DISORDERS OF THE FOOT AND ANKLE FOR THE INTERNIST

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OVERVIEW

- INTRODUCTION: 5 MINUTES
- REVIEW OF ANATOMY, TERMS: 15 MINUTES
- SMALL GROUPS: 50 MINUTES
- WRAP-UP AND EVALUATION COMPLETION: 15 MINUTES
The Consensus Report of the Alliance for Academic Internal Medicine Education Redesign Task Force

- “Ambulatory education for internal medicine residents should be improved.”
- “The disconnect between education and practice continues to challenge teaching institutions to provide more relevant educational experiences.”
- As clinician-educators, we realize that faculty development is necessary if we are to become facilitators of residency redesign.
Why are the foot and heel important?

- Foot and ankle pain represent 20% of all musculoskeletal (MS) complaints.
- 20,000 people sprain their ankle each day in the US – it’s an epidemic!
- Foot and ankle provide a base while standing & a lever while walking or running.
- If we are encouraging patients to become increasingly active, we need to be familiar with the musculoskeletal consequences.
Why are the foot and heel important?

- Disorders of the foot & ankle can be associated with pain/dysfunction of other joints, especially the knees.

- Pain in the foot and ankle with weight bearing can lead to changes in gait with resultant back, hip or knee pain.
SUBTALAR JOINT: TRIPHASIC JOINT

• SAGITTAL PLANE: DORSIFLEXION AND PLANTAR FLEXION
• TRANSVERSE PLANE: ADDUCTION AND ABDUCTION
• FRONTAL PLANE: INVERSION AND EVERSION
Mechanics of Normal Pronation

1. Foot rolls inward
2. Height of the arch decreases
3. Leg rotates internally as foot reaches its internal edge.
Valgus and Varus

- **VARUS**: the inward angulation of the distal segment of a bone or joint.
- **Varus deformity of the knee** – “bow legged.”

- **VALGUS**: the outward angulation of the distal segment of a bone or joint.
- **Valgus deformity of the knee** – “knock-kneed.”
Arch Types

Fig. 1  Foot Type

Pes cavus (high arch)

Normal arch

Pes planus (flatfoot)
Ankle Anatomy: Bones

- Tibia
- Talus
- Cartilage
- Fibula

Ankle Joint Capsule

Side view

Posterior view

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Bones of the Foot and Ankle: Lateral View

- Fibula
- Tibia
- Talus
- Navicular
- Cuneiforms
- Metatarsals
- Phalanges
- Calcaneus
- Cuboid
- Tarsal-metatarsal joints
- Metatarsal-phalangeal joints
Tendons of the Lateral Ankle
Achilles Tendon
Anatomy: Nerves

Nerves of the Foot and Ankle

Tibial nerve (called the plantar nerve in the sole)

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Anatomy: Nerves

Nerves of the Foot and Ankle

- Sural nerve
- Deep peroneal nerve
- Lateral plantar nerve
- Intermediate dorsal cutaneous nerve
- Medial dorsal cutaneous nerve
- Medial plantar nerve
- Sole/plantar surface
Anatomy: Plantar Fascia
Bursae of Ankle, Foot and Toes
"Normal Pronation" (noun)

When, after heel-strike, the foot rolls about 15 degrees inward to make contact with the ground.

Gait: Normal
**Gait:**

**Overpronation**

*Definition*

When, after heel-strike, the foot rolls more than 15 degrees inward to meet the ground.

*Characteristics*

- More typical in runners with low arches.
- Causes heavy wear along heel and inside of forefoot.
"Underpronation" (noun)

When the foot does not roll inward enough after the outside of the heel hits the ground.

- More typical in runners with high arches
- Causes excess wear along sides of shoe
Physical Exam of the Foot and Ankle

- Expose both limbs above the knees.
- Begin with patient standing.
  - Observe alignment from the front.
  - Observe arch height and pronation.
  - View foot from the back to see axis of alignment, valgus/varus deformity.
  - Have patient stand on toes – should convert to varus alignment of the heel.
Physical Exam of the Foot and Ankle

- Examine the vascular structures.
- Check for bunions, hammer toes, callus (callus pattern shows where patient bears weight).
- Sensory exam, including compression of metatarsals.
- Evaluate flexion, extension, inversion and eversion (passive and active) as well as circumduction.
- Palpate for areas of tenderness.
Tips for Teaching

- Build a foundation in:
  - Anatomy
  - Mechanics
- Teach using models and orthotics.
- Emphasize adequate physical exam.
- Encourage residents to consider foot/ankle issues in the setting of hip/back/knee pain.
RESOURCES

- http://www.foothelthfacts.org/footankleinfo
- http://orthoinfo.aaos.org
RESOURCES

Ankle Sprain:
- **Orthotics**: u-shaped ankle support, Levamed ankle support (soft); lace-up ankle supports >semi-rigid ankle supports > elastic bandages
- **Exercises**: Achilles tendon stretch, plantar/dorsiflex, foot circles, inversion/eversion, alphabet exercise, toe towel curls, marble pickups, heel/toe walks then proprioceptive training (circle wobble board, walking on different surfaces) then activity specific training such as running
- **Patient Ed materials (including exercises)**:

Ankle Fracture:
- IF Unimalleolar, nondisplaced and no ligamentous injury; may be splinted with the ankle at 90 degrees (neutral position -usually short leg posterior splint), bulky dressing if swelling to allow for increased swelling.

Achilles Tendonitis:
- **Exercises**: stretching (including hamstrings), strengthening, gait analysis, review of footwear
- **Orthotics**: Achilles trainer, Levamed ankle support (soft), U shaped ankle support, 3/8 heel lift, heel wedge
RESOURCES

- Hammertoe: http://www.foothealthfacts.org/footankleinfo/hammertoes.htm
- Bunion: http://www.foothealthfacts.org/footankleinfo/bunions.htm
- Corn: http://www.foothealthfacts.org/what-is/ns_corns.htm
- Callous: http://www.foothealthfacts.org/what-is/ns_callus.htm
- OA: http://www.foothealthfacts.org/footankleinfo/osteoarthritis.htm
- Gout: http://www.foothealthfacts.org/footankleinfo/gout.htm
- Orthotics and footwear: www.footsmart.com