

### Biomechanics

**Foot pronation is:** Eversion, abduction and dorsiflexion, begins at heel strike to mid stance

Limited by: Ligamentous and bony integrity + eccentric contraction of tibialis posterior

**Chronic hyperpronation** - causes laxity of calcaneonavicular ligament and talonavicular joint capsule, elongated plantar fascia, posterior tibial tendinopathy and posterior tibial nerve irritation

- Hyperpronation causes internal rotation of the tibia, resulting in internal rotation of femur (moves femoral head and acetabulum backwards, anterior tilt of the pelvis then hyperextension of lx)

- **Internal tibial rotation:** Causes valgus stress on the knee, MCL and ACL stressed, causes a lateral displacement of the patella

- **Internal femur rotation:** Also causes lateral displacement of the patella, quads, hip adductors/abductors - weakness of gluts causes excessive hip adduction, increases the foot arch during ambulation, also causes weakening of gluteal and abdominal muscles and tightening of hip flexors

### Presentation

- Look for lower chain dysfunction

- Excessive forefoot abduction (too many toes )

- Calcaneal eversion (bowing of achilles tendon)

- Navicular drop >10mm (6-8mm normal)

- Posterior tibial weakness (excessive calcaneal eversion when performing a heel raise)

- TTP: Posterior tibialis tendon

- Weak hip abductors (+ve Trendeleberg, single leg squat)

- Flexibility of soleus and gastroc

### Management

- Arch supports

- Address leg length inequalities

- Stretching and myofascial release in gastrocnemius and soleus

- Strengthening of posterior tibialis and hip abductor (posterior lunge, clam with a band and side bridge)

- Single leg and Vele's then lungers on unstable surface



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