estimated for each tomb, which would impact how the demography of each tomb was interpreted in this context. A Student's t-test was conducted to compare the contextualized MNI from the looted vs. non-looted tombs. The results ($t = -1.1003$, $df = 21$, p-value = 0.2837) indicate that looting did not significantly affect the contextualized MNI of the tombs. In fact, the average contextualized MNI for looted tombs (13.5 individuals per tomb) was higher than the average MNI for non-looted tombs (9.2 individuals per tomb). This demonstrates that even though tombs were looted, the bones from each tomb are equally representative of the number of individuals interred in each tomb; although, they likely do not represent the original number of individuals in each tomb because of taphonomic effects.

Table 7.9. Minimum Number of Individuals – All Five Methods

Tomb	Element	Max L, R*	(L+R)/2	L+R-P**	MLNI***	"Contextualized" MNI (cMNI)
85.I	Humerus	3	3	3	3	3
85.II	Fibula	2	1	2	2	2
88.I	Tibia	19	16	21	22.3	27
88.II	Tibia	18	18	25	28.8	23
III	Parietals	10	9	10	10	10
IV	Femur	4	3.5	4	4	4
V	Crania	6	3	6	6	6
VII	Femur	18	15.5	21	23.2	23
IX	Femur	4	4	4	4	4
X	Femur	6	6	8	8.8	9
XI	Parietal	2	1	2	2	3
XII	Occipital	4	4	4	4	4
XIII	Femur	22	17	22	22	31
XIV	Femur	3	2.5	3	3	3
XV	Tibia	3	2.5	3	3	4
XVI	Femur	23	22.5	28	29.7	27
XX	Tibia	2	1	2	2	2
XXIV	Tibia	7	7	8	8.1	13
XXV	Mandible	5	4.5	5	5	9
XXVI	Femur	13	12.5	17	19.2	19
XXVII	Femur	14	12.5	15	15.4	17
XXVIII	Femur	9	8	10	10.4	11
XXIX	Humerus	4	3	4	4	4
Total		**201**	**177**	**227**	**239.9**	**258**
Average Per Tomb		**8.7**	**7.7**	**9.9**	**10.4**	**11.2**

*L = Left, R = Right
**P = Pairs
***Most Likely Number of Individuals

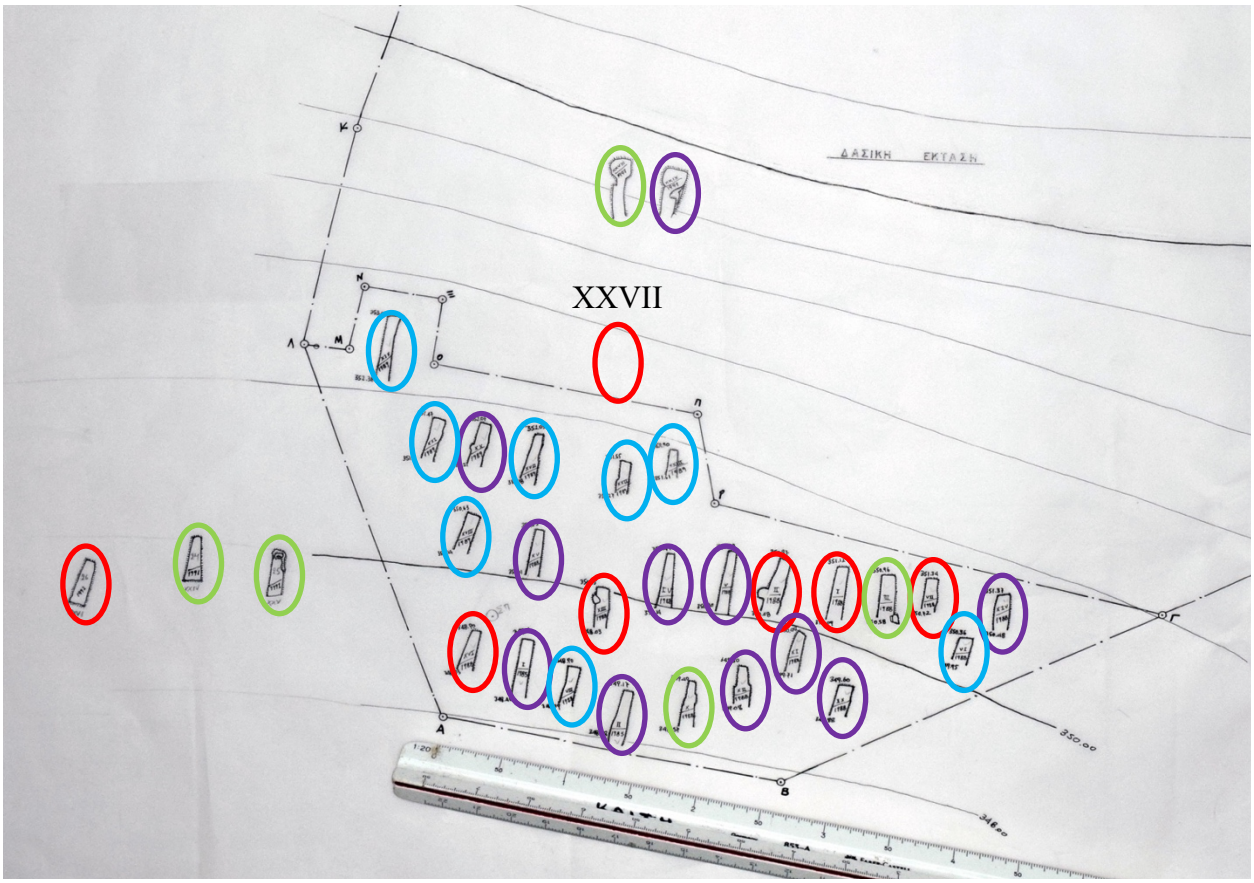


Figure 7.7. Distribution of tombs according to cMNI: Red: >14, Green: 8-14, Purple: <7, Blue: not included in analysis

Age and Sex

Age and adult sex were estimated as detailed in Chapter 6. As with the estimation of MNI, the numbers of male, female, and juvenile individuals were calculated for each tomb and then added to arrive at the cemetery totals. Sex was estimated using crania, pelvic bones, femoral circumferences, and tibial circumferences. The results of the analysis are represented in Table 7.10. The maximum number of males and females was estimated from each element and then those numbers were compared to one another. I began with the cranial and pelvic bones because it was possible to estimate age from some elements, which provided another factor to consider when counting the males/females for each tomb. For example, if a tomb contained the remains of two individuals, estimated from long bones, as well as an ostensibly male cranium and an ostensibly female pelvis, the tomb was recorded as containing one male and one female even though only one of each type of bone was present. When only cranial and pelvic fragments were taken into account, there are 56 males/probable males and 55 females/probable females. However, even when the pelvic and cranial bones are considered separately, the ratio does not change significantly. Of the cranial material for which sex could be estimated, there are 48 males/probable males and 45 females/probable females. Of the pelvic elements for which sex could be estimated, there are 30 males/probable males and 27 females/probable females.

When femoral and tibial circumference measurements are added to the analysis, the number of males increases to 74 and the number of females increases to 69. To arrive at these numbers, the total number of male and female femora of each tomb were compared to the number estimated from the combined cranial and pelvic elements. If there were five males and three females estimated from the cranial and pelvic remains, but the femoral estimates suggested there were eight males and three females, then the number of males was revised to reflect this.

Table 7.10. Sex Estimation Results by Element

Element(s) Considered	Male	Female	Total
Cranium + Pelvis	56	55	111
Cranium	48	45	93
Os Coxa/Pelvis	30	27	57
Cranium + Pelvis + Femur + Tibia	74	69	143
Femur	51	27	78
Tibia	39	41	80

The process was repeated with the tibial measurements. When considering only the femoral measurements, there are 51 males and 27 females and when using only the tibial measurements, there are 39 males and 41 females. The femoral measurements indicate an imbalance between male and female individuals, but the tibial measurements continue the pattern observed in the crania and pelvic remains of a nearly 1:1 ratio between males and females.

Using the methods mentioned above, sex could be estimated for at least one individual in every tomb except Tomb XXIX, which contained very poorly preserved remains. The distribution of males, females, and juveniles is demonstrated in Table 7.11. Only two tombs, 88.II and XIII, exhibited noticeable differences between male and female representation. Tomb 88.II contains twice as many males (n=10) as females (n=5) when femora and tibiae are taken into account. Tomb XIII contains almost twice as many females (n=10) as males (n=6) when femora and tibiae are included in the estimation. The ratio of male to female individuals in all other tombs is similar to the cemetery wide ratio of 1:1.

As one of the guiding questions of this dissertation related to the relative representation of males and females in the cemetery, it is important to determine whether some tombs may have demonstrated notably different proportions of males to females. The relative probabilities of male and female individuals occurring in a given tomb were calculated through hierarchical

Bayesian analysis. Analyses were conducted using both sets of data: 1) number of males and females estimated from only crania and pelvises and 2) number of males and females estimated from crania, pelvises, femora, and tibiae. The results of both analyses indicate that no tomb group contained a significantly high or low number of males or females. This includes tombs where there are almost twice as many males as females, such as in Tomb 88.II or vice-versa such as in Tomb XIII. Although theses tombs are not statistically different from the overall distribution of the cemetery, the sex differences may be significant when the archaeological data is also considered.

The average age at death for the entire cemetery is 27.9 years-old. When only adult individuals are considered (18+) the average age at death is 35.3. The average juvenile age at death is 5.8 years old. There are 52 juvenile individuals, which are defined as individuals ranging in age from fetal to 18 years of age at death. There was only one individual of fetal age (30-32 weeks), from Tomb XIII. Tomb XIII also contains the second youngest individual in the cemetery, a neonate, ca. 0-6 months. The juvenile demography is summarized in Table 7.12. Infants are the most represented juvenile group with 17 individuals, followed by the child group with 13 individuals. Older children and adolescents are almost equally represented with 11 and 10 individuals, respectively. Juveniles are included in 15 of the 23 tombs. The tombs without juvenile individuals (85.I, 85.II, III, IX, XI, XIV, XX, XXIX) are among those with the fewest individuals total (four or less), with the exception of Tomb III which has a cMNI of 10 individuals, none of which could be confidently classified as juveniles.

Table 7.11. Distribution of Males, Females, and Juveniles Per Tomb

Tomb	Males	Females	*Revised Males	*Revised Females	Juveniles
85.I	1	0	1	1	0
85.II	1	0	1	0	0
88.I	3	7	5	7	13
88.II	5	5	10	5	4
III	4	2	4	4	0
IV	2	1	2	1	1
V	1	2	1	2	1
VII	4	4	6	4	2
IX	0	1	2	1	0
X	2	3	4	3	1
XI	0	1	0	1	0
XII	0	1	0	1	2
XIII	5	10	6	10	7
XIV	0	0	0	1	0
XV	1	1	1	1	1
XVI	8	7	8	7	4
XX	0	0	1	1	0
XXIV	3	2	4	4	4
XXV	4	2	4	2	3
XXVI	7	3	7	6	4
XXVII	3	2	5	6	3
XXVIII	2	1	2	1	2
XXIX	0	0	0	0	0
Total	**56**	**55**	**74**	**69**	**52**

*Includes femora and tibiae estimations

Table 7.12. Juvenile Demography

Tomb	Fetal (<0)	Infant (0-2)	Child (2.5-6)	Older Child (6.5-10)	Adolescent (10.5-18)
85.I	0	0	0	0	0
85.II	0	0	0	0	0
88.I	0	2	3	5	3
88.II	0	1	2	0	1
III	0	0	0	0	0
IV	0	1	0	0	0
V	0	0	1	0	0
VII	0	1	0	0	1
IX	0	0	0	0	0
X	0	0	1	0	0
XI	0	0	0	0	0
XII	0	0	0	1	1
XIII	1	2	0	2	2
XIV	0	0	0	0	0
XV	0	0	1	0	0
XVI	0	2	1	1	0
XX	0	0	0	0	0
XXIV	0	1	1	0	2
XXV	0	1	1	1	0
XXVI	0	2	1	1	0
XXVII	0	1	2	0	0
XXVIII	0	2	0	0	0
XXIX	0	0	0	0	0
Total	**1**	**16**	**14**	**11**	**10**

Tomb 88.I contains the most juveniles of any tomb in the cemetery. Of the 27 individuals estimated to be present in the tomb, 13 are juvenile individuals. The distribution of ages in Tomb 88.I span from infant to adolescent. There are five individuals between the ages of 6 and 10 years old and three individuals between the ages of 10 and 18 years old. The remaining five individuals are 6 years or younger. No other tomb has a similar distribution. The tomb with the next highest number of juveniles (n=7) is Tomb XIII, which has 31 total individuals. The juveniles in Tomb XIII have equal representation in every juvenile age group (two in each) except the child group, which is not represented. Tomb 88.I is the only tomb that has more than two individuals in any given juvenile age group.

The distribution of juveniles per tomb was assessed through hierarchical Bayesian analysis to determine whether some tombs demonstrated a higher proportion of juveniles than others when compared to the average rate of occurrence, which is important for understanding how demography can be interpreted at Golemi. The results indicate that probability for the rate of occurrence in Tomb 88.I is notably high as demonstrated in Figure 7.8. The solid horizontal line demonstrates the cemetery wide probability of occurrence and the dotted horizontal lines represent the upper and lower bounds of the 95% credible interval (CI). The solid vertical lines represent the CIs of the individual tombs assessed for this trait (n=23). The empty circle at the midpoint of each line is the median probability for that particular tomb.

The adult age distributions can be seen in Table 7.13 for the whole cemetery and in Table 7.14 by tomb. The largest age group is the Young Adult group (n=33), followed closely by the Middle Adults (n=26). The age category “Young/Middle” was created for individuals who did not clearly fall into the Young or Middle Adult categories. When the Young, Young/Middle, and Middle adults are added (n=70), they make up 60% of the total adult sample. The next largest

group is the Middle/Prime and Prime group (n=38, 33%). The least represented age group, including juvenile groups, is the Old Adult group, which has eight individuals. Tombs 88.II and XVI have more Young Adults than other tombs with five and four individuals, respectively. The Middle Adult and Middle/Prime age groups are most represented in Tomb XIII with 10 individuals total, while the other tombs contain six or less from the same groups.

The number of males versus females is essentially equal in most age categories except for the Middle/Prime and Old groups. Of the 116 individuals with estimated ages, sex could not be estimated for 12 individuals. When the Young/Middle and Middle/Prime categories are added to the Young and Middle categories, respectively, the Middle age category exhibits a significant difference between male and female representation (29 Males vs. 16 Females). Middle Adult males are the largest age/sex group (n = 29) of all of the age/sex groups, which means that more Middle Adult (30-40-year-old) males died than did those in any other age/sex group in the cemetery. Alternatively, the Prime and Old Adult groups, when combined, exhibit a much higher proportion of females to males (15:6). Of the eight Old Adult individuals, six have been estimated to be female or probable females. There is only one "Old Adult" per tomb. Old female individuals were found in 88.I, 88.II, XIII, XVI, XXV, and XXVI. Tombs V and XIV contained the Old Adults of unknown sex.

Table 7.13. Adult Demography

	Male	**Female**	**Unknown**	**Total**
Young (18-30)	13	15	5	33
Young/Middle (25-35)	6	4	1	11
Middle (30-40)	15	10	1	26
Middle/Prime (35-45)	14	6	1	21
Prime (40-50)	6	9	2	17
Old (50+)	0	6	2	8
Total	54	50	12	116

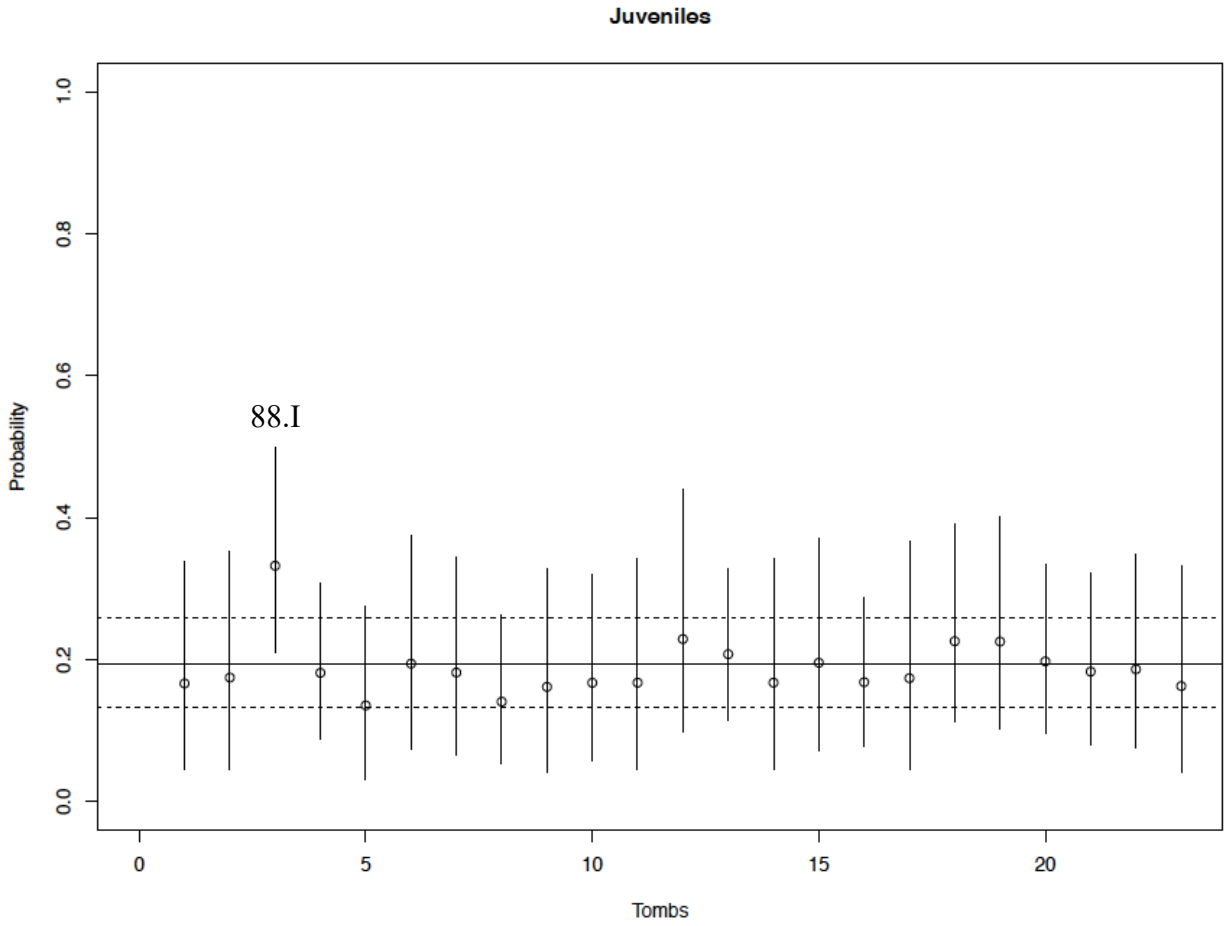


Figure 7.8. Results of the hierarchical Bayesian analysis for juvenile distribution per tomb

Table 7.14. Adult Demography by Tomb

Tomb	Young	Young/Middle	Middle	Middle/Prime	Prime	Old
85.I	0	0	1	0	0	0
85.II	0	0	0	1	0	0
88.I	3	1	1	2	2	1
88.II	6	0	3	0	1	1
III	3	1	2	0	0	0
IV	0	1	1	0	1	0
V	1	0	1	0	1	1
VII	0	1	1	3	2	0
IX	0	0	1	0	0	0
X	4	0	2	0	0	0
XI	0	0	0	0	0	0
XII	0	0	0	1	0	0
XIII	3	1	5	5	3	1
XIV	0	1	0	0	0	1
XV	1	1	0	0	0	0
XVI	4	0	2	3	2	1
XX	0	0	0	0	0	0
XXIV	4	0	2	0	0	0
XXV	1	1	0	3	0	1
XXVI	2	1	1	1	3	1
XXVII	1	0	2	3	0	0
XXVIII	0	2	1	0	1	0
XXIX	0	0	0	0	0	0
Totals	**33**	**11**	**26**	**22**	**16**	**8**

Modeling Mortality

The mortality pattern for the Golemi individuals was modeled using age-at-death estimates calculated from the median of the age ranges assigned to adult individuals for whom age could be estimated (n = 116). The sample includes individuals with an age-at-death of 18 years or older. The Kaplan-Meier plot illustrates the survivorship of the whole sample showing that as age increases, survivorship decreases (Figure 7.9). The age-at-death estimates are represented as percentages by age. The plot begins at age 18 and each "step" down in the solid line represents one of the 116 individuals in the sample being assessed. In the case of Golemi, several individuals are represented by the same line as many ages were repeated. The 95% credible interval for the curve is indicated by the dotted lines on either side of the solid line.

The parameters for the Gompertz and Gompertz-Makeham models were calculated from the same data as above from which survival curves were created. The parameters for each model are reported in Table 7.15 and the survival curves are plotted against the Kaplan-Meier plot in Figure 7.10. The Akaika Information Criteria (AIC) was calculated using the log-likelihoods from each model to determine which one best fit the available data.

The lower AIC indicates a better fit. Thus, for modeling the survivorship of all of the individuals at Golemi, the Gompertz model provides the best fit. This indicates that the age-independent parameter (α_2) is not a significant factor affecting the sample. Mean age-at-death was calculated from both models using numerical integration for survivorship. The Gompertz model provided a mean age-at-death of 37.6 years old and the Gompertz-Makeham model provided an age of 39.1 years old.

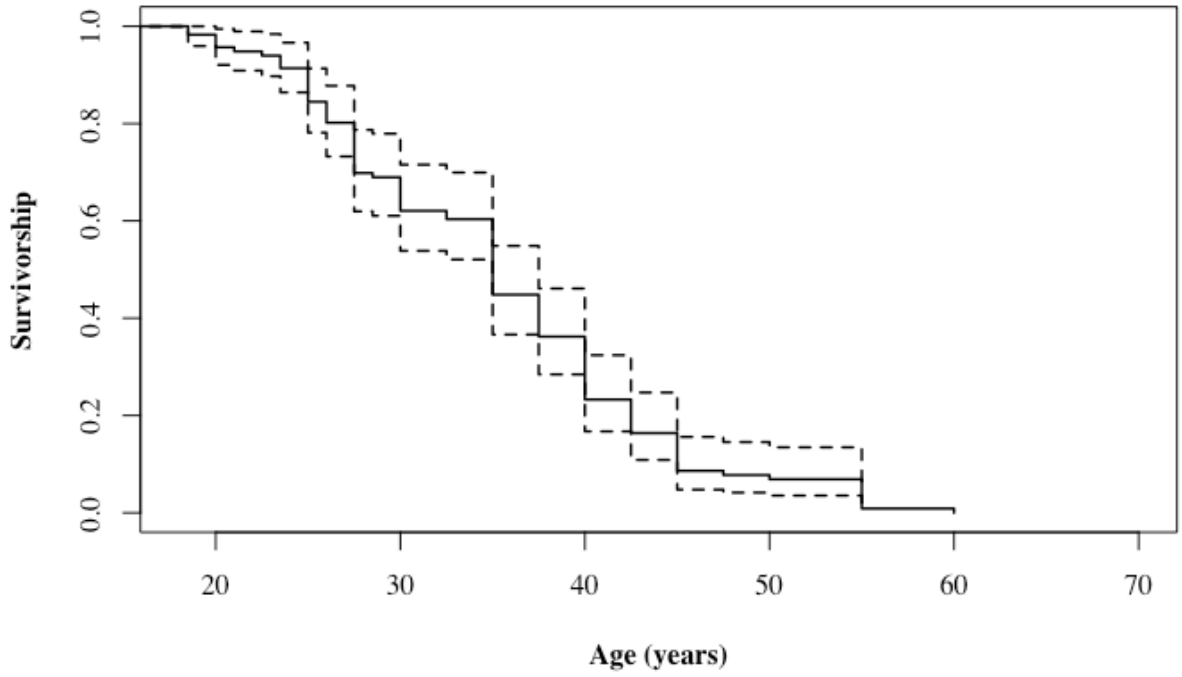


Figure 7.9. Kaplan-Meier survivorship plot for adult mortality of observable Golemi adult sample (n = 116)

Table 7.15. Gompertz and Gompertz-Makeham hazard parameters for the observable Golemi adult sample

	α_2	α_3	β_3	**Log-likelihood**	**AIC**
Gompertz	N/A	0.02051287	0.07398876	-418.1893	**840.3786**
Gompertz-Makeham	0.01386155	0.01000000	0.09613131	-420.0327	846.0654

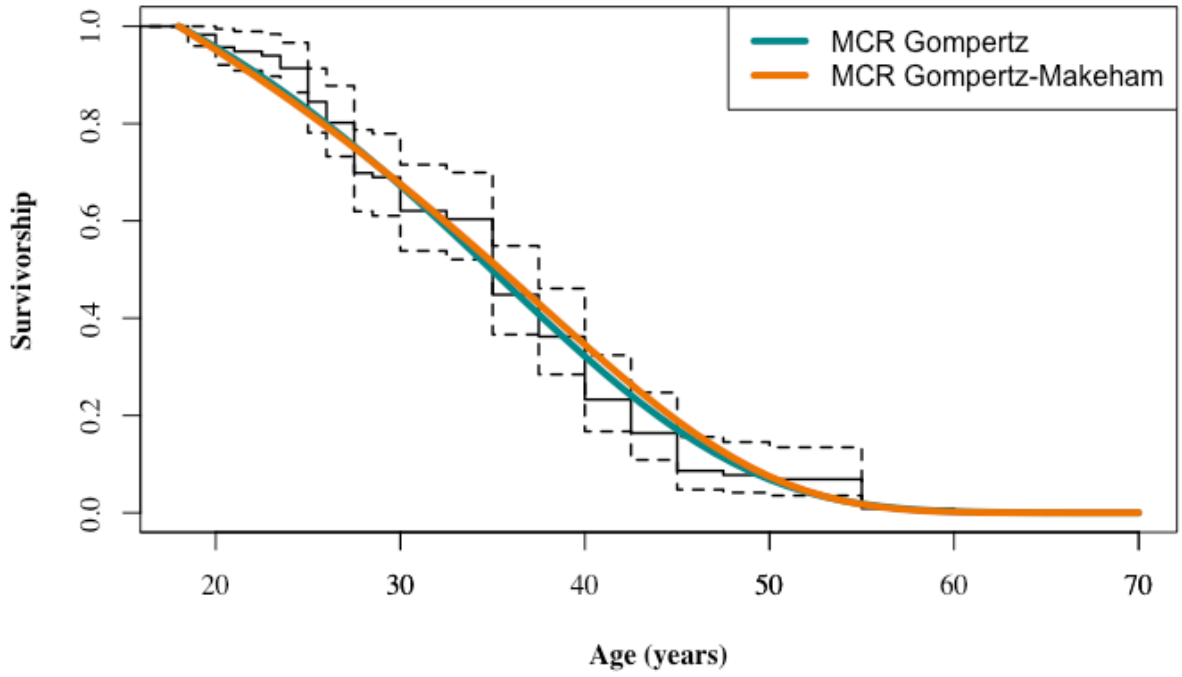


Figure 7.10. Gompertz and Gompertz-Makeham survival curves for observable Golemi adult sample

To determine whether there may have been any significant difference in survivorship based on sex, males and females were separated. So that the best model was used for each sex when the two sexes were compared, both parameters for both the Gompertz and Gompertz-Makeham models were calculated and graphed. The parameters of both models for all adult females from the Golemi sample are recorded in Table 7.16. The AIC calculated from the log-likelihoods of each model indicates that the Gompertz-Makeham provides the best fit. This indicates that the age-independent parameter is important for understanding survivorship of female individuals. The survival curves for both are represented against the Kaplan-Meier plot in Figure 7.11. The mean age-at-death calculated from the Gompertz-Makeham model for female individuals is 41.3 years old.

Table 7.16. Gompertz and Gompertz-Makeham hazard parameters for the observable Golemi female adult sample

Model	α_2	α_3	β_3	**Log-likelihood**	**AIC**
Gompertz	N/A	0.04972131	0.01000000	-195.0193	394.0386
Gompertz-Makeham	0.006724707	0.010000000	0.079849217	-192.2557	**390.5114**

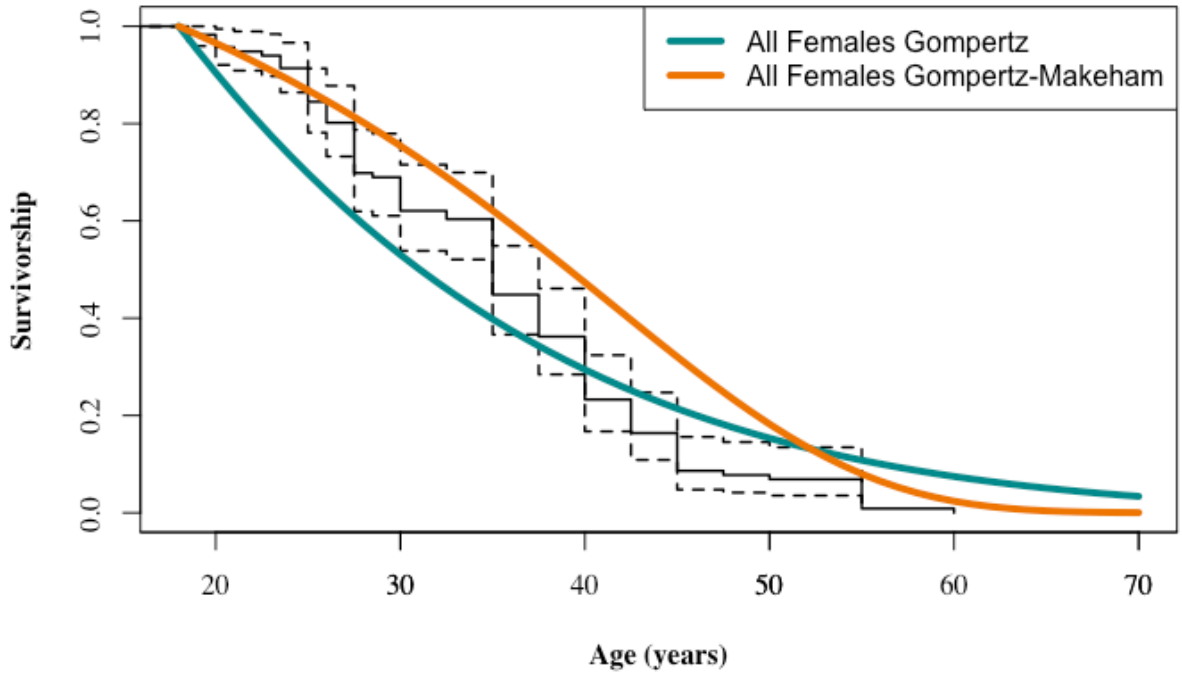


Figure 7.11. Gompertz and Gompertz-Makeham survival curves for observable Golemi adult female sample

Table 7.17. Gompertz and Gompertz-Makeham hazard parameters for the observable Golemi male adult sample

Model	α_2	α_3	β_3	**Log-likelihood**	**AIC**
Gompertz	N/A	0.005270878	0.153329385	-176.1409	356.2818
Gompertz-Makeham	0.002507016	0.008515444	0.150873294	-174.9785	**355.957**

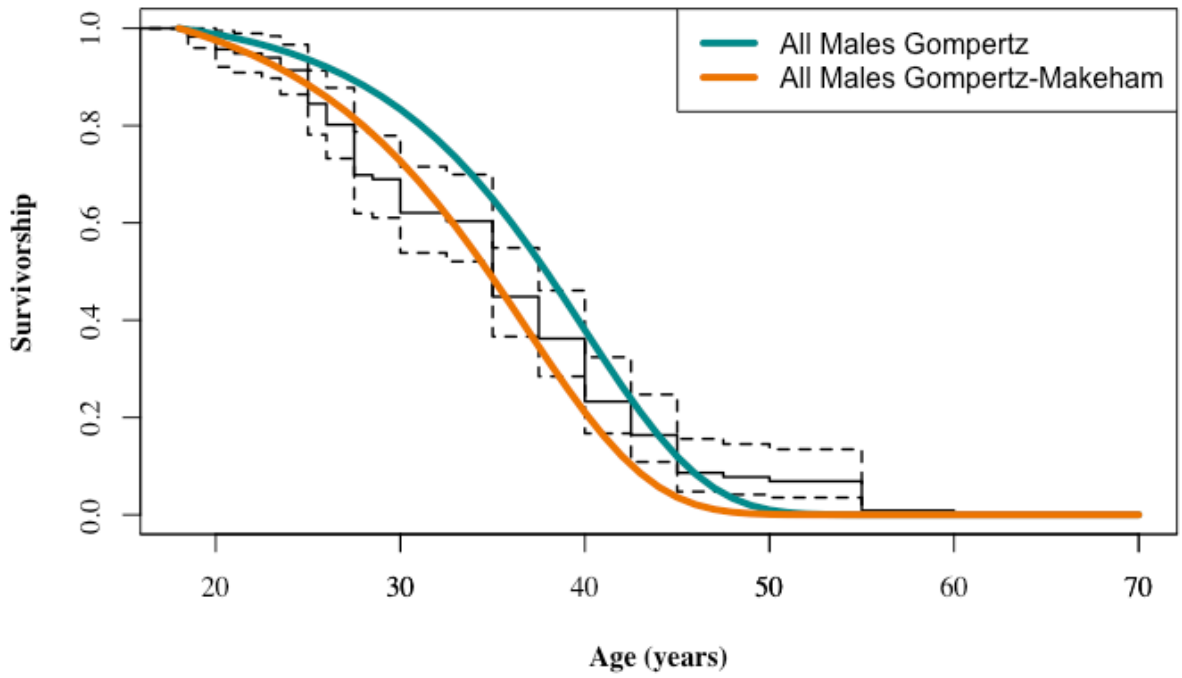


Figure 7.12. Gompertz and Gompertz-Makeham survival curves for observable Golemi adult male sample

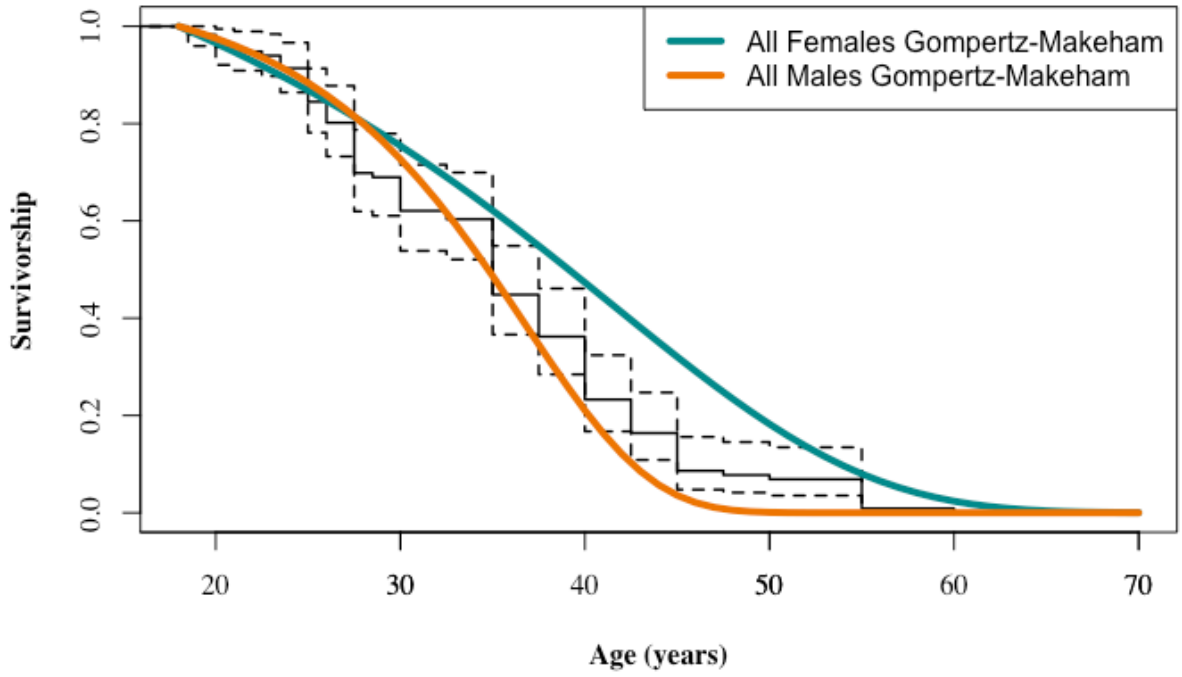


Figure 7.13 Gompertz-Makeham survival curves for observable Golemi adult female sample vs. adult male sample

The parameters of each model for the male individuals are recorded in Table 7.17 and the survival curves are shown in Figure 7.13. As with the females, the Gompertz-Makeham model provided the best fit for the data. This again indicates that the age-independent parameter is significantly contributing to survivorship among male individuals. The mean age-at-death calculated for male individuals from the Gompertz-Makeham model is 35.2 years old.

By visualizing both the male and female Gompertz-Makeham curves against the Kaplan-Meier plot, it is evident that males and females had different survival patterns (Figure 7.13). Male and female individuals had similar levels of survivability between ages 18-30, but female individuals had higher survivability than males from 30-60+. The male curve shows a much more drastic shift from young adult ages to older adult ages. The mean ages-at-death calculated from these models (F:41.3; M: 35.2) demonstrate the higher female survivability.

Cranial and Dental Non-Metric Traits

Cranial and dental non-metric traits were recorded to determine whether tombs might contain genetically related individuals. Because of the fragmentary, commingled nature of the material, full individuals could not be assessed. However, patterns of expression and rarer traits exhibited in the population at large were identified. A trait was considered to be "rare" if it was present in 15% or less of the observable sample. Traits that were not observable in 30 or more individuals or teeth were not included in this analysis with one exception, Carabelli's cusp (see below). Hierarchical Bayesian analysis was conducted to determine whether the distribution of a given trait was notably different from that of the cemetery wide average distribution. The results are illustrated in figures when one or more tomb is notably different from the average.

Cranial Non-Metric Traits

The cranial non-metric traits observed and their prevalence in the cemetery are displayed in Table 7.18 where (N) represents the number of observed individuals. Five traits were present in 15% or less of the observable individuals. The metopic suture was present in 12.2% (n=13) of the observable individuals (n=106) and distributed across eight tombs: 85.I, 85.II, 88.I, XI, XIII, XVI, XXVI, XXVII, XXVIII. Coronal ossicles were present in 11% of the observable individuals which are found in 6 tombs: 88.I, III, X, XVI, XXIV, and XXVI. Tomb XXVI is the only tomb that contains more than one individual with the trait. The supraorbital foramen was present in more than 15% of the individuals observed, but when both orbits were observable in a single individual, only 8.1% exhibited the foramen on one side and a notch on the other side. This present/absent combination was observed in six individuals in four tombs: III, VII, XIII, and XVI. The probabilities for the

Table 7.18. Cranial Non-Metric Trait Frequencies

Cranial Trait	Individuals with Trait	N	Percentage
Metopic Suture	13	106	12.2%
Supraorbital Foramen – Present on one or both sides	14	81	17.5%
Supraorbital Foramen – Present/Absent	6	74	8.1%
Parietal Foramen – Present on one or both sides	44	115	38.2%
Lambdoid Ossicles	65	86	75.5%
Coronal Ossicles	7	63	11%
Sagittal Sulcus Flexure – Left Side	22	86	25.6%
Sagittal Sulcus Flexure – Both Sides	3	86	3.5%
Tympanic Dehiscence	6	59	10.2%

distribution of these traits in each tomb are not significantly different from the cemetery wide probabilities according to hierarchical Bayesian analysis.

The sagittal sulcus flexure generally presents on the left or right side of the endocranial surface of the occipital bone. No tomb group exhibits a significantly different probability of occurrence for the left or right side according to hierarchical Bayesian analysis. However, in three individuals at Golemi, it was present on both sides. These individuals are from two tombs: XXVI, XXVII. Two individuals are from Tomb XXVI. Even though the occurrence of the sagittal flexure on both sides is very rare for the Golemi population, its probability of occurrence in these two tombs does not exceed the limits of the probability of occurring in the cemetery as a whole according to the hierarchical Bayesian analysis. Tympanic dehiscence occurs in 10.2% of the observable individuals (n=59). The six individuals exhibiting the trait are distributed across four tombs: 88.I, XIII, XXVI, and XXVII. As with the previous attributes, hierarchical Bayesian analysis does not reveal a significant difference in the probability of distribution of tympanic dehiscence in each tomb as compared to the cemetery wide distribution.

Maxillary Non-Metric Traits

Because there were considerably fewer maxillary teeth than mandibular teeth present among the skeletal material at Golemi, there are fewer non-metric maxillary traits to report. Only one trait was observable in more than 20 individuals, Carabelli's cusp. Because maxillary traits are under-represented, Carabelli's cusp was included in this analysis even though it could only be observed in 24 individuals. Of these individuals, six had a Carabelli's cusp (25%) and were from four tombs: 88.I, III, XIII, XXVI. Of the six with the trait, three had a strong expression of the trait (score 3 or higher), from Tombs 88.I and III, which brings the prevalence of the trait down to 12.5% when only considering teeth with a score of three or higher. Two individuals with

strong expressions of the trait are present in one tomb: Tomb III. A hierarchical Bayesian analysis of the trait's strong distribution among the tombs indicates that based on the rate of occurrence in the cemetery, no tomb's distribution lies outside the average distribution of the trait for the cemetery.

Mandibular Non-Metric Traits

Of the mandibular non-metric traits, five traits occur in less than 15% of the observable individuals. These traits include molar cusp number of six or more, protostylid, anterior fovea, premolar with equal sized cusps, and premolar with larger distal cusps. Other traits that were observable in more than 30 individuals include the molar groove patterns Y, X, and +, and the premolar cusp size. The prevalence of each of these traits is presented in Table 7.19.

Four individuals with molars exhibiting six or more cusps were found in 4 tombs: 88.I, III, XIII, XXIV. The next trait examined was the protostylid, which is found on the molars when present. There were subtle expressions of the trait (scores 1 and 2) in several individuals (n=27), but two individuals from the same tomb, Tomb 88.I, had strong expressions of the trait (score 6) on the same tooth (Tooth 17).

The anterior fovea was found strongly expressed (score 3) in only one individual who is from Tomb XVI. Teeth with scores of 0-2 were evenly distributed among the other observable individuals. The last two traits considered are two variants of cusp size in mandibular premolars. The first variant is equal sizes of the lingual cusps. It is present in 8% (n= 4) of the observable individuals (n = 50) from four tombs: 88.I, III, XVI, XXVII. The second variant is a larger distal cusp. This trait is present in four individuals (8%) from two tombs: 88.I, XXVII. Three of the four individuals are from Tomb 88.I which had seven observable individuals.

Hierarchical Bayesian analyses were conducted of all mentioned mandibular traits was conducted using the tooth data because it provides the clearest representation of the sample as it is difficult to determine if loose teeth belong to individuals that have already been counted. These analyses were performed to determine whether any tomb groups demonstrated higher frequencies of any particular trait thereby suggesting that the individuals of the same tomb group may be related. The results of the analyses demonstrated that there were no clear differences between the distribution of traits in each tomb compared to the cemetery wide rates of occurrence.

Although no significant patterns were found for the non-metric traits based on hierarchical Bayesian analysis, there is an interesting pattern to consider when the traits present in 15% or less of the individuals are visualized on the site map (Figure 7.14). It appears that several of the traits appear in the same few tombs like 88.I, III, XIII, and XXVI, and XXVII. The most traits (n=7) appear in Tomb 88.I, followed by Tombs XXVII with five traits and Tombs III, XIII, and XXVI with four traits. The meaning of this is unclear at the moment but is discussed further in the Chapter 8.

Table 7.19. Mandibular Non-Metric Dental Traits

Mandibular Traits	**MNI Trait**	**N Observed**	**%**	**Teeth with Trait**	**N Observed**	**%**
Molars: 6 or more cusps	4	63	6%	5	150	3%
Molars: Protostylid	2	62	3%	2	163	1.2%
Molars: Anterior Fovea – Score 3	1	33	3%	1	69	1.4%
Molars: Groove Pattern Y	20	53	37.7%	28	131	21.4%
Molars: Groove Pattern X	28	53	52.8%	43	131	32.8%
Molars: Groove Pattern +	37	53	69.8%	60	131	45.8%
Premolar: Mesial/Distal Cusps Equal	4	50	8%	6	99	6%
Premolar: Distal cusp larger	4	50	8%	5	99	5%

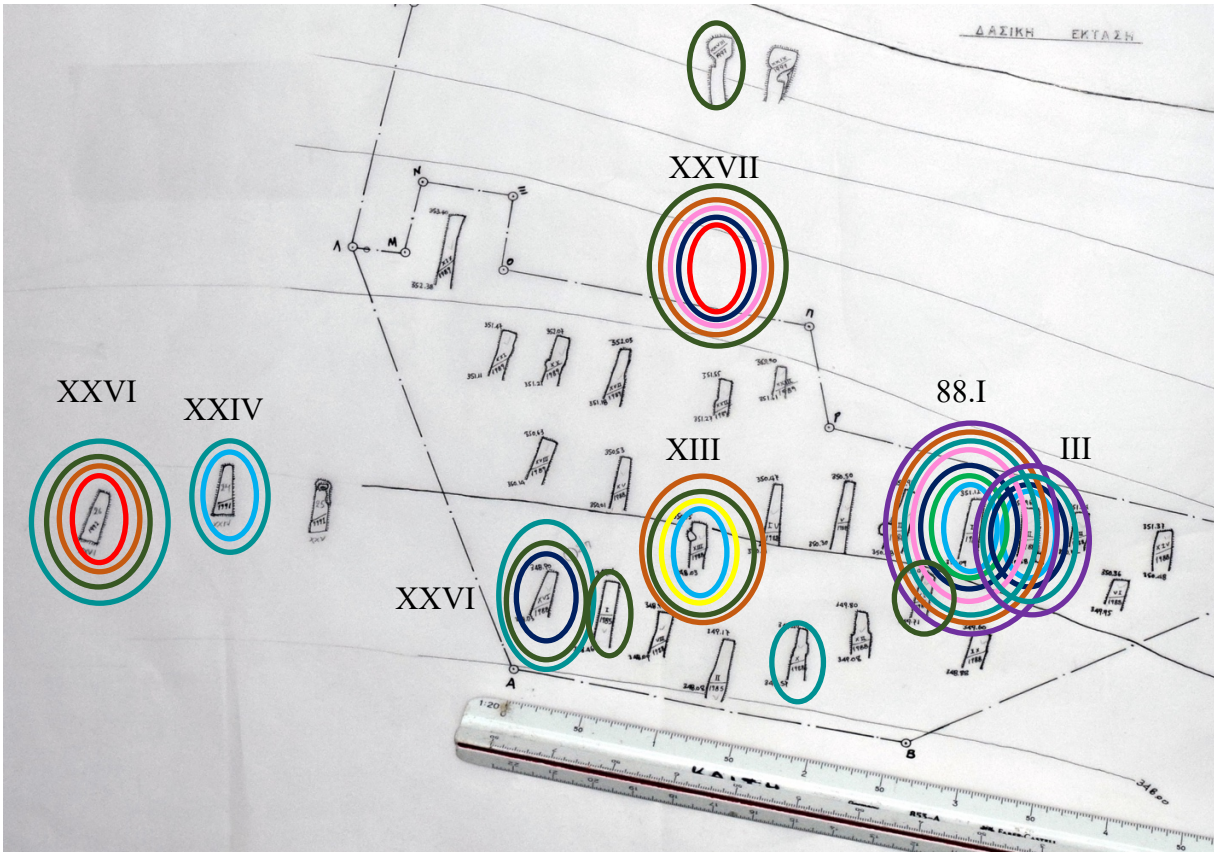


Figure 7.14. Site map of distribution of non-metric traits present in 15% or less of sample. Dark green: metopic suture; Teal: coronal ossicles; Red: superior sagittal flexure; Orange: tympanic dehiscence; Blue: molar cusps >5; Green: protostylid; Yellow: anterior fovea; Dark blue: premolars with equal cusp sizes; Pink: Premolars with large distal cusp; Purple: Carabelli's cusp

Health Status/Non-Specific Indicators of Disease

The non-specific indicators of disease considered in this dissertation can be grouped into two broad categories: general and oral. The general indicators are those that refer to systemic stress/disease (Ortner 2003). These include cribra orbitalia, porotic lesions of the skull, periostitis, and linear enamel hypoplasia (LEH). The relative frequencies of cribra orbitalia, porotic lesions of the skull, and periostitis are reported in Table 7.20. LEH is reported with the oral indicators given that they occur in teeth, but they are better interpreted as an indicator of general health than oral health because they provide information about stress and disease episodes during growth and development. The oral indicators (except for LEH) provide information about oral health which is highly correlated with diet, general health, and quality of life (Lukacs 2012). These markers include antemortem tooth loss, caries, abscesses, and calculus. The frequencies and rates of these markers are presented in Tables 7.21 – 7.28. Chi square and Fisher's exact tests were used to test whether age and sex were associated with specific oral indicators of disease/stress. Hierarchical Bayesian analysis was performed for all traits to determine if any tombs had higher or lower distributions than expected given the overall cemetery rates of occurrence. The results were used to identify if certain traits were closely associated with other biological or archaeological traits, which provided ways to assess their importance in the archaeological context.

Table 7.20. Non-specific Indicators of Disease (Non-Dental)

	Individuals/Fragments	**N**	**Percentage**	**Average Per Tomb**
Cribra Orbitalia	20	96	20.8%	0.87
Porotic Lesions of the Skull	7	138	5.1%	0.30
Periostitis (MNI)	34	258	13.2%	1.48
Periostitis (Fragment Count)	76	2963	3%	3.30

Genderal Indicators

Cribra Orbitalia

Cribra orbitalia (CO) was present in approximately 21% (n = 20) of the observable individuals (n=96). The MNI of observable individuals was estimated from the most frequently occurring left or right orbit per tomb. For example, if one tomb had three left orbits and five right orbits, the observable MNI was recorded as five. Individuals with CO were present in nine of the 16 tombs with observable individuals. Tomb XIII contained the most individuals with CO, 75% (n=6) of the observable individuals (n=8). Tombs 88.II and XXV also contained relatively high proportions of individuals with CO (88.II: 43%; XXV: 50%), when compared to the rate of 21% for all observable individuals. Hierarchical Bayesian analysis demonstrates that Tomb XIII has a higher rate of CO occurrence than that of any other tomb in the cemetery. Figure 7.15 demonstrates that the lower range of Tomb XIII's credible interval overlaps with that of the cemetery average, but its median probability is outside of the bounds. This indicates that Tomb XIII is significantly different than other tombs in the cemetery in this regard.

Porotic Lesions of the Skull

Porotic lesions of the skull (PL) were observed from the cranial vault fragments of each tomb. An MNI for observable individuals was calculated from the number of individualized crania present in the tomb. PLs were present in only 5% (n=7) of the observable individuals (n=138). These were distributed in five of 21 tombs with observable individuals. Of the seven individuals with PL, three are in Tomb XXVII, which contained 11 observable individuals. The remaining tombs (88.II, X, XVI, XXVI) each contained one individual. Hierarchical Bayesian analysis indicates that Tomb XXVII contains a higher than average probability, but it is not outside of the CI for the cemetery as a whole (Figure 7.16).

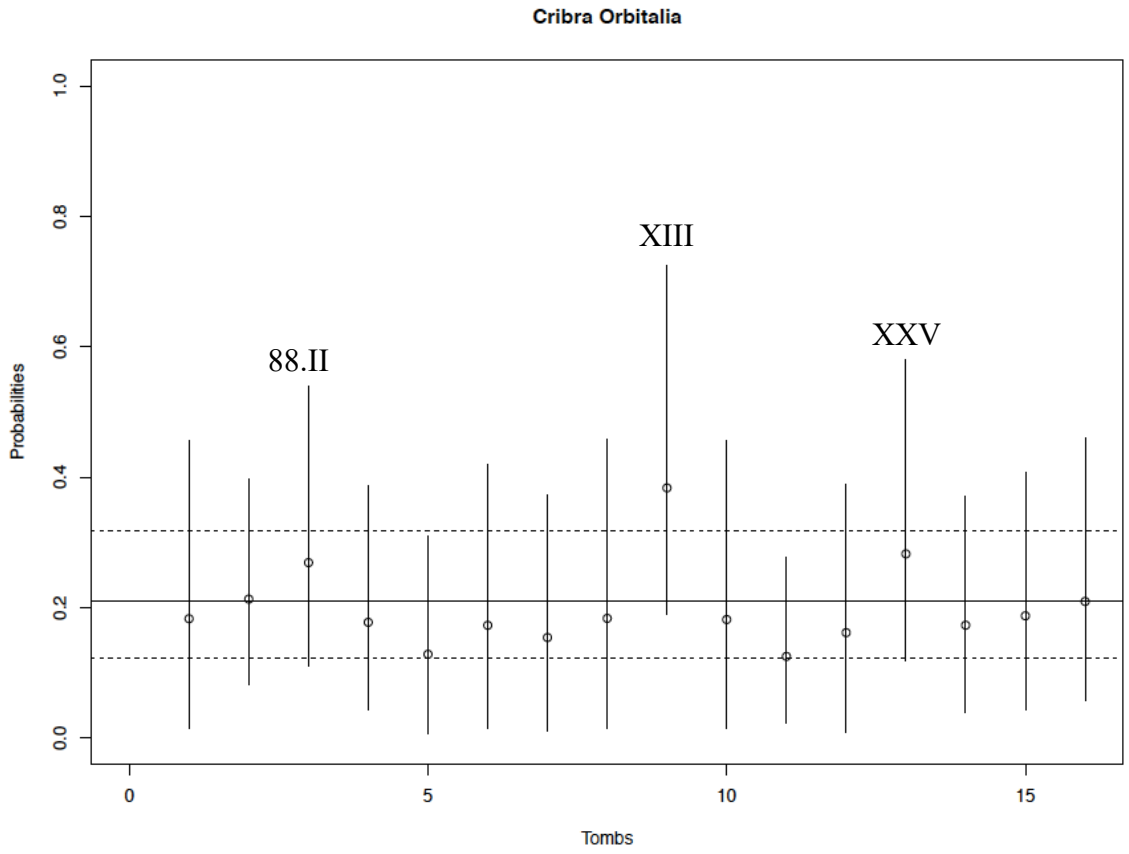


Figure 7.15. Results of the hierarchical Bayesian analysis for cribra orbitalia per tomb (MNI Data)

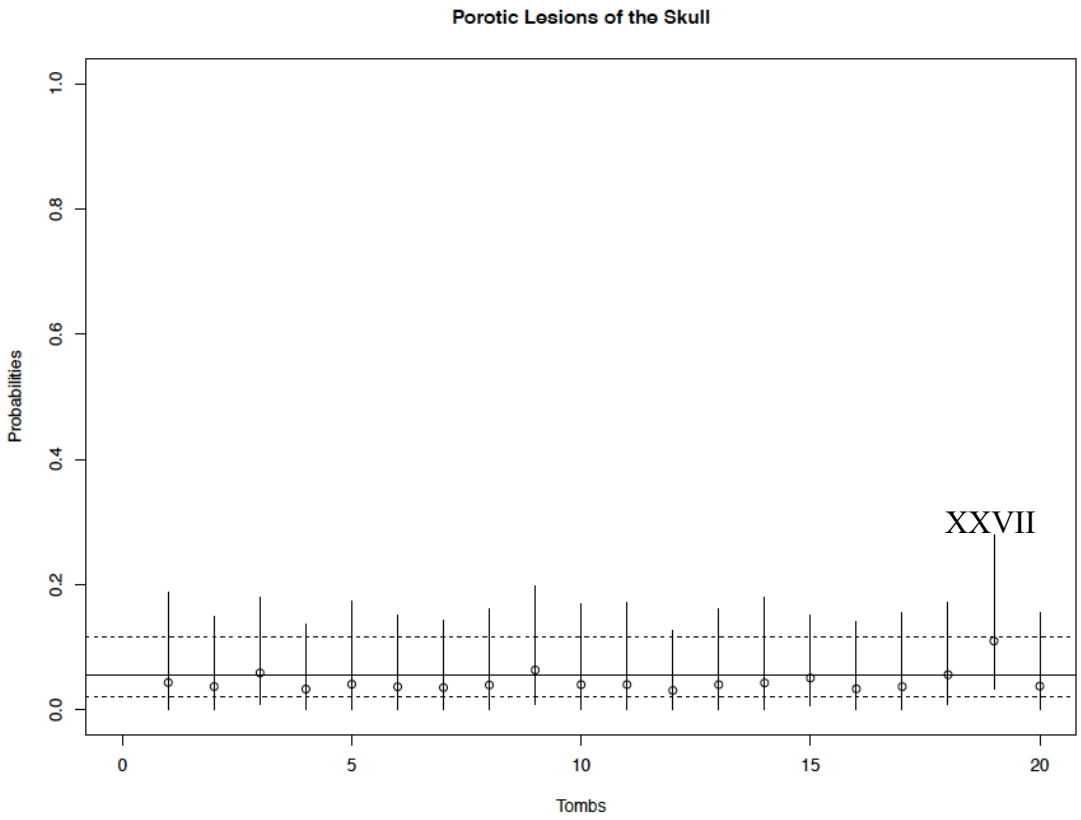


Figure 7.16. Results of the hierarchical Bayesian analysis per tomb for porotic lesions of the skull

No individuals with observable orbits and vaults (n = 70) exhibited both CO and PL.

Periostitis

The prevalence of periostitis in each tomb was considered in two ways: 1) the MNI of individuals exhibiting periostitis and 2) the total fragments exhibiting periostitis in each tomb. The results of both will be presented here. Using the first method, prevalence of periostitis is 13% (34/258) for all observed individuals. This method may provide a more accurate representation of prevalence in the cemetery because it is accounting for the fragmentation of the material by using cMNI rather than fragment number. However, the cMNI may not represent the actual number of individuals observed, which may result in the over-estimation of prevalence. Both methods have weaknesses. Using the second method, the prevalence of periostitis in the

cemetery is 3% (76/2963) for all observable long bone and rib elements. Because periostitis can be difficult to observe in highly fragmented remains and the high degree of fragmentation increases the number of observed elements, the rate of periostitis is likely underestimated using this method. In this case, I am using the results of the second method to more closely observe the prevalence differences among the tombs.

A majority of the tombs contained individuals exhibiting periostitis (14 of 23). The hierarchical Bayesian analysis indicates that Tomb IV has a median probability that is outside of the credible interval for the cemetery average indicating a high rate of occurrence, but the lower range of Tomb IV's credible interval is encompassed by the entire range of the cemetery wide credible interval. Tombs VII and XIII have low prevalence of periostitis as depicted in Figures 7.17 and 7.18. In the hierarchical Bayesian analysis for the fragment data, Tomb IV again has an elevated probability, but Tomb X has a higher probability than Tomb IV when compared to the cemetery average probability. Tombs XXVI and XXVII also demonstrate higher rates of occurrence. This indicates that differences between the tombs are more exaggerated when using the fragment data set. Differences in sample size in each data set are accounted for by the hierarchical Bayesian analysis so that a tomb with a higher number of long bones can be compared to a tomb with fewer long bones.

Tomb XIII is notable with respect to periostitis prevalence because although it has a cMNI of 31, the highest of the cemetery, it yielded relatively few fragments with periostitis. In Tomb XIII there were only three bone fragments with periostitis out of 491 fragments observed. The three fragments were all long bone fragments (1 right fibula, 1 right tibia, 1 un-sided fibula), which is where periostitis is most commonly observed (Ortner 2003). It may be that these fragments belong to three different individuals, but since no elements repeat, it is only possible

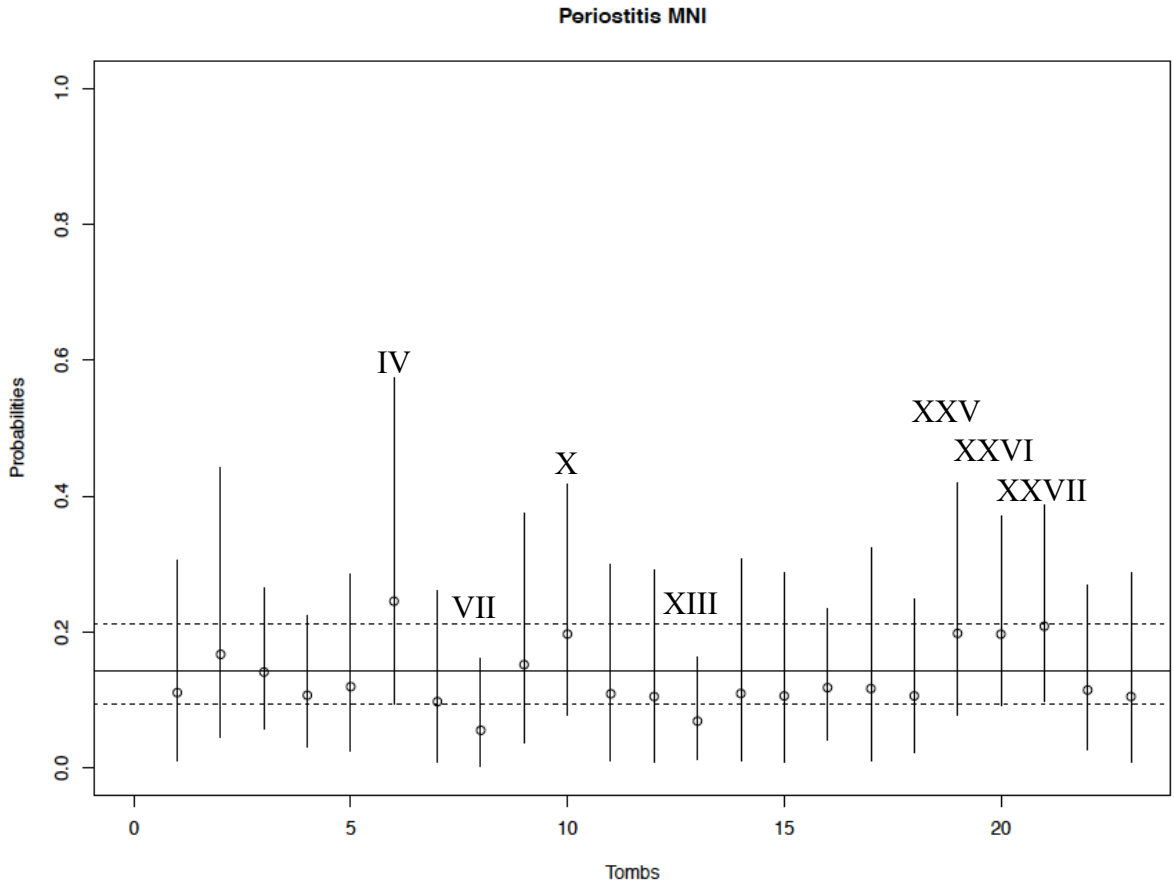


Figure 7.17. Results of the hierarchical Bayesian analysis for periostitis per tomb (MNI Data)

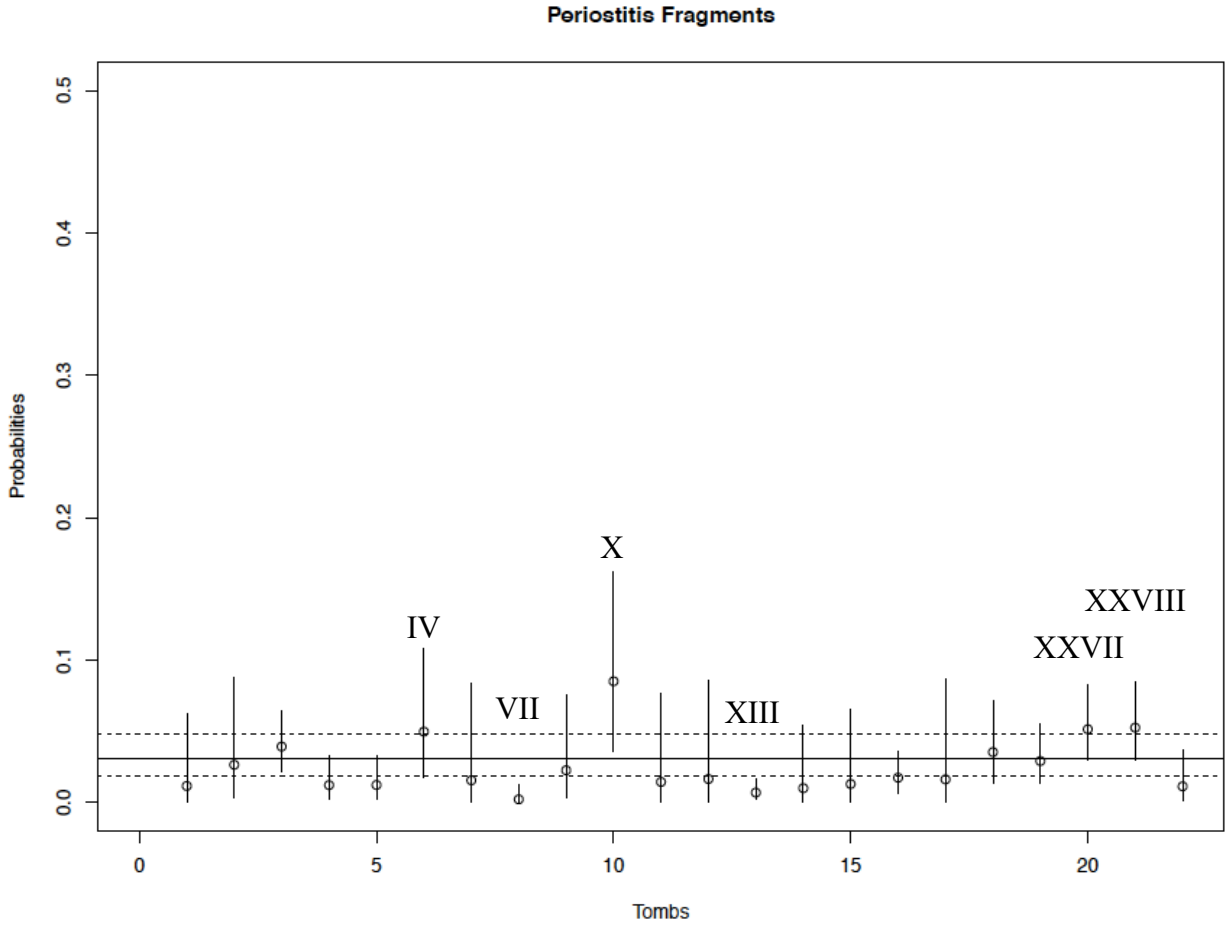


Figure 7.18. Results of the hierarchical Bayesian analysis for periostitis per tomb (Fragment Data)

to say that at least one individual exhibited periostitis in the tomb group. The low prevalence of periostitis in Tomb VII is less informative because many of the fragments from this tomb were poorly preserved which made it more difficult to observe the presence and severity of any potential periostitis on the fragments. Of the 280 fragments observed for periostitis from Tomb VII, zero exhibited the trait and like that of Tomb XIII, Tomb VII has a high cMNI of 23.

Oral Indicators of Health

The following section provides the frequencies of the oral indicators of stress and disease including linear enamel hypoplasias (LEH), antemortem tooth loss (AMTL), caries, abscesses, and calculus. Although LEH is included here, it will be considered with the general indicators of health in the discussion of the results (Chapter 8) for reasons described above. The remaining indicators provide information about oral health and diet. Sex and age were estimated from the mandible when possible (age: n = 77; sex: n = 56) so that the frequencies of the various attributes could be observed according to sex and age. Similar to periostitis, all oral indicators of health were observed in two ways: 1) MNI of the individuals exhibiting the trait out of the total number with observable individuals and; 2) number of teeth exhibiting LEH out of the total number of teeth observed including all tooth types. To determine whether there were significant associations ($p<0.05$) between age and/or sex and the frequency of a given trait, chi-square tests were conducted when the percentages between the two groups were more than 5% different from one another and the counts for each exceeded one. The significant tests are noted in the tables as well as in the text. The results of these analyses provided a way to assess cemetery wide differences based on sex and/or age, which is important for the discussing the ways in which disease/stress was embodied at Golemi. As with the other indicators of health, hierarchical

Bayesian analysis was conducted for each trait to determine if the distribution of the trait in each tomb was significantly different from the cemetery wide rate of occurrence.

In the tables below, the counts for both types of data are provided, designated "MNI Data" for frequencies based on individuals and "Fragment" or "Tooth Data" when frequencies are based on fragment or tooth counts. Because traits like antemortem tooth loss and abscesses are or can be observed without teeth in occlusion, more individuals/tooth sockets could be observed than for LEH, caries, and calculus. For this reason, "N Assessed" refers to the total number of individuals with observable tooth sockets for MNI data and to the number of observable sockets for tooth data. On the other hand, "N" refers to the number of individuals with teeth observable for MNI data and the number of teeth observable for tooth data.

Linear Enamel Hypoplasia

All individuals with teeth were included for analysis even if they only had one tooth represented because LEH was observed in both anterior and posterior teeth. Individuals with LEH were observed in 10 of the 23 tombs and in 42.5% (n = 37) of individuals with observable anterior and/or posterior teeth (n = 87). The tombs with the highest prevalence of LEH among tombs with more than one observable individual are Tombs 88.I (7 of 9) and XXVII (6 of 7). Using the second method, the prevalence of LEH was 14.4% (n = 122) of the total number of teeth observed (n=850) including both anterior and posterior teeth. Tombs 88.I and XXVII contributed the highest number of teeth of the tomb groups with LEH, 19 and 26 teeth, respectively.

Hierarchical Bayesian analysis of the two data sets for LEH provide different results. The MNI data set illustrates that none of the tombs are significantly different from one another in terms of number of individuals with the trait per tomb, although Tombs 88.I and XXVII show

elevated rates of occurrence (Figure 7.19). The tooth data illustrates that some tombs had significantly different rates of teeth with LEH when compared to the cemetery wide rate (Figure 7.20). Tombs 85.I, XII, and XXVII contained more teeth with LEH at a higher rate of occurrence than the average rate for the cemetery. The credible intervals for the probabilities for Tombs 85.I and XXVII are completely outside of the credible interval for the LEH tooth rate of the cemetery as a whole. Although there are several tombs whose median probabilities fall below the lower edge of the credible interval for the whole cemetery (XIII, XV, XVI), only one tomb (XXVI) has a median and credible interval that falls completely below the range.

Some tombs contain individuals that exhibit significantly more LEH than others. In Tomb 85.I there is only one observable set of dentition, a mandible, with 14 teeth in occlusion, but the individual exhibits some of the most notable LEH in the cemetery. Based on dental wear and mandibular features, this individual was estimated to be a young male. Every tooth except one (Tooth 32) had at least two LEHs and some teeth had up to five LEHs (Figures 7.21 and 7.22). Similarly, one individual from Tomb XXVII has LEH on 5 of 10 observable teeth, one of which has at least six linear defects (Figure 7.23). The individual from tomb XXVII is also estimated to be a young male, ca. 21 years old based on the incomplete closure of the apex on Tooth 22. Possible periostitis on the left mandibular body, inferior to the dentition, suggests he experienced a systemic infectious disease not too long before death. The taphonomic erosion on the bone makes it difficult to tell the extent to which it has healed, but from the flattened, sclerotic structure of the reaction it may have been mostly healed.

Sex was estimated for a total of 56 individuals with teeth of which 21 are male/probable male and 34 are female/probable females. Using the MNI data, of the males observed, 61.9% exhibited LEH on at least one tooth and of the females observed, 29.4% exhibit LEH.

Table 7.21. Frequency of Oral Indicators of Disease/Stress (MNI Data)

	Individuals	MNI: Dental Arch	Percentage	Average Per Tomb
LEH	37	87	42.5%	1.61
AMTL	44	95	46.3%	1.74
Caries	21	87	24.1%	0.91
Abscesses	6	95	6.3%	0.26
Calculus	11	87	12.6%	0.49

Table 7.22. Frequency of Oral Indicators (Tooth Data)

	Teeth with Trait	Total Teeth	Percentage	Average Per Tomb
LEH	122	850	14.4%	5.30
AMTL	174	1246*	14%	7.57
Caries	43	850	5.1% (18.5%**)	1.87
Abscess	11	1246*	0.9%	0.49
Calculus	28	850	3.3%	1.22

*Total teeth and sockets considered
**Corrected Rate

Table 7.23. Oral Indicators by Sex (MNI Data)

	N	N Assessed	LEH	Caries	AMTL	Abscess	Calculus
Male	21	21	13 (61.9%)	6 (28.6%)	7 (33%)	1 (4.8%)	3 (14.3%)
Female	34	35	11 (29.4%)	12 (32.4%)	22 (60%)	3 (8.6%)	5 (14.7%)
Total	55	56	24 (43.6%)	18 (32.7%)	29 (51.9%)	4 (7.1%)	8 (14.5%)

Table 7.24. Oral Indicators by Age (MNI Data)

	N	N Assessed	LEH	Caries	AMTL*	Abscess	Calculus
Younger	36	37	18 (50%)	14 (38.9%)	9 (24.3%)	1 (2.7%)	4 (11.1%)
Older	38	40	14 (36.8%)	7 (18.4%)	25 (62.5%)	4 (10%)	6 (15.8)
Total	74	77	32 (43.2%)	21 (28.4%)	35 (45.5%)	5 (6.5%)	10 (13.5%)

*Significant chi-square test between younger and older individuals (p=0.002)

Table 7.25. Oral Indicators by Age and Sex (MNI Data)

	N	N Assessed	LEH	Caries	AMTL	Abscess	Calculus
Younger Males	10	10	8 (8%)*	3 (30%)	1 (10%)	1 (10%)	0
Younger Females	19	20	5 (26.3%)*	9 (47.4%)	8 (40%)	0	3 (15.8%)
Older Males	11	11	3 (27.3%)	3 (27.3%)	6 (54.5%)	0	3 (27.3%)
Older Females	14	14	6 (42.9%)	3 (21.4%)	12 (85.7%)	3 (21.4%)	2 (14.3%)

*Significant chi square test between younger males and younger females (p = 0.018)

Table 7.26. Oral Indicators by Sex (Tooth Data)

	N	N Assessed	LEH*	Caries	AMTL	Abscess	Calculus
Male	202	296	43 (21.3%)	11 (5.4%)	27 (9.1%)	1 (0.3%)	6 (3%)
Female	295	435	42 (14.2%)	17 (5.7%)	53 (12.2%)	3 (0.7%)	12 (4.1%)
Total	497	731	85 (17.1%)	28 (5.6%)	80 (10.9%)	4 (0.5%)	18 (3.6%)

*Significant chi square test between male and females (p = 0.054)

Table 7.27. Oral Indicators by Age (Tooth Data)

	N	N Assessed	LEH	Caries	AMTL*	Abscess	Calculus
Younger	408	547	79 (19.4%)	23 (5.6%)	22 (4%)	1 (0.2%)	9 (2.2%)
Older	231	442	39 (16.9%)	11 (4.7%)	98 (22.2%)	4 (0.9%)	15 (6.5%)
Total	639	989	118 (18.5%)	34 (5.3%)	120 (12.1%)	5 (0.5%)	24 (3.8%)

*Significant chi square test between younger and older individuals (p=0.000)

Table 7.28. Oral Indicators by Sex and Age (Tooth Data)

	N	N Assessed	LEH	Caries	AMTL	Abscess	Calculus
Younger Males	100	129	28 (28%)*	5 (5%)	2 (1.6%)	1 (0.8%)	0
Younger Females	205	277	30 (14.6%)*	13 (6.3%)	16 (5.8%)	0	8 (3.9%)
Older Male	89	154	12 (13.5%)	6 (6.7%)	25 (16.2%)	0	6 (6.7%)
Older Female	83	151	12 (14.5%)	4 (4.8%)	34 (22.5%)	3 (2%)	4 (4.8%)

*Significant chi-square test between younger males and younger females (p=0.008)

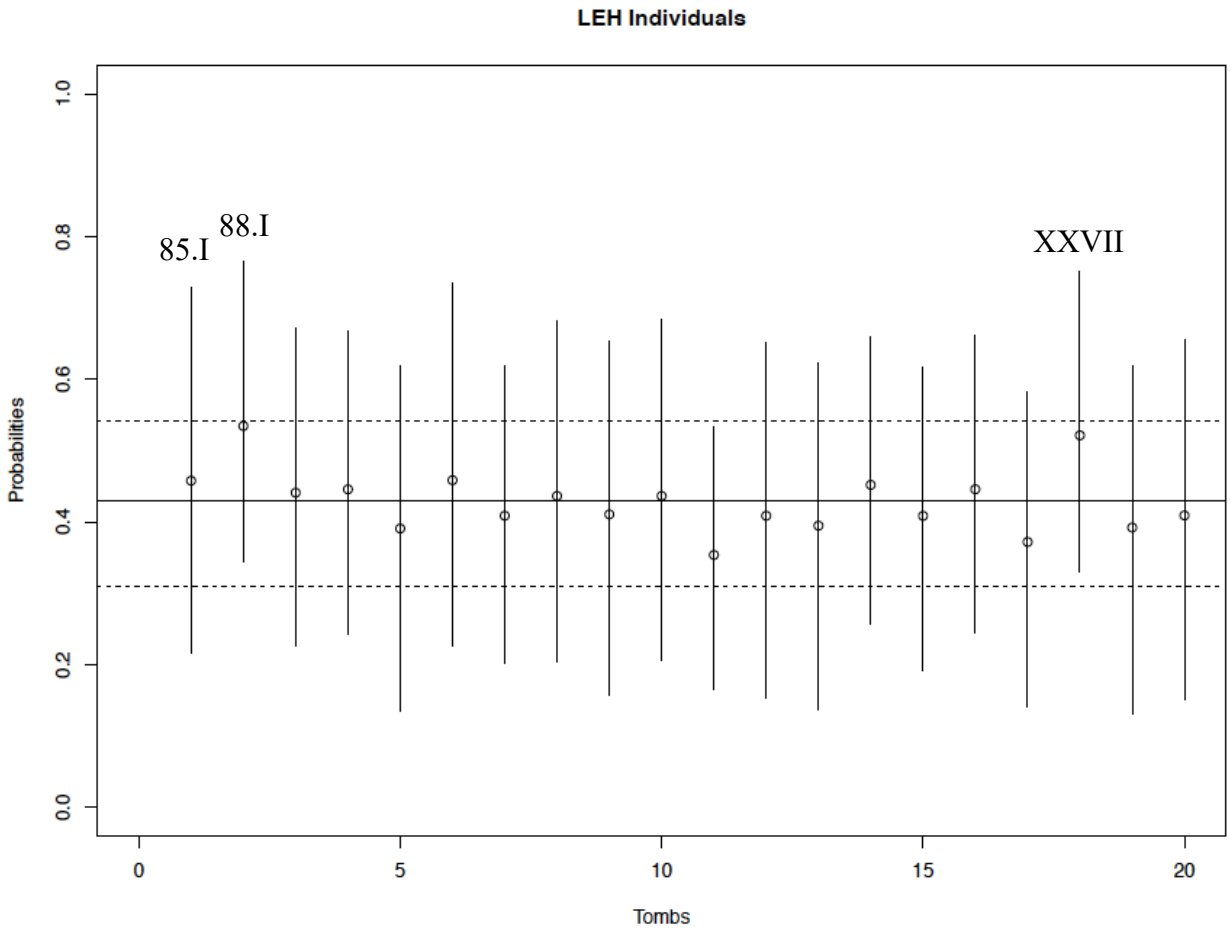


Figure 7.19. Results of the hierarchical Bayesian analysis for LEH per Tomb (MNI Data)

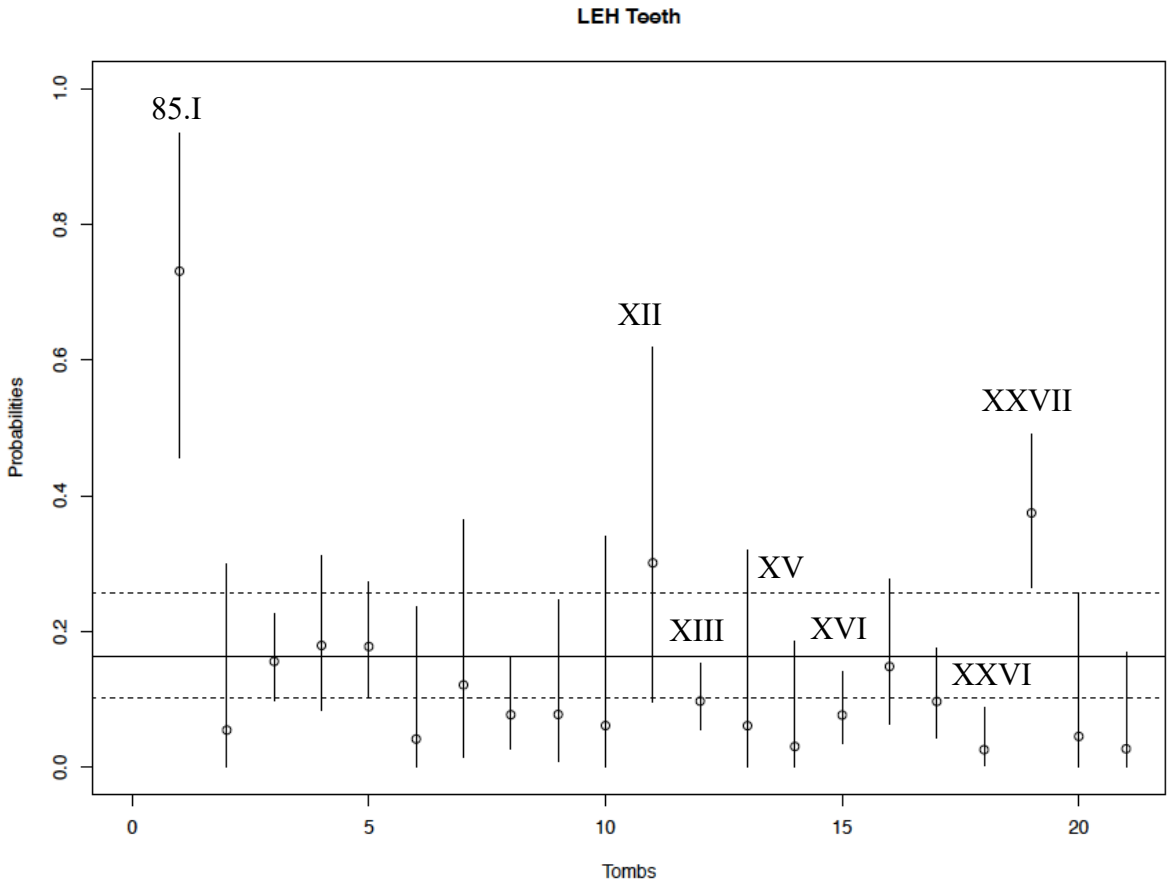


Figure 7.20. Results of the hierarchical Bayesian analysis for LEH per tomb (Tooth Data)



Figure 7.21. Individual with LEH from Tomb 85.I, anterior view

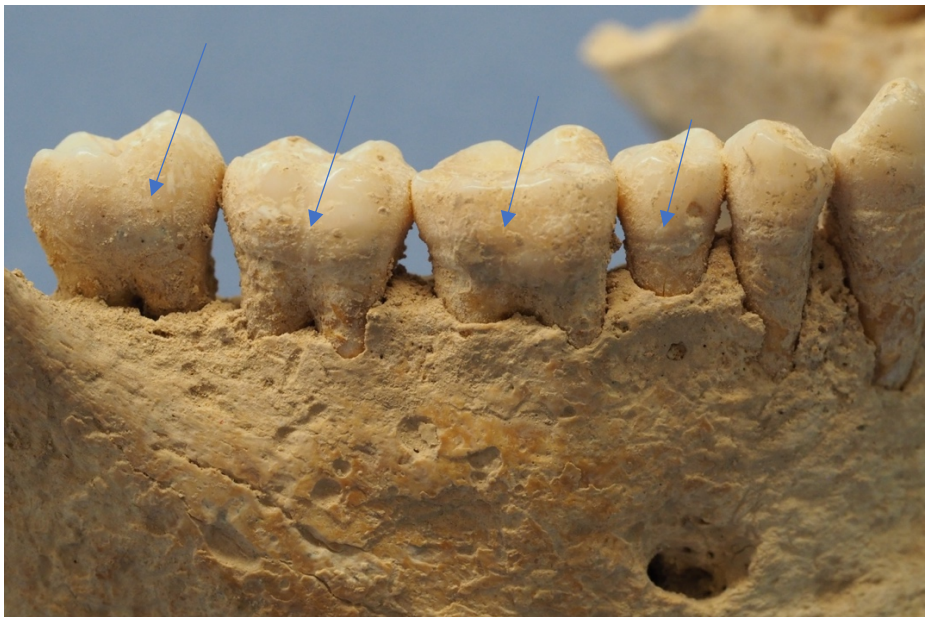


Figure 7.22. Individual with LEH from Tomb 85.I, right lateral view



Figure 7.23. Individual with LEH from Tomb XXVII, left lateral view (blue circles around possible periostitis)

From these percentages, it appears that male individuals had a higher rate of LEH than female individuals suggesting that more male individuals experienced episodes of stress or disease during dental development than female individuals did. The tooth count data revealed a similar pattern. The male/probable male mandibles provided 202 teeth for observation of which 20.1% had a least one tooth with one LEH. The female/probable female individuals provided 295 teeth of which 14.2% had at least one tooth with one LEH. As with the MNI data, the rate of occurrence in males is almost twice as much as the rate of occurrence in females. A chi square test revealed a nearly significant relationship between sex and the occurrence of LEH in teeth (X-squared = 3.7206, df = 1, p-value = 0.05375).

Age was estimated for a total of 77 individuals which represented "younger individuals" (ca. 18-35) and "older individuals" (ca. 35+). The younger individuals exhibited relatively more LEH than the older individuals did. 50% (n = 18) of the younger individuals observed (n=36) had at least one tooth with one LEH and 36.8% (n = 14) of the older individuals (n=38) had at least one tooth with one LEH. It is possible that more frequent stress events during development represented by LEH contributed to earlier mortality, which may explain why the younger individuals exhibited more LEH than the older individuals did (Armelagos et al. 2009). However, the sample for older individuals is likely underestimating the amount of LEH present because dental attrition is more prevalent in older individuals on average (Brothwell 1965) and is evident in the Golemi sample (see antemortem tooth loss below), which therefore limits the number of observable teeth for older individuals.

When both sex and age were considered, younger male/probable male individuals exhibited the highest prevalence of LEH. Chi square tests indicated a significant relationship between age, sex, and the occurrence of LEH on both the individual level (X-squared = 6.0322,

df = 1, p-value = 0.01405) and the tooth level (X-squared = 11.895, df = 1, p-value = 0.000563), which suggests that younger male individuals displayed a significantly higher frequency of LEH than other age and sex groups at Golemi. The higher occurrence of LEH and thus the more frequent experience and survival of stress or disease episodes may be a social or cultural phenomenon, but it may also be the related to innate male physiology which has been shown to be more susceptible to some infectious disease than that of female individuals (Klein 2016; DeWitte 2009; Owens 2002; Wells 2000). Experiencing stress and disease during the first couple of years of development has also been linked to worse adult health and earlier mortality (Armelagos et al. 2009).

Antemortem Tooth Loss (AMTL)

Antemortem tooth loss was common among the individuals of Golemi. Fourteen of the 23 tombs contained individuals with antemortem tooth loss (AMTL). It was present in 46.3% (n=44) of the 95 observable individuals. When considering the total number of teeth lost antemortem (n = 174), AMTL occurred in 14% of the sample (n=1246). The six adult individuals from Tomb XXV collectively lost the most teeth antemortem in the cemetery (n = 41). The results of the hierarchical Bayesian analysis using MNI data do not indicate any significant differences between the tombs (Figure 7.24). The results from the hierarchical Bayesian analysis using the tooth count data indicate that Tombs IV, XIV, XXV, and XXVIII had significantly higher rates of AMTL than the average cemetery rate of occurrence while Tombs 88.II, XIII, and XVI had significantly lower rates (Figure 7.25).

Females exhibited a higher rate of AMTL (60%) than male individuals did (33%), but chi-square tests indicate that there is no significant relationship between sex and AMTL (MNI Data: X-squared = 3.4759, df = 1, p-value = 0.06227; Tooth Data: X-squared = 1.3952, df = 1, p-

value = 0.2375). Older adults had a much higher rate of AMTL (62.5%) than younger adults did (24.3%). Chi square tests indicate there is a significant relationship between age and AMTL occurrence at both the individual level (MNI Data: X-squared = 9.8646, df = 1, p-value = 0.001685) and the tooth level (Tooth Data: X-squared = 73.844, df = 1, p-value < 2.2e-16).

When both age and sex were taken into account, older female individuals exhibited the highest rate (85.7%) of AMTL. Younger females had a higher rate of AMTL (31.6%) than younger male individuals did (11.1%) who had the lowest rate of all the age/sex categories. As with LEH, the tooth count data for AMTL yielded the same results as the MNI data but with smaller proportions (See Table 7.25). The older female individuals experienced AMTL for 22.5% (n=34) of the teeth observed (n=151). Chi square tests indicate that there is no sex specific relationship between age and prevalence of AMTL using either MNI or tooth data. The higher prevalence of AMTL in older individuals is not unusual since older adults are more likely to have more dental attrition, making them more prone to dental caries that can lead to tooth loss (Boldsen 2005; Ortner 2003; Lovejoy 1985). Additionally, because of the prevalence of AMTL in older individuals, there were fewer teeth to observe for other oral characteristics, which means that older individuals may be under-represented in other categories. Female individuals may exhibit higher prevalence of AMTL as a result of a higher prevalence of caries, which is addressed in the following section.

Caries

The rate of caries for the Golemi cemetery is 24.1% (21 of 87) based on the MNI of individuals with caries compared to the number of observable individuals. MNI was calculated from the number of individuated dentitions, primarily mandibles. The rate of caries based on tooth count data is 5.1%. However, because antemortem tooth loss is often caused by caries, it is

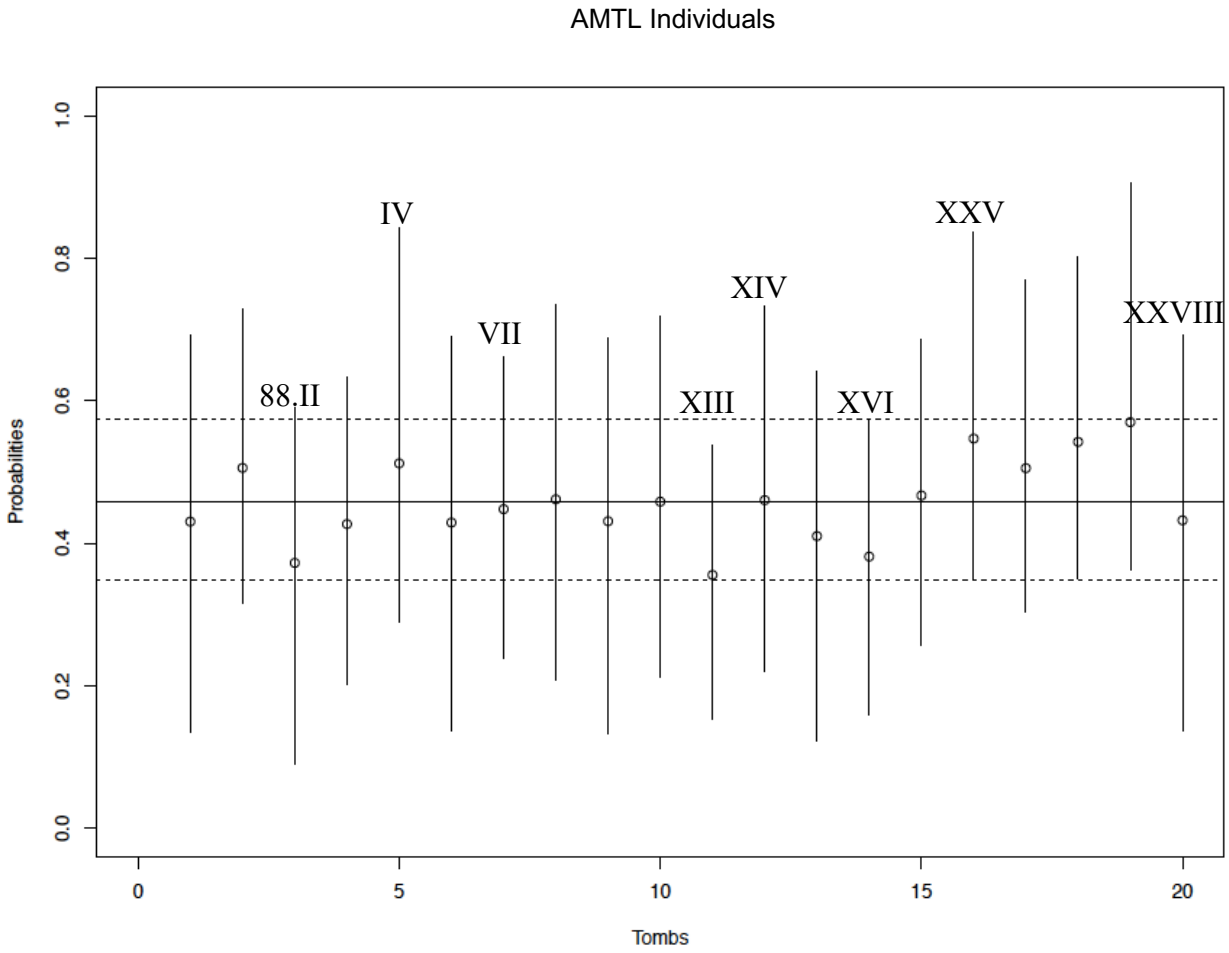


Figure 7.24. Results of the hierarchical Bayesian analysis for AMTL per tomb (MNI Data)

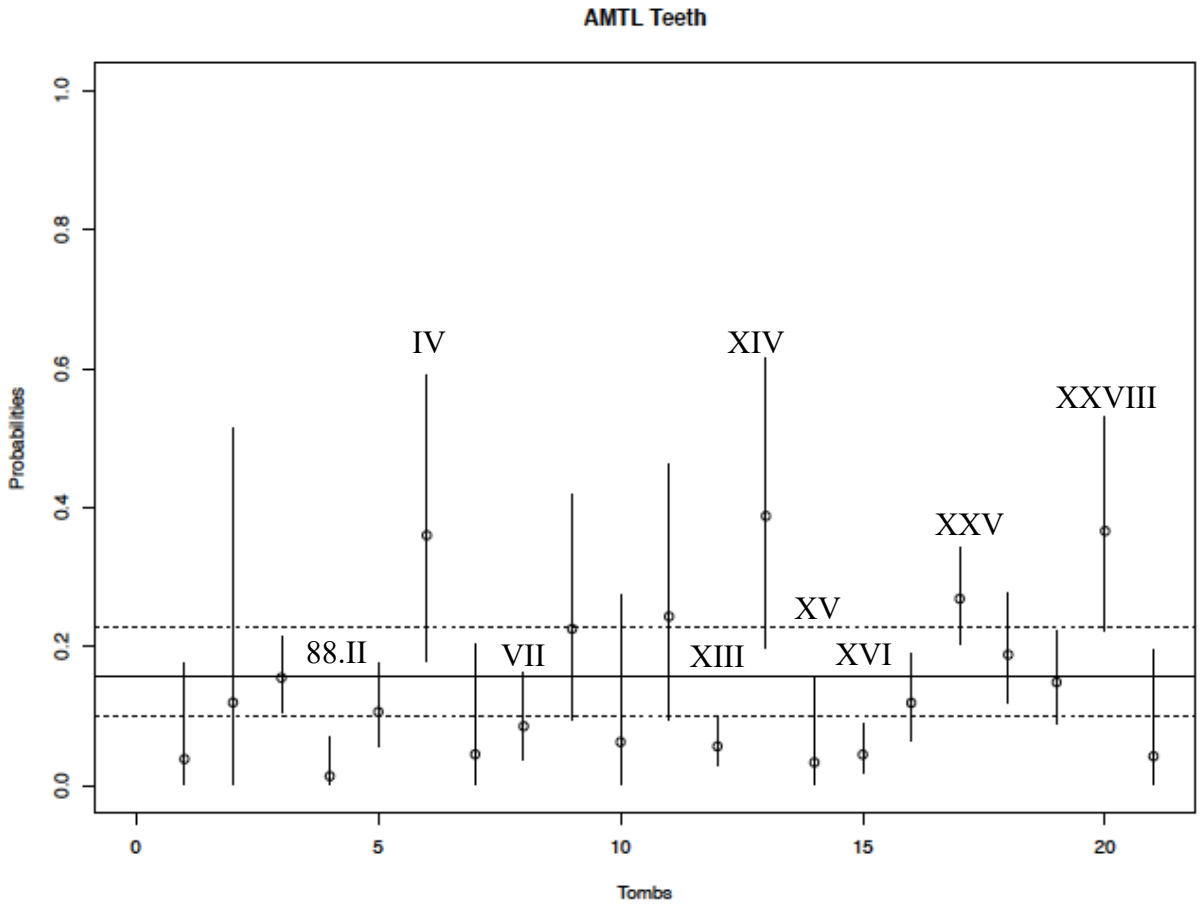


Figure 7.25. Results of the hierarchical Bayesian analysis for AMTL per tomb (Tooth Data)

necessary to calculate the corrected rate of caries accounting for antemortem tooth loss (Lukacs 1992, 1995). Lukacs's (1995, Fig. 1) formula was used to calculate the corrected rate of teeth with caries based on the tooth count data. The corrected rate is 18.5%, which is considerably higher than the uncorrected rate (Table 7.29).

Twenty-one individuals from nine of the 23 tombs exhibit at least one tooth with caries. Given the corrected rate of caries and high prevalence of AMTL, it is likely that many individuals with AMTL also had caries prior to tooth loss. Five individuals in five tombs exhibit both caries and AMTL and one individual exhibits caries but does not also have AMTL. Tomb XIII contains the most individuals with caries (n = 6), but it also has the largest observable MNI (n=12) of all the tomb groups. Hierarchical Bayesian analysis indicates that no tomb groups exhibit significantly high or low rates of caries. Tomb XXVII has a slightly elevated rate when compared to the average rate of caries in the cemetery but is well within the credible interval of the cemetery wide probability of occurrence.

Female individuals exhibited a higher rate of caries (32.4%) than did male individuals (28.6%), but only by four percent. The chi square test for sex and prevalence of caries is not significant (X-squared = 2.5586e-31, df = 1, p-value = 1). Younger individuals had proportionally more individuals with caries than did older individuals (38.9% vs. 18.4%). A chi square test revealed that age and caries are not significantly related to one another (X-squared = 2.8699, df = 1, p-value = 0.09025). Younger females had the highest prevalence of caries

Table 7.29. Dental Caries Rates

Observed Caries Rate	5.1%
Corrected Tooth Count Caries Rate	18.5%
Individual Count Caries Rate	21/87 = 0.241
Mean Caries Per Individual	43/87 = 0.494

(47.4%) according to the MNI data, but the results of a chi square test indicate that there is not a significant relationship between sex and caries prevalence among younger individuals from this data (X-squared = 0.25607, df = 1, p-value = 0.6128). When the tooth count data are considered, the prevalence of caries for each subgroup are between five and seven percent indicating that the relative proportions of teeth affected by caries was more or less the same among the various age and sex groups.

As noted above, older individuals have significantly more AMTL, which likely means they had more caries throughout their lives than did the younger individuals. For this reason, it is not surprising that the younger individuals exhibit more caries while older individuals exhibit more AMTL. Younger females having the highest prevalence of caries coincides with older females having the highest prevalence of AMTL (Lukacs 1995). These results are consistent with findings of both archaeological and clinical studies which have found that female individuals often exhibit higher rates of caries than do male individuals, especially at younger ages (Ferraro and Vieria 2010; Boldsen 1997). The reasons for this are still being explored, but it is likely the result of a combination of environmental, hormonal, genetic, and social factors (Ferraro and Vieria 2010; Lukacs 2008; Lukacs and Largaespada 2006).

Abscesses

Very few individuals have abscesses among the Golemi sample. Only six individuals presented evidence of abscesses, which is 6.3% of the observable individuals (n=87). These six individuals are from six different tombs: IV, IX, XIII, XVI, XXIV, and XXVIII. Age and sex were estimated for four individuals, one young male and three older females. Proportionally, there were more older individuals (n=4) than younger individuals (n=1) with abscesses. The total number of tooth sockets affected by an abscess is 11, which is 0.88% of the total tooth sockets

observed (n = 1246). The tooth socket data indicates the same pattern as that observed for the MNI data.

One individual of unknown sex and age from Tomb XXIV (Maxilla 180) has five abscesses, which far outnumber those of the other individuals (Figure 7.26). Caries could not be observed for this individual because of the extensive wear on the teeth and poor preservation. However, the presence of so many abscesses may potentially be related to a pathological condition beyond caries since there is also some evidence of remodeling around at the periapical aperture (Ortner 2003; Rubini et al. 2011). In addition to the abscesses, this individual also exhibits antemortem tooth loss and alveolar resorption at three other sockets, indicating that they had very poor oral health. Hierarchical Bayesian analyses using both tooth data and MNI data indicate that no tomb exhibits a significantly different rate of abscess given the rate of occurrence in the cemetery as a whole.



Figure 7.26. Tomb XXIV, Maxilla 180, with five abscesses

Calculus

Similar to abscesses, few individuals have calculus (n = 11), which is 12.6% of the total number of observable individuals (n=87). These individuals are from only six tombs: 88.I, XIII, XVI, XXIV, XXV, and XXVII. In most individuals the amount of calculus on the teeth is minimal. There is an even distribution of calculus among the males and females and between younger and older individuals. Proportionally, older male individuals exhibit more calculus than the other age/sex groups. Of the individuals for which sex and age could be estimated, no younger males exhibit calculus. Tomb XXV has the most individuals with calculus (n = 3), but it is minimal. On other hand, one notable individual from Tomb XXVII has a significant amount of calculus (ca. 2-3mm thick) on four teeth (Teeth 3, 28-30) and minimal to moderate amounts on the remaining observable teeth (Figures 7.27-28). The individual was estimated to be an older adult male based on dental wear and mandibular attributes who also lost four teeth antemortem and has LEHs on four teeth.

Results of the hierarchical Bayesian analysis using the MNI data indicate that no tomb has proportionally more individuals exhibiting calculus than those of other tombs (Figure 7.29). When the tooth data is used, Tombs XXIV has a significantly higher rate of occurrence than the other tombs. Tomb 88.II appears to have a lower than average rate, but several of the teeth observed for this tomb were loose and likely lost evidence of calculus through taphonomic and cleaning processes and therefore is not significant for the purposes of this research.



Figure 7.27. Individual with Severe Calculus, Tomb XXVII, right lateral view

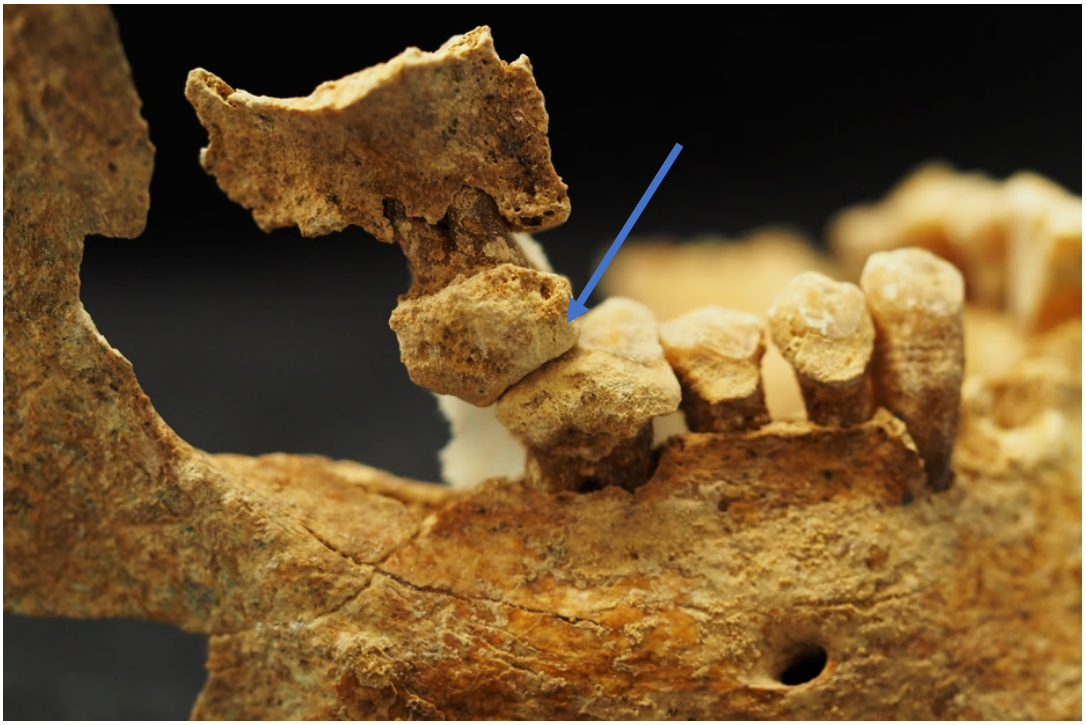


Figure 7.28. Individual with severe calculus, Tomb XXVII, right lateral view with upper molar (indicated by blue arrow)

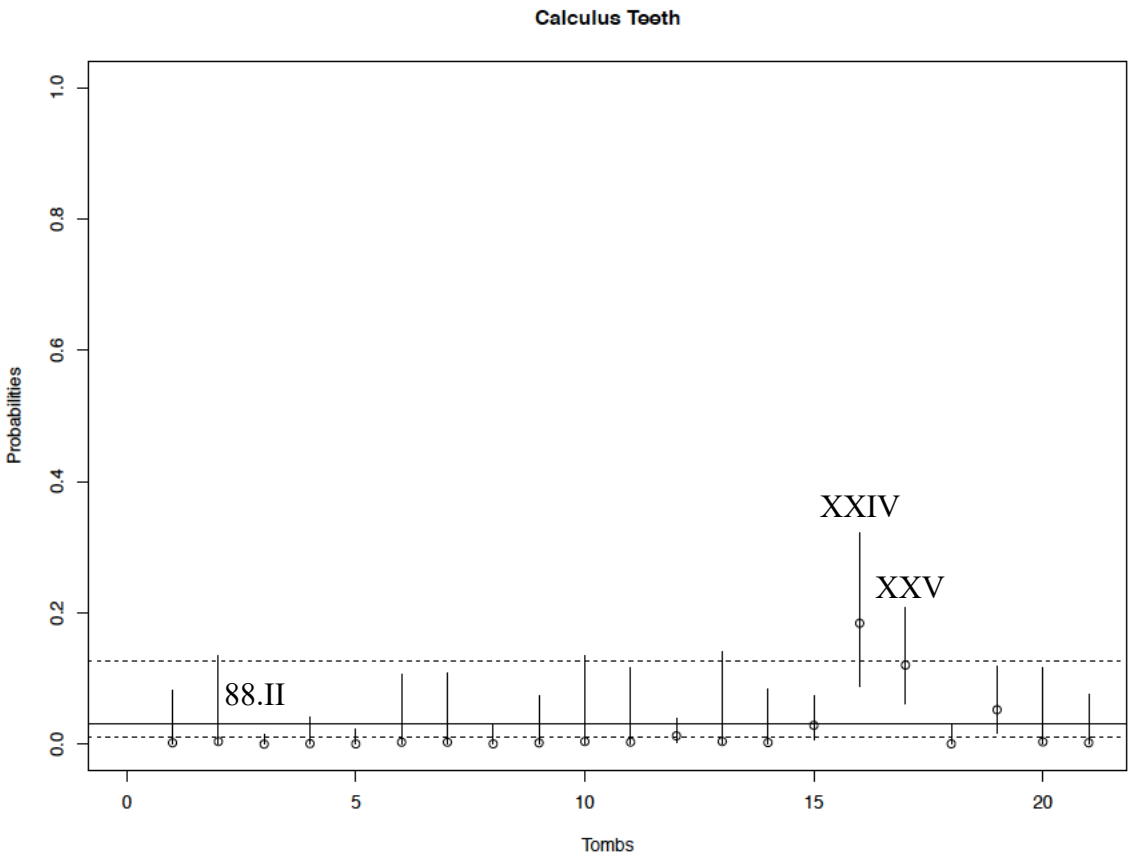


Figure 7.29. Results of the hierarchical Bayesian analysis for calculus per tomb (Tooth Data)

Activity Markers

The activity markers assess for this dissertation include entheseal changes, degenerative joint disease in non-vertebral joints, platymeric index, and cranial trauma. The results of these analyses are presented in Tables 7.30.

Entheseal Changes

Entheseal changes were present in the long bones from most tombs (n = 17) representing at least one individual. Similar to the documentation of periostitis and the oral health indicators, entheseal changes were recorded both as a percentage of the minimum number of individuals observed for entheseal changes and as a percentage of the total number of fragments observed. In the first case, entheseal changes were present in 25.7% of the individuals. In the second, entheseal changes were present in 9.9%, which is a much smaller percentage. As with periostitis, the first method may overestimate the prevalence and the second method may underestimate it. For this reason, these percentages should be thought of as a potential range.

Entheseal changes were most prevalent in Tombs 88.I, 88.II, XIII, and XXVII, although no tombs exhibit an especially high number of individuals with entheseal changes. The entheseal changes were minimal for the most part. Of 154 fragments with entheseal changes, 124 fragments (80.5%) were scored as a 1. Only three bones from two tombs (III, XXVII) were scored with the maximum score (3), which means that the entheseal changes were likely the result of injury (Buikstra and Ubelaker 1994). The most frequently observed element with entheseal changes was the femur (n = 51), followed by the humerus (n= 35) and the tibia (n = 30). These elements represent 75.3% (n = 116) of the 154 fragments observed. The most commonly observed sites were the gluteal line on the femur (47/51), the deltoid tuberosity

Table 7.30. Frequencies of Activity Markers

	Trait Observed	N	Percentage
Entheseal Changes (MNI)	43	167	25.7%
Entheseal Changes (Fragment Counts)	154	1560	9.9%
Degenerative Joint Disease (MNI)	24	121	19.8%
Degenerative Joint Disease (Joint Fragments)	73	996	7.3%

(18/35) and bicipital groove (10/35) on the humerus, and the popliteal line (27/30) on the tibia. Hierarchical Bayesian analysis using the MNI data indicates that Tomb VII has a lower than average prevalence of entheseal changes based on the distribution of the trait cemetery wide. Tomb III exhibits a higher rate of occurrence but not by much as the lower end of the credible interval for Tomb III falls within the higher end of the cemetery wide credible interval (Figure 7.30). Given the issues with interpreting entheseal changes as reflective of activities in skeletons (see Chapter 3), I am not inclined to put much confidence in this data, which are even further complicated by commingling and fragmentation.

Degenerative Joint Disease

Degenerative joint disease (DJD) was recorded for non-vertebral joints as an indicator of activity. DJD was present in 13 of the 23 tombs at Golemi. As with the entheseal changes, two methods were used to document DJD prevalence: as a percentage of the minimum number of individuals observed and as a percentage of the total number of fragments observed from joint locations. Using the first method, DJD was present in 19.8% of the minimum number of individuals observed for the most represented element/side. For the second method, DJD was present in 7.3% of the joint fragments observed for the entire cemetery. In most cases, the DJD

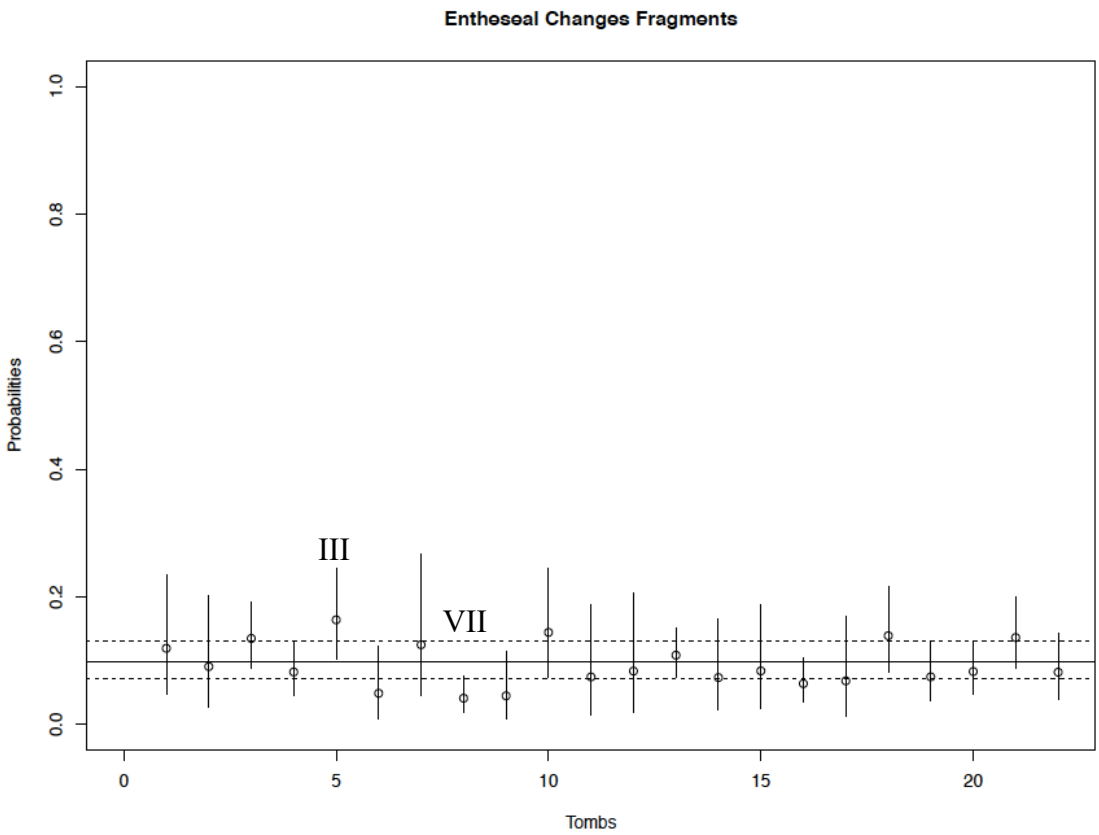


Figure 7.30. Results of the hierarchical Bayesian analysis for entheseal changes per tomb (Fragment Data)

was not severe and could have been caused by old age or a genetic propensity for bone formation (Jurmain 1999). Again, this frequency should be viewed as a range of DJD prevalence in the cemetery, given the commingled and fragmentary nature of the material.

Platymeric Index

The platymeric index (PI) is a measure of the shape of the proximal femoral shaft. Individuals exhibiting a PI of less than 85 are considered to be "platymeric," which means that the proximal femur is wider medio-laterally than it is anterio-posteriorly (Wescott 2005). The PI has been used as both a measure of ancestry and activity (McIlvaine and Schepartz 2015; Wescott 2005). Several studies have illustrated that behavior and functional aspects of the femur significantly affect the shape of the diaphysis (Angel 1966; Brothwell 1981; Ruff 1987; Ruff et

al. 2006). T-tests were used to determine whether bone side or sex significantly impacted the average PI of the cemetery. The results indicate that there are no significant differences between sides (t = 0.92167, df = 207, p-value = 0.3578) or sexes (t = -0.52004, df = 127, p-value = 0.6039). The measurements were pooled to arrive at the averages for each tomb.

On the whole, individuals from Golemi are platymeric with a cemetery wide average of 75.93. The cemetery wide average is similar to most of the tomb averages and has a similar standard deviation to that of most tomb standard deviations. Some tombs have a notably larger standard deviation than the other tombs such as Tombs VII and XXVII, which have standard deviations close ca. 10. On the other hand, individuals in Tombs X and XIII have smaller standard deviations, indicating more homogenous PI values among the individuals in each tomb. The average PIs for each tomb group demonstrates that all groups were platymeric (Table 7.31). 96% (n=201) of all observable femora (n=209) were platymeric. The remaining eight femora provided PI values ranging from 85.3 to 105.3. Two individuals have significantly higher PI values than nearly everyone in the cemetery. One individual, for whom sex could not be estimated, is from Tomb VII and has a PI of 101.9. The other individual is from Tomb XXVII and has a PI of 105.3, the largest PI value in the cemetery. The next highest value is much lower: 93.6 (Tomb 88.II). The individual from XXVII is most likely male based on the femoral circumference (Circ. = 93mm). Nothing else unusual was noted about the bone. The smallest PI value (60.1) is also from Tomb VII but it is close in value to the next smallest PI values (60.3, 60.5, etc.). It is interesting that Tomb VII contains the individuals with the second largest and the smallest PI values, indicating that there was a range of activities and/or genetic mixture in the tomb.

Table 7.31. Platymeric Index (PI) Averages

Tomb	**n**	**Average PI**	**Standard Deviation**
85.I	3	64.98	3.92
85.II	2	79.65	0.10
88.I	21	76.05	6.58
88.II	24	75.04	6.73
III	12	74.88	6.23
IV	4	74.45	5.43
V	1	83.14	
VII	18	76.45	9.43
IX	8	77.84	5.07
X	9	76.04	3.29
XI	0		
XII	0		
XIII	25	74.61	4.37
XIV	1	72.08	
XV	3	76.74	5.24
XVI	28	75.12	6.80
XX	1	73.88	
XXIV	7	71.43	6.50
XXV	9	76.04	5.26
XXVI	19	72.76	6.04
XXVII	12	75.72	10.73
XXVIII	2	80.71	8.05
XXIX	0		
Total/Average	209	75.93	6.68

Cranial Trauma

Cranial trauma is included in the "activity markers" category because it can be used as evidence to study the prevalence of a specific activity: interpersonal violence. Of the 143 observable individuals, 20 (14%) exhibit evidence of cranial trauma. These 20 individuals are from eight of the 23 tombs (Table 7.32). Tomb XVI contains the most individuals (n = 6) with cranial trauma. Tomb XXVII contains the second highest number of individuals with cranial trauma (n =4). No other tomb contains more than two individuals with cranial trauma. Tombs XVI and XXVII contain half (n=10) of the individuals with cranial trauma (n = 20) in the cemetery. It is interesting to note that the tomb with the highest cMNI, Tomb XIII, does not have evidence of any cranial trauma on any observable crania (n=12). The results of hierarchical Bayesian analysis indicate that Tombs XVI and XXVII do contain a proportionally higher rate of individuals with cranial trauma given the rate exhibited in the cemetery as a whole as illustrated in Figure 7.31. The median probability of Tomb XXVII is still within the credible interval for the cemetery wide probability but is elevated compared to those of most of the other tombs.

A summary of all of the cranial trauma observed at Golemi is provided in Tables 7.33-7.34. The most common type of cranial trauma is blunt force trauma (11/20). Of these, three experienced both blunt and sharp force trauma. In one case, the individual exhibited sharp force trauma in addition to a fractured nose. Most of the trauma is healed or had been in the process of healing for some time before death. Of the 20 individuals with cranial trauma, five were estimated to be female or probable females, 10 were estimated to be male or probable males, and the remaining five were of unknown sex. All four individuals who experienced more than one trauma were estimated to be male or probable males. The female individuals experienced blunt and sharp force trauma as well as fractures. The ages vary from young adult (ca. 18-30) to prime

Table 7.32. Individuals with Cranial Trauma per Tomb

Tomb	Cranial Trauma	N
85.I	1	3
88.II	2	11
IV	1	3
VII	2	7
X	2	8
XVI	6	17
XXIV	2	9
XXVII	4	13

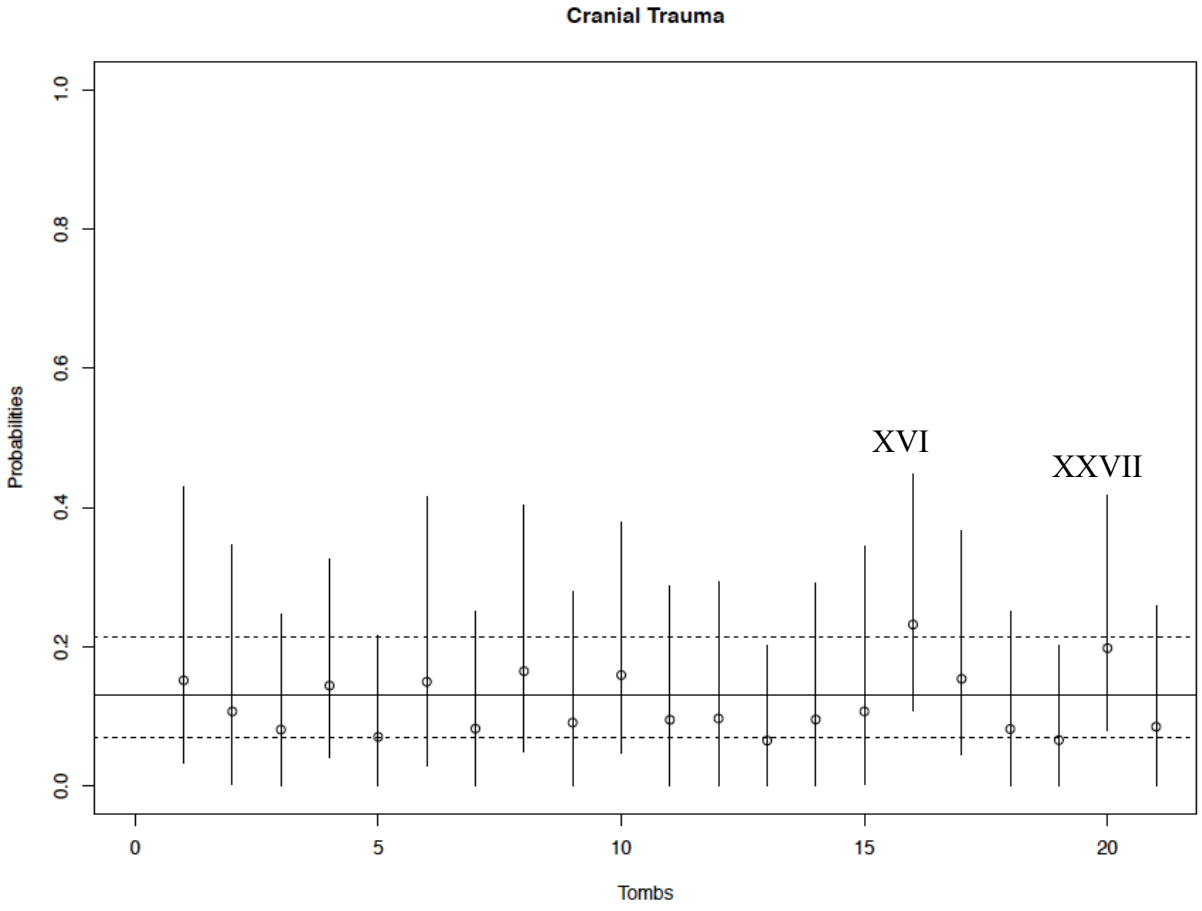


Figure 7.31. Results of the hierarchical Bayesian analysis for cranial trauma per tomb

adult (ca. 40-55). The most common age category is the collective middle and middle/prime group (n=8). There are five males, two females, and one of unknown sex. Among the four young adult individuals with cranial trauma, two are male and two are female.

There are two individuals that received cranial wounds perimortem. The first is a Middle Adult (ca. 25-40), male individual from Tomb XVI whose cranium has a puncture wound on the left squama of the frontal bone. The edges are jagged and there is no evidence of new bone formation, which indicates that the individual died before the wound could heal. The wound pierces through the endocranial surface, but it is small. It does not appear to be taphonomic based on the uniform coloration of the area as well as the size and shape of the defect (Figure 7.32 - 33). In addition to the puncture wound, Cranium 170 has three instances of healed blunt force trauma.

The second individual who received a perimortem wound was excavated from Tomb XXIV. The individual was an adult male, 25-45-years-old. The trauma on his skull suggests that he encountered violence frequently. The cranium has a healed depression fracture on the left/medial squama of the frontal bone, a possible sling bullet wound on the lateral-posterior aspect of the left parietal (see below), and a possible wound on the left zygomatic process of the left maxilla. The most interesting wound, however, is the oval defect (39.66 x 28.36mm) on the left parietal near the posterior portion of the sagittal suture (Figure 7.34). The shape and characteristics of this defect suggest that it may be a case of trepanation performed to relieve pressure in the cranial cavity caused by head trauma. This potential trepanation has two incisions within it, the first being ca. 2mm more superficial than the second. The second, deeper incision spans the length of the perforation on the endocranial surface. The more superficial incision can only be clearly seen on the posterior portion on the ectocranial portion of the wound.

Table 7.33. Distribution of Cranial Trauma According to Age and Sex

Age	**Male**	**Female**	**Unknown**	**Total**
Young (18-30)	2	1	0	3
Middle (30-40)	3	2	0	5
Prime (40-50+)	1	0	0	1
Middle/Prime (30-50)	3	1	0	4
Unknown	1	1	5	7
Total	10	5	5	20

Table 7.34 Inventory of Cranial Trauma

Tomb	Bone	Sex	Age	Element	Location	Type	Healed?
85.I	31	?	Adult	Right Parietal	Superior, Medial	Small Depression Fracture	Yes
88.II	218	F	Young Adult	Cranium	Right Frontal Squama	Small Depression Fracture	Yes
88.II	92	F	Middle Adult	Vault	Left Supraorbital Margin	Depression Fracture	Yes
IV	72	M?	Young to Middle Adult	Vault	Right Parietal	Small Depression Fracture	Yes
VII	228	F?	Middle to Old Adult	Vault	Left Occipital, Superior Aspect, Adjacent to Lambdoidal Suture	Small Depression Fracture	Yes
VII	227	M?	Middle to Old Adult	Vault	Right Supraorbital Margin	Depression Fracture	Yes
X	29	F?	Young/ Middle Adult	Vault	Frontal Bone, Just Anterior to Bregma	Small Sharp Force	No
X	25	M?	Middle to Prime Adult	Vault	Right Mid-Lambdoidal Suture	Depression Fracture – Possible Sling Bullet	Yes
XVI	181	?	Adult	Vault	Posterior Left Parietal	Very Small Sharp Force	Yes

Table 7.34. Continued.

Tomb	Bone	Sex	Age	Element	Location	Type	Healed?
XVI	178	F?	Adult	Vault	Left Frontal Squama	Sharp Force	Yes
XVI	170	M	Young to Middle Adult	Cranium	Right Orbit; Obelion; Lambda; Frontal	Depression Fractures at First Three; Puncture on Frontal	Yes, Yes, Yes, No
XVI	173	M	Prime to Old Adult	Vault	Nasals	Fracture	Yes
XVI	180	M?	Adult	Frontal	Left Squama; Nasals	Sharp Force (Possible Sword); Fracture	No? Yes
XVI	435	M?	Young to Middle Adult	Vault	Left Parietal Squama	Small Depression Fracture	Yes
XXIV	175	M	Young Adult	Cranium	Left Occipital – Perpendicular to Nuchal Line; Left Parietal – at Pterion	Sharp Force Trauma Depression Fracture	Yes Yes
XXIV	176	M	Young to Middle Adult	Cranium	Frontal Squama; Posterior, Superior Left Parietal; Posterior, Inferior Left Parietal	Small Depression Fracture Sharp Force with Trepanation; Large Depression Fracture – Possible Sling Bullet	Yes, No, Yes

Figure 7.34. Continued.

Tomb	Bone	Sex	Age	Element	Location	Type	Healed?
XXVII	254	?	Adult	Frontal	Left Squama	Puncture Wound	No
XXVII	263	?	Adult	Left Parietal	Posterior, Superior Aspect – Between Sagittal and Lambdoidal Sutures	Depression Fracture – Possible Sling Bullet	Yes – in progress
XXVII	304	?	Adult	Left Zygomatic Arch	Anterior aspect at suture	Depression Fracture	Yes
XXVII	349	M	Middle/ Prime Adult	Vault	Left Parietal – Posterior, Inferior Aspect near Squamosal Suture	Depression Fracture – Possible Sling Bullet	Yes

There is slight evidence of healing around the edges of the ectocranial surface of the wound and there is no sign of a periosteal reaction on the endocranial surface of the bone.

The wound does not appear to have been caused by a blunt object as there is only one small fracture radiating from the hole on the left lateral side and no concentric fractures typical of blunt force trauma (Ortner 2003). There is marked beveling on the ectocranial surface of the wound (Figure 7.35) and a smaller degree of beveling on the endocranial surface (Figure 7.36). However, the beveling on the outer surface is likely the result of trepanation. It is unclear whether the two incisions around the defect are from the original wound or the result of the trepanning. It would be unusual for the incisions to have been caused by the trepanation since the most common methods of performing trepanation involve scraping the bone away layer by layer or using instruments to cut a circle or square around the concerned area (Lisowski 1967;



Figure 7.32. Individual with perimortem puncture wound, Tomb XVI (circled in blue)



Figure 7.33. Tomb XVI Individual, Left Frontal Squama, Anterior Aspect



Figure 7.34. Tomb XXIV potential trepanation, superior aspect, anterior aspect of the cranium to the right



Figure 7.35. Trepanation ectocranial surface, anterior to the right



Figure 7.36. Trepanation endocranial surface, anterior to the right.

Papagrigorakis et al. 2014).

I propose that the wound may have been caused by a sharp object, potentially an arrowhead, spearhead, or tip of a sword, given the shape of the wound and incision as well as its placement on the top of the head (Smith et al. 2007; Forsom and Smith 2017). The more superficial incision may have been caused in the process of removing the arrow and trepanning the wound with a chisel like object (Liston and Day 2009). Future research will provide a differential diagnosis of this wound and its potential causes as well as the technique used for trepanation.

One individual from Tomb XVI provides potential evidence for the use of a sword or dagger against him. A frontal bone (Bone 180) exhibits a shallow vertical cut mark oriented on a sagittal plane on the left squama (Figures 7.37-41). It consists of two portions, the longer one is more superior and exhibits a distinct incision and a shallow depression adjoining it laterally. The shorter one is located inferiorly by ca. 2.5 cm and just superior to the left supraorbital margin. It consists of a wider cut marker with shallow depressions around it. The depressions associated with each mark indicate that the top layer of ectocranial bone may have flaked off at the time of impact. There is no sign of porosity or active bone formation around either section of the cut mark indicating that there was no active infection around the wound at the time of death. The preservation of this particular bone is far better than most of the other elements from the tomb. Bone 180 was found in a pit in the dromos of Tomb XVI along with several other crania and long bones. No joins could be found between it and any other cranial fragments.

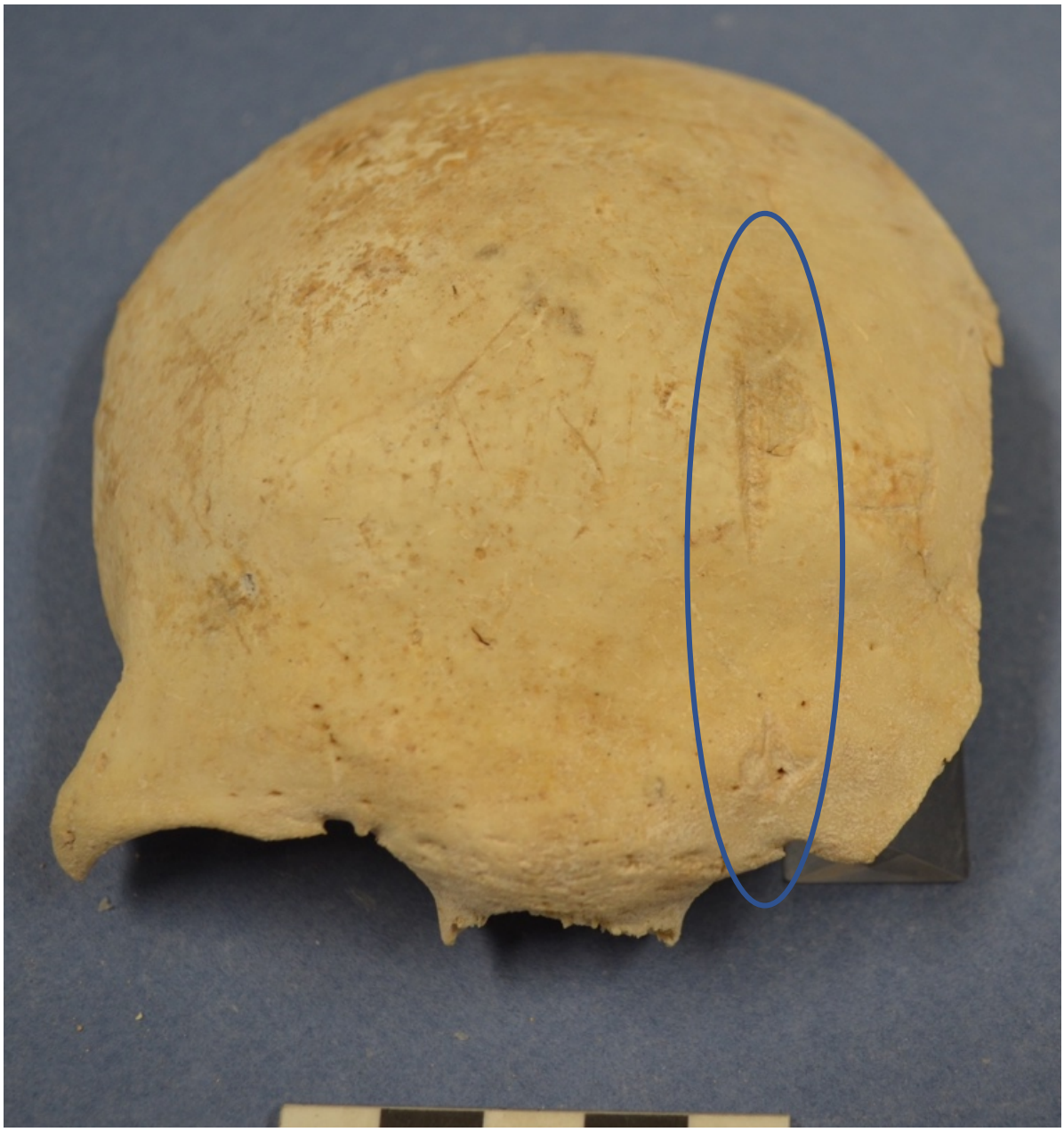


Figure 7.37. Tomb XVI, frontal bone with cut mark, anterior aspect (circled in blue). Scale in cm.



Figure 7.38. Tomb XVI, frontal bone with cut mark, superior segment

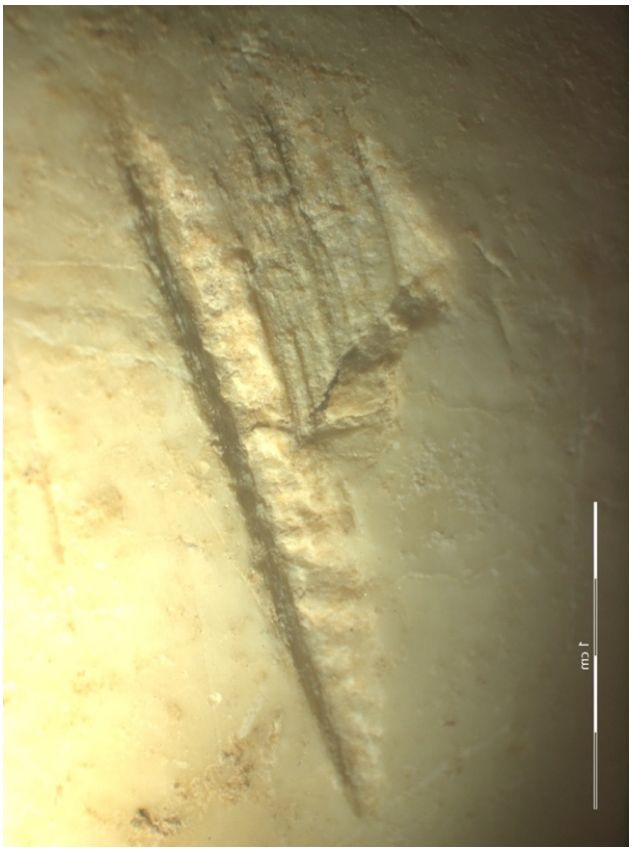


Figure 7.39. Tomb XVI, frontal bone with cut mark, superior segment magnified. Scale in cm.



Figure 7.40. Tomb XVI, frontal bone with cut mark, inferior segment



Figure 7.41. Tomb XVI, frontal bone with cut mark, inferior segment magnified

Finally, four crania exhibited a similar type of depression fracture that may indicate the instrument that caused it. In each case the wound is located on the parietal or temporal bone. The wound is healed in all cases, but the bone remodeling suggests that the wound was potentially caused by projectile. The four possible cases can be divided into two types. The first exhibits a "c" shaped impression located superior to the squamosal suture, posterior on the parietal bone. Vault 349 from Tomb XXVII has a healed, "c" shaped depression located just superior to the posterior squamosal suture on the left parietal (Figures 7.42-43) and there is notable remodeling on the endocranial surface as well. Cranium 176 from Tomb XXIV has a very similar "c" shaped healed depression in almost the same location as that on Vault 349 (Figures 7.44-45). It is slightly more superior to the squamosal suture on the left parietal. The second type is a shallower ovoid or diamond shaped impression. It is also located on the parietal, but closer to the lambdoidal and sagittal sutures. Tombs X (Figures 7.46-47) and XXVII (Figures 7.48-49) each have one example of this type. The depression in the individual from Tomb X is fully healed, but the depression from the individual in Tomb XXVII has evidence of on-going healing.

The individuals with these types of depressions are either male (n = 3) or of unknown sex (n = 1). The individuals with the first type of depression are both male individuals with ages estimated between 25 and 45 years old. Both individuals exhibit multiple cranial traumas. Vault 176 from Tomb XXIV is the individual with trepanation, which means he had survived the event that caused this particular wound long before succumbing to the wound that made the trepanation necessary. The individual from Tomb X with the second type of depression is also an adult male aged between 30 and 45. The final individual from Tomb XXVII is represented by a left parietal for which sex and age could not be estimated.



Figure 7.42. Tomb XXVII, cranium with potential sling bullet wound, posterior left parietal bone adjacent to squamosal suture (circled in blue). Scale in cm.



Figure 7.43. Tomb XXVII, potential sling bullet wound, magnified view, anterior aspect of cranium to left



Figure 7.44. Individual from Tomb XXIV with trepanation and potential sling bullet wound (circled in blue)



Figure 7.45. Individual from Tomb XXIV, close up of potential sling bullet wound



Figure 7.46. Individual from Tomb X with potential sling bullet wound. Scale in cm.



Figure 7.47. Individual from Tomb X, close up of potential sling bullet wound



Figure 7.48. Individual 2 from Tomb XXVII with potential sling bullet wound



Figure 7.49. Individual 2 from Tomb XXVII, close up of potential sling bullet wound

Other Notable Trauma

While this research focused primarily on cranial trauma, there was one incident of post-cranial trauma observed that deserves special mention. A right humerus from Tomb XVI exhibits trauma to the distal epiphysis (Figures 7.50), which impacted the bone in such a way that it would have limited the movement and functionality of the elbow joint. The injury likely involved both the distal humerus and the radial head based on the malformation of the capitulum (Figure 7.51-53). The trauma occurred when the individual was between the ages of 8 and 12 before the distal epiphysis had fully fused (Lovell 1997; Schaefer et al. 2009). The result of the injury was the enlargement of the distal epiphysis and the malformation of the capitulum and trochlea which would have limited the ability of the radius to pronate and supinate correctly as well as the ability to fully extend the forearm. Other than some porosity at the point of articulation between the radial head and malformed capitulum, there is no sign of infection at the joint. In addition to the enlargement of the epiphysis, there is evidence for degenerative joint disease in the form of lipping at the superior edges of the articular surfaces of the epiphysis, both posterior and anterior aspects. Furthermore, the bone enlargement caused by the trauma enveloped the coronoid, radial, and olecranon fossae, attesting to the limitation of movement at the joint. This bone was found among bones thrown from the chamber of the tomb by looters, which suggest it had previously been located inside the chamber (Diaries, unpublished).



Figure 7.50. Tomb XVI, malformed humerus, compared to normal humerus

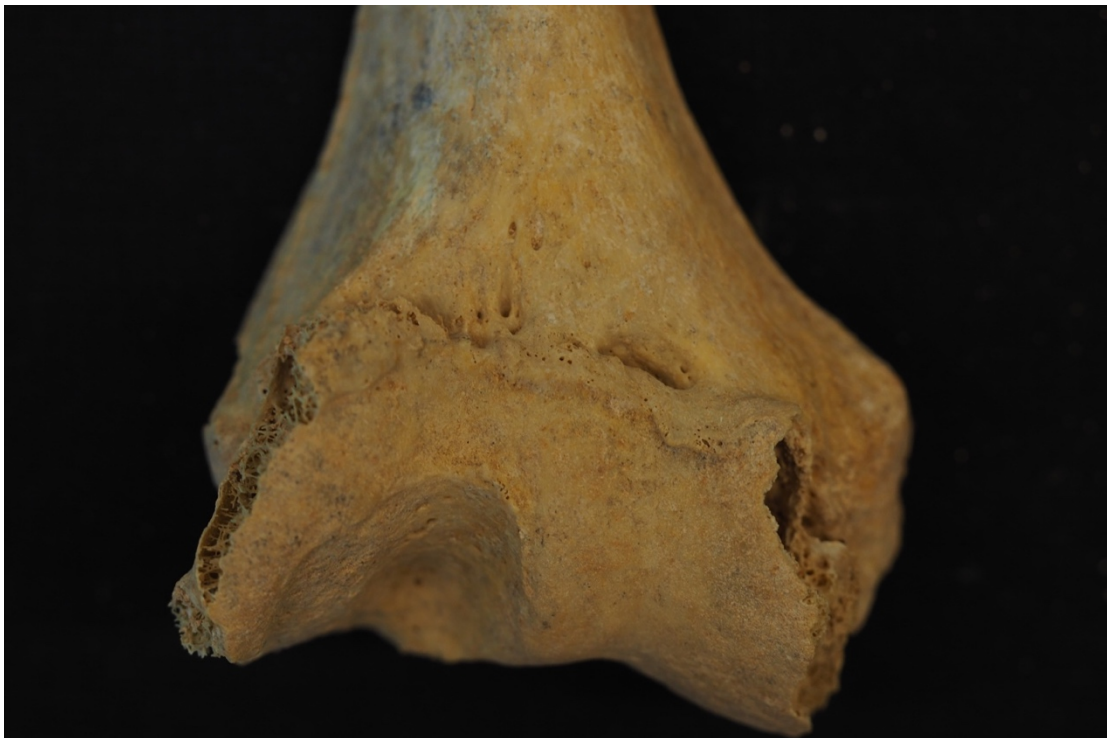


Figure 7.51. Tomb XVI, malformed humerus, close up anterior aspect



Figure 7.52. Tomb XVI, malformed humerus, close up distal aspect

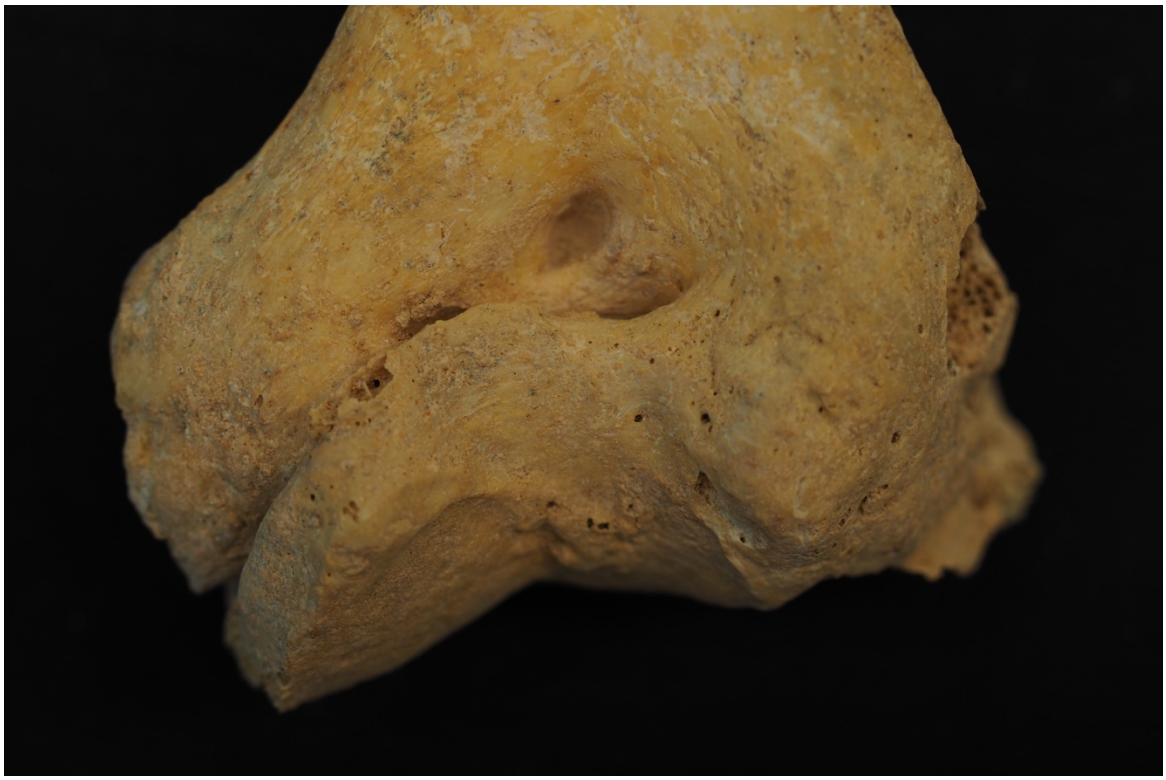


Figure 7.53. Tomb XVI, malformed humerus, close up posterior aspect

Chi-Square and Fisher's Exact Tests for Independence

To determine whether there are significant relationships between archaeological data and biological data from Golemi, chi square and Fisher's exact tests of independence were conducted. The variables were chosen based on their prevalence in the cemetery as well as their cultural and/or biological significance. Because seal stones are thought to potentially represent a connection to the palatial system as personal markers of identification and may therefore demonstrate a stronger access to palatial resources, I tested the relationship between seals and certain indicators of disease/stress as well as cranial trauma. The health markers I focused on are periostitis, LEH, AMTL, and caries (Tables 7.35-7.36). The data from the tombs are divided into two groups, those in tombs with seals and those in tombs without seals. Because the t-test demonstrated that the presence of seal stones was not affected by looting, all available data from the tombs were used. For both bone and dental traits, the fragment/tooth data were used to avoid miscalculating MNI. A result is considered significant if the p-value is less than or equal to 0.05; however, values greater than but close to 0.05 are also noted. For test that include cell values of less than 5, a Fisher's exact test was used instead of a chi square test as described in Chapter 6.

The results of the chi-square tests indicate that the presence of seals in tombs is significantly related to two health indicators: periostitis and AMTL. In both cases, tombs with no seal stones present have a higher proportion of fragments with periostitis and teeth lost antemortem thereby suggesting that the individuals in the two tomb groups had different health experiences during life. There was not a significant relationship between the presence of seals in a tomb and the presence of cranial trauma. For the second set of tests (Table 7.37-7.38), bronze was used to divide the tombs into two groups. Since looting did affect the distribution of bronze in the tombs (see above), only the non-looted tombs were used for this analysis.

Table 7.35. Seal Stones Presence vs. Periostitis, LEH and AMTL

Tomb Groups	Perio	No Perio	Total	%	LEH	No LEH	Total	%	AMTL	No AMTL	Total	%
No Seal Stone (n=16)	67	2183	2250	3%	98	538	636	15.4%	138	789	927	14.9%
Seal Stone (n=7)	7	706	713	1%	24	190	214	11.2%	33	286	319	10.3%
p-value	0.005				0.161				0.052			

Table 7.36. Seal Stones Presence vs. Caries and Cranial Trauma

Tomb Groups	Caries	No Caries	Total	%	Cranial Trauma	No Cranial Trauma	Total	%
No Seal Stone (n=16)	28	608	631	4%	18	88	106	17%
Seal Stone (n=7)	15	199	114	13.2%	2	35	37	5.4%
p-value	0.185				0.141			

Table 7.37. Bronze Presence vs. Periostitis, LEH, and AMTL

Tomb Group	Perio	No Perio	Total	%	LEH	No LEH	Total	%	AMTL	No AMTL	Total	%
No Bronze (n=5)	12	301	313	1.7%	13	82	95	13.7%	17	117	134	12.7%
Bronze (n=7)	23	1355	1378	3.8%	45	363	408	11%	86	480	566	15.2%
p-value	0.027				0.581				0.548			

Table 7.38. Bronze Presence vs. Caries and Cranial Trauma

Tomb Group	Caries	No Caries	Total	%	Cranial Trauma	No Cranial Trauma	Total	%
No Bronze (n=5)	5	90	95	5.2%	3	19	22	13.6%
Bronze (n=7)	22	408	430	5.1%	2	39	41	4.9%
p-value	1.000				0.333			

If the presence of bronze in a tomb is related to health status or cranial trauma in some way, there will be a significant relationship between the presence of bronze and one or more attribute. The results of the chi square tests indicate that bronze and periostitis are significantly related. However, contrary to the results from the seal stone chi square tests, the tombs with bronze indicate that there is a slightly higher prevalence of periostitis among the individuals of the tomb groups. The distributions of the other biological attributes do not seem to be correlated with the presence of bronze in a tomb. On the other hand, within the non-looted tombs, there is a noticeable difference between quantities of bronze in each tomb. As noted above, two tombs contain the most bronze in the cemetery, Tombs XIII and XIV, but the other four with bronze items have three or fewer. For this reason, the relationship between quantity of bronze and skeletal traits was examined. The remains from tombs with more than three bronze items were compared to those with three bronze items or less combined with those with no bronze items in the tomb (Table 7.39-7.40). The results indicate that when the quantity of bronze in the tomb is considered there is a significant relationship between bronze and two health indicators, periostitis and AMTL, as there was with seal stones.

Because it was possible to explore differences in oral indicators of health between the two sexes (see above), it was also possible to explore whether there are any significant relationships between social status (as represented by seal stones and bronze quantities) and oral health indicators within each sex. Fisher's Exact Test was used for all of these analyses because at least one cell contained a value of less than five for each comparison.

For female individuals (Table 7.41), the tests demonstrated that there was a significant relationship between presence of seal stones and caries as well as AMTL. The females in tombs with seal stones demonstrated higher amounts of caries than those without seal stones. For

AMTL, the percentages of occurrence indicate that the females in tombs with no seal stones exhibit a higher rate of AMTL. Because AMTL and Caries are related (Lukacs 1995), it would seem that those female individuals with more AMTL likely experienced more caries.

For male individuals (Table 7.42), there is a significant relationship between the presence of seal stones and AMTL as well as LEH. Those in tombs with no seal stones exhibit more AMTL and LEH than those in tombs with seal stones. Because there was a significant relationship found between quantity of bronze within tombs and certain health traits (see above), the tomb groups were divided into tombs with no or low amounts bronze and those with high amounts of bronze for the next analyses. Only one tomb was observable for the "high bronze" category, Tomb XIII, which means that the sample size was smaller. Fisher's Exact tests were used to test the relationship between bronze, seals, and sex among the tombs of Golemi.

For female individuals (Table 7.43), there appears to be a significant difference between bronze quantity, LEH, and Caries. Like with the seal stones, females in tombs with high bronze exhibit more caries than those in tombs with low or no bronze. Again, the relationship between bronze quantity and AMTL is almost significant, which suggests that no/low bronze tomb individuals may have experienced more caries than those in high bronze tombs but the teeth were lost before death. The relationship between LEH and bronze quantity suggests that females from tombs with no/low bronze experienced relatively more disease and stress than those in high bronze tombs. However, the low sample sizes of the high bronze tombs may be skewing the results of this analysis. Finally, the Fisher's exact tests indicate that there is no significant relationship between bronze quantity and LEH, AMTL, or caries among male individuals (Table 7.44). As with the tests for the female individuals, the results of these tests must be treated cautiously given the low cell values in all three tests.

Table 7.39. Bronze Quantity vs. Periostitis, LEH, and AMTL

Tomb Group	Perio	No Perio	Total	%	LEH	No LEH	Total	%	AMTL	No AMTL	Total	%
No or Low Bronze (n=10)	32	1132	1164	2.7%	44	311	355	12.4%	85	431	516	16.5%
High Bronze (n=2)	3	524	527	0.7%	40	301	341	11.7%	18	166	184	9.9%
p-value	0.003				0.879				0.038			

Table 7.40. Bronze Quantity vs. Caries and Cranial Trauma

Tomb Group	Caries	No Caries	Total	%	Cranial Trauma	No Cranial Trauma	Total	%
No or Low Bronze (n=10)	15	340	355	4.2%	5	43	48	10.4%
High Bronze (n=2)	12	136	148	8.1%	0	15	15	0%
p-value	0.123				0.326			

Table 7.41. Female Individuals and Seal Stones vs. LEH, Caries, and AMTL

Tomb Group	LEH	No LEH	Total	%	AMTL	No AMTL	Total	%	Caries	No Caries	Total	%
No Seal Stone (n=16)	31	130	161	19.3%	35	251	286	12.2%	7	154	161	4.3%
Seal Stone (n=3)	4	38	42	9.5%	2	58	60	3.3%	6	36	42	14.3%
p-value	0.172				0.040				0.047			

Table 7.42. Male Individuals and Seal Stones vs. LEH, Caries, and AMTL

Tomb Group	LEH	No LEH	Total	%	AMTL	No AMTL	Total	%	Caries	No Caries	Total	%
No Seal Stone (n=16)	39	123	162	24.1%	26	182	208	12.5%	8	154	162	4.9%
Seal Stone (n=3)	1	21	22	4.5%	1	51	52	1.9%	3	19	22	13.6%
p-value	0.050				0.022				0.130			

Table 7.43. Female Individuals and Bronze Quantities vs. LEH, Caries, and AMTL

Tomb Group	LEH	No LEH	Total	%	AMTL	No AMTL	Total	%	Caries	No Caries	Total	%
No or Low Bronze (n=7)	25	81	106	23.6	27	137	164	16.5%	3	83	86	3.5%
High Bronze (n=1)	0	25	25	0%	1	31	32	3.1%	6	19	31	31.6%
p-value	0.004				0.054				0.004			

Table 7.44. Male Individuals and Bronze Quantities vs. LEH, Caries, and AMTL

Tomb Group	LEH	No LEH	Total	%	AMTL	No AMTL	Total	%	Caries	No Caries	Total	%
No or Low Bronze (n=7)	7	73	80	8.8%	11	106	117	9.4%	5	75	80	6.3%
Bronze (n=1)	1	5	6	16.7%	0	8	8	0%	1	5	6	16.7%
p-value	0.454				1.000				0.361			

Chapter Summary

In this chapter, I have reported the results of both archaeological and osteological analyses. The archaeological results illustrate that there is a wide degree of variation between the tombs in terms of tomb architecture as well as the quantities and qualities of the various grave goods between the tombs of the Golemi cemetery. The osteological analyses revealed a similar depiction as some tombs revealed higher rates of certain traits than observed for the cemetery as a whole as shown through hierarchical Bayesian analysis. Chi square tests demonstrated that there are significant relationships between certain oral indicators of health and adult demography. The results of both the non-metric traits and the activity markers (entheseal changes and degenerative joint disease) were not conclusive and require further analyses. However, an examination of the cranial trauma revealed interesting patterns of trauma in a moderate proportion of the observable crania. All together these results indicate a variable

expression of Mycenaean cultural identity among the individuals of the RCCT cemetery at Golemi Agios Georgios.

CHAPTER 8: DISCUSSION

Introduction

The objective of this dissertation was to determine the extent to which the individuals of Golemi Agios Georgios archaeologically and biologically embodied Mycenaean cultural identity. As part of my approach to addressing the primary objective of this research, it is necessary to first consider the extent to which individuals interred in the cemetery at Golemi Agios Georgios can be considered a social group (MacSweeney 2009; 2014). Establishing "group-ness" is a necessary first step in assessing the expression of cultural identity. If a shared identity can be established, the diversity in archaeological and biological attributes observed within the group illustrates a range of expression of cultural identity that is derived from a shared source and sense of commonality.

Having discussed the "groupness" of Golemi, I investigate how the archaeological and biological attributes coincide with and/or diverge from the Mycenaean cultural identity defined in Chapter 4. This discussion will be guided by the questions posed in Chapter 1 to address the main objectives of this research. These are related to the specific demography, health, and activity statuses correlated to Mycenaean cultural identity in Chapter 4.6. The interpretation of these results is based in an intersectional embodiment framework (see Chapter 2). For each category of analysis, the overall pattern of the traits is discussed within their categories in relation to the questions. An osteobiographical approach is taken when discussing specific tombs in the cemetery as a way to identify tombs that stand out from others and how they illustrate the embodied diversity of Mycenaean cultural identity.

The last element of this discussion is concerned with the potential relationships between archaeological and biological aspects of Mycenaean cultural identity. Potential patterns of spatial

organization are also considered using both archaeological and biological data, which are interpreted as reflecting the networked nature of Mycenaean society. Finally, the significance of these analyses is discussed with respect to how Golemi fits into the broader regional and cultural context of Late Bronze Age Greece.

The Group-ness of Golemi Agios Georgios

Prepalatial Period

The first question that must be addressed when considering group identity in an archaeological context is whether or not there is a sense of group-ness or commonality within the site (Brubaker and Cooper 2000; MacSweeney 2009). The rock cut chamber tomb cemetery at Golemi Agios Georgios represents both a statement of individuality and a claim to community. The initial tombs of the cemetery (85.II, XV, XXIV) were established in LH II (see Chapters 5 and 7), while the remaining 28 tombs do not appear to have been established until LH IIIA or later, meaning that there was a period of about 50 to 100 years that these three tombs were the only tombs in the cemetery. Based on this, it could be argued that those who established the first tombs were not interested in creating an inclusive community of individuals in death as they specifically chose to establish tombs in a previously unoccupied area. As discussed in Chapter 5, it is possible that the first tombs of Golemi were established by non-local individuals or by local elites emulating the wealthy individuals interred in the tombs near Kalapodi at Kokkalia. Whatever the case may be, the original tomb founders were potentially making a statement of individuality by being the first. The Prepalatial period was a time when individuals were attempting to rise above the masses, most archaeologically visible in burial contexts. The RCCT, which spread in the LH II phase from the Peloponnese to central Greece, was one of the ways in

which elites attempted stand out (See Chapters 4 and 5; Wright 1995; 2004; Voutsaki 1995; 1998; Van de Moortel 2016).

Although the first tomb builders of Golemi were claiming an individuality of sorts, they also chose to use a burial type that was connected to a larger socio-cultural group identity being formed at the time, Mycenaean cultural identity. The rock cut chamber tomb was one of the earliest major cultural identifiers of the Mycenaeans (Cavanagh and Mee 1998; Phialon 2011; Tsountas and Manatt 1897) as other identifiers had not yet been established (i.e., fortified citadels, Cyclopean masonry, Linear B). By adopting the RCCT at Golemi, the individuals who made the tombs are claiming at least some affinity with the developing Mycenaean culture of the Prepalatial period. This was also occurring in close proximity to the establishment of two other RCCT cemeteries in the area at Zeli Agios Georgios and Kalapodi-Kokkalia in the LH IIB phase. The timing and proximity of the sites suggest a relationship between the cemeteries (Dimaki 2013).

Within the cemetery of Golemi, Tombs 85.II, XV, XXIV are located within a few meters of one another (See Map 6.1), which suggests some sense of community with one another, albeit an exclusive one. Most RCCTs generally have multiple individuals in them, which implies a sense of group-ness at least within the tomb (Boyd 2016), but the number of individuals can vary widely. Of the three potential Prepalatial tombs, two (85.II and XV) have relatively few individuals, two and four individuals, respectively, but one tomb (XXIV) has a contextualized MNI of 13. Unfortunately, the pottery from these tombs has not been studied, but based on the higher number of individuals in Tomb XXIV, it is possible that it was used for a longer period of time than the other two were, but because the tomb was thoroughly looted (Dakoronia 1996); more radiocarbon dating is needed to establish a range of tomb use. The limited number of

individuals in Tombs 85.II and XV may suggest greater exclusivity over a longer period of time or the complete removal of earlier burials in phases of use after the Prepalatial period. For example, one individual from Tomb XV was radiocarbon dated to LH IIIB-C, but the inclusion of an LH IIB vessel suggests an early date for the tomb, thereby indicating a long period of use for the tomb. Alternatively, the vessel may have been an heirloom item buried at a much later date. Given the uncertainty around the time of use for all three tombs, it is not prudent to speculate about which grave goods may have accompanied the individuals and the significance of such goods.

The rise of the elites and their separation from the rest of their society through burial was part of establishing the cultural norms of the Mycenaeans (Voutsaki 1995; 1998; 2001; Wright 2004; 2008; Van de Moortel 2016). In this way, the non-palatial site of Golemi was emulating these cultural norms through the establishment of an RCCT cemetery and thus claiming some connection or affinity with Mycenaean cultural identity. The inclusion of multiple individuals in each tomb illustrates a sense of groupness within each tomb as does the generally close proximity of the tombs to one another. However, the separation of individuals within separate tombs underlines the individuality of each group, emphasizing their difference from one another.

Palatial and Post-Palatial Periods

While the cemetery of Golemi was established by a few enterprising individuals, the growth to a cemetery of several tombs in the Palatial period (ca. 1400-1200 BCE) indicates that a sense of commonality was established among the individuals who chose to bury their dead there. There are several potential reasons that the mortuary community of Golemi could be considered a social group. The first is that the use of the rock cut chamber tomb means that the individuals who built and interred their dead in the tombs claimed at least a basic connection to Mycenaean

cultural identity. Therefore, on the most superficial level, the burial of individuals in RCCTs in the same cemetery represents a claim to group-ness. Another reason may be a desired association with the individuals who established the first three tombs, thereby indicating some level of connected-ness or sense of commonality with the early inhabitants of the cemetery. The relationship between the early inhabitants and the founders of the later tombs in unknown at this point, but the decision to bury their dead nearby suggests either a real or desired relationship between the two groups. The possibility of a kinship relationship will be explored below.

Other factors that indicate that the individuals of Golemi shared at least some basic sense of commonality other than location and use of the RCCT are the structure and contents of the tombs. For the most part, the tombs all share the basic structure: a dromos, stomion, and chamber. The dromoi and chambers vary in size and shape to some extent, which indicates some diversity in construction methods, but the tombs all face the same direction with the opening of the dromos in the north and the chamber to the south. This orientation appears to have been dictated by the contours of the hill more than anything else, which is consistent with the structure of other RCCT cemeteries (Smith et al. 2017; Blegen 1936; Wace 1932). The grave goods from the tombs of Golemi vary considerable in quantity and quality, but the types of goods offered are consistent with those found in other Mycenaean RCCTs. The inclusion of seal stones in seven of the 23 tombs as well as imported materials (bronze, gold, silver, and amber) in 12 tombs indicates that at least one individual from these tombs likely had a connection to the palatial socioeconomic system. The overall use of the same types of architecture and grave goods among the tombs of Golemi indicate that on a material level, the individuals of the Golemi cemetery shared some sense of group identity in the Palatial period. Because Epiknemidian Lokris seems to have been a contested area during this time, the Dipotamos Valley may have represented the

border of the palatial territory of Orchomenos thereby putting Golemi in a more liminal position and reinforcing a sense of group-ness in the community (Barth 1969).

It is difficult to determine the degree of solidarity within the cemetery in the Post-Palatial period because it is unclear how many tombs were in use at the time (LH IIIC). However, because at least some individuals were still using the tombs in LH IIIC, there appears to have been some sense of commonality carried into this period at Golemi. From this broad analysis of the primarily archaeological features of the Golemi cemetery, it is possible to infer that the cemetery represents a social group that shares at least some parts of the Mycenaean cultural identity.

The Biocultural Expression of Mycenean Cultural Identity at Golemi Agios Georgios

The biological correlates for Mycenaean cultural identity were identified and discussed in Chapter 4.6. To address the primary objective of this dissertation, separate hypotheses were developed for each biological category to determine the extent to which the individuals at Golemi bioculturally expressed and reflected Mycenaean cultural identity. The results of the osteological analyses are used to address each question that was discussed in conjunction with the archaeological context of the cemetery. Because identity is intersectional, the components of "Mycenaean-ness" are not mutually exclusive nor are their biological correlates. Their inter-relatedness provides evidence for the interactions between the body-self and body-politic (Scheper-Hughes and Locke 1987; Martin et al. 2103). The basic biological features of the body such as age and sex are fundamental aspects of how cultural identity is manifested (See Chapters 2 and 3). The following discussion is broken into biological categories, but the interactions between the various categories becomes clear as the results of each are discussed.

Paleodemography

Adult Demography and Morality

The demography of an RCCT cemetery provides important information about who was permitted to be buried in an RCCT. There were three primary guiding questions associated with the demography of Golemi Agios Georgios. The first questioned whether males would be more prevalent than female individuals, thereby supporting the perceived importance of male dominance in Mycenaean cultural identity. The results of the osteological analysis indicated that males and females are represented in almost equal numbers both in the cemetery as a whole and in individual tombs, regardless of the method of sex estimation. This finding concurs with those of Triantaphyllou (2017) at Agia Sotira, Iezzi (2005) in East Lokris and northeast Phokis, and Papathanasiou et al. (2012) and Schepartz et al. (2009) at Pylos; thus, providing further evidence against the pervasive claim that males are more prevalent in RCCT cemeteries (Cavanagh 2008).

The second question queried whether the cemetery would contain more adult individuals in the Young and Middle adult age categories than in the Prime and Old adult categories. The demographic profile estimated for Golemi suggests that this is the case. When considering male, female, and individuals of unknown sex, the Young and Middle age individuals outnumber those in the Prime and Old categories (ca. 81:36). The greater prevalence of Young and Middle age individuals does not coincide with the normal distribution of ages in a mortuary sample (Chamberlain 2006), in which infants and old individuals make up the majority of the deceased population.

Another pattern observed in the demographic profile is that male individuals do not appear to have lived as long as female individuals on average. Of the individuals in the Old category, none could be positively identified as male individuals while six of the eight appear to

be female or probable female individuals. The results of the hazards analysis illustrated that the females experienced a much steadier reduction in survivability over the course of 60+ years than male individuals did. The survivorship curves show that males and females had similar survivorships from 18-30, but from the ages of 30 to 60+, males had a much lower probability of survival than female individuals. There is a notable difference between the mean ages at death as well since females lived to an average of 41.3 years old, but males lived to an average of 35.2 years old. It is possible that fewer males survived to older ages as a combination of genetic, physiological, and behavioral factors.

The almost one to one ratio of males to females at Golemi suggests that females were not prevented from being buried in RCCTs. Instead, they either attained a similar status to the male individuals of the tomb or were ascribed status through their relationship with the male individuals of the tomb. The increased survivorship of females compared to males between the ages of ca. 30 to 60+ suggest a few possibilities. The first is that male individuals engaged in riskier behavior than females did after the age of 30. There are a number of occupations in the Bronze Age that may have made men more susceptible to accidental death than female individuals such as that of a soldier, farmer, herder, or rower--although it is certainly possible that female individuals also engaged in farming and herding in addition to the more domestic related tasks. Another possibility is that males were less healthy than female individuals, on average, in the later years of their lives. This proposition is not well supported by clinical studies which suggest that while female individuals live longer than males in most populations, female individuals are less healthy over the course of their lives (Adler and Stewart 2010; Seifarth et al. 2012; Austad and Fischer 2016). For this reason, the lower survivability of males does not

necessarily reflect poorer health, though it may indicate that behavior may be at least partly responsible for earlier deaths in males than in females on average after the age of 30.

The equal survivability between males and females between the ages of 18 and 30 suggest that they faced similar levels of mortality risk at those ages, but these risks may have been different based on sex. As already proposed, young males may have had encountered risk of death associated with interpersonal violence. Young females, on the other hand, may have died as a result of childbirth as 18-30 would have been prime childbearing years. However, it appears that if a female individual survived this period of her life, her survivability was much greater than that of a male individual in her age cohort. The presence of at least six old female individuals suggests that age nor sex was a limiting factor for burial in an RCCT. Furthermore, when the archaeological data are considered in conjunction with the age data, it appears that in tombs containing Old female individuals, stirrup jars are also present. Only one tomb (V) containing an Old individual does not contain a stirrup jar. Stirrup jars are associated with perfume, which was a palatially controlled industry (Killen 2001; Nakassis 2013). The association of stirrup jars with old female individuals may indicate a sign of wealth, respect, and familial connection to the palatial system. However, this correlation is weak and proposal speculative as a result of the commingled nature of the tombs as well as the fact that the pottery from these tombs has not yet been studied.

Juvenile Demography and Treatment

Another aspect of the cemetery demography is the degree of juvenile representation. Juvenile individuals make up approximately 20% of the total number of individuals at Golemi (n=258). As described in Chapter 7, juvenile individuals should be around 50% of an archaeological mortuary sample (Chamberlain 2006). While the demography of Golemi supports

the idea that not all juveniles were included in RCCTs (Lebegyev 2009), the age groups represented in the Golemi sample indicate that age was not necessarily the deciding factor for inclusion or exclusion.

Of the 52 juvenile individuals at Golemi, 17 individuals were estimated to be two years old or younger, including a fetus (ca. 30-32 weeks) and a perinate (< 6 months), making up the largest juvenile group (ca. 33%) of the sample. Those less than 6 years old represent over 50% of the juvenile sample. These data contradict the idea that those under the age of two were generally not included in monumental tombs such as RCCTs (Lebegyev 2009). The data from Golemi indicates that not only is this not the case, but also that those under the age of two make up the largest juvenile demographic in the cemetery and were included in 12 of 15 tombs that contained juvenile remains. The inclusion of young juveniles from a broad range of ages in the majority of the Golemi tombs supports the idea that age was not necessarily a factor when deciding which juveniles to include in RCCTs. However, the low numbers of juveniles in the cemetery as a whole does indicate that only some juveniles were ascribed the status necessary to achieve burial in an RCCT. This trend was first noticed by Cavanagh and Mee (1998) in their landmark study of Bronze Age burial practices in Greece. The fact that Golemi appears to adhere to similar mortuary practices with respect to juveniles indicates an affinity with overarching Mycenaean ideology.

One unusual case indicates that at least some juveniles at Golemi received special treatment in addition to the honor of being buried in an RCCT. Tomb 88.I contains exactly a quarter (n=13) of the juveniles observed at Golemi and nearly half of the individuals represented in the tomb (n=27). Hierarchical Bayesian analysis indicates that the probability for the distribution of juveniles in Tomb 88.I exceeds the average probability of juvenile distribution for

the cemetery (See Chapter 7). Coincidentally, the number of beads (>200) in Tomb 88.I far exceeds the number of beads found in any other tomb at Golemi. The tomb with the second highest number of juvenile individuals (n=7) contained the second highest number of beads (ca. 80). However, no other tomb contains more than 15 beads, even those including juveniles. As discussed in Chapter 4.6, small beads in high quantities have been specifically associated with juvenile skeletal remains and may have been used as a way to honor or express status of such juveniles (Smith and Dabney 2012). The numerous beads provided in the tombs with the most juvenile individuals indicates that the beads are associated with the juveniles rather than the adults, and likely have special meaning. However, the paucity of beads in other tombs with juvenile individuals suggest that the practices of including beads with juveniles was not a universal custom at Golemi. In fact, in some cases juveniles are included in tombs that exhibit almost no grave goods, such as Tomb IV. The differential inclusion of juveniles in tombs alongside the variability in the inclusion of small beads suggests that the decision to include a juvenile individual in a tomb was not based on wealth or status, but potentially on personal preference. The individuality of this choice for each tomb may also provide evidence for the idea that the responsibility for the tomb and its contents was dependent on the head of the family or social group represented by the tomb (Wright 2008a).

As niches in RCCT dromoi are often interpreted as burials for juveniles (Smith and Dabney 2012; Cavanagh and Mee 1998; Blegen 1936; Wace 1932), I would like to point out that the use of niches does not necessarily indicate that a juvenile was interred therein. Tomb 88.II was the only tomb to have a niche in the wall of the dromos and the contents of the niche included a relatively large amount of adult skeletal remains (105 fragments) and only two juvenile fragments. While the burial of adult individuals in a niche is not uncommon elsewhere, I

would caution excavators from assuming that niches were used for juvenile individuals in cases in which bones are not found.

To sum up, it appears that the Golemi tombs were not male dominated in that there were not more males represented than female individuals. Males and females appear to have had similar rates of survivability in early adulthood, but males had notably worse survivability after the age of 25-30. The inclusion of juveniles in Golemi tombs appears to be highly variable, but age was not an exclusionary factor when considering only the juvenile data. Furthermore, the treatment of juveniles in death was also variable indicating that the decision to provide special items such as small beads was dependent on the custodians of each tomb. Small samples sizes and the commingling of the bones in each tomb hinder the accuracy of these analyses, especially the hazards analyses, so these conclusions should be viewed cautiously.

Health and Social Status

Because non-specific indicators of disease are correlated with social status (see Chapter 3), such indicators were used in conjunction with the archaeological features of the tombs at Golemi to explore health and social status representation in the cemetery. In this dissertation, "health" is represented by non-specific indicators of disease and stress, which reflect only a limited part of the overall concept of health as defined by the World Health Organization (Wilson 2014) and discussed in Chapter 3. As the Osteological Paradox pointed out, more lesions do not necessarily mean worse health and may even mean better health, or at least, better survivability. Here, I discuss how the frequencies of the skeletal indicators of stress and disease may be interpreted to reflect better or worse health keeping both the archaeological and osteological (age and sex) contexts in mind.

Analyses of non-specific indicators of stress/disease as the representation of health status at Golemi revealed that the sample had relatively few lesions with some exceptions in certain tombs and individuals. The total adult population had a mean age of death of 37.6 years old, which indicates that most adult individuals lived long enough to embody a wide range of lived experiences that impacted their health status. The skeletal sample from Golemi exhibits generally low rates of periostitis and porotic lesions of the skull (< 20%) indicating that systemic infectious disease was not prevalent in the cemetery or, if it was, it killed before leaving many observable lesions in the skeleton (Wood et al. 1992).

The Golemi individuals exhibit a moderate level of cribra orbitalia, linear enamel hypoplasias, antemortem tooth loss, and caries (>20%) when considering the MNI data. The tooth data indicates lower rates of the oral indicators of health. The rates of LEH, AMTL, and caries are comparable to the rates found among individuals interred in RCCTs at Pylos by Schepartz et al. (2009). It seems that the tombs at Pylos were somewhat wealthier and of higher status than the tombs of Golemi as most contained bronze including swords and other weaponry (Cavanagh and Mee 1998; Schepartz et al. 2009). Despite this difference in wealth and potentially status, the similarities in overall level of oral indicators of health between the samples from Golemi and Pylos suggests that they had access to similar types and quantities of subsistence resources even if they did not have the same access to material resources.

Although bronze was moderately represented at Golemi, it did not appear in all tombs (11 of 23) and even in those in which it was present, the distribution is fairly uneven (See Chapter 7). This suggests that bronze may have been a way for tomb groups to distinguished themselves from other tomb groups in the cemetery. As discussed in Chapter 4, it may have been the duty of each subsequent male leader of a familial unit to add to the wealth and status of the family tomb

with each burial. The presence of more bronze items may suggest an intergenerational access to wealth and other resources; it may also indicate a relationship to the palace (chapter 4). However, an assessment of the cMNI of the tombs at Golemi indicates that number of individuals per tomb is not correlated with the quantity of bronze in that tomb as the non-looted tombs with the most bronze demonstrate (XIII: 31 individuals; XIV: 3 individuals). Furthermore, chi square tests revealed that when the tombs are divided into groups based on the presence or absence of bronze, bronze does not appear to be significantly associated with most indicators of stress and disease. The exception is that tombs with bronze appear to have more fragments of bone with periostitis. This finding is somewhat unexpected as one would assume that access to bronze meant that such individuals were of higher status and had better access to nutritional resources and would thus exhibit fewer signs of infectious disease, not more. Conversely, the increased rate of periostitis may actually be a sign of better health indicating that such individuals survived more incidences of disease than those in tombs without bronze. This interpretation is supported by the demography of the tombs with bronze which hold all of the Old Adult (n=8) individuals as well as 14 of the 16 Prime Adult (40-50) individuals. Ideally, I would compare the relative ages of individuals with periostitis to those without but given the inability to associate sex and age with most of the elements with periostitis, this was not possible.

When the groups are rearranged to reflect tombs with high versus low/no amounts of bronze, there is a significant relationship between bronze distribution and two indicators of health. In tombs with more bronze (>15 pieces) there is less periostitis and AMTL. These results appear to indicate that the amount of bronze in a tomb is a better reflection of access to resources than the presence or absence of bronze. I propose that individuals with smaller amounts of bronze and more periostitis and AMTL may represent individuals/groups who only had a

moderate or limited connection to the palatial system or received the bronze items from individuals who had a stronger relationship with the palatial system (cf. Nakassis 2013; Voutsaki 2010b). In this way, certain members of the community became "clients" of the "patron(s)" who had a deeper connection to the palatial socio-economic system (Wright 2008a; Mee and Cavanagh 1990).

A significant association between the presence of seal stones and frequencies of periostitis and AMTL was also found but it is not dependent on number of seal stones represented in each tomb. Seal stones imply an administrative or trade related connection to the palatial system as discussed in Chapter 4 (Historical Overview) because they were likely identifiers important to doing business within the palatial socio-economic system (Eder 2007; Eder and Jung 2015). The presence of seal stones does not seem to be associated with the presence of bronze or with high quantities of other types of grave goods. For example, Tomb V had the most seal stones (n=3), including one made of precious rock crystal, but it is relatively poor in other ways (no bronze, no amber, very little pottery, etc.), even though it had not been looted. However, the significant relationship between seal stones and reduced periostitis and antemortem tooth loss at Golemi suggests that the individuals involved with the palatial system through trade or another type of contract may have enjoyed better access to better nutritional resources consisting of fewer cariogenic foods.

If individuals in tombs with seal stones enjoyed fewer incidents of disease and stress as a result of greater accessibility to resources through a connection to the palatial system, why does there appear to be no association between seal stones and bronze goods? It is possible that individuals who traded with the palace or with subsidiaries of the palace did not necessarily have high status therefore explaining the lack of association between seal stones and bronze items;

though, those individuals with seals made of glass or rock crystal, higher quality materials, may have claimed higher status (Tombs V and XIII). Eder (2007) posited that the soft stone seals, including steatite seals, which were most common in the Palatial period may have served as symbols of administrative authority for local illiterate individuals as a way to mark membership in a specific group permitted to participate in certain transactions or procedures. I propose that these procedures, transactions, or tasks may not have required an individual to be of elite status, although it does suggest that one or more individuals in the tomb may have had an important connection to the palaces. Middle class individuals may have also been able to participate and therefore access better food resources if not higher status material resources through this palatial connection, which may explain their relatively lower rates of infection and tooth loss.

Sex, Age, and Dental Traits

Because it was possible to roughly estimate sex and/or age from the mandibles of some individuals, it is possible to discuss how the health and social statuses of male and female individuals compare based on dental traits. The results of the chi square tests indicate that age was significantly related to antemortem tooth loss (AMTL). The older adults exhibited proportionally more AMTL than younger adult individuals. This is not unexpected as older individuals had more time to develop caries, wear teeth down, and experience oral injuries. To better understand the patterns illustrated through antemortem tooth loss and other dental indicators it is necessary to also consider sex.

Overall, the only significant difference between males and females appears to be related to juvenile stress and disease as represented through the occurrence of LEH. The phenomenon does not appear to be related to social status as a chi square test demonstrated no significant relationship between LEH and bronze quantity among male individuals. As discussed in Chapter

3, LEH in adult individuals represents periods of stress or disease during the growth of permanent dentition which occurs throughout the juvenile years. The greater prevalence of LEH in young male individuals at Golemi suggests that they were experiencing greater levels of stress and disease during development.

There are several potential non-mutually exclusive explanations for this occurrence. The first is related to differences in physiology and immunological responses between males and females. Several studies have indicated that the males are more susceptible to certain kinds of infectious disease, especially during juvenile development, which may be reflected through LEH (DeWitte 2009; 2010; Zhou and Coruccini 1998). Another possible reason for greater LEH in males is that the males of this particular community and potentially gene pool were particularly frail, therefore compounding the inherent male biological susceptibility to disease and resulting in more disease and stress during development. These two explanations could both be true but given the lack of information about the genetic makeup of the population, it is not possible to confirm or reject either explanation. However, females do not always have less LEH than male individuals (Griffin and Donlon 2009; King et al. 2005) and thus significant differences between the rates of LEH between the sexes may demonstrate differences in access to nutritional resources and relatively levels of stress. It is unclear what cultural conditions of Mycenaean society would have driven this treatment, especially since it seems that male individuals, even juveniles, were highly valued in Mycenaean society (cf. Grave Circle A – burial of an apparently male child with gold and high-status items; Dickinson 1977). It does, however, suggest that juveniles of different sexes were treated differently in some ways from a very young age. This, if true, provides evidence for determining the age at which gender was officially recognized in Mycenaean society, which has been a question pondered by those interested in the study of

cultural phenomena related to Mycenaean and Aegean juvenile growth and development (Rutter 2003; Lebegyev 2009; Muskett 2009). If juveniles were being treated differently based on sex from such a young age, it means that those at Golemi, at least unofficially, recognized gender to some extent at that point.

The early lived experiences of these young juvenile males appear to have had a direct impact on their later adult health. Evidence from the mortality profile supports this hypothesis as it is these males who died at young ages. Because there is a significant association between early life stress represented by LEH and mortality (Armelagos et al. 2009; DeWitte 2009; Boldsen 2007), it is possible that the increased exposure to disease and/or stress during development is associated with the increased adult male mortality at Golemi. Of course, another potential explanation for earlier deaths of male individuals is interpersonal violence, which will be discussed further in a later section.

With respect to the indicators of oral health, there were no other "significant" relationships between the occurrence of the traits and sex, but there were some notable trends. Older females exhibit the most AMTL overall and because AMTL is frequently caused by caries, the higher prevalence of AMTL in older females suggests a higher prevalence of caries earlier in life. This is supported by the presence of more young females with caries than young male individuals. Such results coincide with more recent research that indicates that women in general and, more specifically, women of child-bearing age are more susceptible to caries as a result of various sex hormones, pregnancy, genetic factors, and other unknown causes (Ferraro and Viera 2013; See Chapter 3). There may also be social reasons for differences in prevalence between the sexes related to diet. Given the differences observed between male and female AMTL and caries prevalence it is possible that male and female individuals may have had access to different food

resources. Female individuals may have relied more heavily on cariogenic food sources such as grains and male individuals more on less cariogenic food sources such as animal proteins (Cucina and Tiesler 2003).

Status appears to be the driving force behind oral health differences between males and females as demonstrated by chi square and Fisher's exact tests. If status is assumed to be associated with the amount of bronze in a tomb, there are no significant differences in antemortem tooth loss and caries frequencies between male and female individuals of the same status. Similarly, if access to subsistence resources was related to the presence of seal stones in tombs, it seems that male and female individuals in tombs with seal stones experienced similar levels of oral health markers and the same is true for those in tombs without seal stones. Such results indicate that males and females enjoyed a similar type of diet at their respective social status levels. Therefore, the different rates of AMTL and caries in males versus females are reflecting status differences more than sex differences.

When delving deeper into status differences within the same sex, it appears that female individuals in tombs with high amounts of bronze items experienced more caries but less antemortem tooth loss than those in tombs with less or no bronze. A similar pattern is found among female individuals with respect to seal stones. Male individuals do not appear to show any notable differences among the oral traits between those in tombs of different bronze quantities, but there are significant relationships between seal stones, AMTL, and linear enamel hypoplasia according to the chi square analyses. Such results indicate that there were differences in the types of resources available to males and females of different social classes, but more so among females than males. Female individuals of middle and lower classes (defined as tombs with little or no bronze and/or no seal stones) may have had a more heavily carbohydrate-based

diet than their higher-class counterparts. However, the differences among male individuals indicate that males who potentially had connections to palatial trade or administration (signified by seal stones) had better access to subsistence resources than those without seals in their tombs. Those with seal stones may not have deposited higher status material resources in their tombs, but they were able to access less cariogenic food sources more frequently than those in tombs without seal stones.

To conclude this section on health status and social status, it appears that male individuals were not necessarily healthier than their female counter parts of the same social class and in some ways, such as in terms of increased juvenile stress and disease, they were less healthy. This contradicts the prominent social positioning of male individuals reflected in Linear B texts and the male dominance projected in Mycenaean cultural identity. As demonstrated through demography as well, the individuals of Golemi do not appear to embody the male domination of Mycenaean cultural identity. Instead, it seems that whatever gender specific treatments or behaviors occurred among those buried at Golemi, they may have been somewhat confined to the younger years of development and affected male individuals more adversely than female individuals. While it is likely that male individuals were tasked with providing for their family's subsistence needs and gaining status through trade and palatial connections, this did not translate into worse treatment of female individuals in this community.

The Golemi individuals do embody social status differences through health as seen through the significant relationships between certain health markers and the presence of bronze and/or seal stones in a tomb. This link between grave goods and health illustrates that the cemetery contains a continuum of health and social statuses reflective of individuals from a

variety of social classes attempting to express some sort of Mycenaean identity. As will be discussed below, this expression took on several different forms.

Activity Markers and Occupation

The category of activity markers included an examination of entheseal changes, degenerative joint disease, the platymeric index, and cranial trauma. The first three traits were examined to address the question of whether the remains of the individuals of Golemi would be robust (i.e., marked entheseal changes), exhibit heavy wear on the joints, and suggest high levels of physical activity, which would be consistent with a lifestyle that heavily emphasized hunting and warfare. The results of analysis of entheseal changes and non-vertebral degenerative joint disease (DJD) indicated that the Golemi sample exhibited fairly low levels of entheseal changes and DJD, which suggests that they were not participating in daily, back-breaking labor. This seems to support the idea that these individuals engaged in occupations that did not require a high degree of hard physical labor such as that of merchants, traders, herders, textile workers, and other craftspeople. It also suggests that those of Golemi were generally not participating in a warrior's active lifestyle or if they did, it was not for a long enough period of time to have affected the bones. However, as detailed in Chapters 3 and 4.6, the results of these analyses should be treated very cautiously as both entheseal changes and DJD have multifactorial etiologies and are not easily observed or interpreted in fragmentary, commingled material.

The platymeric index (PI) of the femur indicates that most individuals were platymeric (flatter anterio-posteriorly than medio-laterally) (Wescott 2005; McIlvaine and Schepartz 2015). Compared to two Bronze Age to Iron Age samples from nearby Albania, more Golemi individuals are platymeric (G: 96% vs. A: 82%) as well as proportionally more platymeric (G: 75.93 vs. A: 79.66) (McIlvaine and Schepartz 2015: Table 4). Platymeria has been associated

with activities involving carrying heavy loads, frequent horse-back riding, and agricultural subsistence practices (Wescott and Srikanta 2008; Wescott and Cunningham 2006; Wescott 2005). A horse bridle piece from Mitrou suggests that horses were present, at least, in East Lokris during the Prepalatial period (Maran and Van de Moortel 2014) and the use of chariots throughout the Palatial period among the palatial elite. The mountainous terrain around the cemetery of Golemi may also partly explain the relatively high degree of platymeria among the sample (McIlvaine and Schepartz 2015). Iezzi (2005) found that inland groups located closer to the mountains (Modi and Kolaka) demonstrated more platymeria than individuals in the coastal groups (Atalanti and Agia Triada) of East Lokris. Given their location along the Dipotamos Valley, which provides access to and from the northern Euboean Gulf, the individuals from Golemi may have been more likely to have carried heavy weights as merchants and traders through the mountainous terrain than frequently ridden horses; although, it is still possible that they rode horses. However, since female individuals were also primarily platymeric, it is only possible to say that these individuals were frequently traveling across mountainous terrain.

A few femora (n=7) exhibited rounder, less platymeric indices which suggests that the individuals they represent may have participated in different lower body activities. The average male and female PIs were essentially equal, which suggests that there were no significant differences in the way that males and females were using their lower limbs. This does not necessarily mean they were participating in the same activities, but it may suggest that they were using their lower limbs in similar ways. Again, given the mountainous terrain around Golemi, it is possible that both males and females were regularly traversing it. However, it is not possible to tell precisely from these data in what the activities of the Golemi individuals may have participated.

Cranial Trauma, Interpersonal Violence, and Warrior Ideology

The last trait considered in the population of Golemi was the prevalence of cranial trauma. The Golemi cemetery contained only one potential weapon, a bronze sickle dagger, in a tomb that contained primarily female and juvenile individuals (Tomb 88.I). Some tombs contained tweezers, which have been characterized as part of the "warrior kit" but without associated weapons, there is no way to know if they belonged to those subscribing to the warrior identity. As discussed in Chapter 4 (Historical Overview), the palaces may have controlled the extent to which individuals could display weaponry, or at least swords, in their burials. It is possible, though, that the community of Golemi embodied aspects of warrior activity such as cranial trauma despite the lack of artifacts to indicate warrior or soldier status or lifestyles.

The results of analyses indicate that there was a moderate rate of cranial trauma among those buried at Golemi (14%). The rate is similar to that (12.3%) observed from the Iberian Peninsula in the Bronze Age where warfare was more prevalent according to archaeological research (Jiménez-Brobeil et al. 2009). Arkush and Tung (2013) reported a cranial trauma rate of 23% for one of the more violent Pre-Columbian Andean populations, the Chinchorro. The cranial trauma rate of Golemi suggests that while many individuals at Golemi did not physically embody the warrior aspect of Mycenaean identity through cranial trauma, it was not uncommon, and it appears to be comparable to other war-like cultures from around same the time and place.

The patterns among those impacted by cranial trauma reveal some information about how aspects of the warrior ideology might have been embodied. For instance, among those exhibiting cranial trauma (n = 20), half were male or probable male individuals, whose ages range from 18-50. These results are consistent with other studies of cranial trauma prevalence (Jiménez-Brobeil et al. 2009). The four individuals who experienced more than one trauma event were Young to

Middle adult male individuals, therefore potentially attesting to engagement in multiple violent conflicts. The lower survivability of male individuals beyond the age of 30 may have been partly caused by earlier deaths as a result of interpersonal trauma. Female individuals who exhibited cranial trauma (n=5) had both blunt and sharp force trauma, which was all healed. Such wounds may have been caused by accidents or through violence such as a settlement raid (Betancourt et al. 2008; Georganas 2018). The lack of corroborating settlement data means that the cause of such wounds is purely speculative at this point. The moderately good health, longer lives, and low rates of cranial trauma among female individuals suggests that they were not experiencing effects of prolonged warfare (Milner 1991; Steadman 2008). Most of the trauma was healed, which demonstrates that most of the individuals with trauma, male and female, lived well beyond the traumatic event(s).

The different types of trauma exhibited on the crania illustrate that there were several types of weapons in use during armed conflicts, thereby demonstrating the variable ways in which individuals embodied interpersonal violence. The four instances of possible sling bullet wounds on four separate individuals, described in Chapter 7, indicate that individuals were taking advantage of one of the simplest weapons to make, the sling. Such a weapon could be made completely outside of the palatial system and therefore the wounds from a sling represents conflict that may have taken place outside of palatial contexts (Vituropoulos 1991). There is evidence for slings being used in Mycenaean warfare contexts on the silver Siege Rhyton from Grave Circle A, which depicts slingers and archers fighting alongside spearmen (Molloy 2010; Hiller 1999). There is also a small amount of corroborating skeletal evidence to attest to the use of sling bullets in the Mycenaean period. Smith (2009) identified a circular depression fracture on the skull of a young male individual in a Palatial era RCCT in Athens consistent with a

wound made by a small round projectile. Liston (personal communication) has identified another individual in a different RCCT from the same time and place who also may have experienced one or more sling bullet wounds. From this skeletal evidence and the knowledge of the ease of producing and using a sling, it seems that the sling may have been a common weapon of choice in the Palatial period, especially among individuals who had more limited access to bronze weaponry.

One of the individuals who may have survived a sling bullet wound also underwent trepanation of another cranial wound that may have been caused by a sharp-edged instrument. There is some evidence for healing around the wound, but the individual died not long after the trepanation occurred. As presented in Chapter 7 (Figs. 7.31-7.33), the incisions inside the wound suggest that it was caused by a sharp object such as an arrowhead, spearhead, knife, or potentially even the tip of a sword. The position of the wound next to the sagittal suture on the top of the cranium indicates the blow came from above, potentially from someone on horseback, in a chariot, or from a sharp projectile falling from above. This is one of very few cases of trepanation known from the Late Bronze Age (Papagrigorakis 2014; Mountrakis et al. 2011; Arnott 1997; Charles 1958) and so little is known about the prevalence of the use of the trepanation at this time or the techniques used to accomplish it.

There is evidence that another individual from Golemi engaged in sword or dagger-based combat. The position of the wound on the left frontal bone (Bone 180) of an adult male individual from Tomb XVI indicates that the attacker was in front of the individual and struck with a up and down slicing motion. The cut mark is similar to those said to have been caused by swords in other skeletal populations (Powers 2005, Fig. 7). In addition to the cut mark, this bone is unique in other ways. As described in Chapter 7, this bone had excellent preservation, no

joining fragments, and was found with several other crania in a pit in the dromos of Tomb XVI. Tomb XVI has not been ceramically nor radiocarbon dated, but it can be assumed based on Mycenaean burial practices that the skeletal remains in the pit of the dromos were interred before those found in the chamber (see Chapter 4; Cavanagh 2008). Based on this evidence, I believe it is possible that this bone received special treatment. Since ancestors and associations with great warriors from the past were important to Mycenaeans, it is possible that this frontal bone belonged to a revered ancestor (Smith et al. 2017; Van de Moortel 2016; Boyd 2015; Voutsaki 2010c; Gallou 2005). Smith et al. (2017:132) have posited that tombs which appear to have been cleaned out in antiquity might indicate that the bones had been removed to other tombs in a different location when individuals moved from one place to another. If this was the case, perhaps the frontal bone in Tomb XVI represents such a bone moved from a previous tomb thereby explaining the lack of joins. Stable isotope analysis (strontium and oxygen) and radiocarbon dating of the bone would be necessary to test this hypothesis. However, even if the individual was moved from one place to another, he may have come from a nearby settlement and exhibit a similar isotopic signature.

The other cranial trauma wounds are inconclusive with respect to the type of weapons used to create them. However, the existence of several cranial wounds, some potentially associated with specific weapons, illustrates that some individuals from Golemi, primarily male, did adhere to the warrior or soldier lifestyle on some level. In this way, the Golemi community does embody the traditionally male-related, warrior/soldier ideology embedded in Mycenaean cultural identity.

Heterogeneity of Mycenaean Cultural Identity at Golemi

Having established the trends apparent in the Golemi sample as a whole, it is necessary to take a closer look at the composition of individual tombs, their contents, and organization. The assumption that RCCTs represent familial units is examined with respect to demography, non-metric traits, and individual tomb composition of certain biological traits. The diversity in the representation of Mycenaean cultural identity and social status is then observed through short osteobiographical evaluations of several individual tombs. Finally, the organization of the cemetery is discussed through the lens of relational agency within the networked nature of Mycenaean culture.

Tomb Groups as Family Units

It has been assumed by most scholars that the individuals in a tomb group represent a familial unit, which may be true but has not been scientifically tested. If family tombs are the norm, it implies that the family was an important organizing principle of Mycenaean society as suggested by Wright (2008a). The above demographic profile along with cranial and dental non-metric traits were used to address this assumption. The inclusion of an approximately equal ratio of males to females along with the interment of some, though not all, juveniles provides some support for the assumption. Unfortunately, the results from the non-metric trait analyses were mostly inconclusive and do not suggest that any one tomb had a higher or lower distribution of non-metric traits than those of other tombs. However, it may be possible to gauge potential familial relationships from the organization, biological markers, and demography of specific tombs.

Some support for the tomb as a family unit is found in Tomb XXV based on the burial positions of the skeletons. Tomb XXV, dated to the Palatial period, contained the remains of nine

in situ individuals including four adult males, two adult females, and three juveniles. The three juveniles lay on top of or directly beside the three adult individuals on the west side of the tomb (See Figure 7.2). The position of the bodies alongside the absence of bones in pits, niches, or in piles along the chamber walls suggest that the individuals were buried around the same time. The positioning of the bodies and the demography of the tomb indicates that this may have been a familial unit who all died around the same time. Alternatively, these may be unrelated individuals who all died from a fast-acting disease. In either case, it is highly unusual for an RCCT to have only been used once for several burials. To my knowledge, such a case has not yet been reported for this period of Greek prehistory.

Other potential support for the tomb as a family unit is from the high prevalence of cribra orbitalia (CO) in Tombs XXV, 88.II, and XIII. In Tomb XIII, 6 out of 8 observable individuals, or 75% showed CO, whereas in Tomb XXV this percentage was 50% (3 out of 6) and in Tomb 88.II it was 43% (3 of 7). Together, these three tombs contain over 50% of cases of CO in the cemetery. Although CO is used as an indicator of health (nutritional deficiencies, infectious disease, etc.), it may also provide information about relatedness because it can be caused by some genetic diseases like thalassemia and sickle-cell anemia (Walker et al. 2009). Bisel and Angel (1985) posited that ancient Greek populations exhibited a higher rate of thalassemia than people elsewhere because malaria was endemic in the eastern Mediterranean and it would have provided a "heterozygous advantage" to individuals who carried only one allele for the disorder. Because thalassemia is a hemolytic anemia, individuals do not have enough functional red-blood cells, which then prevents them from being able to carry the malaria virus. For this reason, high rates of CO in a tomb may indicate that the individuals of these tombs were genetically related to others with the trait in the same tomb. Tomb XIII provides the strongest indication of this since it

contains the highest proportion of individuals with CO but is otherwise one of the healthiest tombs in the cemetery (see below).

On the other hand, the demography of Tomb 88.I discussed above challenges the idea that all tombs contained nuclear families. There are several non-mutually exclusive explanations for the presence of such a high number of juveniles in a single tomb. One is that these juveniles belonged to a single family who made the uncommon decision to bury all juveniles from their family in the RCCT over the course of several generations. The concentration of several of the less frequently occurring non-metric traits in Tomb 88.I (See Figure 7.13) may indicate genetic relationships among the adults in the tomb, but the only way to test relationships between these individuals would be to analyze nuclear DNA from each member of the tomb. While it is possible that the individuals of Tomb 88.I may be genetically related, the unusual age distribution of the juveniles seems to suggest otherwise. As discussed previously, the most prevalent age groups in most archaeological samples are those individuals between birth and ca. 6 years old (Chamberlain 2006). However, of the thirteen juveniles in Tomb 88.I, eight are between 8 and 17 years old, which demonstrates that the majority of the juveniles from this tomb survived their most vulnerable years of development only to die during their most resilient. Therefore, it is unlikely that all juveniles from Tomb 88.I belonged to the same family as one would expect infants to be the most highly represented group in a mortuary sample. This aspect of the juvenile demography brings up another possibility, which is that the juveniles and potentially the adults of the tomb died as a result of a fast-acting disease or catastrophic accident. However, the size of the tomb is too small ($2.76m^2$) to have contained the primary burials of 27 individuals inside the chamber at one time. Additionally, the individuals of the tomb group exhibit very little trauma, therefore making a catastrophic incident unlikely.

A third explanation for the tomb's demography is that the juveniles were included in the tomb because they were part of a meaningful social group which may not have been related to a family unit. The inclusion of the numerous beads in the tomb, as mentioned above, signifies that the juveniles may have had some sort of special status. For this reason, I argue that while it is likely that many tombs contained nuclear families or households, it is also possible that other types of social groups used RCCTs for burial. Linear B records suggest suggests that there were palatial dependents, primarily women and children, stationed outside of the palace itself as discussed in Chapter 4 (Historical Overview) and it is possible Tomb 88.I represents such a group. However, the inclusion of high quantities of beads signifying elevated status as well as the inclusion of the only possible weapon in the entire cemetery, a sickle knife, appears to contradict this explanation. It does not seem likely the palaces would have provided such socially significant goods for dependent servants or slaves, especially given the great emphasis placed on social status in Mycenaean society. Furthermore, the rates of skeletal lesions in the tombs is not significantly worse (or better) than those of the cemetery sample as a whole. The individuals even have proportionately less antemortem tooth loss than those in most other tomb groups in the cemetery. This evidence indicates that the individuals in Tomb 88.I were a relatively healthy, wealthy, high status social group. For these reasons, it is possible that the group represented in Tomb 88.I was not necessarily a family group but some other meaningful social group. Whether they were a family group or some other socially meaningful group, the nine primary burials may be of people who have died from an infectious disease that does not leave a mark on the bones.

Osteobiographical Analysis of Individual Tombs

Although the overall health and status of the cemetery of Golemi is comparable to that of other RCCT cemeteries, there is a notable heterogeneity in the expressions of wealth and status

between tombs, which is a reflection of how Mycenaean culture was differentially adopted and adapted by various groups of individuals as represented in the tomb groups. The osteobiographical examination of individual tombs illustrates some differences in how the archaeological traits and health indicators match up with one another, thus providing evidence for the existence of a range of social statuses among those in the cemetery as well as demonstrating evidence for the differential manifestations of Mycenaean cultural identity. The variability demonstrated in these tombs provides evidence for the possible inclusion of high, middle, and low-class individuals. The variable rates of cranial trauma among the tomb groups, indicates that at least two tomb groups (Tombs XVI and XXVII) were significantly more involved with interpersonal violence than were other groups of the cemetery.

The widely varying number of individuals included in each tomb already exhibits a high degree of variability in the way the tombs were used by different groups. As shown in Chapter 7, the number of individuals in each tomb varies drastically with some having as few as two and some having 27 or more. This is not unique to Golemi as others have also reported widely varying numbers of individuals included in RCCTs (Smith et al. 2017; Schepartz et al. 2009; Blegen 1936; Wace 1932). Furthermore, the number, types, and quality of grave goods does not correspond to the number of individuals represented in a given tomb nor to the level of health or activity present among the individuals of the tomb. The widely varying numbers of individuals per tomb suggests that the decision to bury an individual in a tomb was highly individualized and potentially dependent on the "head of the household," if the tomb groups are family units. If the tomb groups are not family units, perhaps a leading figure of the community such as the *telestes* "service man" of the *damos* or *gwasileus,* the local "chief," decided who was buried in the RCCTs.

Tombs XIII and XIV, the wealthiest tombs of the cemetery (See Chapter 7), are examples of tombs whose skeletal remains appear to reflect their status and wealth. This is demonstrated by the relatively good health and advanced ages of several individuals in the tombs. Tomb XIII, the wealthiest tomb of the cemetery, has a significantly lower rate of periostitis than all other Golemi tombs. As noted above, the increased amount of cribra orbitalia in Tomb XIII could be related to malnutrition or disease, but it could also indicate that the individuals of the tomb shared the genetic condition of thalassemia thereby attesting to a possible kinship relationship within the tomb group (see above), which seems more likely given the exceptionally low occurrence of periostitis in the tomb group. Those in Tomb XIV experienced a significantly higher amount of antemortem tooth loss than other tombs, but this may be explained by the relatively old ages of two of the three individuals in the tomb, thus indicating longer lives and potentially better health.

Tombs XIII and XIV also demonstrate that the number of individuals in a tomb is not related to the level of wealth in the tomb, as is shown through their significantly different contextualized MNIs (XIII: 31 vs. XVI: 3). Since both tombs have not been systematically dated, it is unclear whether their different cMNIs are the result of choice or length of tomb use. If it was choice, those who buried their dead in Tomb XIV greatly limited the number of individuals they interred and/or allowed to remain inside the tomb. If the difference was caused by the amount of time the tomb was in use, Tomb XIV may have been used for a shorter period of time. The bronze and silver located in Tomb XIV as well as a seal stone attest to its relatively high status and potential connections to the palatial system. Perhaps such connections were short lived and unsustainable for future generations who chose not to use the tomb. Through both grave goods

and skeletal markers, the individuals from Tombs XIII and XIV appear to embody the elite status that is central to Mycenaean cultural identity.

While the above tombs appear to exhibit both good health and wealth and thereby conform to some important aspects of Mycenean cultural identity, there are also those that exhibit less than ideal health and/or wealth, seeming to deviate from this identity to some extent. Tomb III, which was non-looted and of medium size, contained the remains of ten adult individuals, but had only one ceramic pot of unidentified type as a grave good for the entire tomb (Table 7.5). The near lack of grave goods in this tomb appears to indicate that those using the tomb to bury their dead were not exceptionally wealthy or of very high status. The ages of the individuals range from Young to Middle aged, potentially suggesting that the individuals in the tomb were not as healthy as others in the cemetery. However, those in the tomb had average or lower prevalence of the various health indicators. The earlier ages at death may indicate that they perished from a fast-acting disease or by some other means such as through interpersonal violence (see above), though there is no evidence of cranial trauma among the individuals in Tomb III. All in all, it appears that the individuals of Tomb III had access to adequate subsistence resources, but not necessarily to material resources. They were wealthy enough to build a decent size chamber tomb, but either chose not to bury individuals with non-perishable items portraying wealth and status or did not have the means to do so; although they may have provided perishable items such as textiles as grave goods. A similar case occurs in Tomb VII which had significantly low rates of periostitis (similar to that of Tomb XIII) and antemortem tooth loss as well as low prevalence of LEH, thus indicating relatively good health. However, this non-looted tomb contained only four grave goods: two ceramic alabastra, one ceramic cup, and a bronze object. I propose that the existence of these tombs may represent groups of

individuals from the middle class just as the presence of seal stones in relatively poor tombs such as Tomb V (see above) indicates that individuals may have had access to adequate food sources without necessarily accumulating a lot of material wealth or status. Alternatively, they may have been lower class individuals who had connections to higher class individuals potentially through their occupations like that of a herder being supervised by a more elite individual who provided access to better or at least adequate subsistence resources (Nakassis 2013).

There are also tombs at Golemi that suggest that lower class individuals may have been buried in RCCTs. Tombs IV and X are examples of tombs that were relatively poor and also demonstrated poorer health in some ways as compared to the rest of the tombs. Neither tomb was looted and both are of medium size. Tomb IV contained only two poor grave goods: a ceramic pyxis lid and a shell, as well as the remains of at least four individuals including two adult males and one adult female ranging in age from 25 to 50 and one infant. Because only the lid of the pyxis was found, it is possible that the pyxis to which it belonged was recycled as a grave good for another burial (Smith et al. 2017). The skeletal remains exhibit a higher rate of periostitis when compared to the rest of the cemetery (see Chapter 7, Figures 7.15-7.16), indicating an increased rate of infectious disease during life. This tomb also contained one of the six individuals with an abscess and the two individuals for which dentition could be observed both experienced significantly higher rates of antemortem tooth loss than those in other tombs.

Tomb X contained a few more grave goods (n=14), but none of great value except perhaps a bone pin. The individuals from the tomb experienced a higher rate of periostitis, though still within the average range of the cemetery, but otherwise demonstrated average rates of other traits. Tomb 85.I yielded the remains of one young male individual who experienced the most LEH of any individual in the cemetery together with an instance of healed blunt force

cranial trauma, and it was a small tomb according to the excavators (Diaries, unpublished). Although the tomb was robbed, the remaining goods consisted of only five beads, which suggests that the tomb may have been fairly poor. In these cases, poorer grave goods are associated with poorer health in one or more health related biological traits and may indicate that these were lower status individuals who were able to afford to build an RCCT but either were not able to or not allowed to furnish it with the material items featured in wealthier tombs. In this way they do not appear to be practicing conspicuous consumption at all or on the same level as others in the cemetery and thus appear to have embodied Mycenaean cultural identity differently from those in Tombs XIII or XIV.

A different sort of embodiment of Mycenaean cultural identity is apparent in Tombs XVI and XXVII. The concentration of cranial trauma in these tombs suggests that some groups in the cemetery may have engaged with the warrior ideology more fully than did others. Tomb XVI contained the most individuals with cranial trauma in the cemetery, but the tomb did not contain weapons of any sort, which is not unexpected since the chamber had been looted. However, the tomb's non-looted pit, which held many of the crania with trauma but did not contain weaponry, yielded four unidentified bronze pieces. Further study of these items may provide evidence for bronze weaponry in the tomb. Other than the bronze pieces and two bronze decorative items, the tomb is relatively poor. The most common type of grave good was a spindle whorl (n=22), which is odd since the spindle whorl is primarily associated with women's work and clothing (Hughes-Brock 1999). Otherwise, the individuals of the tomb exhibit relatively average rates of health and activity markers, which suggest that they were not participating in consistently high levels of physical activity nor experiencing malnutrition or undernutrition.

Tomb XXVII, on the other hand, had the second highest amount of cranial trauma and exhibits higher rates of several health markers indicative of poor health. It was the only tomb with a significantly higher proportion of porotic lesions of the skull in a mortuary population that exhibits a relatively low prevalence of the trait (see Figure 7.4). The tomb contained a higher number of fragments with periostitis and several individuals with LEHs on numerous teeth, including the individual with the second highest rate of LEH in the cemetery (see Chapter 7). This suggests a relatively high rate of infectious disease and stress events throughout the lives of the individuals in this tomb. Tomb XXVII was thoroughly looted and so cannot be compared in terms of material wealth. However, the differential expression of health status among these two tomb groups suggest that even though they both participated in activities resulting in relatively high rates of cranial trauma, they had different access to resources. This, in turn, suggests that fighting as a soldier or warrior did not necessarily confer a social status that resulted in better access to resources.

Because Tomb XVI contained bronze it is possible that those in the tomb had at least a limited connection to palatial resources but neither Tomb XVI or XXVII contained seal stones. It might be that both groups were involved in military actions for the palace, but one group (Tomb XVI) had a more elevated status while the other group (XXVII) represented those from a lower class, potentially even men who did military duty as corvée labor. These interpretations are loose and should be treated cautiously, but the data do indicate that there were differences in the lived experiences of the two groups. Nakassis (2013) provides support for this occurrence as he demonstrates that those engaged in the same occupation could have widely different social statuses as discussed in Chapter 4. The concentration of cranial trauma in these tombs and not others also illustrates the differential expression of Mycenaean cultural identity at Golemi. The

warrior ideology is an intrinsic aspect of the identity, yet moderately few individuals and tomb groups physically embodied this aspect through cranial trauma.

In Chapter 4, I posited that it was possible that some RCCTs may have contained individuals who were not necessarily of the same social status as the others in the tomb group. Such individuals may have been servants or slaves granted the privilege of being buried with their masters or mistresses. For the Golemi sample, it was difficult to differentiate such individuals from others in the tomb because of the fragmentary and commingled nature of the skeletal elements. There is not much evidence to suggest that tomb groups contained individuals who embodied drastically different lifestyles than others in the tomb group since it appears that individuals in the same tomb experienced a similar level of health, activity, and trauma. The fairly homogenous composition of markers within tomb groups indicates that such experiences were similar for those individuals, potentially through the *habitus* developed in that community at the various levels of social status (Bourdieu 1977).

There is only one case in which I believe an individual stands out with respect to lived experiences among both his or her tomb group and the cemetery as a whole. The malformed distal epiphysis of a humerus from Tomb XVI indicates that this tomb group included an individual who had a visible disability, caused during juvenile development, which limited the range of motion and likely the types of activities in which this individual could participate. Its position inside the chamber suggest that the individual to whom it belonged was buried in the customary Mycenaean fashion, thereby indicating that this person was not treated differently as a result of the disability, at least in death. There are no other bones exhibiting similarly malformed properties in the tomb, but as demonstrated above, Tomb XVI contains several individuals with cranial trauma suggestive of interpersonal violence. Therefore, the existence in this tomb of an

individual with a disability that would have limited participation in military activities is even more interesting because one would expect that physical fitness would be a high priority for this group. Instead, the inclusion of this individual in the tomb group provides further evidence for the ascription of status through relationships rather than the attainment through other means for certain individuals.

Cemetery Organization

Previous studies of the organization of RCCT cemeteries of the Palatial period have found no clustering based on wealth distribution or date of establishment (Cavanagh and Mee 1990). My preliminary analysis of the grave goods and tomb structures of Golemi appears to concur with these findings. When visualized on the site map, tombs with high concentrations of high-quality grave goods (metal items) do not cluster together (Fig. 7.6). Wealthy tombs and poor tombs are dispersed throughout the cemetery in no particular arrangement. Similarly, as wealth is not correlated with the size of the RCCT as far as can be told, given the looting of several tombs, there is no correlation between tomb size and placement in the cemetery. The same is true for dromos length, presence of pits, and bodies found *in situ*.

As discussed at the beginning of this chapter, the tombs with the earliest dates are close to one another but not close enough to be considered clustered together once more tombs joined them in the Palatial and Post-Palatial periods. Considering the dates of the tombs, it appears that the wealthiest tomb (XIII) is located in between the two tombs that have ceramically been dated to LH IIB (85.II and XV). Similarly, Tomb XXV, which contains several high-quality grave goods including amber is located directly to the west of Tomb XXIV, the third founding tomb of the cemetery, which has yielded a radiocarbon date of ca. 1500-1400 BCE, or LH IIA-LH IIB according to the low chronology, and LH IIA-LH IIIA1 according to the high chronology. This

pattern of newer wealthy tombs placed next to old tombs may indicate some attempt at association with the founders of the cemetery by later elite groups. Given the intentionality observed in the founding of the initial tombs in the cemetery as well as in other practices throughout mainland Greece (i.e., the renovation of Grave Circle A at Mycenae and its inclusion within the fortification walls; Dickinson 1977), it seems likely that the association with founding groups was intentional.

Like the archaeological traits, there does not appear to be a clustering of tombs with particularly good or bad health, high amounts of cranial trauma, number of individuals in a tomb, or shared non-metric traits/kinship. These traits, too, are scattered among the tombs throughout the cemetery. These finds suggest that placement within the cemetery was not dependent on status or kinship but potentially on social or political connections with other individuals in the cemetery as Wright (2008a) and Mee and Cavanagh (1990) suggest. The non-metric data do not provide adequate information to gauge whether or not tomb groups may have been related to one another. However, when traits that appear in less than 15% of the population are visualized on the site map as shown in Fig. 7.13, it seems that several are present in the same few tombs (88.I, III, XXVII, XXVI, and XIII). It is unclear what this clustering of traits in the same few tombs may mean, but it tentatively suggests genetic relationships between those tombs. These tombs are not located close to each other for the most part, but if these groups are genetically related, it would indicate that related individuals did not prioritize proximity to relatives but spread throughout the cemetery, perhaps suggesting that other types of relationships were more important in the mortuary realm.

It may have been a combination of both kinship and other social or political relationships that dictated where individuals were buried in the cemetery (Mee and Cavanagh 1990). If this is

the case and proximity of tombs does suggest kinship relationships, it seems that the wealth of one family does not necessarily mean that a related family will experience the same level of wealth or status. This provides support for the idea that personal success was crucial for providing wealth and status for one's immediate family (Wright 2008a). If individuals in tombs close to one another were not related, this may indicate that the tombs clustered around the wealthier tombs represent a socially networked group. Tomb XIII, the wealthiest, healthiest, and most populous tomb of the Golemi cemetery is located most closely to Tomb IV, one of the poorest and least healthy tombs of the cemetery. To the west of tomb IV, Tomb V is also relatively poor, but it had a seal stone and exhibits relatively good health.

Tomb 88.I, which contained the most juveniles of all the tombs and several grave goods, as well as exhibiting moderately good health within the tomb group, is located directly next to Tomb III, which contained zero juveniles and one ceramic vessel, but individuals who also exhibit moderately good health. In this case, the tombs are comparable in terms of health, but not in terms of grave goods or demography. Directly to the east of Tomb 88.I is Tomb 88.II, which contained several grave goods including bronze, despite its looted condition, and it has the largest chamber of any tomb with observable chamber size, indicating that it may have been quite wealthy. The representations of the various biological traits fall within the cemetery wide rates of occurrence for each trait. Therefore, from these three tombs located adjacent to one another it seems that while they shared similar levels of health, activity, and trauma, wealth was diversely represented among them. This may provide support for the idea that individuals of less wealthy tombs gained access to resources through connections to wealthier individuals who were able to inter their dead with objects of higher status and wealth (Mee and Cavanagh 1990).

Golemi Agios Georgios in Mycenaean Central Greece

The establishment of the RCCT cemetery at Golemi in the LH II phase marked its occupants as early adopters of Mycenaean cultural identity and ideology. The cemetery's proximity and possible association with the elite groups at the cult sanctuary of Kalapodi suggest that the Kalapodi elite may have been the driving force behind the establishment of the Golemi cemetery (Dimaki 2013; Niemeier 2016). When the skeletal remains and contents of the first three tombs of the cemetery are considered a few things stand out. The first is that Tomb XXIV, dated through radiocarbon possibly as early as LH IIA, contains the cranium of an individual who experienced several traumatic events, including a possible sling bullet wound and a wound that needed trepanation (See Chapter 7). The existence of such an individual in one of the earliest tombs of the cemetery may indicate that this group was involved in the violent competition observed in the Prepalatial period and this individual may have been one of the founding members of the tomb as a result. However, this individual has not been directly dated to the Prepalatial period of the tomb and is one of thirteen individuals, which means that the cranium could be from a later phase of the tomb's use. The tomb was robbed and so it is unknown whether it contained any weaponry that might have identified it as a warrior tomb, but at least one seal stone was recovered from the debris of the chamber, which suggest connections to the palatial administrative system in the Palatial period (Eder 2007; Eder and Jung 2015).

The difficulty of assigning specific individuals to specific chronological phases is representative of one of the major challenges in studying and interpreting the skeletal material of Golemi with respect to its role in the broader Mycenaean world. In other areas of mainland Greece, such as Messenia and the Argolid, distinct differences were observed in settlement and burial patterns between the Palatial and Post-Palatial period (See Chapter 4). As demonstrated in

this dissertation and through the work of Fanouria Dakoronia, northeast Phokis, including the Dipotamos Valley, seems to experience moderate to great prosperity throughout the Palatial and Post-Palatial periods. The persistent good fortune of northeast Phokis suggests that some of the wealth found in the Golemi tombs could date to the Post-Palatial period (Dakoronia 2009a,b; Deger-Jalkotzy 2009).

One tomb (XI) may be dated to the LH IIIC period because of its similarity in structure to the small, poorer LH IIIC tombs of Elateia (See Chapter 5; Deger-Jalkotzy 2009). This tomb also contains a steatite seal stone, which was not an uncommon occurrence in the LH IIIC period and may indicate an adherence to the previous Mycenaean palatial customs (Deger-Jalkotzy 2009). Tomb XIII, the wealthiest tomb in the cemetery, has a tentative date of ca. 1260 BCE or earlier, based on the radiocarbon dating of one individual (see Chapter 7), which suggests that the tomb may have been established in the Palatial period and that at least some of its contents are representative of Palatial period customs and relationships at least among those buried in the earlier phases of the tomb's usage, likely those individuals interred in the pit in the dromos. The excavation of a new RCCT at Golemi approximately 400 meters from the known cemetery suggests that the cemetery is much more extensive than previously thought, and this is indicative of a populous and likely prosperous settlement (Dimaki 2013). At Elateia, 30 new RCCTs were established during the Post-Palatial period (see Chapter 5; Deger-Jalkotzy 2009), which suggests that Golemi could have experienced a similar type of growth.

The moderate wealth of the Golemi tombs, relatively older ages and lower prevalence of skeletal lesions, accompanied by a low to moderate rate of cranial trauma represented in the skeletal sample indicates that the inhabitants of the settlement associated with the cemetery did not suffer under palatial control and continued to prosper even after the palatial socio-economic

system collapsed. Given the patterns of destruction observed at Mitrou and Kynos in East Lokris, it is possible that new tombs established in the Palatial and Post-Palatial periods were constructed by individuals who conquered Golemi's settlement or by local individuals who cooperated with those doing the conquering. This seems unlikely because of the existence of the cemetery prior to the destructions attested in East Lokris and Kalapodi and its continuation through both the Palatial and Post-Palatial periods. This pattern is not seen at the RCCT cemetery near Mitrou, Tragana-Agia Triadha (Van de Moortel 2007), which was only in use during the Palatial period. Furthermore, the Kokkalia cemetery associated with Kalapodi did not continue in use after the destruction of the sanctuary in LH IIIA2, but rather a new cemetery was established at Vagia to the west (Dimaki 2013; Cavanagh and Mee 1998; Dakoronia 1980). For this reason, I believe that if Golemi experienced a similar fate to that of Mitrou or Kalapodi in the early Palatial period, the cemetery would not have continued to grow as it did.

If the individuals were from the same settlement from which the original tomb founders came, it appears that they were not conscripted by Orchomenos in the LH IIIB1 and LH IIIB2 Early phases to drain the Copaic Basin, build Glas, and farm the land as Van de Moortel (forthcoming) has suggested for the people of Mitrou in East Lokris (see Chapter 5). Very few individuals from Golemi appear to have engaged in a great deal of hard physical labor, which is evident primarily through a low rate of degenerative joint disease. Rather, as discussed above, I find it more plausible that many of the individuals of Golemi engaged in less physically demanding occupations as administrators, traders, craftspeople, and perhaps fairly well-to-do farmers and herders, and occasionally as soldiers. This may be because of their location along the Dipotamos Valley, which provided access to the northern Euboean Gulf and its maritime trade route from the Kephissos Valley, which was home to a land trade route (see Chapter 5).

The varying degrees of wealth and social status mirrored by varying degrees of skeletal lesions suggests that the tomb groups of Golemi represent a spectrum of social statuses, ranging from high to low status. From this evidence it seems likely that some people benefitted from relationships to the palatial system or to private economic activities more than others did, which provided them with better quality material goods and subsistence resources. The continuum of social statuses represented at Golemi supports Shelmerdine's (2011) and Nakassis' (2013) assessments of the individualized nature of the relationships that people and communities had with the palatial system. The lack of apparent organization based on date or wealth suggests that there may have been a social network in place that guided where people were buried within the cemetery, which may not have included kinship relationships. If this is the case, it seems to indicate that Mycenaean society was organized through networks of individualized relationships not only at the elite palatial levels of society, but also at lower community levels.

Until the individual tombs of Golemi Agios Georgios are more securely dated, it is not possible to separate the Palatial versus Post-Palatial patterns of the cemetery. However, the continuity of the cemetery, the general similarities between the grave good types, and the lack of drastic differences in skeletal markers between most tombs suggest that the inhabitants continued to adhere to broadly similar subsistence practices and cultural customs throughout the Late Bronze Age. Despite the collapse of the palatial system at the end of the Palatial period, the Mycenaean cultural identity persisted in some form in northeast Phokis, which can be seen in the cemetery at Golemi through the skeletal remains of the individuals living through it, as well as through the presence of a steatite seal of the Mainland Popular Group in a LH IIIC tomb.

Chapter Summary

In this chapter, I have provided a discussion of the results of the bioarchaeological analysis of the skeletal remains from Golemi Agios Georgios which indicate that the individuals of Golemi embodied some elements of the archaeologically defined Mycenaean cultural identity, but also deviated from it in some ways. I first determined that the individuals interred in the cemetery of Golemi did indeed represent some sort of social group through shared claims to Mycenaean identity as represented in the use of RCCTs. I then illustrated the extent to which the cemetery population aligned with Mycenaean cultural identity through a discussion of demography, health, status, activity markers, and cranial trauma. Already in that discussion, it became apparent that there was some degree of heterogeneity in the way various tombs reflected Mycenaean cultural identity. This was discussed further in a closer examination of certain tombs that illustrated status, health, wealth, and activity differences. Drawing from all of the above analyses, the organization of the cemetery was explored to determine if tombs were clustered spatially based on one or more archaeological or skeletal trait. Having determined that there was no organizing principle dictated by a specific trait, it was concluded that the cemetery might reflect a social network similar to the one that was used to organize the palatial administrative system, i.e., the manner in which the palatial elites formed relationships with lesser local elites (Nakassis 2013). Finally, the discussion turned to how Golemi fits into the overall picture of central Greece, which illustrated that the community of Golemi was likely benefitting from one or more direct relationships with the palatial system, but was not fully dependent on it or found other ways to prosper despite its collapse as its persistence through the Post-Palatial period reflects.

CHAPTER 9: CONCLUSION

My research uses human skeletal remains and archaeological context to assess the extent to which individuals interred in the cemetery of Golemi Agios Georgios in central Greece bioculturally manifested the archaeologically defined characteristics of Mycenaean cultural identity. By critically examining the definition of "Mycenaean" and identifying the attributes used by archaeologists to study Mycenean culture, I was able to identify biological correlates for some, though not all, of these attributes. I developed several guiding questions designed to address each of the identified biological correlates and tested them through the bioarchaeological study of the human skeletal material from 23 of 31 excavated rock cut chamber tombs at Golemi, dating to the LH II-IIIC phases. The interpretations of the materials were based in the theoretical perspective of embodiment in conjunction with theories of practice, relational agency, and intersectionality.

My research found that, overall, the mortuary population of Golemi Agios Georgios embodied several aspects of Mycenaean cultural identity. The fairly moderate wealth of some tombs was accompanied by relatively few non-specific indicators of stress and disease and advanced ages-at-death thereby embodying aspects of a lesser elite Mycenaean cultural identity. Other tombs illustrate that not all in the cemetery embodied the same level of health, wealth, and status, which indicates that the cemetery contained a range of social statuses. Such a range seems to reflect the continuum of statuses observed in Linear B tablets, as argued by Nakassis (2013) and Shelmerdine (2011). As demonstrated through the osteobiographical analysis, a paucity of status markers in a tomb did not necessarily correlate to poor health, thereby illustrating a variability in access to resources even within the same social stratum.

The demography of juveniles revealed that juvenile representation at Golemi is similar to that of other RCCT cemeteries, though it disputes the currently accepted scholarly idea that those under two were excluded from monumental burial. Special treatment of some juveniles as well as their selective presence in some tombs suggests that including juveniles was a highly individualized decision on the part of the "head of the household" or other authoritative individual which may be interpreted as a trait of Mycenaean culture. Other aspects of the cemetery that appear to confirm the existence of individualized decision making per tomb are the non-uniformity of chamber size and shape, the dromos length, and the widely varying number of individuals included in each tomb. However, there may be many other reasons for the wide variation in the number of individuals represented in a tomb.

The spatial location of seemingly high status and low lesion tombs next to low status and higher lesion tombs--lesions being indicators of stress or disease--provides potential evidence for a networked cemetery organization that reflects the broader organization of palatial socio-economic networks. The evidence for familial relationships within each tomb and among tomb groups at Golemi was fairly inconclusive, and so it is possible that familial relationships played some part in the organization of the cemetery, but the extent to which this may be the case could not be determined by the data collected and examined for this dissertation. The inclusion of several seemingly unrelated juveniles of a wide range of ages within a single tomb (Tomb 88.I) suggests that there may have been other types of social groups allowed to use the RCCT as a form of burial. However, further research on which type of social group this may indicate is needed.

The moderate rate of cranial trauma suggests that at least some individuals physically engaged with the warrior ideology embedded within Mycenaean cultural identity. Compared to

rates of cranial trauma in other warlike societies, the skeletal sample of Golemi manifests evidence that confirms warlike activities, which coincides with the evidence for warfare in the archaeological record and Linear B texts. Two tomb groups (Tombs XVI and XXVII) appear to have embraced the lifestyle of a warrior or fighter more fully than others, but such an identity did not preclude the mortuary inclusion in the same tomb of those who may not have been able to participate, as is demonstrated by the inclusion of a disabled person in Tomb XVI.

The ways in which the cemetery as a whole does not necessarily adhere to the modern scholarly notion of Mycenaean cultural identity are primarily demographic. Males are not significantly more prevalent than females, which indicates that female individuals enjoyed as much access to the cemetery as males did. However, there is evidence for biocultural differences between males and females that suggests that they had different lived experiences even at the same social levels.

The elevated LEH prevalence in males indicates that Mycenaeans at Golemi recognized gender differences, at least practically if not officially, from a very young age. Furthermore, males who died at younger ages experienced more incidences of stress and/or disease during development, which may have influenced their adult health resulting in earlier mortality. Males over the age of 30 had poorer survivability than female individuals of the same ages, which indicates that they may have experienced mortality risk factors that females did not face such as interpersonal violence. A major risk factor is likely to have been the warrior lifestyle typical of Mycenaean culture. Several male individuals show evidence of embodying this lifestyle through cranial trauma. Female individuals experienced less stress during development and lived longer on average with a higher mean age-at-death and better survivability past the age of 30. The relatively worse oral health in female and probable female individuals may indicate gendered

differences in diet. In this respect, social status differences reflected in oral health appear to be more significant among females than among males. Higher status female individuals, as indicated by the presence of high quantities of bronze and seal stones, had more caries but less antemortem tooth loss and linear enamel hypoplasia than those females from seemingly lower status tombs.

The osteological analysis of the Golemi individuals in conjunction with the archaeological material provided some information about how Golemi may have fit in to the broader picture of Mycenaean Greece. Established by the LH IIB phase, if not in LH IIA, it had one of the earliest RCCT cemeteries in the region, which indicates that it was in contact with Mycenaean culture early in its development, potentially because of its location on a natural trade route between the Euboean Gulf and Kephissos Valley. It is unclear at this time whether the earliest RCCTs at Golemi were built by local elites who became Mycenaeanized or by Mycenaeanized elites who came from elsewhere. In the Palatial period, Golemi may have belonged to Orchomenos and potentially was located in a border area of the palatial territory of Orchomenos. At that time, the cemetery held a community of people with a variety of social statuses from lower elites to middle class and potentially lower-class individuals, who all ascribed to some parts of Mycenaean identity. Some must have engaged directly with a palatial authority, most likely Orchomenos, because of the presence of seal stones, bronzes, and precious imports such as gold, silver, and amber. Others may have maintained relationships with those groups and in this way had indirect access to resources and a more indirect connection to Mycenaean cultural identity, as a result.

Most individuals, both males and females, displayed platymeria which can be linked to agricultural subsistence practices, carrying heavy loads, frequent horseback riding, and/or

traversing mountainous terrain. This indicates that. even though their occupations and daily activities may not have involved frequent and strenuous physical labor, they would habitually have walked long distances, rode horses and/or carried heavy loads. Possible professions known from Linear B texts that would fit such activity patterns are those of administrators, merchants, traders, craftspersons, fairly well-to-do farmers, herders, and military personnel. The evidence of cranial trauma and indicators of stress and disease among the tomb groups of Golemi suggests that they include soldiers; this is especially the case for Tombs XVI and XXVII, which appear to have held military personnel of higher and lower social status, respectively.

The osteobiographical analysis of the tomb groups and their spatial locations within the cemetery revealed that the organization of the cemetery appears to have been based on socio-economic relationships, with less-well-to-do tombs clustering around wealthier tombs--although familial relationships cannot be conclusively ruled out. The implication of a socio-economic network expressed through the spatial arrangement of tombs within the cemetery reflects the highly networked character of Mycenaean palatial social organization, as indicated by other evidence such as Linear B tablets. Finally, the persistence of the cemetery through the tumultuous periods at the beginning and end of the Palatial period are a testament to the ability of Golemi's population to adapt to major socio-political changes. However, the exact ways in which Mycenaean culture was manifested at Golemi in the Palatial versus Post-Palatial period could not be studied because so few tombs have been precisely dated.

The conclusions presented here represent one set of interpretations of the osteological and archaeological material from Golemi, but others could and should be entertained. More study of materials from Golemi and other sites around central Greece will provide new ways to interpret the data presented here. One of the positives of working with the remains from Golemi was that

the skeletal material was divided into tomb groups, which allowed the comparison between the skeletal remains of each tomb. However, this study was limited first and foremost by the fragmentary, commingled nature of the osteological material, which prevented precise observations of several traits as well as limited the types of analyses that could be performed with the data. Commingling mostly took place as a result of Mycenaean burial practices, but some of it happened during post-excavation storage. Based on the experience of conducting this research, I would recommend that the skeletal remains of each tomb be stored in separate closed boxes or other containers so as to prevent further commingling of skeletal remains after excavation. The use of resilient storage containers as well as climate-controlled storage facilities would also reduce the occurrence of post-excavation damage. The extensive taphonomic damage on many of the remains limited the precision and accuracy of the analyses preformed. While the excavation notes were certainly helpful, the lack of detail about the skeletal material limited the degree to which relationships between skeletons, grave goods, and tomb architecture could be established. Such data loss would be prevented by having trained osteologists excavate the burials.

Skeletal remains from prehistoric Greece, especially the Bronze Age, have long been underutilized (Mackinnon 2007; Galanakis 2018), but there has been a recent surge in the study of human remains from all periods of Greece (Lagia et al. 2014; Schepartz et al. 2009). This project contributes new data from central Greece, which is an understudied area of the Bronze Age Aegean. As the second bioarchaeological study ever conducted on material from northeast Phokis and East Lokris it adds to the small but growing body of data on Late Bronze Age human skeletal remains from Greece. The results of this study have provided in-depth analyses of materials from a site excavated to combat looting activities. Such sites make up a large portion of

excavations in Greece but are rarely studied fully, as bioarchaeologists tend to favor material from larger, systematic excavations carried out without time pressures. This dissertation goes beyond looking at burial practices by examining biological and archaeological data through the lens of social theory to understand how those at Golemi may have related to the broader Mycenaean cultural identity and world through their lived experiences. Finally, since the site of Golemi is not located in the immediate vicinity of a palatial power, Golemi's skeletal population provides a new perspective on the manifestation of Mycenaean cultural identity.

As has been demonstrated throughout this dissertation, Golemi is one site of many in the regions of northeast Phokis and East Lokris. Much more analysis is needed of both the osteological and archaeological material of RCCT cemeteries in these areas so that regional trends can be assessed and compared to the better-known regions of the Peloponnese. Future directions of research at Golemi include the development of statistical methodology appropriate for the assessment of the organization of tombs within a cemetery based on the relative osteological and archaeological compositions of each tomb while accounting for the uneven sample sizes of the biological traits. Hierarchical Bayesian analysis may provide a way to accomplish this task. The methodology could be then be broadly applied within and between other RCCT cemeteries.

Given the early establishment of the cemetery at Golemi, I would like to explore how the RCCT was introduced to the area. Strontium and oxygen isotope analysis, a biochemical method used to determine the birthplace of an individual, could be used to establish whether any of the individuals from the earliest tombs of the cemetery were non-local, potentially suggesting that the custom was brought by people physically moving into the area. Radiocarbon dating via accelerated mass spectrometry would provide a way to date burials in conjunction with grave

goods, thereby providing a framework for a diachronic analysis of the skeletal material. Finally, more extensive excavation should be done at Golemi since one more RCCT has been found in the vicinity of the cemetery (Dimaki 2013). Not only would this provide a better idea of the size of the cemetery, but it would potentially provide more non-looted tombs and the opportunity to study more taphonomic aspects of the skeletal remains alongside material artifacts.

The archaeological definition of Mycenaean cultural identity has been built over time primarily through the study of artifacts and architecture. This dissertation has demonstrated that it is necessary to consider the contextualized human skeletal material of the individuals who made the artifacts and built the architecture of the Mycenaean civilization to construct a more nuanced understanding of how cultural identity was embodied and structured by the lived experiences of ordinary people. Such an approach is not confined to the study of Mycenaean or Greek cultures but should be applied to the study of all cultures, both past and present.

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APPENDIX

Table A1. MNI data per tomb excluding dental traits

Tomb	Cribra Orbitalia	MNI Observed	Porotic Lesions	MNI Observed	Periostitis MNI	MNI Observed	Entheseal Changes MNI	MNI Observed	DJD MNI	MNI Observed	PI Average	N Observed	Cranial Trauma	MNI Observed
85.I	0	1	0	1	0	3	1	3	1	3	65.0	3	1	3
85.II	0	0	0	0	1	2	1	2	0	2	79.6	2	0	1
88.I	3	13	0	6	4	27	4	14	3	13	76.1	21	0	6
88.II	3	7	1	11	2	23	4	13	1	9	75.0	24	2	11
III	1	7	0	10	1	10	2	7	1	8	74.9	12	0	10
IV	0	0	0	3	3	4	0	4	0	2	74.5	4	1	3
V	0	0	0	6	0	6	1	3	0	1	83.1	1	0	6
VII	0	8	0	7	0	23	3	16	1	6	76.5	18	2	7
IX	0	2	0	4	1	4	0	4	0	3	77.8	8	0	4
X	0	4	1	8	3	9	3	6	0	3	76.0	9	2	8
XI	0	1	0	3	0	3	0	2	0	3		0	0	3
XII	0	0	0	3	0	4	0	3	1	1		0	0	3
XIII	6	8	0	12	1	31	7	20	4	15	74.6	25	0	12
XIV	0	0	0	3	0	3	1	2	0	2	72.1	1	0	3
XV	0	1	0	1	0	4	1	3	0	1	76.7	3	0	1
XVI	1	17	1	17	3	27	2	17	3	10	75.1	28	6	17
XX	0	0	0	0	0	2	0	2	0	0	73.9	1	0	0
XXIV	0	3	0	9	1	13	3	6	1	6	71.4	7	2	9
XXV	3	6	0	6	3	9	2	5	3	9	76.0	9	0	6
XXVI	1	8	1	12	5	19	2	11	2	8	72.8	19	0	12
XXVII	1	6	3	11	5	17	4	14	2	10	75.7	12	4	13
XXVIII	1	4	0	5	1	11	2	7	1	3	80.7	2	0	5
XXIX	0	0	0	0	0	4	0	3	0	3		0	0	0
Total	20	96	7	138	34	258	43	167	24	121	75.9	209	20	143

Table A2. Non-dental fragment data

Tomb	Periostitis Fragments	Total Fragments	Entheseal Changes	Total Fragments	DJD Fragments	Total Fragments
85.I	0	27	3	17	1	9
85.II	1	31	1	11	0	13
88.I	12	288	20	137	10	107
88.II	2	185	10	124	3	77
III	2	184	15	76	4	64
IV	4	61	0	29	0	18
V	0	12	2	7	0	6
VII	0	281	5	162	2	57
IX	1	42	0	34	0	7
X	6	46	7	36	0	19
XI	0	15	0	7	0	6
XII	0	10	0	3	0	3
XIII	3	491	24	215	14	185
XIV	0	36	1	21	0	3
XV	0	22	1	15	0	6
XVI	5	291	10	168	6	96
XX	0	11	0	11	0	0
XXIV	5	127	12	74	2	46
XXV	7	228	6	88	17	100
XXVI	13	232	11	136	8	110
XXVII	13	227	17	113	5	51
XXVIII	1	116	6	76	1	13
XXIX	0	0	0	0	0	0
Total	75	2963	151	1560	73	996

Table A3. Dental MNI and Tooth Data

Tomb	AMTL	Abscess	MNI Observed Mandibles	LEH	Caries	Calculus	MNI Observed Teeth	AMTL Teeth	LEH Teeth	Abscess Teeth	Caries Teeth	Calculus Teeth	Total Teeth	Total Sockets
85.I	0	0	1	1	0	0	1	0	13	0	0	0	14	14
85.II			0	0	0		0	0	0	0	0	0	5	0
88.I	6	0	10	7	3	1	9	24	19	0	6	0	120	153
88.II	0	0	4	2	1	0	4	0	7	0	1	0	37	52
III	2	0	6	3	2	0	6	10	13	0	5	0	71	95
IV	2	1	2	0	0	0	2	7	0	1	0	0	8	15
V	0	0	1	1	0	0	1	0	1	0	0	0	8	11
VII	3	0	7	2	0	0	6	6	4	0	0	0	54	73
IX	1	1	2	1	0	0	2	5	1	1	0	0	15	19
X	0	0	1	0	0	0	1	0	0	0	0	0	4	6
XI			0				0						0	0
XII	1	0	2	1	0	0	2	4	3	0	0	0	7	13
XIII	3	1	14	3	6	2	13	9	14	1	12	2	144	168
XIV	1	0	2	0	0	0	1	8	0	0	0	0	4	16
XV	0	0	2	0	0	0	2	0	0	0	0	0	12	18
XVI	2	1	9	4	2	1	8	5	7	1	3	3	93	125
XX			0				0						0	
XXIV	3	1	6	2	2	2	6	11	6	5	3	9	39	93
XXV	5	0	6	3	1	3	6	40	7	0	4	10	73	145
XXVI	4	0	6	1	2	0	6	17	1	0	6	0	55	87
XXVII	6	0	8	6	2	2	8	15	26	0	3	4	66	100
XXVIII	5	1	5	0	0	0	2	13	0	2	0	0	7	31
XXIX	0	0	1	0	0	0	1	0	0	0	0	0	14	12
Total	44	6	95	37	21	11	87	174	122	11	43	28	850	1246

VITA

Kaitlyn grew up in Garland, Texas. She attended Texas A&M University in College Station where she double majored in Anthropology and Classics, receiving her Bachelor of Arts degree in May 2011. As an undergraduate student, she participated in archaeological projects in Greece, Poland, and Egypt, where she contributed to excavation processes, lab activities, and bioarchaeological research. Kaitlyn continued to graduate school at the University of Tennessee in Knoxville in August 2011. At the University of Tennessee, she was a Graduate Research Assistant to Dr. Aleydis Van de Moortel, Graduate Research Assistant for the Molecular Anthropology Laboratory, Graduate Teaching Assistant in the Department of Biology, and a Graduate Teach Assistant for anatomy courses in the Department of Ecology and Evolutionary Biology. Kaitlyn also participated in fieldwork at Mitrou, Corinth, and Karya in Greece where she excavated, conducted bioarchaeological research, and collaborated with archaeologists from the Greek Archaeological Service. She received her doctorate in Anthropology in December 2019 and is currently employed as a postdoctoral research associate and forensic anthropologist at the Defense POW/MIA Accounting Agency Laboratory on Offutt Air Force Base near Omaha, Nebraska.