

An Epidemiological Study of Ankle Injuries Among Football Players At A Division I University

Amy Estep

Faculty Mentor: Eugene Fitzhugh, Ph.D.

Department of Kinesiology, Recreation, & Sport Studies. The University of Tennessee, Knoxville TN

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

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}. 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.

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 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 equally distributed between left and right sides.
- Injuries most often occurred during practice (56.3%) with players wearing full pads (77.7%).
- 28 of the injuries resulted in missed practices 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 A-E.
- Incidence rates were 2x 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 of injury (3.66), but only on grass (6.13)
- Defensive backs and offensive linemen have higher than average incidence 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	66	55
Left Ankle	54	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
Equipment 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

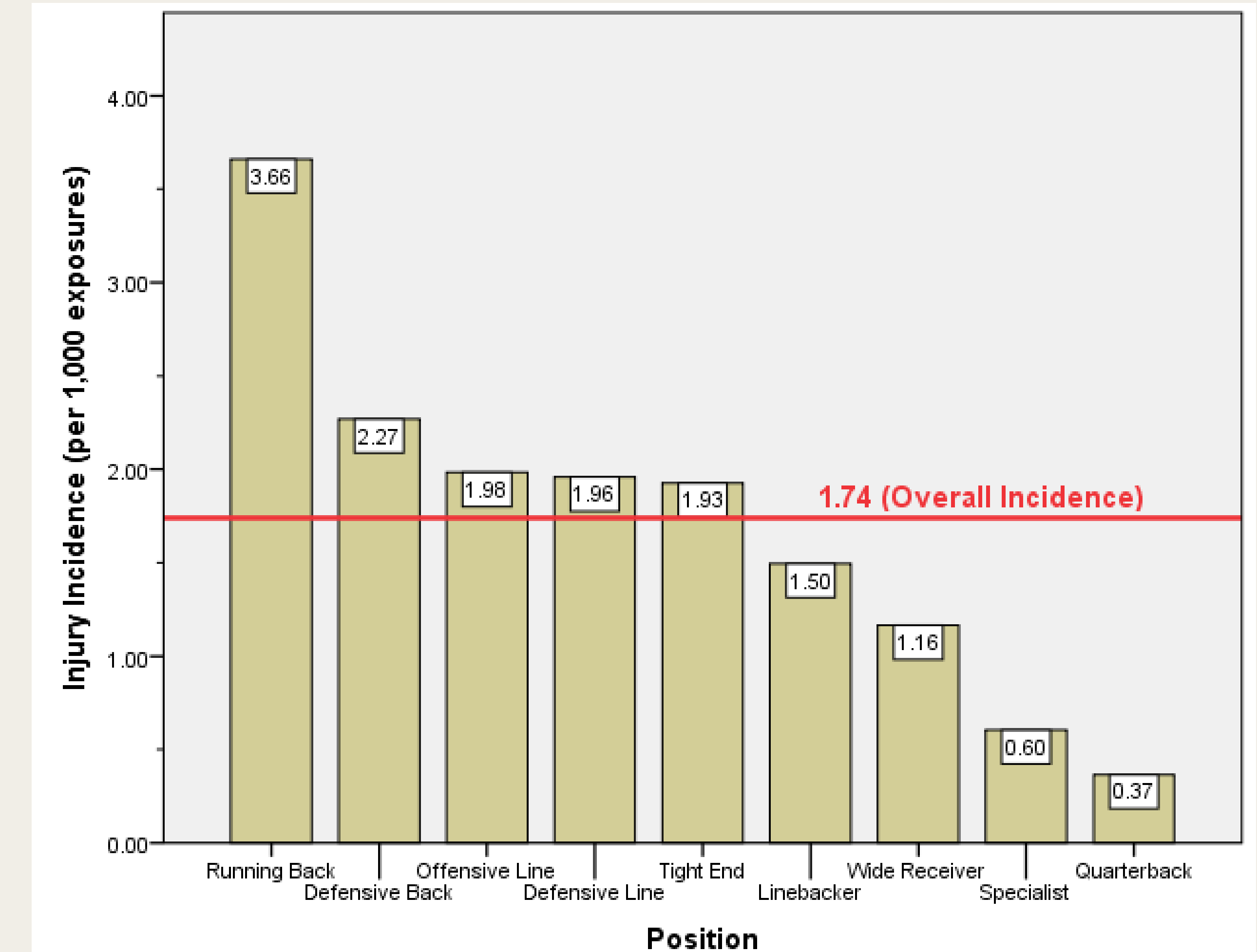


Figure 1. Overall Ankle Injury Incidence Rates by Position.

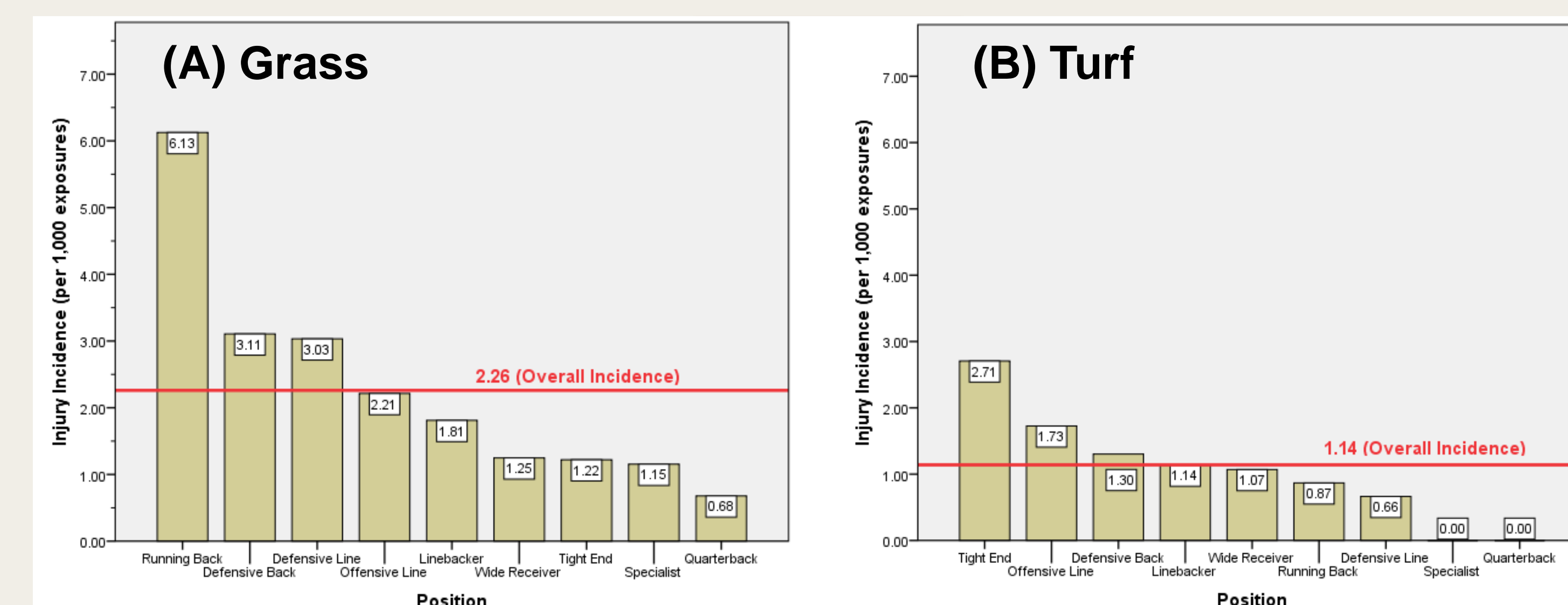


Figure 2. Ankle Injury Incidence Rates by (A) Grass Surface and (B) Turf Surface.

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., Ferrera, M. S., Apel, J., Courson, R., Marshall, S. W., Hanley, M. J., & Reilstock, 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., Hibell, H., Kemper, H.C.G. Incidence, severity, aetiology and prevention of sports injuries: a review of concepts. *Sports Med*, 1992;14:82-99.
3. Leivers, W., Brent, and Peter F. Adams. "Incidence and Severity of Foot and Ankle Injuries in Men's Collegiate American Football." *Orthopaedic Journal of Sports Medicine* 3.5 (2015): 232587115581593. PMC. Web. 7 Apr. 2016.
4. Yang, Jingchen et al. "Epidemiology of Overuse and Acute Injuries Among Competitive Collegiate Athletes." *Journal of Athletic Training* 47.2 (2012): 198-204. Print.
5. Cahill, Deborah; Edmund Delamater; Brian Costello; Jay Healey; John Ryan; Orla Blewley. "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 08 October 2013.
6. Omland, Lauren G. 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 Wojty, 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:10.1177/0363546812448888
8. Villwock, M., Meyer, E., Powell, J., Fouly, A., Haut, R. "Football Playing Surface and Shoe Design Affect Rotational Traction." *Am J Sports Med*, March 2008, 37(3): 518-525.
9. Orchard, J.W., Powell, J.W. 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.