

COMPARISON OF PRIMARY ARTHRODESIS AND OPEN REDUCTION AND INTERNAL FIXATION IN FEMALE COLLEGIATE SOCCER PLAYERS

OLIVIA BENNER
EXERCISE SCIENCE
GARDNER-WEBB UNIVERSITY



ABSTRACT

Lisfranc Injuries (LI) are rare but can be devastating to athletes. LI can be ligamentous, boney or a combination of both that occur in the midfoot, affecting the tarsometatarsal (TMT) joint complex. There are various treatment options for these types of injuries. Some require surgical intervention, which includes primary arthrodesis (PA) and open reduction and internal fixation (ORIF). The purpose of this study was to provide a sports-focused outcomes analysis of PA versus ORIF for LI based on return to sports protocol. It was hypothesized that collegiate female soccer players would return to sports faster with PA when compared with ORIF.

INTRODUCTION

- Lisfranc Injuries (LI) are categorized as rare with an incidence rate of only 0.2% of all fractures (Hu, 2014).
- However, LI can be detrimental to athletes that use their lower extremities for athletic performance and are the second most common athletic foot injury that occur in 4% of football players per year (Meyer, 1994).
- These injuries affect the tarsometatarsal (TMT) joint complex of the midfoot and can be boney, purely ligamentous, or a combination of both to the Lisfranc complex in the midfoot.
- Nunley and Vertullo (2002), created a classification system to properly diagnose and treat athletes with LI (See Figure 2).
- In sports, LI are typically low-energy injuries that happen when an axial longitudinal force occurs when the foot is plantar flexed and slightly rotated (Curtis et al., 1993).
- Primary arthrodesis (PA) and open reduction and internal fixation (ORIF) have both been clinically endorsed for adequate outcomes for the patients who undergo surgery for LI (Nunley & Vertullo, 2002).
- In a study by Cochran and colleges (2017) concluded patients treated with PA returned to full activity two months faster than those who had ORIF.

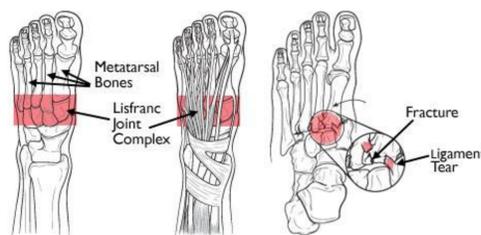


Figure 1: The Lisfranc Joint Complex (Lisfranc (midfoot) injury, 2017).

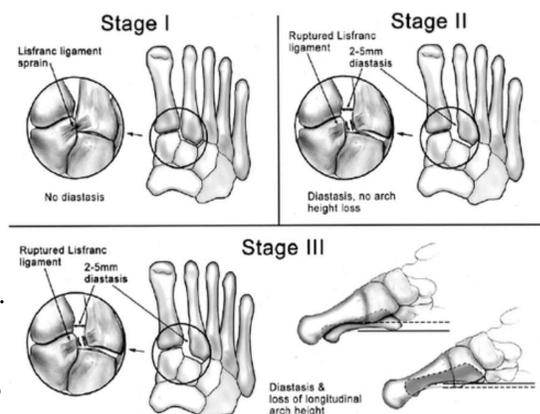


Figure 2: Nunley and Vertullo's Midfoot sprain classification system (Nunley & Vertullo, 2002)

METHODS

Participants

- Selected through Big South Conference women's soccer teams
- Emails were sent to Athletic Trainers of each team to forward to all athletes on the team to identify women's soccer players who suffered an LI
- Athletes were contacted by the researcher via email if they had an interest in participating.

Criteria

- Between the age of 18 and 25
- Suffered a LI from 2015-2020 while playing for a women's soccer team in the Big South Conference
- Completed the Informed Consent form

Instrumentation

- Retrospective Review
- Vertical Height Test
- Mile Time Test
- Time to Return to Play
- Foot and Ankle Ability Measure (FAAM)
- Visual Analog Scale (VAS)

Research Design

- Sports-focused outcomes analysis study
- The tests and questionnaires were completed by each participant at Gardner-Webb University.
- The tests and questionnaires were assessed to compare PA and ORIF

Data Analysis

- Two-sample, 2-tailed *t* tests were used to assess the differences in outcomes between PA and ORIF surgery by analyzing the test and questionnaire scores

OPERATIONAL DEFINITIONS

- Lisfranc Injuries:** Injuries to the midfoot that can be boney, ligamentous, or a combination of both (Kaar, 2020)
- Registry Review:** Consists of history, physical examination, physician interviews, prior medical records, and imaging studies completed at the time of injury and used to confirm each surgery and their return to physical activity time
- Sports-focused Outcome:** results related to sports
- Vertical Height Test:** Commonly used to assess athlete's vertical height and leg power when they jump. A timing mat is used, and an athlete stands both legs on it and jumps as high as they can three different times.
- Mile Time Test:** the aim of this test is to complete one mile in as short as time as possible. It is measured in mile per minute.
- Time to Return to Play:** based on the time the doctor cleared the patient to resume physical activities
- Foot and Ankle Ability Measure:** 29-item questionnaire divided into two subscales: The Foot and Ankle Ability Measure, and Activities of Daily Living Subscale. It provides a universal measure of change in physical functioning of patients with leg, ankle, and foot disorders. It asks a variety of questions and the patients must answer from "no difficulty" to "unable to do" (Irrgang, et.al. 2005)
- Visual Analog Scale:** A 10 cm horizontal line that rates pain from 0-10 with 0 being "no pain" and 10 being "pain as bad as it could possibly be." (Aggarwal, et al., 2018)

PURPOSE AND HYPOTHESIS

The purpose of this study was to provide a sports-focused outcomes analysis of PA versus ORIF for LI based on return to sports protocol. It was hypothesized that collegiate female soccer players would return to sports faster with PA when compared with ORIF.

DISCUSSION

- Limitation was convenience sampling.
- Lack of generalizability
- Another limitation included the gap between injury and the time this study was done.
- Lastly, that the response to the questionnaires were self-reported.
- Bias could have occurred from the participants not accurately reporting their pain and difficulty doing a task on the VAS and FAAM questionnaires.
- Future research could expand the population size. This could be done by broadening the population to different regions in the US.

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