ANKLE AND FOOT EXAMINATION

FOOTWEAR
- Abnormal wear may indicate gait abnormalities

GAIT
- Stance phase (heel strike → midstance → toe-off)
- Swing phase and stride length
- Smoothness, symmetry, ability to turn quickly
- Antalgic gait (identify point at which pain occurs)
- Ask patient to walk on the heels, toes, and medial and lateral borders of the feet

INSPECTION
- Briefly observe spine, hip and knee for misalignment
- Feet should be inspected in weight-bearing and at rest
- Standing
  - Splaying of the toes (suggest collapse of transverse arch)
  - Pes planus or “flat feet” (collapsed longitudinal arch)
  - Pes cavus (high longitudinal arch)
  - Hindfoot valgus (normally 5-10°)
  - “Too many toes sign”
    - More than 2 toes visible when looking from the back
    - Seen in severe pes planus or posterior tibialis dysfunction
- Swelling
  - True ankle swelling causes loss of normal depressions anterior to malleoli
  - Peroneal tenosynovitis: swelling posterior to lateral malleolus
  - Posterior tibial tenosynovitis: swelling posterior to medial malleolus
  - Swelling at the back of the heel: retrocalcaneal bursitis, retroachilleal bursitis
  - Swelling of the forefoot: can be seen
in inflammatory arthritis

- Erythema
- Atrophy
- Deformities
  - Hallux valgus, bunions, or bunionettes
  - Hammer toes
  - Claw toes
  - Mallet toes
- Skin changes or scars
  - Callous formation (may indicate abnormal gait or stance)
  - Remember to inspect sole of the foot

**PALPTION** (tenderness or temperature changes)

- Palpate bones and soft tissue structures in a systematic manner
- Fibula, lateral malleolus, lateral malleolar bursa, lateral ligaments, peroneal tendons
- Shin, extensor tendons, tarsal bones, metatarsals
- Medial malleolus, deltoid ligament, posterior tibialis
- Gastrocnemius, musculotendinous junction, Achilles tendon, enthesis, calcaneus
- Plantar fasciitis
  - Apply pressure to medial calcaneus tuberosity (insertion of plantar fascia)
  - Tense plantar fascia by passively dorsiflexing toes
- Painful Heel Pad Syndrome
  - Centre of heel is painful
- True ankle (tibiotalar) joint swelling
  - Cup hands around the ankle, palpate tibiotalar joint space anteriorly for fullness, try to ballot fluid between thumbs
- MTP Squeeze (metatarsal compression test)
  - Painful with inflammatory arthritis, intermetatarsal bursitis
- MTP joint swelling
  - Four-finger technique: palpate with tips of thumbs on top and fingers stabilizing underneath. Remember: MTP joint is 1-2 cm proximal to the webspace.
- PIPs and DIPs
  - Palpate with two fingers stabilizing at sides, index finger and thumb of other hand pressing from top and bottom

**RANGE OF MOVEMENT**

- Assess ROM with knee flexed and foot in neutral position (90° flexion)
- True ankle (tibiotalar) joint
  - Ankle dorsiflexion (15-25°)
  - Ankle plantar flexion (40-50°)
  - Ankle inversion and eversion (subtalar joint)
- Subtalar joint (between talus and calcaneum)
  - Ankle inversion (up to 30°)
  - Ankle eversion (up to 20°)
- Midtarsal joint
  - Stabilize heel, grasp and rotate the mid and forefoot
  - Inversion (30°)
  - Eversion (20°)
  - Adduction
  - Abduction
- Toes: flexion and extension
SPECIAL TESTS

- Stability Testing
  - Deltoid Ligament
    - Stabilize lower leg, grasp hindfoot and apply eversion force checking for excessive movement
  - Lateral Ligaments
    - Stabilize lower leg, grasp hindfoot and apply inversion force checking for excessive movement
  - Anterior Drawer Test (anterior talofibular ligament)
    - With the foot in 20° of plantar flexion, stabilize the leg, grasp the calcaneus, and pull the heel forward (normally < 5 mm movement)
    - A positive test indicates an anterior talofibular ligament tear

- Tarsal Tunnel Syndrome
  - Tinel’s Test
    - Tap over the tarsal tunnel (just posterior to medial malleolus)
    - Paresthesias radiating to the first three toes indicates possible tarsal tunnel syndrome

- Torn Achilles Tendon
  - Thompson Calf-Squeeze Test
    - With the patient supine or kneeling and foot hanging off chair, squeeze the calf
    - Failure of the foot to plantarflex indicates a torn Achilles tendon