Common pathologies of the Foot and Ankle

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Ligamentous anatomy of the Foot and Ankle
Ligamentous anatomy of the Foot and Ankle
“The Longitudinal Arch”
“The Transverse Arches”

- Tarsal
- Posterior MetaTarsal
- Anterior MetaTarsal
Anterior

Posterior

View
Lateral View

FIG. 2-2. (A) Patient positioned for lateral ankle view (mediolateral) with slight dorsiflexion of ankle. Curved line (•) marks the medial malleolar tip. (B) Lateral radiograph includes base of fifth metatarsal. Normal pre-Achilles fat pad outlined with broken lines. (C) Severe sprain with anterior "teardrop" (arrow) and posterior soft tissue density due to an effusion (curved arrow).
FIG. 2-3. (A) Patient positioned for mortise view with 15° to 20° internal rotation of ankle. (B) Mortise radiograph defines the entire mortise as well as providing better visualization of the talar dome.
Standing anterior posterior view of the foot
Standing Lateral view of the foot
Measurements of the foot
Rupture of the Achilles Tendon

- Complete Rupture
- Symptoms of rupture- sudden pain, minimal trauma
- Signs of rupture- gap in tendon, Thompson’s Test

- Partial rupture
  Natural history (degenerative change)
  Conservative management- Stretch exc.
  Operative management- Excision deg. tissue
Thompson’s test

Complete tear - palpable gap
Anatomy of bursa
Achilles Tendinosis

- Uphill running, especially in shoes with poorly flexible soles, puts strain on Achilles tendon at toe-off.
- In downhill running, forceful impact transmitted to Achilles tendon.
- Cavus foot predisposes to Achilles tendonitis.
- Hyperpronation due to soft heel counter exerts torsion on tendon.
- Tenderness over tendon. Swelling may or may not be present.

Achilles tendon with inflammation at insertion into calcaneal tuberosity.
Achilles “Tendinosis”

- Acute Achilles “Tendinosis”:
- History
- Symptoms and Signs
- Anti-inflammatory measures
- Preventative measures
- Further Investigations
- Chronic Achilles “Tendinosis”

Degenerative partial tear
Retrocalcaneal / Retroachilles Bursitis

• Etiology:
  – Repetitive dorsiflexion/plantar flexion of the ankle with friction/traction exerted through the achilles tendon
  – Direct pressure

• Pathology:
  – Inflammation of the retrocalcaneal and/or retroachilles bursa
  – This may be with w/out callus formation “pump bump” (Hagelund def.)
Haglund Deformity
Case 1- Rec. sprain
Case 1
Case 1
Case 1
Case 1
Case 1
Peroneal tendinosis (Chronic tear)
TALAR DOME FRACTURES

Symptoms:
locking, instability, weakness, discomfort

Diagnosis:
x-rays in 6 weeks, bone scan, MRI scan

Treatment:
removal of loose body and defect curettage
Talar osteochondral fractures
Talar osteochondral fractures
Fractures of Lateral Process of the talus
Fractures of Lateral Process of the talus
Os Trigon Fracture
Imaging of the Os-Trigon

Plain x-ray

Bone Scan- Increased uptake posterior talus

Axial CT- Complete Separation, Deg. Changes
Inflammatory conditions - plantar fasciitis

- **Clinical** - obese women, runners, or seronegative arthritis w/ heel pain
- **Etiology** - chronic, repetitive stress or inflammation
- **Pathology** - tears, myxoid degeneration, inflammation
- **MRI** - thickened w/ high signal (T1, T2) at calcaneal attachment
  - perifasciitis (edema around thickened fascia)
  - marrow edema/erosions, plantar aspect of calcaneal tuberosity
Plantar Fasciitis

Clinical presentation
Night pain
First step pain
Anteromedial pain
and tenderness
Pes Cavus

Tethered cord-
Diastematomyelia, intradural lipoma, Tumors

Muscle imbalance-
Polio, MMC, CP, Friedrich’s ataxia, Charcot Marie Tooth
Pes Plano valgus

Tibialis Posterior Dysfunction
Tarsal coalition
Midfoot Diabetic Charcot
Trauma- Lisfranc fracture dislocation
Muscle imbalance- MMC
Tibialis Posterior Dysfunction

Clinical Presentation

Medial ankle and Midfoot pain
Medial ankle and Midfoot Swelling
Pes Planus
Calcaneovalgus
Forefoot abduction
Tibialis Posterior Dysfunction

Too many toes sign

Unable single heel rise test

max = 3
Complete vs partial tear of the P.T. tendon
Tarsal Coalition

Rigid, painful flatfoot (pes planus) with hind part of foot in valgus position, characteristic of tarsal coalition

Prominence of peroneus longus and brevis tendons. These muscles contract on forced inversion of foot
Talocalcaneal coalition (medial facet)
Talocalcaneal coalition
(medial facet)
Calcaneonavicular coalition

Calcaneonavicular coalition

Navicular
Calcaneonavicular bar
Head
Body
Talus
Calcaneus

Calcaneonavicular coalition

Solid, bony calcaneonavicular coalition evident on oblique radiograph

Cartilaginous calcaneonavicular coalition visible but poorly defined on lateral radiograph

Calcaneonavicular bar resected and extensor digitorum brevis muscle interposed to prevent reformation of coalition

Postoperative radiograph
Charcot Mid-foot collapse
Mid foot Charcot
LisFranc # Dis.
Calc
Calc
Hallux Valgus Deformity
Hallux Valgus

• Great toe deviated laterally at MTP joint and pronated
• First metatarsal is deviated medially
• Long flexor and extensor muscles have bowstring effect as they are displaced to the lateral side of the joint
• Callus develops over medial side of the head of the metatarsal bone, bursa becomes thickened and inflamed – bunion
• Development of OA of MTP joint secondary to malalignment
Causes

• Hypermobility of first MT
• Forefoot adductus (congenital)
• Excessive pronation of the forefoot
• RA
• Muscle imbalance
Hallux Valgus

Advanced bunion. Wide (splayed) forefoot with inflamed prominence over 1st metatarsal head. Great toe deviated laterally (hallux valgus), overlaps 2nd toe, and is internally rotated. Other toes also deviated laterally in conformity with great toe. Laterally displaced extensor hallucis longus tendon is apparent.

Metatarsus primus varus
Exostosis
Laterally displaced lateral sesamoid (medial sesamoid under metatarsal)
Conjoined tendon
Subluxation
Hallux valgus

Radiograph of severe hallux valgus (50°) and metatarsus primus varus (22°) shows rotation of great toe, laterally displaced sesamoids, subluxation of 1st metatarsophalangeal joint, lateral deviation of toes, and splayed forefoot.
Hallux Valgus Bx.
Main Deformities of Hallux-Valgus

- Ist metatarsal Varus
- Lateral deviation of the hallux
- Pronation of the hallux
- Lateral inclination of the metatarsal head (DMAA)
- Pronation of the metatarsal head
Measurements- IM and HV angle
Congruency, DMAA
Interphalangeal Angle
Hallux Valgus Angle
Distal Metatarsal Articular Angle (DMAA)
Intermetatarsal Angle

Angles of Deformity
Treatment

• **Conservative** – orthotics, toe wedge, custom made shoes, intrinsic exercises

• **Surgical** – osteotomy, arthrodesis, excision arthroplasty
Conservative treatment
Ideal Osteotomy

- **Correction** of I-II intermetatarsal angle
- **Correction** of valgus of the toe
- **Avoiding** shortening
- **Avoiding** elevation of the 1st. MT.
- **Transfer metatarsalgia MT head II**
Ideal Osteotomy

• No evidence for Correction
• pronation of the toe
• No evidence for Correction
• pronation of the MT head.
• Minimal evidence for Correction
• of the DMAA
Types of Ist. MT. Osteotomies

• Distal osteotomies
  Chevron, Mitchell, Wilson

• Proximal osteotomies- Crescentic, Closing wedge, Chevron, Ludloff, Scarf
Types of Ist. MT. Osteotomies

• Displacement osteotomies
  Chevron, Mitchell, Wilson, Scarf

• Angular osteotomies-
  Mau, Crescentic, Closing wedge, Ludloff,
Algorithm for Hallux Valgus Surgery
(Roger Mann)

1. Hallux valgus
   - Incongruent joint
   - Degenerative joint disease
     - Fusion
     - Prosthesis

   a. Internetarsal angle <15°
      - Hallux valgus angle <30°
        - Chevron procedure (age < 50yr) (See Fig 6-48)
        - Distal soft tissue procedure with or without proximal crescentic (see Figs 6-49 and 6-50)
        - Mitchell procedure (see Fig 6-51)

   b. Internetarsal angle >15°
      - Hallux valgus angle <40°
        - Distal soft tissue procedure with proximal crescentic osteotomy (see Fig 6-52)
        - Mitchell procedure (see Fig 6-51)
## Decision making in HV surgery

<table>
<thead>
<tr>
<th>Type deformity</th>
<th>I-II M.T. angle</th>
<th>H.V. angle</th>
<th>D.M.A.A. angle</th>
<th>Sugg. Osteotomy</th>
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<tbody>
<tr>
<td>Mild</td>
<td>&lt;15</td>
<td>&lt;30</td>
<td>&lt;8</td>
<td>Chevron Mitchel</td>
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<tr>
<td>Intermediate</td>
<td>15-18 (20)</td>
<td>30-40</td>
<td>8-15</td>
<td>Scarf Prox Chevron combinations</td>
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<tr>
<td>Severe</td>
<td>&gt;18</td>
<td>&gt;40</td>
<td>&gt;15</td>
<td></td>
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Vor der Operation  
Nach der Operation
Hallux Valgus,
Dilocated Hammer toes II-III
Metatarsalgia
Correction of Hammer toe
Correction of HV
Hallux Rigidus
Hallux Rigidus
Conservative treatment
Surgical Treatment

Cheilectomy
Dorsal wedge osteotomy
Fusion
Total toe replacement
Hammer Toe
Other Toe Deformities

- Claw toes – MTP ext, DIP and PIP flex (A)
- Hammer toes – MTP, DIP ext, PIP flex (B)
- Mallet toe – flexion of DIP (C)
Freiberg’s Disease
Metatarsalgia
(pain in forefoot)

Causes

• Subluxation/dislocation MTPJ with HT. (RA, Idiopathic, Seronegative)
• Anterior flat foot (dropped transverse arch)
• Subluxation of the fat pad
• Thinning of the fat pad (Diabetes, RA)
Symptoms

- Pain on plantar surface of MTP heads
- Callouses over the plantar surface of MTP heads
- Unable to arch the toes and lift the MTP heads off the floor
Metatarsalgia
Treatment

Conservative
- Corrective foot wear, orthotics, metatarsal pads
- Strengthening intrinsics

Surgical
- Elevating osteotomies
  - Distal- Weil, Hellal
  - Proximal wedge osteotomy
- Excision
Morton’s Neuroma

Signs & Symptoms –

• “cramp-like pain during running
• Tingling/numbness in lateral third and medial 4th toes
• pain relief on removal of shoe and/or pressure
• point tenderness
• callus
• positive compression test may have (clicking)
• positive sensory test

Morton's Neuroma