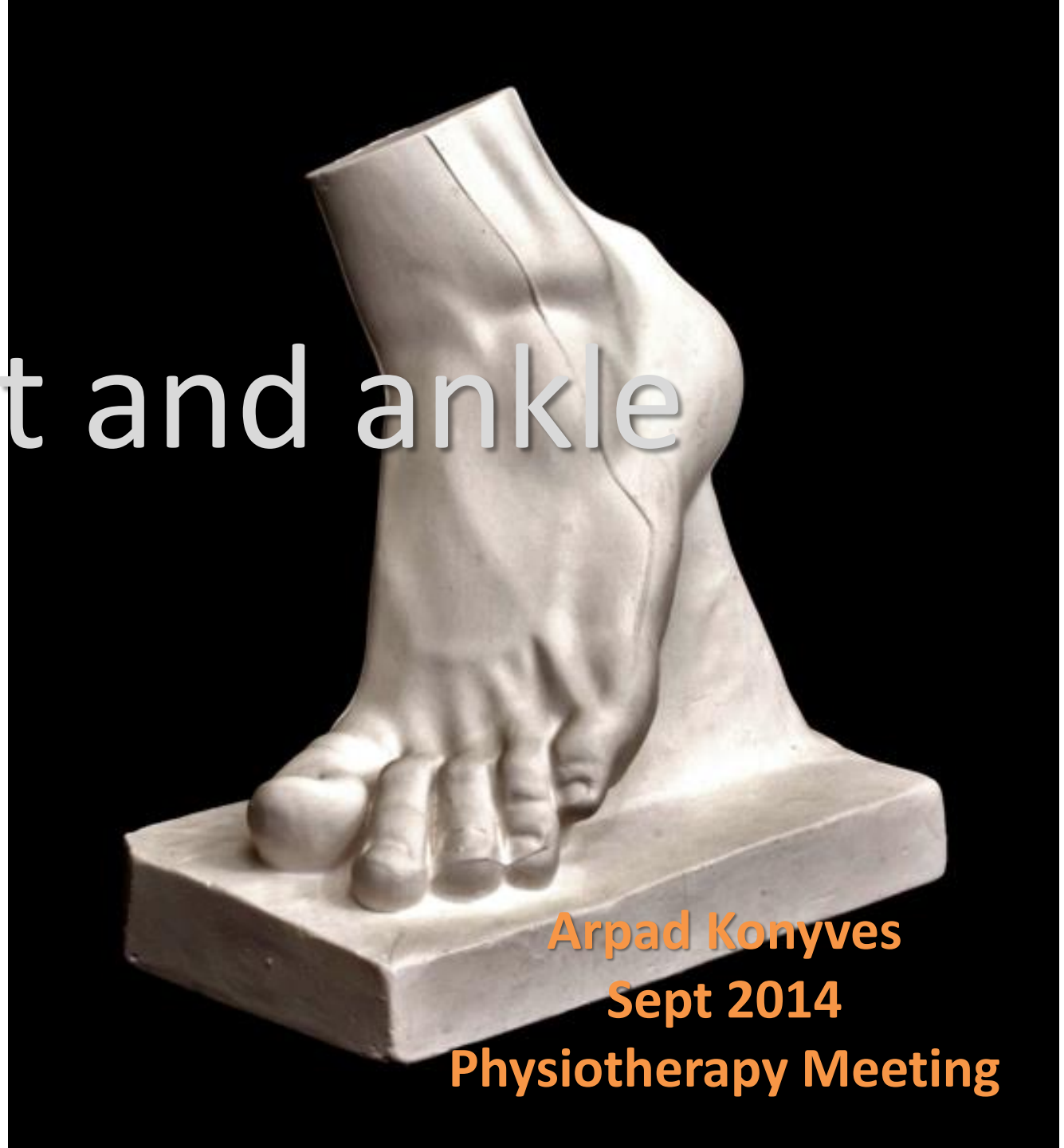
Foot and ankle



Arpad Konyves

Sept 2014

Physiotherapy Meeting

Arpad Konyves

- Consultant at Lakes DHB
- Consulting at Lakes Orthopaedics Ltd.

- General Orthopaedic Surgeon
  - Special interest in lower limb

- Training
  - Orthopaedic training in UK

  - Fellowship in Sports Surgery and Arthroplasty (lower limb) at SportsMed SA, Adelaide

  - Fellowship in Foot and Ankle surgery in York, UK

Role of physiotherapy in F&A

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Joint Health

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Leaders in Foot & Ankle and Integrated Physiotherapy

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Leaders in foot and ankle physiotherapy

We are recognised leaders in foot and ankle physiotherapy. Director Robyn Gant has over 20 years experience in the physiotherapy treatment of a wide spectrum of foot and ankle conditions ranging from post-operative care to sports injuries and chronic pain.

Robyn has a Masters Degree in Physiotherapy researching the movement of the foot and lower limb. She regularly conducts clinical workshops and conference presentations for physiotherapists, podiatrists, sports physicians and foot and ankle orthopaedic surgeons.

Joining Robyn is a team of inspired physiotherapists, providing high quality care and special expertise on foot and ankle injury management.

Teaching and keeping up to date with the latest research helps us provide the most effective treatments for a wide range of foot and ankle conditions including:

- Heel pain
- Achilles tendon disorders
- Ankle sprain and instability
- Bunion and forefoot pain
- Specific rehabilitation following foot or ankle fractures or surgery
- Nerve entrapments

- Muscle Strain (Muscle Pain)

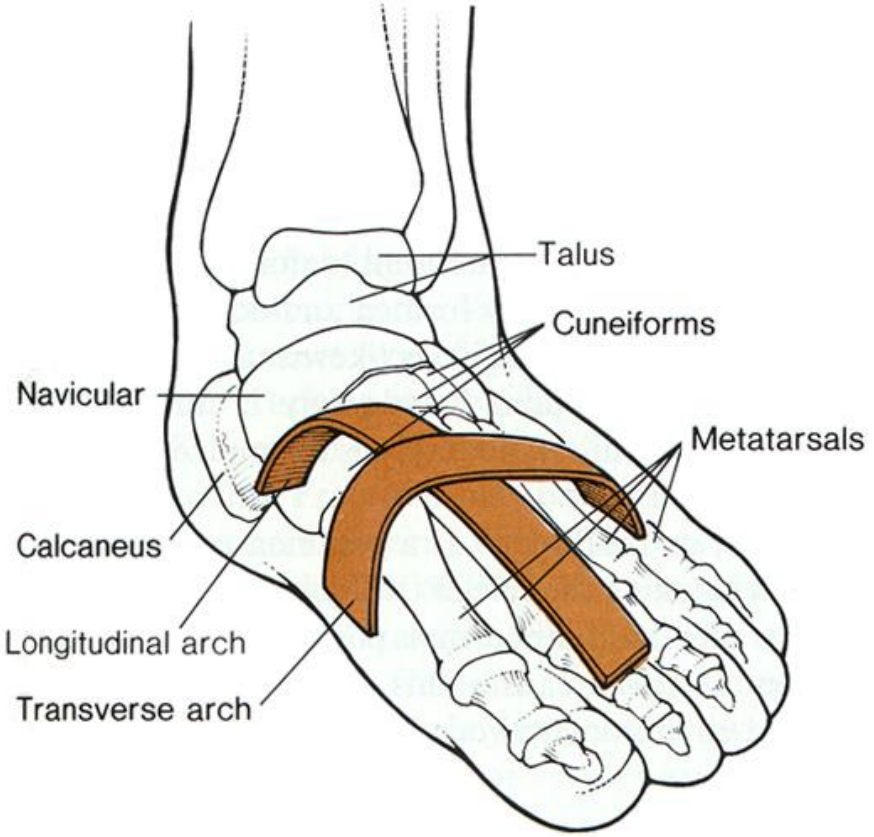
2:23 p.m.
17/09/2014

Role of physiotherapy in F&A

- Treatment of conditions due to:
  - Direct injury
  - Repetitive overuse
  - Poor foot posture
- Rehabilitation after surgical treatment

Biomechanics

- Tripod attached to a hinge
- 3 rockers of gait



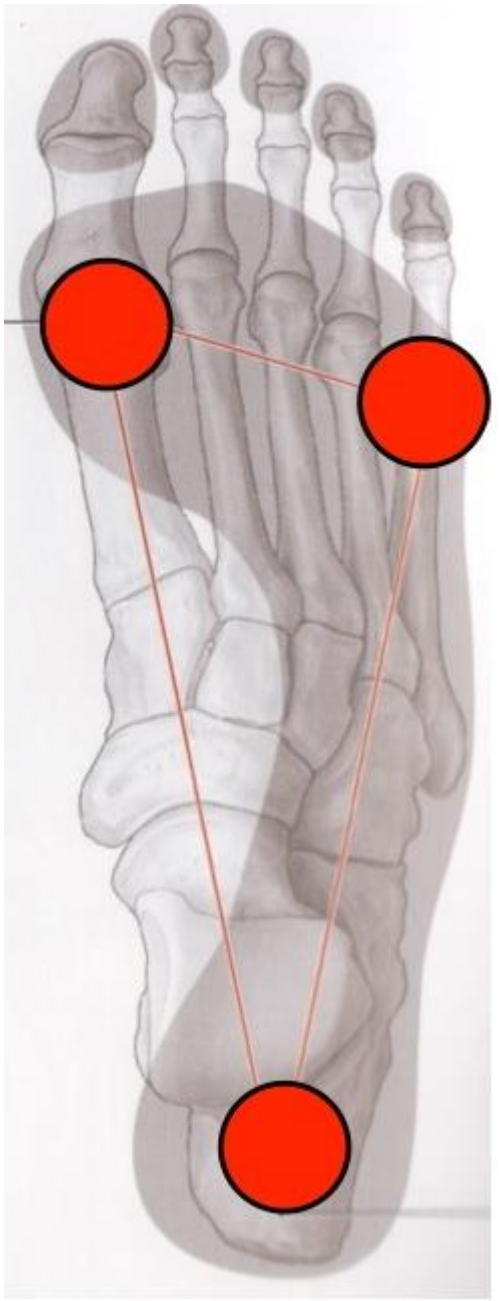
Ankle joint

- Modified hinge joint
  - Most movement in sagital plane
    - Plantar 30-50^{o}, dorsal 20^{o}
  - Minimal rotational movement and eversion / inversion

Tripod

- Head of 1st metatarsal
- Head of 5th metatarsal
- Calcaneus

- 1st ray (1st metatarsal, medial cuneiform)
  - Position, flexibility
  - Key in position of foot

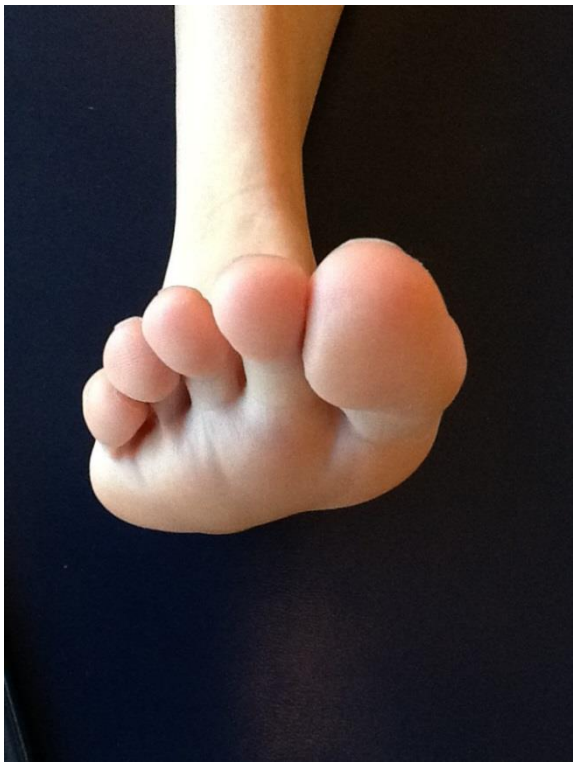


1st ray

- Plantiflexors
  - Peroneus longus
  - Tibialis posterior
- Dorsiflexors
  - Tibialis anterior
- Flexible / Rigid

1st ray

- Elevated – flat foot – throw centre of gravity medially

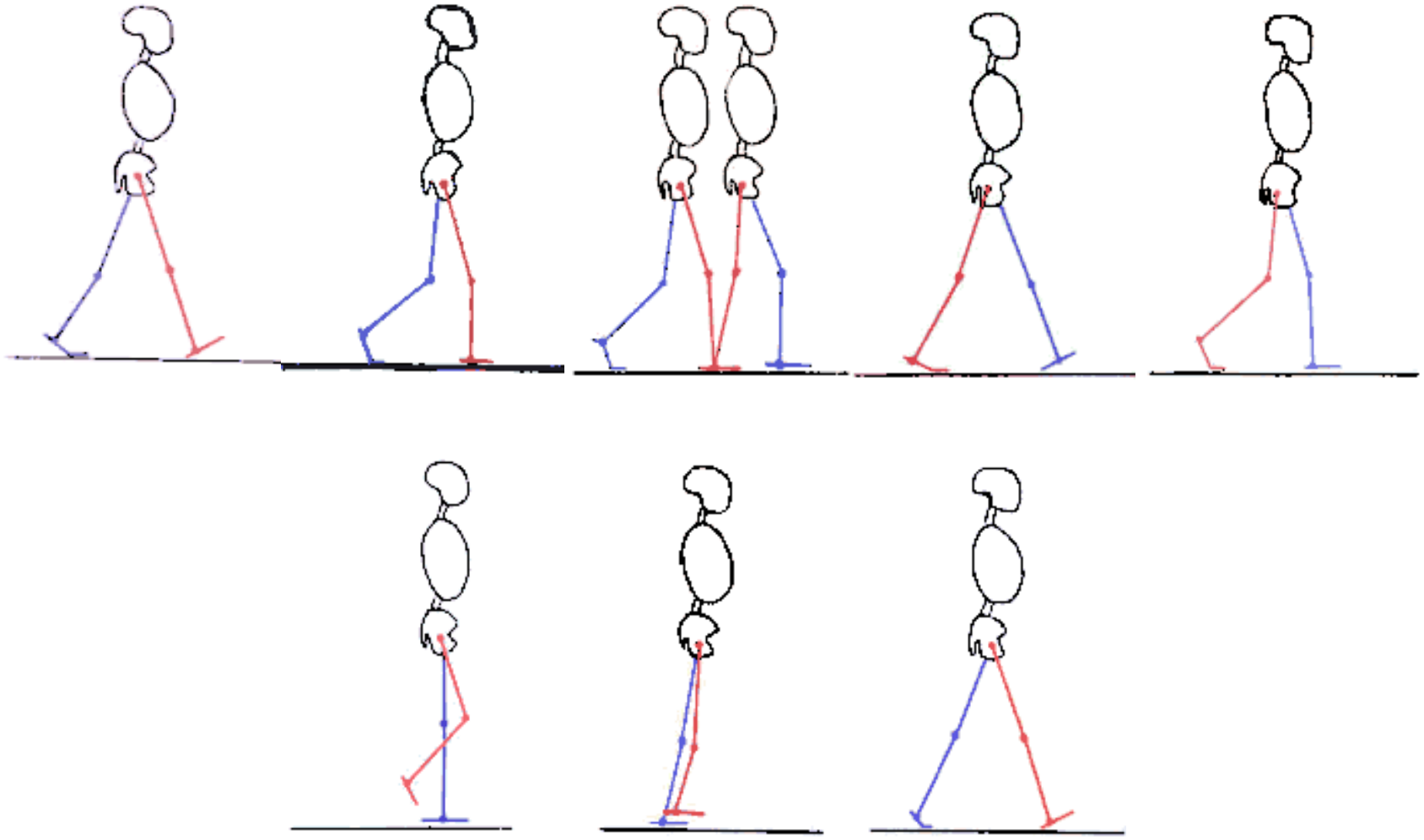


1st ray

- Depressed – cavus – throw centre of gravity laterally

Gait

- Stance phase (62%)
  - Heel strike or initial contact
  - Loading response
  - Midstance
  - Terminal stance or heel off
  - Toe off
- Swing phase (38%)
  - Initial, mid- and terminal swing



Examination of foot

- Stand
- Look
- Walk
- Anything else? (hands, spine, Coleman block)
- Sit
- Move

Stand

- Front
- Side
- Back
- Deformity
- Scars
- Position of heel (5^{o} valgus)
- “Too many toes”

Walk

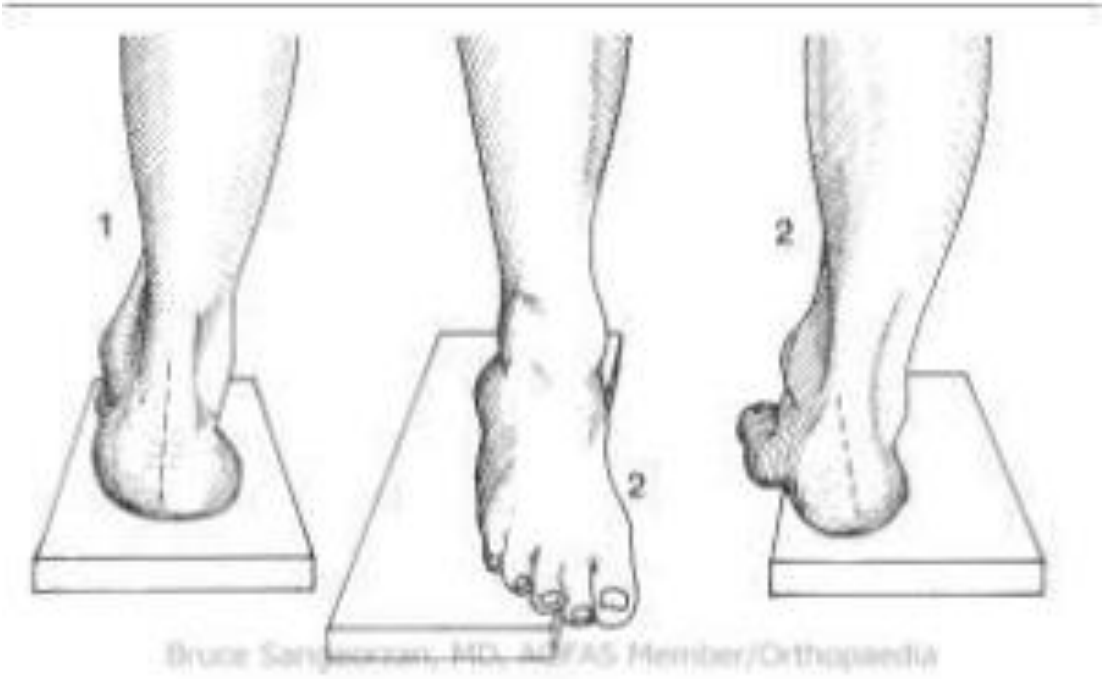
- Stages of gait
- Limp

Anything else?

- Cavus foot
  - Neurological signs (hands, spine)
  - Coleman block test
- Flat foot
  - Tip toe test
  - Ligamentous laxity

Coleman block test

- Remember the tripod



Sit

- Look
  - Shoe
  - Insole
  - Sole of foot
- Palpate
  - Remember anatomy
- Move

Movements

- Subtalar joint
  - Inversion / eversion
- Pronation = ankle dorsiflexion + subtalar eversion + forefooot abduction
- Supination = ankle plantiflexion + subtalar inversion + forefoot adduction

Topics to discuss

- Achilles tendonitis
- Achilles tendon tears
- Ankle sprain / instability
- Footballer's ankle (peroneal tear/instability)
- Plantar fasciitis
- Fat pad syndrome
- Hallux valgus

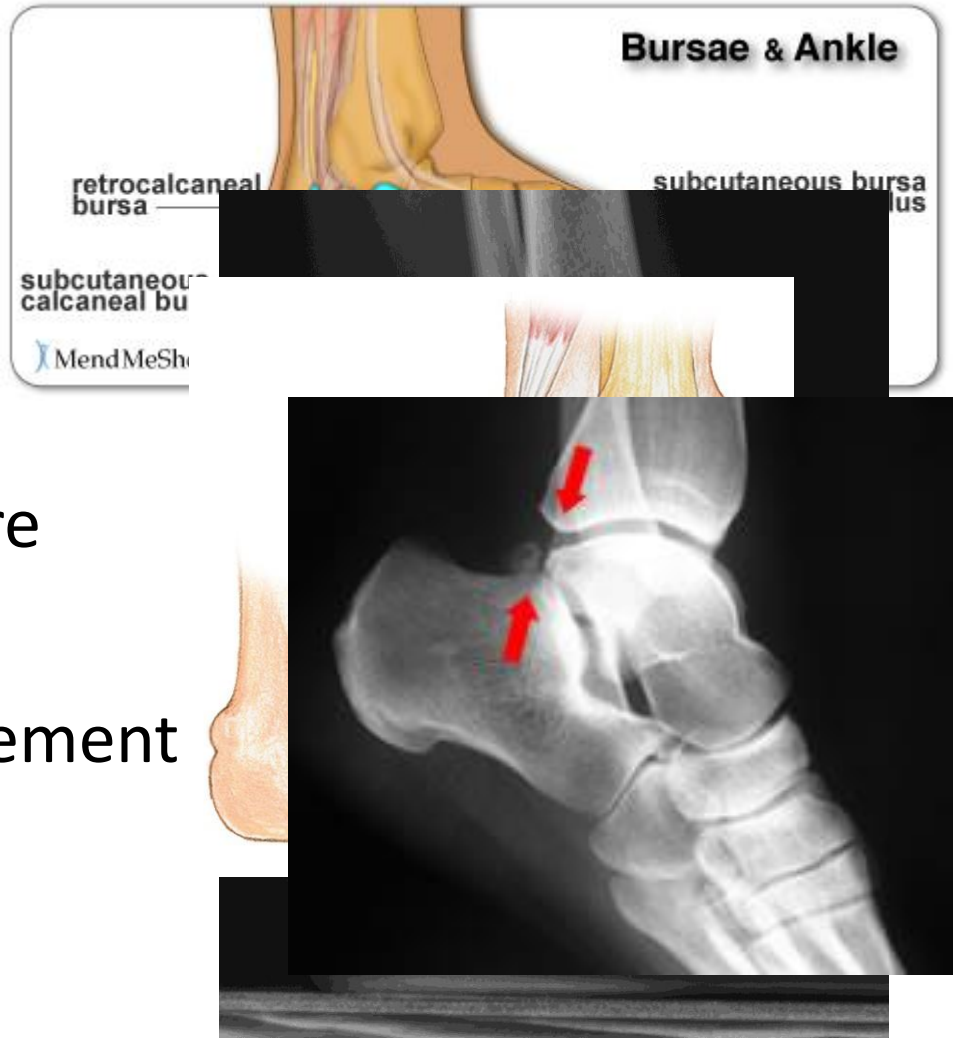
Achilles tendinopathy

- In and around tendon from overuse
- Athletic and non-athletic population
- Several regions of tendon
  - Common 2-4cm from insertion
  - Insertional

Achilles tendinopathy

- Pathogenesis:
  - Not fully understood
  - Repetitive microtrauma
  - Acute phase: inflammatory
  - Chronic: degenerative
- Physical findings
  - Prominence
  - Tenderness
  - Pain on exercise

- Differential diagnosis
  - Pre-Achilles bursitis
  - Retrocalcaneal bursitis
  - Calcaneal stress fracture
  - Haglund deformity
  - Posterior ankle impingement
  - ?Plantar fasciitis



Investigations

- X-rays in insertional tendinopathy
  - DD
  - Calcifications
- US scan
- MRI scan if still in doubt

Treatment

- NSAIDs in acute phase
- Heel lift and shoe modifications (esp. insertional)
- Platelet Rich Plasma injections
  - No overwhelming evidence
- Extracorporeal shock wave
  - Largely unproven

Physiotherapy

- Eccentric strengthening
- ? Taping
- Aggressive Achilles stretching should be avoided
- Up to 50% can be treated conservatively

Surgical treatment

- Objective:
  - Excise fibrosis
  - Remove degenerative nodules
  - Restore vascularity
- Excision of bone
- Augmentation with FHL

Achilles tendon injuries

- Role of US scan
  - Is there an injury?
  - Location of injury (musculo-tendinous junction)
  - Does the gap close (conservative treatment)
- Conservative vs. Operative (higher re-rupture rate vs. surgical complications)
  - Functional bracing
  - Mini-open techniques
  - No difference in functional outcome

Mini-open techniques

Chronic (neglected) Achilles tears

- Much rarer
- Much more difficult
- Outcomes inferior
- Options:
  - Continued neglect, bracing
  - Delayed repair / reconstruction
    - Hamstring
    - FHL
    - Advancements

Ankle sprains

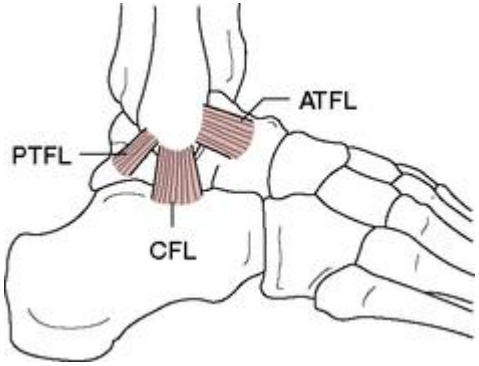
- Athletes
  - Special type of patients
  - Highly motivated person with no time to waste recovering
  - No time to wait for natural recovery

Ankle sprains

- Most common athletic-related injury
  - 40% of all sports injuries
  - Up to 50% of these may have long-term sequelae
    - Instability
  - Instability
    - Functional
    - Mechanical

Ankle instability

- Static stabilisers
  - Bony and ligamentous
  - ATFL weakest, most often injured
  - PTFL strongest, least injured



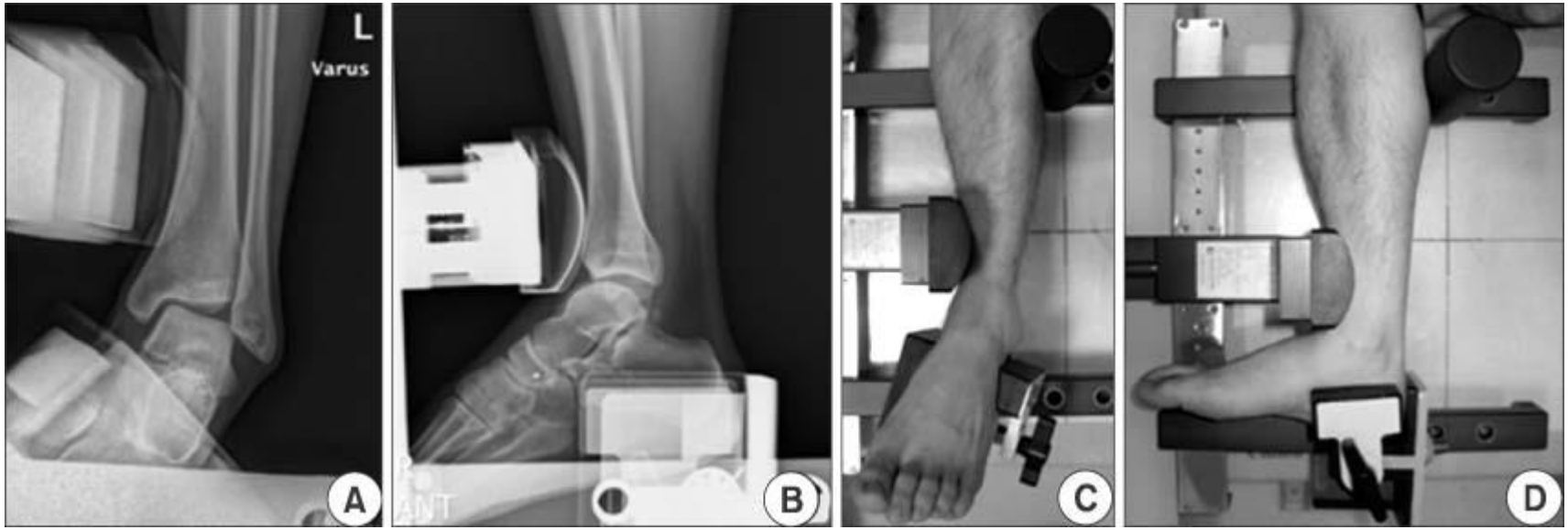
- Dynamic stabilisers
  - Peroneus longus and brevis
- Acute injury -> Immobilisation -> Chronic instability

Chronic ankle instability

- Diagnosis
  - History: Injury, pain(no ne between episodes)
  - Examination: Alignment, ROM, anterior drawer test, peroneal tendons
  - ?Proprioception
    - Should check
    - We don’t check
  - Clinical examination is gold standard

Chronic ankle instability

- Radiology
  - Stress views

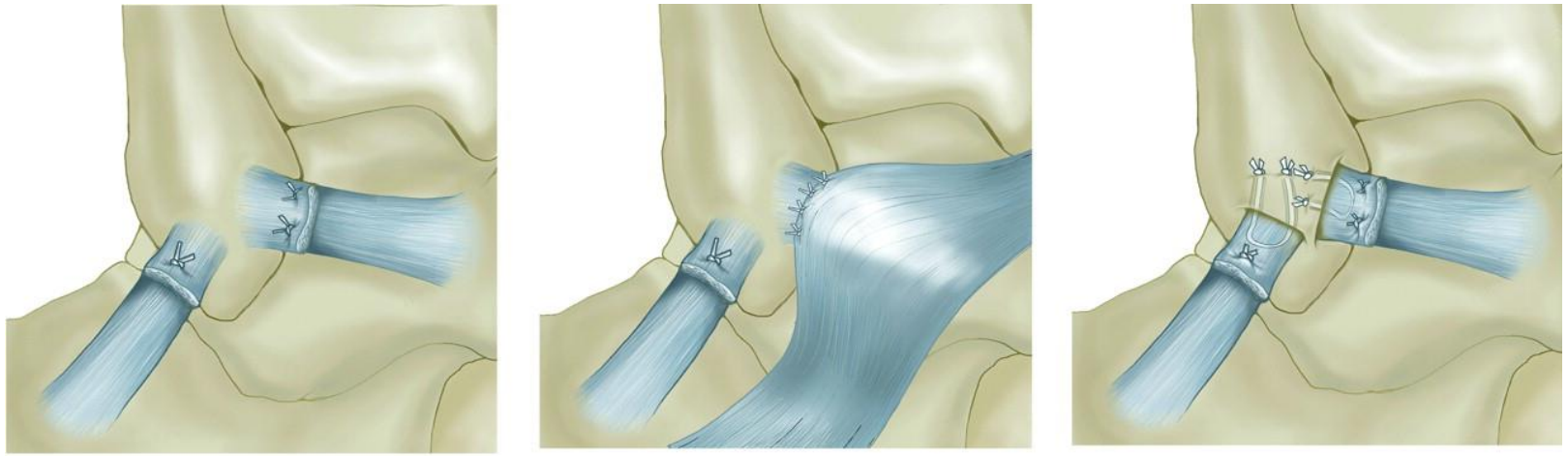


  - MRI scan

Ankle instability - Management

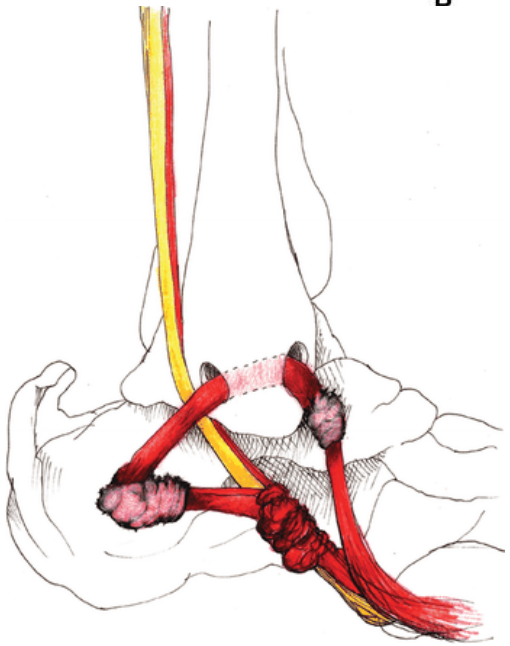
- Conservative treatment
  - Peroneal strengthening, proprioception
  - Taping, bracing
- Surgical management - considerations
  - Ligamentous laxity?
  - Hindfoot varus?
  - Osteochondral lesion?

Ankle instability - surgery



A

B



Ankle instability - Surgery

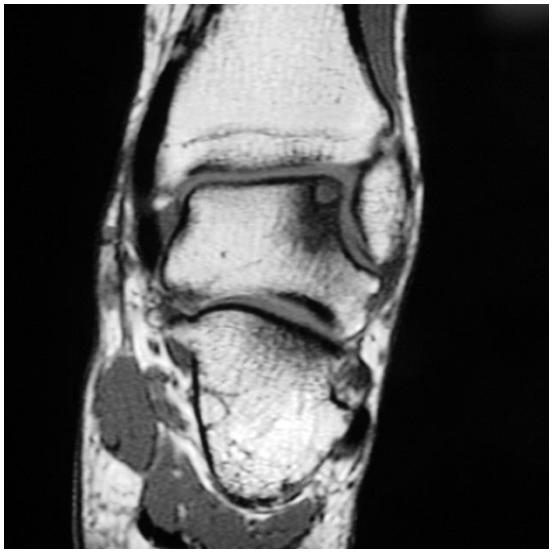
- Surgical management - options
  - Anatomical reconstruction
    - Patients need full ROM
  - Non-anatomical reconstruction
    - Obese
    - Alignment problem
    - Connective tissue disorders
    - Revision
  - Ankle arthroscopy
    - Talar lesions
    - Anterior impingement lesions

Talar dome injuries

- Osteochondral lesions of talus
  - Osteochondritis dissecans
- Talar cartilage 18%-37% softer than tibia
- Lateral
  - Anterolateral, shallower
  - Dorsiflexed ankle, inversion injury
- Medial
  - Posteromedial, deeper, more common
  - Plantarflexed ankle, inversion, external rotation

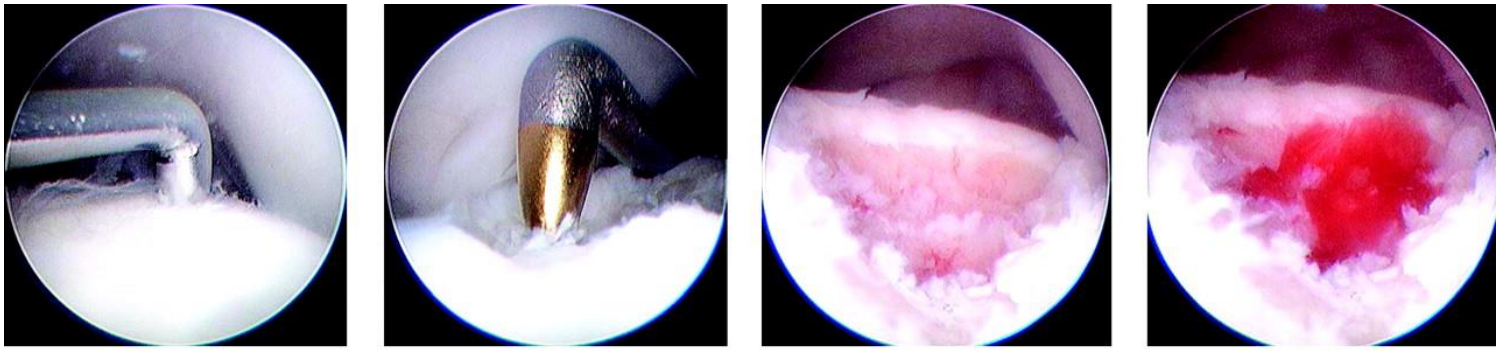
OLT – Natural history

- Often incidental finding
- No evidence that OLT develops to OA
- Indication to surgery:
  - Pain
  - Swelling



OLT - Treatment

- Ankle arthroscopy
  - Chondroplasty
  - Marrow stimulation
    - Microfracture
    - Retrograde drilling



Peroneal tears

- Usually peroneus brevis
  - Commonly at level of lateral malleolus
- Severe sprain – acute rupture rare
- Attrition tear
  - Due to multiple subluxations or tendonitis
- Peroneus longus tear with
  - Os peroneum
  - Calcaneal or cuboid pathology

Symptoms

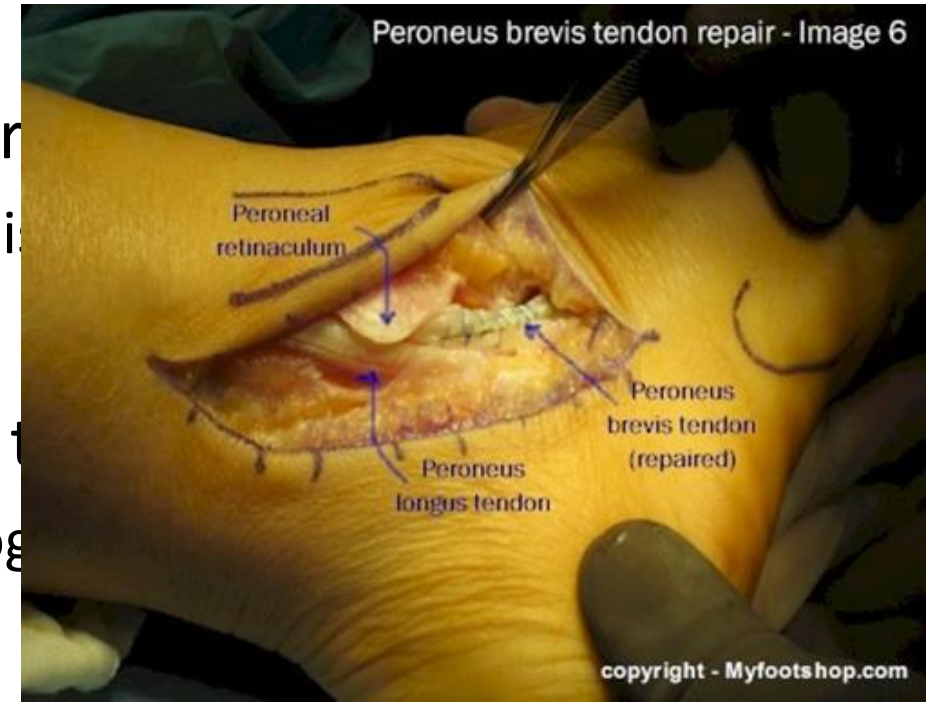
- P. brevis
  - Pain and swelling behind lateral malleolus
- P. longus
  - Pain in cuboid groove, plantar aspect of foot
- ? Subluxation or dislocation
- Varus hindfoot = increased rate of peroneal tendon disorders
- Loss of eversion power
- Loss of plantiflexion of 1st ray

Treatment

- Conservative
  - Rest
  - NSAIDs
  - Lateral heel wedge
  - Immobilisation
  - ? Physiotherapy

Treatment

- Surgical treatment
  - Type I: both tendons grossly intact
    - Synovectomy, excision of degenerate tendon, repair
  - Type II: one tendon tor
    - Debridement, tenodesi
  - Type III: both tendons t
    - Tendon transfer or allog



Plantar fasciitis

- Repetitive microtearing of origin of central band
  - Inflammation, pain
  - Neurogenic pain if tarsal tunnel syndrome
- Chronic if >9 mths
- Pain typical 1st steps in morning, after rest
- Typical point of tenderness
- Asymmetry of firmness on windlass test
- Neuritic symptoms: afterburn, radiation

Plantar fasciitis - Diagnosis

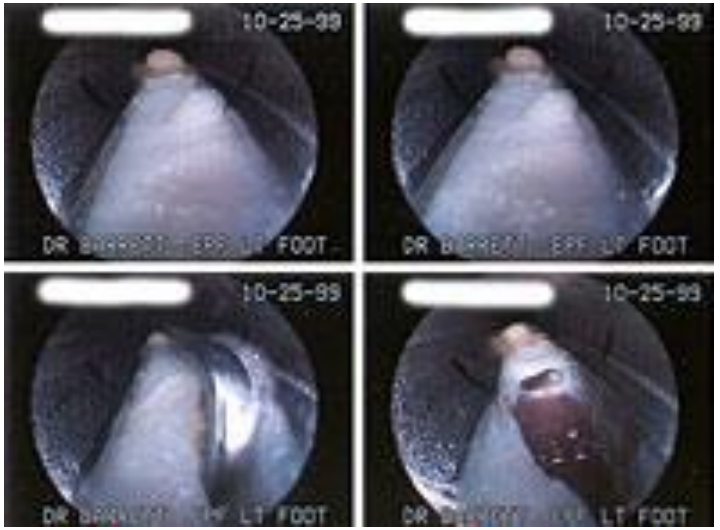
- Clinical history and examination usually diagnostic
- Obesity appr. 70% of patients
- Excessive pronation pre-disposes
- Imaging:
  - X-ray: 50% calcaneal spur – not cause of PF
  - USS: cost-effective, often unnecessary
  - MRI: if clinical picture is complicated (tumours, stress fractures, subtalar OA)

Plantar fasciitis - Management

- Conservative – 95% respond in 12 mths
  - Rest, ice, NSAIDs, PF and TA stretching, heel pads, orthoses, casting, steroid injections, PRP injections
- Surgical
  - Rarely necessary
  - Endoscopic PF release if no nerve symptoms
  - Open release and plantar nerve decompression

Endoscopic plantar fascia release

- 90% success rate



Fat pad syndrome

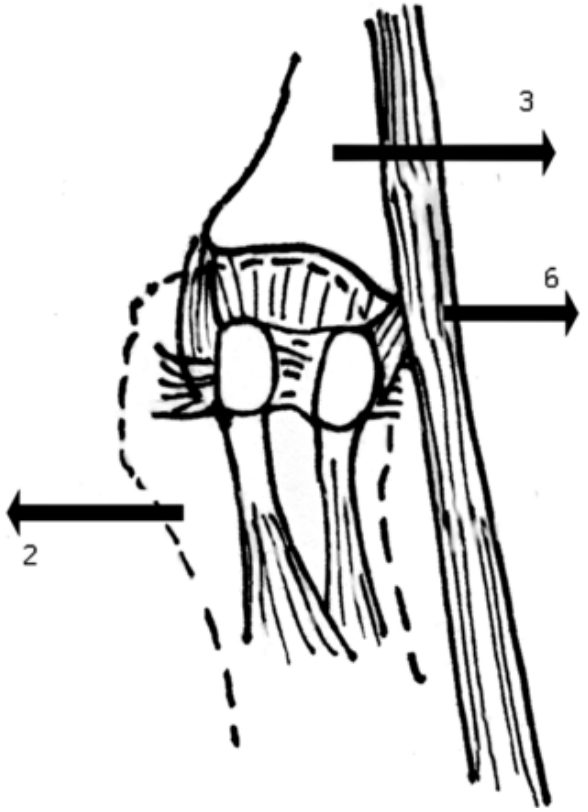
- Often mis-diagnosed as plantar fasciitis
- Dull pain in middle of heel, pain on barefoot walking
- Athletic, but often obese non-athletic patient
- Treatment:
  - Time
  - Taping (not in long term)
  - Heel cup

Hallux valgus

- Complex deformity of 1st ray
- Etiology:
  - Genetic predisposition
  - Inappropriate footwear
  - Structural abnormalities
    - Flatfeet, abnormal tibialis posterior insertion, abnormally long 1st ray, oblique 1st MT-cuneiform joint

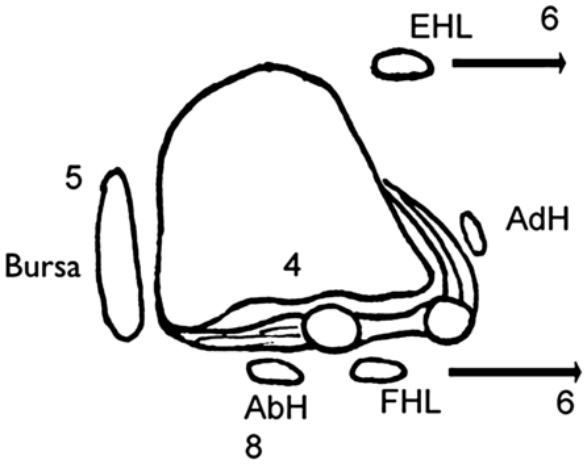
Hallux valgus – pathogenesis

- Medial structures fail
- Medial shift of MT head, slipping off sesamoids
- Medial displacement of proximal phalanx by sesamoids, deep transverse lig. and adductor hallucis
- EHL and FHL bowstring laterally



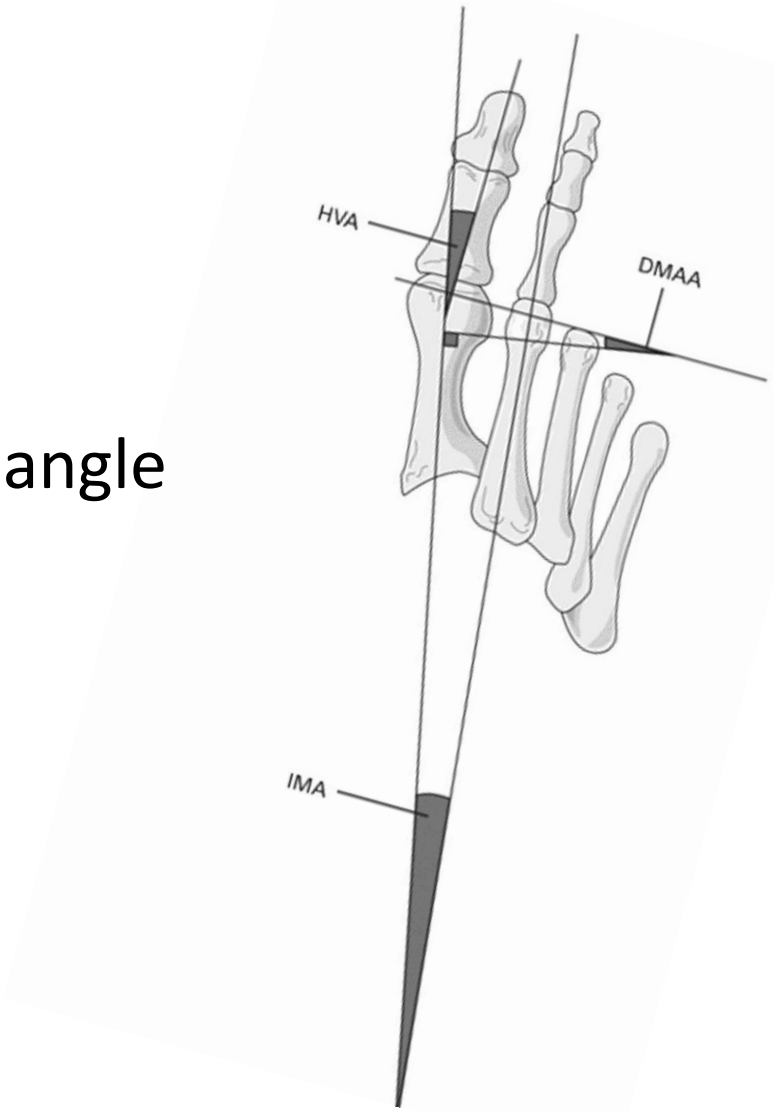
Hallux valgus – pathogenesis

- Metatarsal drops off sesamoids, pronates
- Abductor hallucis becomes dysfuctional
- Metatarsal elevates, transfers pressure laterally
- Bunion of not osteophyte or new bone formation



Hallux valgus - Radiology

- Weightbearing views!
  - Intermetatarsal angle
  - Hallux valgus angle
  - Distal metatarsal articular angle
  - Interphalangeal angle



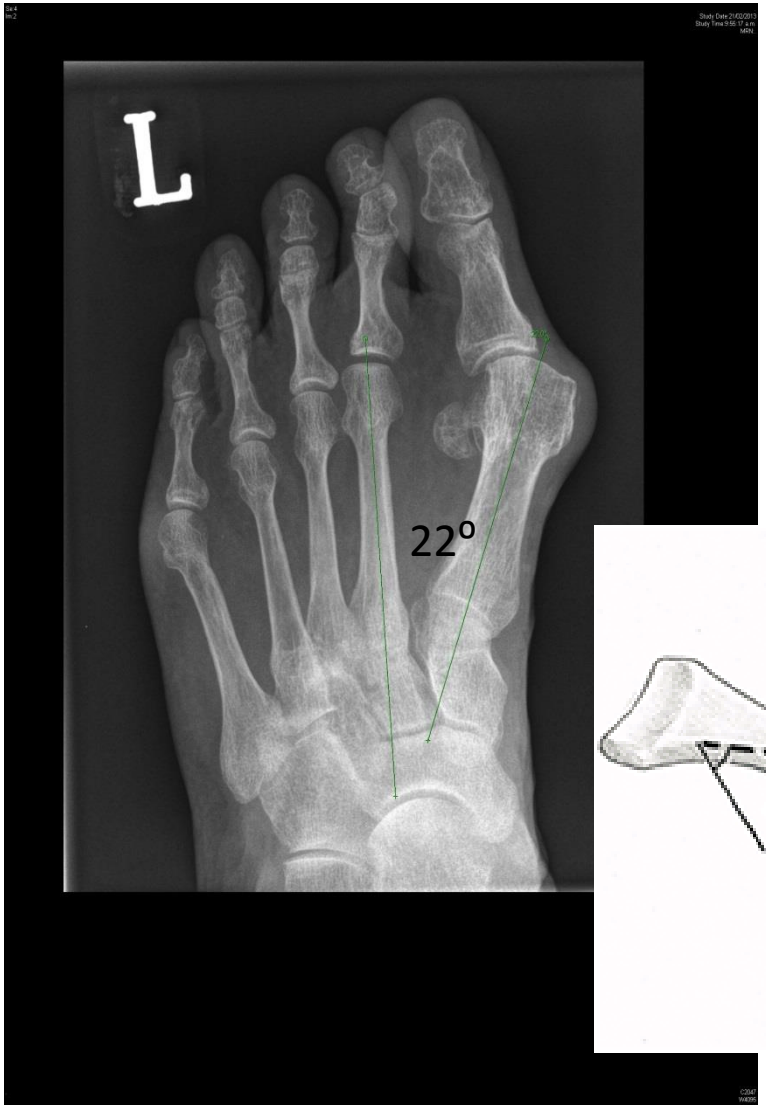
Hallux valgus - Treatment

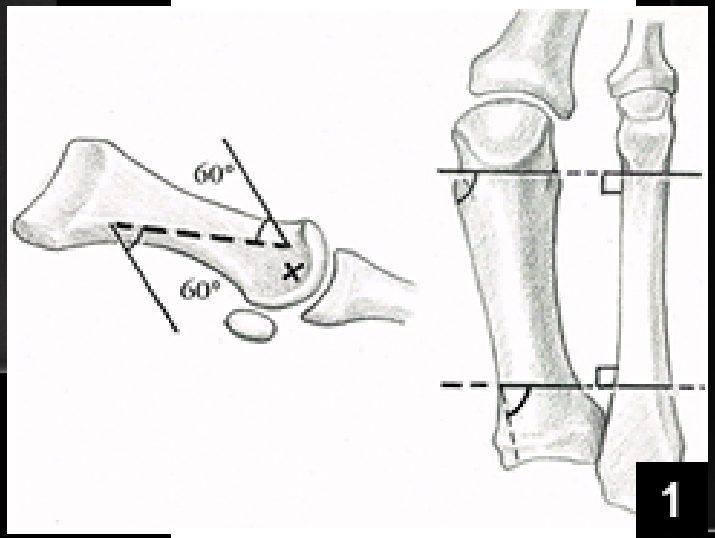
- Conservative
  - Shoe modifications
  - Orthoses
  - Exercises

Hallux valgus - surgery

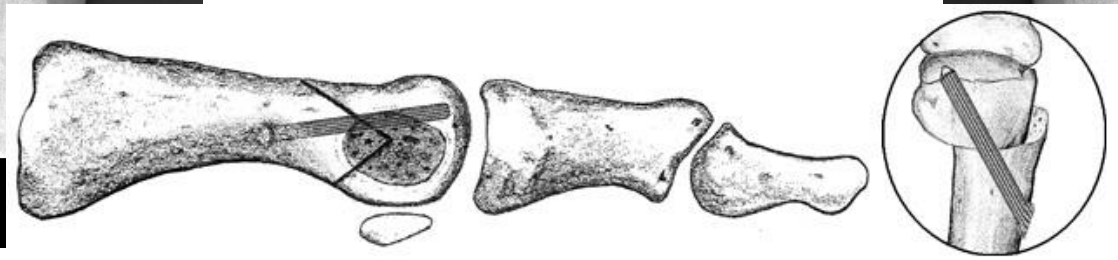
- Varus deviation of 1st MT (IMA)
- Valgus deviation of great toe (HVA)
- Pronation of hallux
- Location of sesamoids
- Hallux valgus interphalangeus
- OA in 1st MTP joint
- Excessive mobility / obliquity of 1st MT-cuneiform

Hallux valgus – Scarf + Akin





Hallux valgus – Chevron + Akin



Minimally invasive surgery

- Stab incisions
- Minimises soft tissue trauma
- Potentially quicker recovery
- Less joint stiffness
- Uses in my practice:
  - Hallux valgus – MICA
  - Hallux limitus – cheilectomy
  - Calcaneal osteotomy
  - Metatarsalgia – DMO


Thank you