

# Incidence of Lower Extremity Injuries in 14- to 18-Year-Old Female Lacrosse Players from Long Island

Elizabeth Piselli, DPM, Dominic J. Catanese, DPM, and Eric G. Walter, DPM

## Abstract

*Women's lacrosse is a relatively young sport in the United States. The goal of this study was to determine which lower extremity injuries are prevalent in the game of lacrosse so that better training programs and protective equipment can be applied. Women's lacrosse is nearly an entirely different game than men's lacrosse and is expected to have unique injury patterns that have yet to be investigated. The authors polled 200 female lacrosse players of the Long Island Elite Lacrosse Club. Of those, 76 returned the survey with proper consent. Of the 76, only 14 reported never having an injury. A majority of the athletes that reported one or more injuries either self-treated or solely saw the team trainer without a doctor follow-up. While there are limitations to the study, it is clear community outreach is needed to guide players to seek treatment when injured.*

The game of lacrosse originated from a Native American tradition that tested young warriors without the perils of actual combat. When the French explorers came to the New World, they renamed the sport La Crosse, meaning “the stick,” after the only piece of equipment used during play. The women's style most closely resembles the Native American game in that very little protective equipment is used during play. Only recently did the National Collegiate Athletic Association (NCAA) mandate the use of protective goggles.

Each time an athlete plays, her agility, speed, strength, and endurance are tested. Women's games typically last two 30-minute halves at the college level and two 25-minute halves at the high school level. There are 11 field players and one goalie that play on a field per team. While historically the Native American field would span up to two miles, modern field size is usually 116 to 140 yards long by 60 to 70 yards wide. The nature of the game includes east-west, north-south motion, including lateral cutting and jumping. Games are typically played on one of three surfaces: grass fields, Astro-Turf® fields, and synthetic grass known as FieldTurf®.

While it is becoming continually popular for girls in the United States, lacrosse injury patterns are not well researched. The most extensive research in the sport has been head and orbital injuries which led to the mandate of protective eyewear in the NCAA in 2004.<sup>1</sup> According to Dick et al,<sup>2</sup> more than 60% of all game and practice injuries are to the lower extremity. The NCAA surveillance data reveal that the women's lacrosse game injury rate is 8.4 per 1,000 athlete exposures.<sup>3</sup> To our knowledge, there has been no women's lacrosse-specific research limited to the lower extremity.

The investigators would like to determine what the sport-specific lower extremity injuries are in lacrosse so that better training programs, post-injury protocols, and protective equipment can be applied. It has been determined that the NCAA Division 1 female lacrosse players have similar fitness levels to the other female athletes in Division 1 sports yet have a higher body fat percentage.<sup>4</sup> This leads us further to believe that proper training is close to where it needs to be. The research into the men's game is not enough. Not only are typical injuries within the same sport different for men and women,<sup>5</sup> the women's game is also a vastly different game than the men's, so it is expected to have its own unique injury patterns.

It was hypothesized by the investigators that there is a correlation between surface specific shoe-gear and increased

Elizabeth Piselli, DPM, Department of Orthopaedic Surgery, Montefiore Medical Center, Bronx, New York, USA. Dominic J. Catanese, DPM, Chief of Podiatric Surgery and Podiatric Medicine Residency Program Director, Montefiore Medical Center and Montefiore Mount Vernon Hospital, Bronx, New York, USA. Eric G. Walter, DPM, Residency Director, Montefiore Medical Center, Bronx, New York, USA.

Correspondence: Elizabeth Piselli, DPM; dcatanes@montefiore.org.

Age: \_\_\_\_\_ What position do you play? \_\_\_\_\_

How long have you played lacrosse? \_\_\_\_\_

How many other sports do you play? \_\_\_\_\_

Have you ever been injured? Yes / No

Please check all injuries to the Lower extremity you have experienced: (below the hip including ankle and foot)

Ankle sprain

ACL Tear

Turf toe

Fractured bones

Shin splints

Toenail injury

None

Other: \_\_\_\_\_

Who did you see to treat the injury? (Check all that apply)

Trainer

Orthopedic

Podiatrist

Did nothing

Do you wear any protective braces to play? (Check all that apply)

Knee brace/s

Ankle brace/s

Tape your ankle/s

None

Other: \_\_\_\_\_

What surfaces do you play on? (Check all that apply)

Turf

Field turf

Grass

What shoe gear do you commonly train/play in? (Check all that apply)

Sneakers

Turf shoes

Cleats

Were you happy with the way the injury was treated? Yes / No

How did this injury effect your playing? (Were you able to go back to full function?)

How long were you out for, if at all for each injury?

Would you do the same treatment if you had to do it over again? Yes / No

**Figure 1** Questionnaire handed to all participants.

incidence of injury and that the athletes are not seeking treatment for the injuries that they are experiencing. Additionally, the authors hypothesize that while some of these injuries can be treated, the athletes are not seeking any type of treatment, let alone treatment by foot and ankle specialists.

## The Study

A questionnaire survey was distributed to the athletes asking them to provide information about their injuries while playing lacrosse (Fig. 1). The target population was female

lacrosse players aged between 14 to 18 that play for a completion-level lacrosse team (i.e., club or travel team). Because participants were members of an elite lacrosse club, it can be assumed that players were physically fit and that injuries reported were more likely due to the nature of the sport than under-training. The LI Elite Lacrosse Club agreed to provide access to the the athletes at a Long Island tournament. The investigators handed out surveys to the players, the players filled out the survey without incentive. All participation was voluntary. Since many of the participants were minors, in-

**Table 1** Distribution (\*Some Girls Identified as Playing More Than One Position)

Position	Years Played	Age	Other Sports	Reported One or More Injuries	Field Types
Offense: 28 Defense: 27 Midfield: 22 Goal: 6	7.6	15.32	1.8	63	3

formed consent was provided by parents, and if consent was not documented, the results of the survey were discarded. Of the 200 athletes at the tournament, 76 girls returned the survey with proper consent. Of the 76 female athletes that participated, the mean age was 15.32 years.

There was an even mix of positions played among the participants, which included 28 offensive players, 27 defensive players, 22 midfielders, and 6 goalies (Table 1). There was a mean of 7.6 years played, and the athletes played a mean of 1.8 other sports in addition to lacrosse. Of the 76 girls, 63 reports injuries: 27 reported previous ankle sprains, 11 reported toenail injuries, 7 reported turf-toe injuries, 22 reported shin splints, and 13 girls reported no injury (Table 2). Ten of the athletes reported some type of knee injury (four ACL, two meniscus, and four reported “other”). Interestingly, of the 76 girls, 47 reported to currently wearing ankle braces, and 13 reported using taping as a protective brace, some of whom reported no ankle injury. Of the 60 girls who reported injuries, 37 reported being able to return to full function after treatment. As far as treatment, 35 sought care of an orthopedic surgeon, 32 went to their trainer for treatment, and seven consulted a podiatrist (Fig. 2). Fifty-four of the girls reported being happy with the treatment, 53 reported that they would receive the same treatment, and 37 stated that after injury they were able to return to full function.

In the shoe-gear line of questioning, only 14 players answered to wearing the proper shoes for every field surface

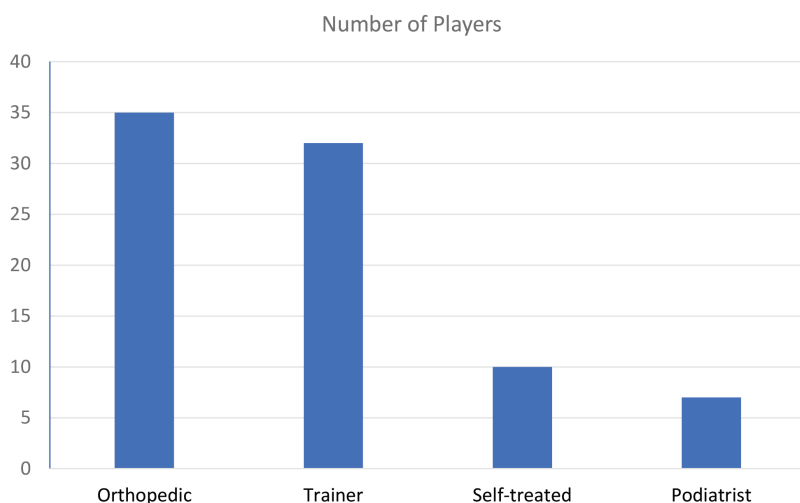
**Table 2** Results Versus Shoe Gear, Non-Sneaker Represents Turf Shoe or Cleat

	Sneakers (30 total)	Non-Sneakers (46 total)
Foot or Ankle Injury	22 (73%)	30 (65%)
Other Injury	2 (7%)	8 (17%)
No Injury	6 (20%)	8 (17%)

they played on. Proper shoes were determined to be turf shoes for AstroTurf® and cleats for FieldTurf® and grass. Thirty admitted to wearing sneakers on at least one of the surfaces, though it is not currently recommended for any of the aforementioned surfaces. Due to the line of questioning, we were unable to determine correlation to shoe gear and injury pattern. This needs further investigation.

**Limitations to the Study**

After reading the players’ answers to the survey, it was determined that some questions that seemed to the authors to be clear-cut were not easily answered by all participants, so many of the questions in the survey had to be disregarded for a lack of uniformity in participant responses. Though a large percentage of the athletes that answered the surveys had some type of injury in their career, this may be a skewed number as the players with injury would be more likely to



**Figure 2** Distribution of sought treatment.

participate. Another limitation may be the venue chosen to recruit survey participants; the tournament setting may have caused players to be reluctant to be seen filling out injury surveys by college coaches as they may perceive that as making them less attractive candidates for recruitment. Prevalent in the athletic community is a “gladiator mentality,” which also may have led to under-reporting of injuries. A lack of knee injuries reported supports this theory.

Other limitations to the study would be any conclusions drawn by the injuries when related to shoe-gear. The numbers reported did not factor into account the weather or quality of playing surface and may have skewed the results.

## Discussion and Analysis

Due to the nature of the agility required for lacrosse, it is not surprising that 27 of the athletes reported ankle sprains, and yet few reported knee injuries despite all of the athletes in the study being female, and that females have a larger proclivity for knee injury. The authors believe that, inherent in the athletic population, is an attitude to not admit to injuries—the “gladiator mentality,” which may be why so many of the athletes reported wearing braces without reporting any previous injury.

The authors purposefully polled the athletes to determine their injuries, because other studies use injury reporting as their determination of injury rates. We have found in our own experience a reluctance among athletes to report injury, and with this study we determined that to be true. This underscores a need for community outreach to discuss the importance of treating injuries and even screening for prevention. As expected by the investigators, many of the injuries could be treated by podiatrists, yet few chose to go. This signifies the need for podiatrists to vocalize their skills to the athletic community. It is harrowing that such a young

and active population would have so few players without injury; however, as previously mentioned, it is probable that athletes who suffered injuries would be more likely to participate than those who did not.

It is difficult to determine, due to the line of questioning whether proper shoe gear per playing surface caused injury. The authors would like to determine that in a future study. A further study may include the trainers and coaches as resources as well as determining what treatments were used and why the athletes were satisfied or not.

## Conflict of Interest Statement

None of the authors have a financial or proprietary interest in the subject matter or materials discussed, including, but not limited to, employment, consultancies, stock ownership, honoraria, and paid expert testimony.

## References

1. Matz SO, Nibbelink G. Injuries in intercollegiate women's lacrosse. *Am J Sports Med.* 2004 Apr-May;32(3):608-11.
2. Dick R, Lincoln AE, Agel J, et al. Descriptive epidemiology of collegiate women's lacrosse injuries: National Collegiate Athletic Association Injury Surveillance System, 1988-1989 Through 2003-2004. *J Athl Train.* 2007 Apr-Jun;42(2):262-9.
3. Dick R, Romani WA, Agel J, et al. Descriptive epidemiology of collegiate men's lacrosse injuries: National Collegiate Athletic Association Injury Surveillance System, 1988-1989 Through 2003-2004. *J Athl Train.* 2007 Apr-Jun;42(2):255-61.
4. Enemark-Miller EA, Seegmiller JG, Rana SR. Physiological profile of women's Lacrosse players. *J Strength Cond Res.* 2009 Jan;23(1):39-43.
5. Decker MJ, Torry MR, Wyland DJ, et al. Gender differences in lower extremity kinematics, kinetics and energy absorption during landing. *Br J Sports Med (Bristol, Avon).* 2003 Aug;18(7):662-9.