Common Foot Injuries Diagnosis and Treatment

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"The warrior above all others prays for peace, for it is the warrior above all others who must suffer and bear the deepest wounds and scars of war"
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Epidemiology

13 to 35/1000 player-hours

95% by direct contact


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Epidemiology

0.85 Ankle Sprains/1000 player days


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Figure 5. Percentage of foot injuries by sport: acute versus overuse.
39.7% of athletic injuries: **FOOT/ANKLE**


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### Summary of Findings From the National Collegiate Athletic Association Injury Surveillance System on Foot and Ankle Injury

<table>
<thead>
<tr>
<th>Sport</th>
<th>Game Injuries Relating to the Ankle (%)</th>
<th>Game Injuries Relating to the Foot (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men's baseball</td>
<td>7.4</td>
<td>0</td>
</tr>
<tr>
<td>Women's softball</td>
<td>10.3</td>
<td>0</td>
</tr>
<tr>
<td>Men's basketball</td>
<td>26.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Women's basketball</td>
<td>24.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Men's football</td>
<td>15.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Men's lacrosse</td>
<td>11.3</td>
<td>0</td>
</tr>
<tr>
<td>Women's lacrosse</td>
<td>22.6</td>
<td>1.3</td>
</tr>
<tr>
<td>Men's soccer</td>
<td>18.8</td>
<td>4.2</td>
</tr>
<tr>
<td>Women's soccer</td>
<td>19.4</td>
<td>2.7</td>
</tr>
</tbody>
</table>

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Epidemiology

>30 years: 42-56% higher rates vs. <30 years

Females 35% higher rates than men


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Foot Function and Shape

- Plantigrade metatarsal heads
  - On heel rise, 2.5x BW supported by metatarsals
  - Dense plantar ligaments prevent upward migration of metatarsals

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Paronychia

- Erythema and edema of the ungual labia
  - Hallux most effected
  - Wide or incurvated nail plate
  - May drain serous to purulent exudate

- Treatment
  - Incision and Drainage
    - Partial or Total Chemical matrixectomy
  - Oral antibiotics usually not necessary
  - Longstanding infection may require X-ray

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Ingrown Toenails

- Etiology
  - Inheritance
    - Genetically predisposed inwardly curved nails
      - ±distortion of one or both nail margins
    - Underlying bony pathology causing deformation of the nail
    - Obesity “fat feet” - deepening of the nail groove
    - Prior trauma - irregularly shaped nail
      - Poor technique in nail trimming
    - HIV antiviral therapy
      - Increased incidence of ingrown nails


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- Stage I
  - Warm soaks
  - Cotton-wick elevation of the affected nail corner
  - Antibiotic therapy in the presence of infection
  - Taping

- Stage II
  - Partial nail avulsion – 30% success rate

- Stage III (Remove and Debride)
  - Debridement (debulking) of the lateral nail groove
  - Silver nitrate cautery to the hypertrophied lateral nail
  - Complete nail avulsion
  - Wedge resection of the distal nail edge
  - Partial nail avulsion with:
    - Phenol (inaccurate), Sodium hydroxide, Laser (expensive)
    - Surgical excision of nail plate, nail bed, and matrix
Turf Toe

- Turf toe
  - 1st MTPJ Sprain
  - Forced hyperextension
- Ranked third in collegiate athletes after knee and ankle injuries

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Turf Toe

- Imaging
  - X-rays
    - Proximal migration of sesamoids
  - MRI
- Treatment
  - Non-operative treatment successful
  - Surgical Treatment rare

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Morton’s Neuroma

- Painful swelling of the interdigital nerve
  - Most commonly seen in third web space
  - Numbness of adjacent digits and plantar pain
- Abnormal stretching of the nerve

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Morton’s Neuroma DDX

- Stress fracture
- Freiberg's infraction
- Capsulitis
- Bone tumor
- Local manifestation of systemic disease

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Morton’s Neuroma DDX

• Stress fracture
• Freiberg's infraction
  – AKA Freiberg disease
    • 1st described by Alfred Freiberg in 1914
    – Osteochondrosis of metatarsal head
    – Typically affects the 2nd metatarsal head
    – 3rd and 4th may also be affected
    – Bilateral in up to 10% of cases

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Plantar Fasciitis

• In US:
  – 10% of runner-related injuries
  – 11-15% of all foot symptoms requiring professional care
  – 10% - general population
  – Presents bilaterally – 1/3 cases
  – Race and ethnicity play no role in the incidence
  – Peak incidence may occur in women aged 40-60 years


"The warrior above all others prays for peace, for it is the warrior above all others who must suffer and bear the deepest wounds and scars of war"
A thickened fibrous aponeurosis
- Originates from medial tubercle of the calcaneus
- Insert into the deep short transverse ligaments of the metatarsal heads
- Central plantar fascia
  - Thickest and strongest section
  - Most likely to be involved with plantar fasciitis

Function to provide static support for the longitudinal arch of the foot
- Assists with shock absorption during foot strike
- 2-3 BW with each step
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Plantar Fasciitis - Symptoms

- Intense sharp heel pain with the first couple of steps in the morning
- Pain is anterior aspect of the calcaneus, but may radiate proximally in more severe cases
- Dull ache in the heel at the end of the day, especially after extensive walking or standing

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- Point of maximal tenderness at the anteromedial region of the calcaneus
- Pain along the proximal plantar fascia
- "Windlass" test
  - Passive dorsiflexion of the toes which elicits Sx pain
  - Having the patient bear weight during the windlass test increased the sensitivity of the test from 13.6% to 31.8%

Plantar Fasciitis - Treatment

- **1st** correct training errors
  - Relative rest
  - Ice after activities
  - Evaluation of the patient's shoes and activities
- **2nd** correct biomechanical factors
  - Stretching and strengthening program (PT)
- **3rd** consider night splints and orthotics
- Other treatment options
  - NSAIDs are considered throughout the treatment course for pain control
- Time for resolution - often 6 to 18 months

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Plantar Fasciitis - Treatment

- Iontophoresis – Electric stimulation
- Assisted Soft Tissue Massage (ASTM)
- Corticosteroid Injections
  - Greatest benefit if administered early
  - Studies have found steroid treatments successful 70% or better
    - Potential risks
      - Rupture of the plantar fascia
      - Fat pad atrophy
- Autologous blood injections
  - Ignites the healing process – in theory
  - Unproven
- Surgery
  - Success rate of surgical release is 70% to 90%
  - Potential risks
    - Flattening of the longitudinal arch
    - Heel hypoesthesia


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**Midfoot Anatomy**

- **Lisfranc’s ligament:**
  - Large oblique ligament that extends from the plantar aspect of the medial cuneiform to the base of the second metatarsal
  - **There is no transverse metatarsal ligament between the first and second metatarsals**
Lisfranc Joint Injuries

- Bony or ligamentous injury involving the tarsometatarsal joint complex
- Named after the Napoleonic-era surgeon who described amputations at this level without ever defining a specific injury

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Lisfranc Joint Injuries

• Generally considered rare
  – 1 per 55,000 people per year
  – 15/5500 fractures

• Requires a high degree of clinical suspicion
  – 20% misdiagnosed
  – 40% no treatment in the 1st week

• Be wary of the diagnosis of “midfoot sprain”

• As index of suspicion increases, so does incidence

• ~20% of these injuries overlooked
  – Especially in polytraumatized patients!!
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Lisfranc Joint Injuries

- Suspect when:
  - Appropriate mechanism
  - Midfoot pain and difficulty weight bearing
  - Swelling across dorsum of foot & plantar ecchymosis
- Deformity variable due to possible spontaneous reduction
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Suspicious X-Ray Signs

Step off at 2nd, gap between 1 and 2

On the lateral view, the metatarsal should not be dorsal to the cuneiform
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Lisfranc Joint Injuries - Treatment

• Early recognition is the key to preventing long term disability
• Anatomic reduction is necessary for best results:
  – Displacement >1mm or gross instability of tarsometatarsal, intercuneiform, or naviculocuneiform joints is unacceptable
• Goal: obtain and/or maintain anatomic reduction
  – Plantar tarsometatarsal ligaments intact
    • Nondisplaced & normal weight bearing or stress x-rays
      – NWB Short leg cast x 4-6 weeks
      – Repeat x-rays to rule out displacement as swelling decreases
      – Total treatment 2-3 months
  – Unstable in 2 planes due to fracture at base
    • K-wire fixation
  – Unstable in 2 planes due to ligament rupture
    • Rigid fixation or arthrodesis

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Navicular Fractures

- Tenuous blood supply
  - Large articular surface
    - Vessels can only enter dorsally, plantarly, and thru tuberosity
  - Medial and lateral thirds have good blood supply
  - Central third is largely avascular
- Number of vessels decreases with age

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Avulsion fractures: usually dorsal lip (essentially severe sprain)

Treatment:
- Immobilization & progressive weight bearing
- Excision of fragment only if painful

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Navicular Fractures

- Tuberosity fractures
  - Avulsion by posterior tibial tendon and spring ligament
  - Usually minimally displaced
  - May have associated calcaneocuboid impaction

- ORIF depending on degree of displacement (>5mm)

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- Body Fractures:
  - High energy trauma with axial foot loading
  - Frequently associated with talonavicular subluxation
  - CT scans helpful for preop planning
  - Anatomic reduction essential

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Navicular Stress Fractures

- Uncommon
  - Delay in diagnosis common
- Usually due to repetitive stress and poor blood supply
  - Running most common
- Typical presentation
  - Vague arch pain with midfoot tenderness
- Required X-Rays: AP, lateral, and oblique
  - CT or MRI if uncertain

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Stress Fractures Prone to Non-Union

- Tension Sided Femoral Neck
- Anterior Tibia
- Medial Malleolus
- Tarsal Navicular
- Calcaneus
- 5th Metatarsal
- Hallux Sesamoids

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You are not intelligent because you think you know everything, but rather because you question everything you think you know.

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