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

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## **ABSTRACT**

Ankle injuries are one of the most common injuries experienced by collegiate football players<sup>1</sup>.

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 injury<sup>2</sup>. 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<sup>3,4</sup>. 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 sport<sup>1</sup>. Ankle injuries are the most common injury among football players<sup>1</sup> and often result in decreased performance, time loss from sport, and physiological problems, including swelling, pain, bruising, and reduced mobility<sup>5</sup>. 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 injuries<sup>3</sup>. 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 actions<sup>2</sup>. A major controllable risk factor of ankle injuries is playing surface<sup>8</sup>. The results of many studies are not consistent as to whether natural grass or artificial turf poses a greater risk of injury<sup>1,3,7</sup>. 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 surface<sup>7</sup>. 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 linemen 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)

<b>Injury Profile</b>	<b>N</b>	<b>Valid (%)</b>
<b>Location of Injury</b>		
Right Ankle	54	55
Left Ankle	66	45
<b>Type of Injury</b>		
Sprain	102	85.7
General Trauma	16	13.4
Fracture	1	0.8
<b>Activity Setting</b>		
Practice	58	56.3
Game	38	36.9
Scrimmage	7	6.8
<b>Protective Gear Worn</b>		
Full Pads	80	77.7
Shells	21	20.4
Vest	2	1.9
<b>Player Position</b>		
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
<b>Missed Activities</b>		
Overall player (%)	34	28.3
Number Activities (Median)	34	8.5 Median Activities

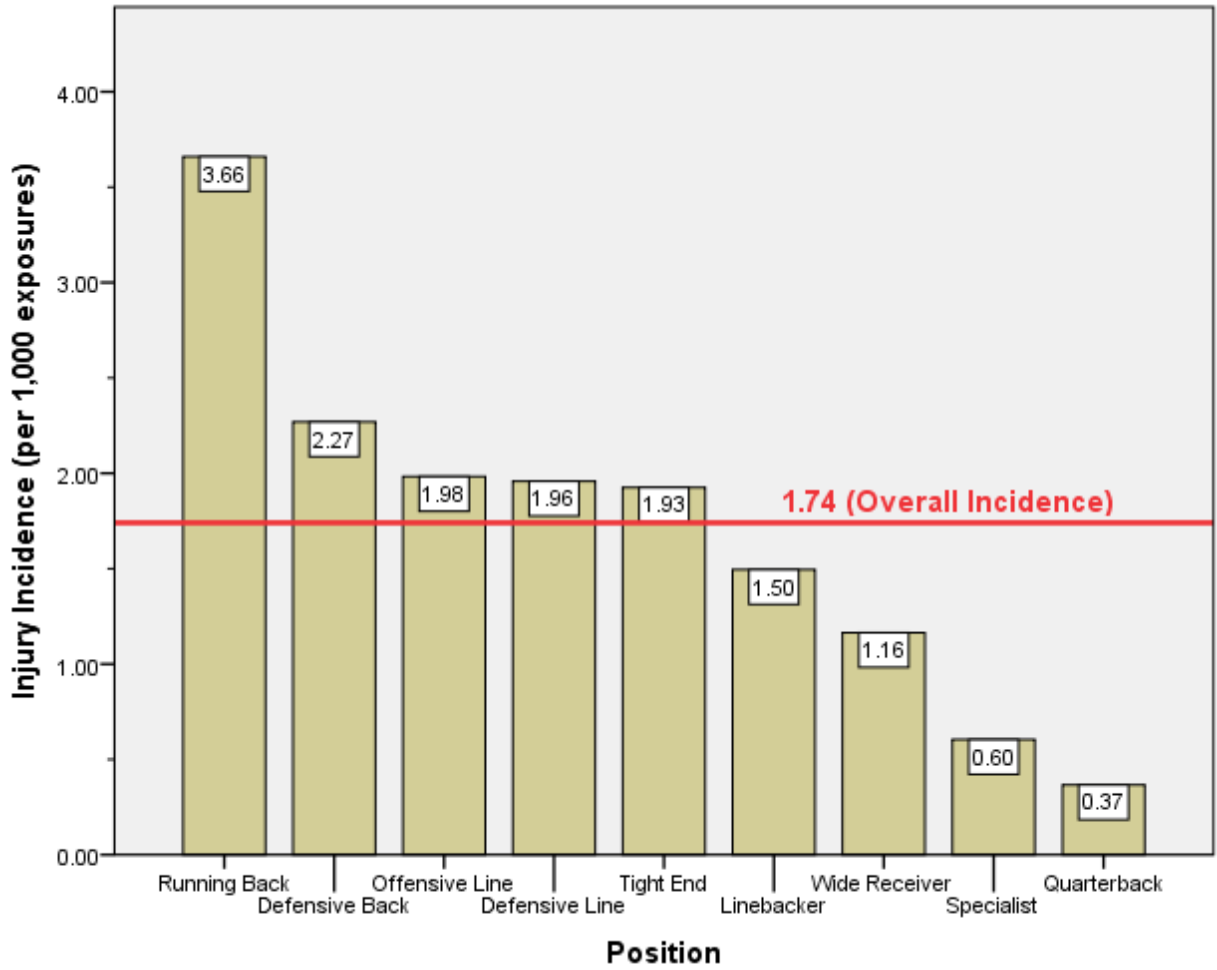
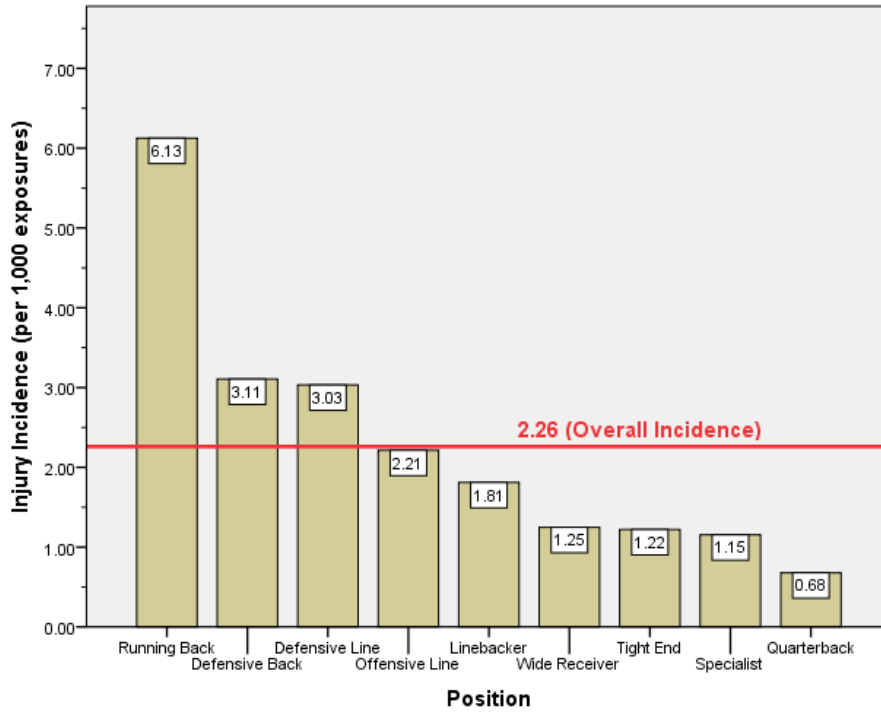
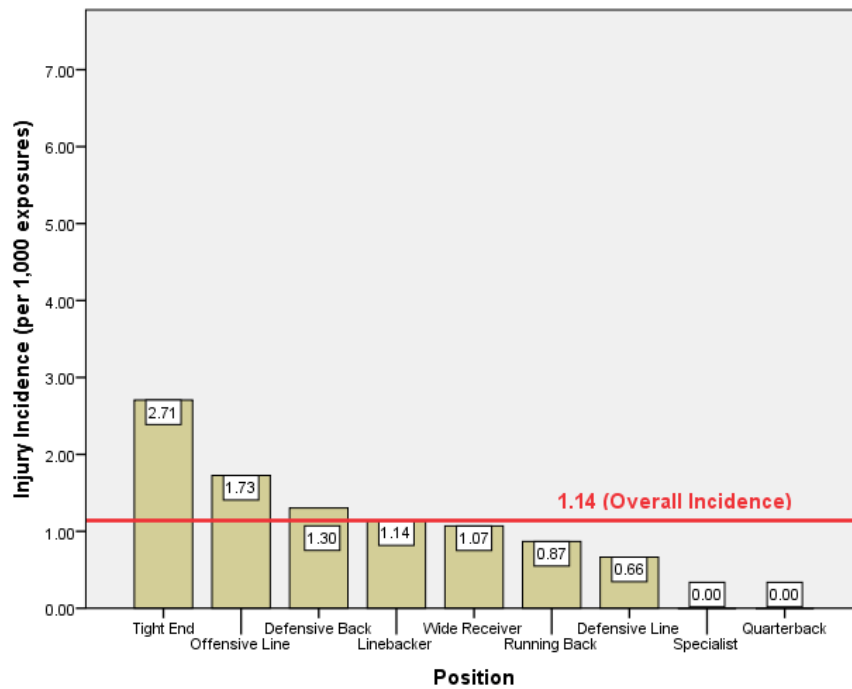


Figure 1. Overall Ankle Injury Incidence Rates by Position



(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 players<sup>3</sup>.
- 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 actions<sup>6</sup>. Correlating incidence and severity of each condition could prioritize focus and resources<sup>3</sup>.
- 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 surface<sup>7</sup>, the lower intensity/contact of non-practice workouts on the indoor FieldTurf, shoe design<sup>8</sup>, and outdoor weather conditions<sup>9</sup> 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.

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