FOOT & ANKLE DISEASES AND INJURIES

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THE FUNCTIONAL FOOT

• Painless
• Mobile
• Stable
• Plantigrade
**SYMPTOMATOLOGY**

- Pain
- Stiffness
- Instability
- Deformity
- Swelling
- Numbness

**PARTS OF THE FOOT**

- Hindfoot
- Midfoot
- Forefoot
ANKLE DISORDERS & INJURIES

- Ankle sprain
- Ankle instability
- Ankle impingement
- Osteochondral lesion of the talus (OLT)
- Ankle arthritis

ANKLE SPRAIN

- Most common – Lateral ankle sprain
- Lateral ankle ligament
  - Anterior talofibular ligament (ATFL) : mostly injured
  - Calcaneofibular ligament (CFL)
  - Posterior talofibular ligament (PTFL)
- Mechanism
  - Inversion injuries
ANKLE SPRAIN

• Grading
  – I  Ligament stretching
  – II Partial rupture
  – III Complete rupture

American Medical Association (AMA) Standard Nomenclature System

• Imaging
  – Plain film to R/O Fx
  – No role MRI in acute injuries

ANKLE SPRAIN

• Treatment
  – Functional treatment
    • RICE (Rest / Ice / Compression / Elevation)
    • Brace / splint
    • Physiotherapy
    • NSAIDs
    • Avoid rigid immobilization eg. casting
    • If not improved after 6 wks : further investigations
  – Operative treatment
    • Large bony avulsion
    • Associated OLT
ANKLE INSTABILITY

- **Presentation**
  - Feeling of looseness
  - Giving way
  - Recurrent ankle sprain
  - Anterior drawer test
  - Inversion stress test

ANKLE INSTABILITY

- **Treatment**
  - Nonoperative
    - Activity modification
    - Physiotherapy
    - Orthosis
    - Ankle-foot-orthosis (AFO)
    - Seldom acceptable on a long-term basis
  - Operative
    - Ligament reconstruction
ANKLE IMPINGEMENT

• Anterior impingement
  – Bony impingement
  – Soft tissue impingement

• Posterior impingement
  – Os trigonum

ANKLE IMPINGEMENT

• Presentation
  – Pain
  – Limited ROM
  – Posterior ankle impingement test

• Investigations
  – Plain film
  – MRI

• Treatment
  – Debridement
  – Os trigonum excision
OLT

• Etiology
  – Idiopathic
  – Traumatic

• Presentation
  – Recurrent ankle pain and swelling
  – Mechanical symptoms (catching, clicking, locking)

• Investigations
  – Plain film
  – CT
  – MRI

OLT

• Treatment
  – Nonoperative treatment
    • Nondisplaced lesion
    • Protected weight in boot 3-6 months
  – Operative treatment
    • Debridement
    • Bone marrow stimulation
    • Osteochondral transplantation (mosaicplasty)
ANKLE ARTHRITIS

• Causes
  – Traumatic
  – Degenerative
  – Inflammatory
  – Metabolic

• Presentation
  – Pain, swelling, redness
  – Stiffness in dorsiflexion-plantarflexion
  – Deformity

ANKLE ARTHRITIS

• Treatment
  – Nonoperative
    • Analgesics
    • Injection
    • Physiotherapy
    • Walking aid
    • Ankle brace / support
    • Weight reduction
    • Activity modification
  – Operative
    • Debridement
    • Arthrodesis
    • Arthroplasty
HINDFOOT DISORDERS & INJURIES

• Subtalar arthritis
• Achilles tendon disorders
• Plantar fasciitis

SUBTALAR ARTHRITIS

• Presentation
  – Pain while walking on uneven ground
  – Pain directly over sinus tarsi
  – Pain & stiffness in eversion-inversion

• Treatment
  – Nonoperative
    • Orthotics
  – Operative
    • Subtalar fusion
ACHILLES TENDON DISORDERS

• Achilles tendon rupture
• Achilles tendinopathy
• Haglund’s deformity

ACHILLES TENDON RUPTURE

• Presentation
  – Snap / audible pop
  – Acute pain
  – Walking difficulty
  – Weak plantarflexion
  – Palpable gap
  – Thompson’s test
ACHILLES TENDON RUPTURE

• Treatment
  – Nonoperative
    • SLC in equinus position
    • Complications – residual weakness, rerupture
  – Operative
    • Tendon repair
    • Tendon transfer
    • Complications – wound problems

<table>
<thead>
<tr>
<th>Factor</th>
<th>Nonsurgical Treatment</th>
<th>Surgical Treatment</th>
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</thead>
<tbody>
<tr>
<td>Morbidity</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Surgical complications</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Hospital cost</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Physican cost</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Strength and endurance</td>
<td>↓</td>
<td>↑</td>
</tr>
<tr>
<td>Rerupture rate</td>
<td>18%</td>
<td>2%</td>
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</tbody>
</table>

ACHILLES TENDINOPATHY

• Location
  – Insertional
  – Non-insertional

• Presentation
  – Posterior heel pain
  – Swelling
  – Activity limitation
ACHILLES TENDINOPATHY

• Pathology
  – Degeneration - tendinosis
  – Inflammation – tendinitis

• Investigations
  – Plain film – calcification, Haglund
  – MRI

ACHILLES TENDINOPATHY

• Treatment
  – Nonoperative
    • NSAIDs
    • Activity modification
    • Walking boot
    • Stretching exercise
    • NTG patch
    • ESWT
    • No steroid injection
  – Operative
    • Gastrocnemius recession
    • Debridement
    • FHL transfer
HAGLUND’S DEFORMITY

• Presentation
  – Bony prominence
  – Retrocalcaneal bursitis
  – Achilles tendinopathy

• Investigations
  – Plain film
  – Ultrasound
  – MRI

• Treatment
  – Nonoperative
  – Operative
    • Resection of bony prominence
    • Rx Achilles tendon pathology

PLANTAR FASCIITIS

• Presentation
  – Plantar heel pain esp. the first step in the morning
  – Tenderness at medial calcaneal tuberosity

• Investigations
  – Usually clinical diagnosis
  – Plain film – heel spur
  – Ultrasound
  – MRI
PLANTAR FASCIITIS

• Treatment
  – Nonoperative
    • NSAIDs
    • Rest
    • Shoe modification
    • Stretching exercise
    • ESWT
    • Avoid steroid injection
  – Operative
    • Gastrocnemius recession
    • Plantar fascia release

MIDFOOT DISORDERS

• Deformities of the arch of foot
• Arthritis
DEFORMITY OF THE ARCH

• Pes cavus (high-arched foot)
• Pes planus (flat foot)

PES CAVUS

• Presentation
  – High-arched foot
  – Heel varus (cavovarus)
  – Claw toes
  – Metatarsalgia & callosity
  – Recurrent ankle sprain (in cavovarus)
  – Possibly progressive: flexible → rigid
• Neuromuscular causes
PES CAVUS

• Treatment
  – Neurological evaluation
  – Nonoperative
    • Orthosis
      – No effect on progression
  – Operative
    • Soft tissue release
    • Tendon transfer
    • Osteotomy
    • Triple fusion

PES PLANUS

• Presentation
  – Flatfoot
  – Too many toe sign
  – Heel valgus
  – Forefoot abduction
  – Progressive
  – Ankle involvement
  – Subfibular impingement
PES PLANUS

• Congenital flatfoot
  – Flexible
    • Part of normal development
    • Tight Achilles tendon
    • Ligamentous laxity
    • Family history
  – Rigid
    • Congenital vertical talus
    • Tarsal coalition
    • Inflammatory
    • Neurologic

TARSAL COALITION

• Unions between adjacent tarsal bones
• Talocalcaneal, calcaneonavicular, talonavicular
• Congenital but present at adolescents
• Possibly traumatic-related presentation
• Peroneal spasm
• Rigid flatfoot with subtalar/midfoot motion loss
**PES PLANUS**

- Adult-acquired flatfoot
  - Bony abnormalities
    - Trauma
    - Degenerative
    - Charcot
    - Inflammatory arthritis
  - Soft tissue abnormalities
    - Posterior tibial tendon dysfunction (PTTD)
    - Spring ligament rupture

**PTTD**

- Posterior tibial tendon function
  - Inversion-plantarflexion
  - Dynamic arch stabilizer
- Evaluation
  - Pain, swelling along posterior tibial tendon
  - Single heel rise
  - Double heel rise
- Investigation
  - MRI
PES PLANUS

• Treatment
  – Nonoperative
    • Stretching exercise
    • Orthotics
      – Goal – stabilization
  – Operative
    • Soft tissue procedures
      – Spring ligament repair
      – Tendon repair / transfer
    • Bony procedures
      – Coalition resection
      – Osteotomy
      – Arthrodesis

ARTHRITIS

• Locations
  – Talonavicular arthritis
  – Calcaneocuboid arthritis
  – Tarsometatarsal arthritis

• Treatment
  – Nonoperative
    • Orthotics
  – Operative
    • Arthrodesis
FOREFOOT DISORDERS

• Hallux valgus
• Hallux rigidus
• Bunionette (Tailor’s bunion)
• Lesser toe deformities
• Morton’s neuroma

HALLUX VALGUS

• Hallux valgus
  – Lateral deviation of the great toe and medial deviation of the first metatarsal
• Bunion
  – Any enlargement or deformity of the MTP joint
HALLUX VALGUS

• Extrinsic causes
  – Shoewear
  – Trauma

• Intrinsic causes
  – Heredity
  – Hypermobility of TMT
  – Ligamentous laxity
  – Achilles contracture
  – Flatfoot
  – Neuromuscular disease
  – Inflammatory arthritis

HALLUX VALGUS

• Problems
  – Appearance
  – Shoewear
  – Bunion pain
  – Arthritic pain
  – Transfer lesions
  – 2nd toe deformities


**HALLUX VALGUS**

- **Treatment**
  - Nonoperative
    - Orthotics
    - Splint
    - Bunion post
    - Bunion pad
  - Operative
    - Bunionectomy
    - Soft tissue procedure
      - Lateral release
      - Medial capsuloraphy
    - Metatarsal osteotomy
    - 1st TMT arthrodesis (Lapidus fusion)

**HALLUX RIGIDUS**

- **Presentation**
  - Pain
  - Stiffness esp. dorsiflexion 1st MTP
  - Dorsal bunion
HALLUX RIGIDUS

• Treatment
  – Nonoperative
    • Orthotics
  – Operative
    • Chilectomy
    • MP1 fusion

BUNIONETTE (TAILOR’S BUNION)

• Painful prominence of the lateral eminence of the fifth metatarsal head
**BUNIONETTE (TAILOR’S BUNION)**

- Treatment
  - Nonoperative
    - Orthotics
  - Operative
    - Lateral condylectomy
    - Metatarsal osteotomy

**LESSER TOE DEFORMITIES**

- Claw toe
  - Hyperextension MTP, flexion IP
  - Multiple digits
  - Neurologic disorders
- Hammertoe
  - Flexion PIP, straight DIP +/- hyperextension MTP
  - One digit
- Mallet toe
  - Flexion DIP
LESSER TOE DEFORMITIES

• Treatment
  – Nonoperative
    • Orthotics
  – Operative
    • Surgical correction

MORTON’S NEUROMA

• Interdigital neuralgia

Table 12-1 Preoperative Symptoms of Interdigital Neuroma

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Patients Affected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plantar pain increased by walking</td>
<td>91</td>
</tr>
<tr>
<td>Relief of pain by resting</td>
<td>89</td>
</tr>
<tr>
<td>Plantar pain</td>
<td>77</td>
</tr>
<tr>
<td>Relief of pain by removing shoes</td>
<td>70</td>
</tr>
<tr>
<td>Pain radiating into toes</td>
<td>62</td>
</tr>
<tr>
<td>Burning pain</td>
<td>54</td>
</tr>
<tr>
<td>Aching or sharp pain</td>
<td>40</td>
</tr>
<tr>
<td>Numbness in toes or foot</td>
<td>40</td>
</tr>
<tr>
<td>Pain radiating up foot or leg</td>
<td>34</td>
</tr>
<tr>
<td>Cramping sensation</td>
<td>34</td>
</tr>
</tbody>
</table>
MORTON’S NEUROMA

• Evaluation
  – Deep palpation test
  – Mulder’s sign / click
  – Abnormal sensation

• Investigations
  – Usually clinical diagnosis
  – Ultrasound
  – MRI

• Treatment
  – Neurectomy

CHARCOT FOOT

• Neuropathic arthropathy
  – Noninfective bone and joint destructive process associated with peripheral neuropathy eg. DM, Leprosy, Charcot-Marie-Tooth
CHARCOT FOOT

• Eichenholz’s temporal staging
  – I Fragmentation
    • Acute inflammatory process
    • Temperature difference
  – II Coalescence
    • Begin reparative process
  – III Consolidation
    • Healed, usually with deformity

CHARCOT FOOT

• Evaluation
  – Neurologic evaluation
  – Vascular evaluation
  – DDx infection: WBC scan, MRI with contrast
  – Deformity evaluation: CT scan

• Treatment
  – Fragmentation
    • Off-loading: total contact cast
  – Consolidation with residual deformity
    • Orthotics
    • Surgical correction
THE END