Sports Injuries in the Foot and Ankle

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Objectives

Learning Objectives
1. To provide attendees with the current best practices in regards to diagnosis, treatment, and recovery on foot and ankle injuries in the athletic population.
3. To provide useful information on treatments and recovery course for common foot and ankle sport injuries.

Outcomes
- After the conclusion of this presentation, attendees will be more knowledgeable regarding the diagnosis, treatment, recovery, and prevention of foot and ankle sports injuries. The knowledge learned will improve the quality of care and provide a better service to their patients.
Sports Injuries in the Foot and Ankle

Introduction
- 25% of all sports injuries are related to the foot and ankle
- Most Common Injuries
  - Ankle Sprains
  - Ankle Fractures
  - Achilles Injuries
  - Heel Pain
  - Stress Fractures
Anatomy

28 Bones
- Ankle
  - Tibia
  - Fibula - 10% of the body weight
  - Talus
- Foot - 26 bones
  - Forefoot - Metatarsals and Phalanges
  - Midfoot - Tarsal bones (Cuneiforms, Navicular, and Cuboid)
  - Rearfoot - Calcaneus and Talus
Subtle Lisfranc Injuries

Epidemiology
- Lisfranc injuries 0.2% of all fractures
  - Approximately 1 per 55,000 persons per year

Etiology
- Low Energy injuries:
  - Axial loading along mets
  - Direct contact TMTJ
  - Forced abduction of the forefoot

https://www.aofoundation.org
Subtle Lisfranc Injuries

Damage to Lisfranc ligament and the 2nd TMTJ
- Most rigid articulation of the TMTJ with minimal motion
Subtle Lisfranc Injuries

Symptoms

- Tenderness over the tarsometatarsal joint
- Pain with barefoot weightbearing
- Pain with side to side compression of met heads
- Edema
- Plantar ecchymosis
Compartment Syndrome

Tissue Pressure within a compartment exceeds perfusion pressure
- Normal compartment pressure is 5 mmHg
- Symptomatic:
  - Compartment pressure of 30-40 mmHg
  - Less than 30 mmHg difference when compared to diastolic BP

Symptoms
- Pain with passive ROM and out of proportion
- Paresthesias
- Pallor / Skin changes
- Pulselessness and Paralysis - less reliable and late changes
- permanent changes are seen ~ 8 hours
Compartment Syndrome

Treatment - Open fasciotomies
- High incidence with Lisfranc
- Most commonly seen in tibial and calc fx

9 Compartments of the Foot

Complications
- Claw toes
- Cavus foot (CS in the leg)
- Insensate foot

Reach JS Clin Anat 2007
Subtle Lisfranc Injuries

**Diagnosis** - 20% of subtle injuries missed

- Weightbearing Radiographs → 2 mm of diastasis
  - AP
  - Medial Oblique
  - Lateral
  - Stress radiographs
  - Compare to bilateral weightbearing radiographs

- **CT scan** - osseous injury
- **MRI** - sprains or ligamentous injuries
  - Identify the LisFranc ligament
Subtle Lisfranc Injuries

Nonsurgical Management

Ligament sprain

- Sprain: WB in CAM boot for 4-6 weeks

< 2 mm diastasis

- NWB in boot or cast for 6 weeks
Subtle Lisfranc Injuries

Surgical Management  > 2mm of displacement

ORIF - Minimal diastasis / fracture
- Screw or suture button technique
  - Screws require removal at 4-6 mo postop

Fusion - comminuted fracture / large diastasis
- Fusion of the involved TMTJ

Pure ligamentous injuries have poorer outcomes in ORIF than fusion

Ly et al JBJS 2006
Kuo et al JBJS 2000
Subtle Lisfranc Injuries

Rehabilitation
- Physical therapy - gait training, strength, and flexibility
- Will require custom orthotics or accommodative device in cleats/shoes
- Roughly 25% will develop posttraumatic arthritis

Return to Activity
- 92% will return to pre-injury activities at 2 yrs
  - 3.5-5 months for return to training
  - 5-6 months for return to competition; osseous injuries take roughly 1 mo longer
- 97% satisfied with return to activity level overall

MacMahon et al FAI 2016
Deol et al AM J Sport Med 2016
Navicular Stress Fractures

Epidemiology
- 35% of all stress fractures in athletes
- Incidence is underreported, but increasing due to CT and MRI
  - Track and Field athletes → jumping and sprinting events
  - Basketball
  - Military recruits

Etiology
- Avascular zone in the central \( \frac{1}{3} \) of the navicular
- Biomechanics
  - Pull of the PT tendon and force from talus and 2nd ray
Navicular Fractures

Risk Factors
- High level athletics without gradual training or starting a second sport
- Poor shoes/equipment or change in playing surface
- Osteopenia
- Biomechanical abnormality

Other
- Female
- Leg length discrepancy
- Conditions that lead to poor bone health or poor vascular status
Navicular Fractures

Symptoms

- Midfoot pain; gradual and progressive
  - Relieved by rest
  - Worse with increased activities
- Pain over navicular at the central aspect
- Pain at medial foot with inv/eversion or with single leg hop

Typically minimal edema and rarely ecchymosis present due to avascular region
Navicular Fractures

Diagnosis

- **Weightbearing Radiographs** - not consistent and often missed
  - AP
  - Lateral Oblique
  - Lateral
- **CT scan**
  - Better visualization of the fracture
- **MRI**
  - Increased signal intensity on T2
- **Bone Scan**
Navicular Fractures

Classification
- Type I: Dorsal cortical fracture
- Type II: Dorsal fracture advances into the navicular body
- Type III: Fracture line involves a second cortex

Further qualified by avascular, cystic, or sclerotic features

Saxena et al JFAS 2006
Navicular Fractures

Nonsurgical Management low threshold for high level athletes
- NWB in boot or cast for 6 wks minimum and progressive WB for 4-6 wks
  - Type I
  - Type II
- Consider bone stimulator, ESWT

Torg et al demonstrated union rate of 100% NWB for 6-8 weeks (10/10) and union rate of 22.2% WB in boot/cast

Khan et al demonstrated 86% NWB 6 wks had return to sports at 5.6 mo and 26% in WB boot/cast had return to sports with similar time frame
Navicular Fractures

Surgical Management

ORIF
- Type III; some Type I and II
- Failed nonoperative treatment
- Use of bone graft
- Aggressive debridement of fracture site

Outcomes similar b/t treatments though potential for quicker return with surgery
Navicular Fractures

Rehabilitation

- Physical therapy a must due to prolonged immobilization
- Improve shoe gear and consider additional support with orthotic/bracing

Return to Activity

- 86% will return to pre-injury activities at an average of 6 months
  - Return to activities 4 months with surgical treatment / 5 months with nonoperative treatment
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REFERENCES

Thank You

Please contact me with any questions:
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