Things I Wish Non-Orthopedists Knew About Feet

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Objectives

- Gain an understanding of foot anatomy and biomechanics.
- Understand the role the Gastrocsoleus complex and Achilles tendon play in contributing to foot pathology.
- Learn the indications for bunion surgery.
- Understand what x-rays of the feet to order, and why.

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Foot Mechanics

- Adults walk an average of 3-5 miles every day.
- There are ~ 1,500 footsteps for every mile walked.
- Cumulative daily force for 150 lb. person ~840,000 lbs. / foot.

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Feet Grow!

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Foot Anatomy

- The human foot contains 28 bones.
- The human foot has 33 joints.
- The bones form 2 structural arches.
  - Longitudinal arch
  - Transverse arch

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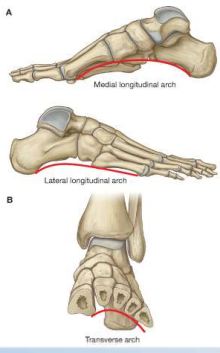

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Feet Grow

- There are 28 bones in the human foot.
- The bones form 2 structural arches.
  - Longitudinal arch
  - Transverse arch
- The arches flatten out as the body ages.
  - The foot gets longer and wider.

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Shoe Fitting Pointers

- Have your feet measured every time you buy shoes.
- Shop for shoes later in the day.
- Don't rely on shoe size alone.
- Fit shoes to the larger foot.
- Don't buy tight shoes and expect them to "stretch out."
- If shoes don't feel good in the store, they won't feel better later on.

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More Foot Facts

- Flat feet aren't necessarily a bad thing.

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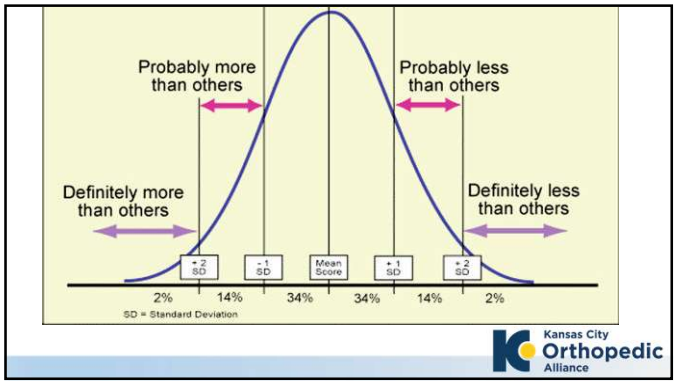

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More Foot Facts

- Flat feet aren't necessarily a bad thing.
- High arches can sometimes be bad too.

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More Foot Facts

- Flat feet aren't necessarily a bad thing.
- High arches can sometimes be bad too.
- Tight calf muscles contribute to a lot of foot and ankle problems.

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Problems Caused by Tight Calf Muscles

- Achilles tendonitis
- Risk for Achilles tendon rupture
- Anterior ankle impingement syndrome (soft tissue)
- Peroneal tendonitis
- Plantar fasciitis
- Midfoot synovitis
- Metatarsalgia
- 1st MTP joint arthritis

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Gastrocsoleus Complex

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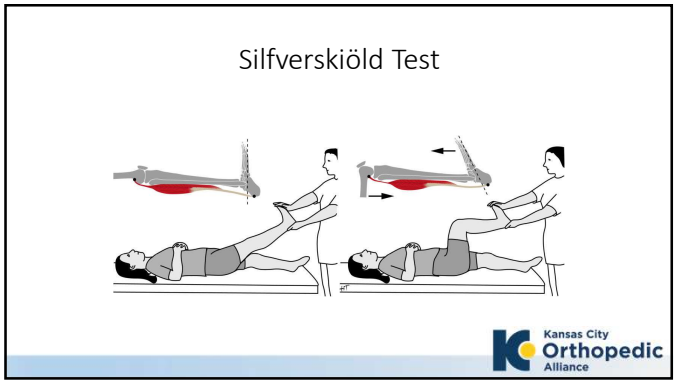
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Stair Stretching

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Slant Board

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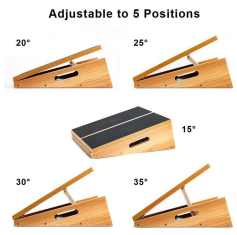
Slant Board



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What Do These Athletes Have in Common?

- Kirk Cousins
- Aaron Rodgers
- Kevin Durant
- Kobe Bryant
- Isiah Thomas
- David Beckham
- Dwayne Johnson
- Al Gore

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STRETCH!

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BUNIONS 101

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Bunion

- A "BUNION" is a symptom, as there are many different disorders that can cause the development of a bunion.
- Being told you have a bunion is about as specific as falling down, going to the E.R., and being told you have "knee pain."

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Bunions

- Bunio = Turnip (Greek)
- Used to describe any enlargement or deformity of the 1st MTP joint
  - Bursitis
  - Ganglion
  - Gout
  - Joint enlargement 2º arthritis
  - Hallux valgus

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Hallux Valgus

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Hallux Valgus vs. Bunion

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Not All Bunions Need Surgery!

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Indications for Bunion Surgery

- Pain

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Indications for Bunion Surgery

- Pain
- Pain

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Indications for Bunion Surgery

- Pain
- Pain
- Pain

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Complications of Bunion Surgery

- Recurrence 7%
- Metatarsalgia 10%
- Patient dissatisfaction 10%
- MTP joint pain 18%

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Bunion Surgery

- There have been more than 150 different surgical procedures that have been described over the last 100 years for treating bunions.

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Bunion Surgery

- There have been more than 150 different surgical procedures that have been described over the last 100 years for treating bunions.
- When there are 150 different ways to fix a problem, there is NOT one way that will work all the time for every patient.

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Complications of Not Having Bunion Surgery

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Complications of Not Having Bunion Surgery

- Eventually you may need to have bunion surgery.

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Neuropathy

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A Warm, Red, Swollen Foot in a Diabetic is a Charcot Foot Until Proven Otherwise

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Charcot Arthropathy (Physical Exam)

- No systemic signs of an infection.
- Local signs of cellulitis.
  - --Swelling & erythema
  - --Improves with elevation of limb
- Little or no pain or palpable tenderness.
- Normal white count.
- Inflammatory markers may be elevated.
- Sensory neuropathy

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Charcot Arthropathy

- X-rays
  - May see an entire spectrum from normal to advanced bone destruction and / or joint dislocation.
- MRI
  - Indistinguishable from osteomyelitis.

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1. Large ulceration involving the plantar, lateral aspect of the midfoot. There is extensive nonenhancing edema and fluid, which extends to the underlying bones and joints, centered in the midfoot. There is widespread septic arthritis and osteomyelitis, predominantly extending from the distal talus and calcaneus, throughout the midfoot, and into the second through fifth metatarsals.

2. Partial destruction and hypoenhancement of the cuboid bone, consistent with severe infection and likely partial devascularization. There is abnormal sclerosis and hypoenhancement involving the distal navicular, likely also relating to avascular necrosis at this site. Complete dislocation of the fourth and fifth tarsometatarsal joints, as seen on preceding radiographs.

3. Extensive soft tissue gas, seen in both the plantar and dorsal soft tissues.

4. Additional abnormal bone marrow signal, likely relating to osteomyelitis, involving the distal second and third metatarsals, and possibly the adjacent second and third proximal phalangeal bases. There is also osteomyelitis noted throughout the proximal and distal portions of the fourth metatarsal diaphysis.

5. Dislocation of the third MTP joint.

6. Diffuse, severe associated soft tissue infection, with diffuse cellulitis and myositis of the foot. Tenosynovitis of the medial and lateral ankle tendons. Probable chronic partial tear of the peroneal longus tendon.

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1. Large ulceration involving the plantar, lateral aspect of the midfoot. There is extensive nonenhancing edema and fluid, which extends to the underlying bones and joints, centered in the midfoot. There is widespread septic arthritis and osteomyelitis, predominantly extending from the distal talus and calcaneus, throughout the midfoot, and into the second through fifth metatarsals.

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Diabetes Must be Controlled Before Elective Surgery

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Diabetes and Orthopedic Surgery

- Hgb A1C Cutoff for elective Orthopaedic surgery < 8.0
- Risks of elevated Hgb A1C
  - Surgical site infections
  - Renal failure
  - Myocardial infarction
  - Higher readmission rates

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Imaging Issues

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X-RAYS

- Always get standing x-rays if possible.

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X-RAYS

- Always get standing x-rays if possible.
- Get a comparison view of the opposite extremity
  - AP view of both feet
  - AP view of both ankles

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X-RAYS

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X-RAYS

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X-RAYS

- Always get standing x-rays if possible.
- Get a comparison view of the opposite extremity
  - AP view of both feet
  - AP view of both ankles
- On the lateral x-ray of the ankle, image the whole foot (and vice versa).

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"A Template Approach for Detecting Fractures in Adults Sustaining Low-energy Ankle Trauma"

J.S. Yu and M.E. Cody

Emergency Radiology
Vol. 16, No. 4
July 2009
Pages 309 - 18

- Template for evaluating x-rays.
- 11 "Target sites"

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"A Template Approach for Detecting Fractures in Adults Sustaining Low-energy Ankle Trauma"

Fig. 1 Search template for the ankle. **a**–**c** A standard radiographic series of the ankle has at least three views but including an anteroposterior view (**a**), internal rotation or mortise view (**b**), and a lateral view (**c**). There are 11 target sites that represent vulnerable areas where fractures occur including the medial (*1*) and lateral (*2*) malleoli, anterior tibial tubercle (*3*) and posterior tibial malleolus (*4*), talar dome (*5*), lateral talar process (*6*), tubercles of the posterior talus process (*7*), dorsal to the talonavicular joint (*8*), anterior calcaneus process (*9*), calcaneal insertion of the extensor digitorum brevis (*10*), and the base of the fifth metatarsal bone (*11*)

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- Understand the role the Gastrocsoleus complex and Achilles tendon play in contributing to foot pathology.
- Know when to consider Charcot arthropathy.
- Learn the indications for bunion surgery.
- Understand what x-rays of the feet to order, and why.

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STRETCH!

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THANK YOU

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