



5-2016

An Epidemiological Study of Ankle Injuries among Football Players at a Division I University

Amy Elizabeth Estep

University of Tennessee-Knoxville, aestep3@vols.utk.edu

Follow this and additional works at: https://trace.tennessee.edu/utk_chanhonoproj

 Part of the [Other Kinesiology Commons](#)

Recommended Citation

Estep, Amy Elizabeth, "An Epidemiological Study of Ankle Injuries among Football Players at a Division I University" (2016).

University of Tennessee Honors Thesis Projects.

https://trace.tennessee.edu/utk_chanhonoproj/1914

This Dissertation/Thesis is brought to you for free and open access by the University of Tennessee Honors Program at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in University of Tennessee Honors Thesis Projects by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact trace@utk.edu.

An Epidemiological Study of Ankle Injuries among Football Players at a Division I

University

Amy Estep

Faculty Mentor: Eugene Fitzhugh, PhD

Department of Kinesiology, Recreation, & Sport Studies

The University of Tennessee, Knoxville TN

Spring 2016

ABSTRACT

Ankle injuries are one of the most common injuries experienced by collegiate football players¹.

Analysis of ankle injury reports can help sports medicine staff prevent these types of injuries among football athletes by better understanding the factors surrounding the injury². The purpose

of this study was to examine the risk factors associated with ankle injuries (N=120) experienced by football players (N=222) at a Division I University during three football seasons (August

2013-December 2015). **METHODS:** De-identified data from the Sports Injury Monitoring System (SIMS) was used to calculate ankle injury incidence rates (per 1,000 exposures) by player position and type of field (grass vs. turf). Risk profiles of ankle injuries were also

examined by the severity of the injury and the activity taking place at the time of the injury.

RESULTS: Overall, the ankle incidence rate was 1.74 injuries per 1,000 athlete-exposures (A-E).

By playing surface, grass had a higher incidence rate (2.26 per 1,000 A-E) compared to turf (1.14 per 1,000 A-E). Incidence rates vary by player position and type of field. **DISCUSSION:** Ankle

injuries were at highest risk to be a sprain on a grass field while wearing full pads during practice and unlikely to result in missed activities.

INTRODUCTION

Notwithstanding the overwhelming evidence of the health benefits, including prevention of chronic diseases and premature death, that regular sport activity provides, participation in contact sports also increases danger of musculoskeletal injury. The game of football is an exciting, high velocity contact sport, which has earned it the documented highest rate of injury among all sports^{3,4}. Countless amounts of resources, money, and hours by health care professionals are invested regularly in preventative action to decrease injury incidence and severity. In fact, the formation of the National Collegiate Athletic Association (NCAA) occurred to improve the safety of football, so it could remain an American sport¹. Ankle injuries are the most common injury among football players¹ and often result in decreased performance, time loss from sport, and physiological problems, including swelling, pain, bruising, and reduced mobility⁵. One NCAA descriptive epidemiological study found the rate of ankle injuries to be 11.35 per 10,000 A-E and lateral ankle sprains to be the most common of foot and ankle injuries³. However, there is very little evidence on the surrounding situations by which ankle injuries occur. Injury epidemiology provides a means of describing and identifying the sport injury problem, understanding the risk factors surrounding the injury, and measuring the effectiveness of preventative actions². A major controllable risk factor of ankle injuries is playing surface⁸. The results of many studies are not consistent as to whether natural grass or artificial turf poses a greater risk of injury^{1,3,7}. A relatively new type of turf, FieldTurf, is composed of a polyethylene fiber blend stabilized with a graded silica sand and cryogenically ground rubber infill to mimic the features of grass and provide an alternative, safer playing surface⁷. The football program studied installed an indoor practice field in 2010 with FieldTurf and regularly utilizes this field for indoor practices and workouts. Due to the disagreement of scientific literature comparing

ankle injuries on various playing surfaces, a focus was placed on this risk factor and, consequently, exposure and incidence rates for grass and turf were determined, in addition to overall ankle injury incidence rate by player position.

PURPOSE

The purpose of this secondary data analysis study is to examine the risk factors associated with ankle injuries experienced by football players at a Division I university during three football seasons (2013-2015).

METHODS

Data for this study was obtained from the Sports Injury Monitoring System (SIMS) from a Division I University during three football seasons (August 2013-December 2015). De-identified data from 222 players indicated 120 ankle injuries were reported among a subset of 79 athletes.

- Ankle injury incidence rates (per 1,000 exposures) were calculated in SPSS statistical software.
- Incidence rates were calculated by type of field (grass vs. turf), and player position.
- Risk profiles of ankle injuries were also examined by the severity of the injury, equipment worn, and the activity taking place at the time of the injury.
- This study was approved by the UTK IRB human subjects.

RESULTS

Ankle Injury Risk Profile (See Table 1)

- In total, players were exposed to 45,466 practices, scrimmages, and games over the 3-year timeframe.
- Injuries were most likely to be diagnosed as a sprain and were equally distributed between left and right sides.
- The injury most often occurred in the practice setting (56.3%) with players wearing full pads (77.7%).
- 28.3% of the injuries resulted in missed practice or games.
Of these athletes, they missed a median of 8.5 days.

Ankle Incidence Rates (See Figures 1, 2A, and 2B)

- The total ankle incidence rate was 1.74 per 1,000 athlete-exposures (A-E). (See Figure 1).
- The incidence rate was twice as high on grass (2.26 per 1,000 A-E) compared to turf fields (1.14 per 1,000 A-E).
- Running backs had the highest overall incidence (3.66), but only on grass (6.13)
- Defensive backs and offensive lineman have higher than average rates, regardless of the type of field
- The lowest injury rates were noted among wide receivers, specialists, and quarterbacks.

Table 1. Profile of Ankle Injuries (N=120)

Injury Profile	N	Valid (%)
Location of Injury		
Right Ankle	54	55
Left Ankle	66	45
Type of Injury		
Sprain	102	85.7
General Trauma	16	13.4
Fracture	1	0.8
Activity Setting		
Practice	58	56.3
Game	38	36.9
Scrimmage	7	6.8
Protective Gear Worn		
Full Pads	80	77.7
Shells	21	20.4
Vest	2	1.9
Player Position		
Offensive Line	26	21.7
Defensive Line	20	16.7
Defensive Back	20	16.7
Running Back	15	12.5
Wide Receiver	13	10.8
Linebacker	13	10.8
Tight End	8	6.7
Specialist	4	3.3
Quarterback	1	0.8
Missed Activities		
Overall player (%)	34	28.3
Number Activities (Median)	34	8.5 Median Activities

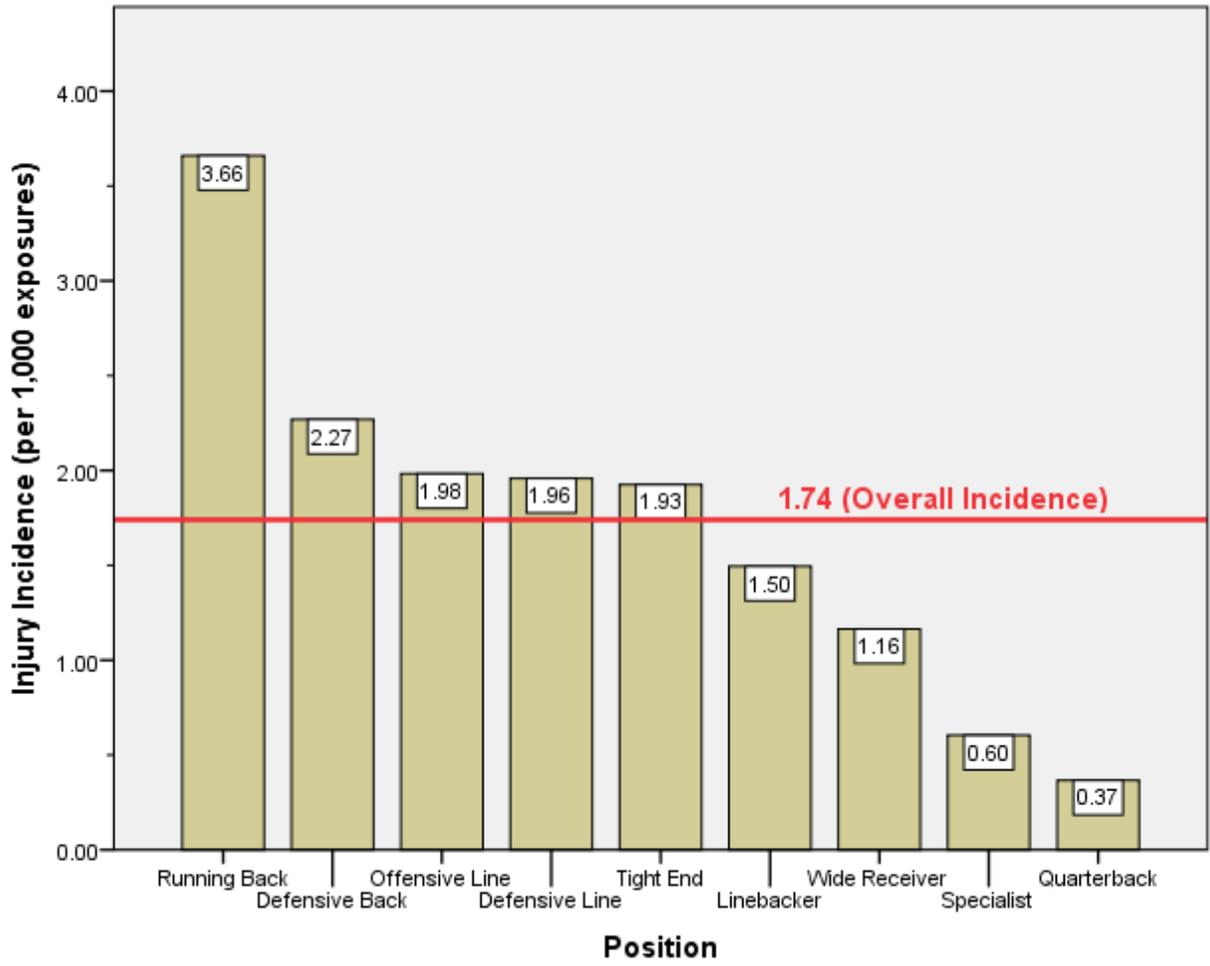
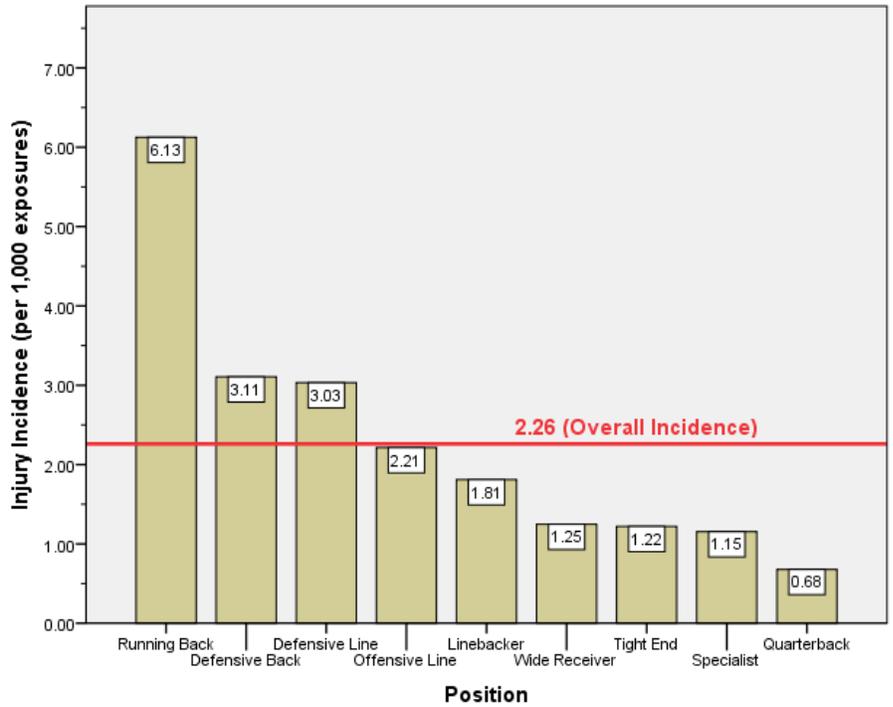
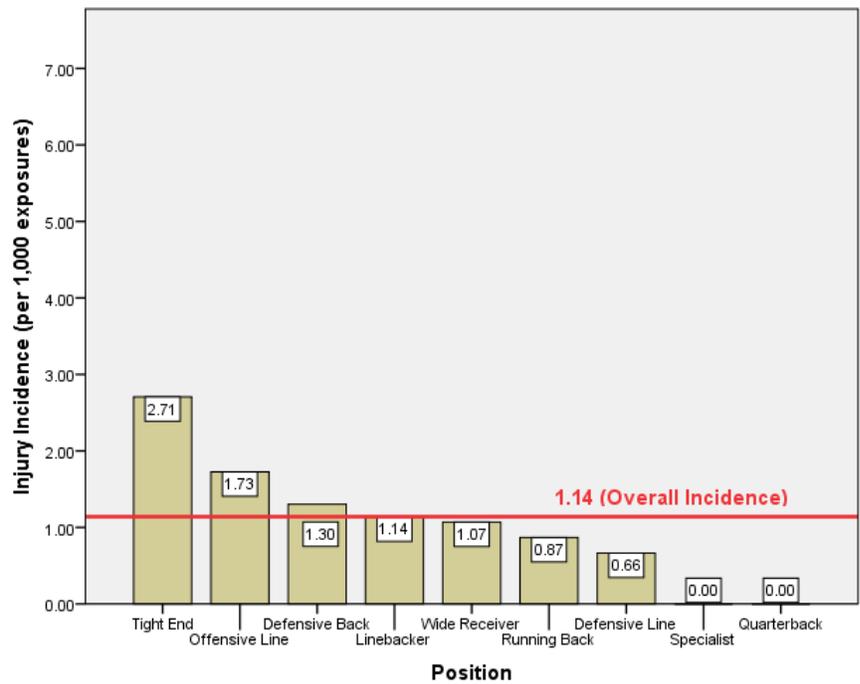


Figure 1. Overall Ankle Injury Incidence Rates by Position



(A) Grass



(B) Turf

Figure 2. Ankle Injury Incidence Rates by (A) Grass Surface and (B) Turf Surface.

DISCUSSION

- This one of the few studies to report overall ankle injury incidence rates among U.S. Division 1 University football players. The rate among this sample was 65% higher than a previously reported rate among NCAA football players³.
- This study examined risk factors surrounding ankle injury (setting, gear, position group, surface). Analyzing incidence rates by protective device worn, such as tape or brace, could indicate effectiveness of preventive actions⁶. Correlating incidence and severity of each condition could prioritize focus and resources³.
- The ankle injury incidence rate on grass was 2x greater than turf. Future research should examine the contribution by which the properties of the playing surface⁷, the lower intensity/contact of non-practice workouts on the indoor FieldTurf, shoe design⁸, and outdoor weather conditions⁹ have towards ankle injury rates.
- Further investigations should investigate the mechanism of injury (contact vs. noncontact), type of play (running vs. passing), role of player when injured (special teams), period of practice (scrimmage at end), and position specific requirements (biomechanics) that lead to injury.

REFERENCES

1. Dick, R., Ferrara, M. S., Agel, J., Courson, R., Marshall, S. W., Hanley, M. J., & Reifsteck, F. (2007). "Descriptive epidemiology of collegiate men's football injuries: National Collegiate Athletic Association Injury Surveillance System, 1988-1989 through 2003-2004." *J Athl Train*, 221-233.
2. Van Mechelen W, Hlobil H, Kemper HCG. Incidence, severity, aetiology and prevention of sports injuries: a review of concepts. *Sports Med*. 1992;14:82–99.
3. Lievers, W. Brent, and Peter F. Adamic. "Incidence and Severity of Foot and Ankle Injuries in Men's Collegiate American Football." *Orthopaedic Journal of Sports Medicine* 3.5 (2015): 2325967115581593. PMC. Web. 7 Apr. 2016.
4. Yang, Jingzhen et al. "Epidemiology of Overuse and Acute Injuries Among Competitive Collegiate Athletes." *Journal of Athletic Training* 47.2 (2012): 198–204. Print.
5. Cailbhe Doherty, Eamonn Delahunty, Brian Caulfield, Jay Hertel, John Ryan, Chris Bleakley. The Incidence and Prevalence of Ankle Sprain Injury: A Systematic Review and Meta-Analysis of Prospective Epidemiological Studies. *Sports Medicine* 44 (2014): 123-140. Web 09 October 2013.
6. Olmsted, Lauren C. et al. "Prophylactic Ankle Taping and Bracing: A Numbers-Needed-to-Treat and Cost-Benefit Analysis." *Journal of Athletic Training* 39.1 (2004): 95–100. Print.
7. Elliott B. Hershman, Robert Anderson, John A. Bergfeld, James P. Bradley, Michael J. Coughlin, Robert J. Johnson, Kurt P. Spindler, Edward Wojtys, John W. Powell, and for the National Football League Injury and Safety Panel. An Analysis of Specific Lower Extremity Injury Rates on Grass and FieldTurf Playing Surfaces in National Football League Games:

2000-2009 Seasons Am J Sports Med October 2012 40 2200-2205; published online before print September 12, 2012, doi:10.1177/0363546512458888

8. Villwock, M., Meyer, E., Powell, J., Fouty, A., Haut, R. Football Playing Surface and Shoe Design Affect Rotational Traction. Am J Sports Med. March 2009, 37(3) 518-525.
9. Orchard JW , Powell JW. Risk of knee and ankle sprains under various weather conditions in American football. Medicine and Science in Sports and Exercise 2003, 35(7):1118-1123.
Web.