Peri-talar Instability: Fact or Fiction
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Given the considerable contact area to the surrounding bones, talar position may be highly confined by the talocrural, subtalar and talonavicular, or peritalar joints. As no muscles and only few ligaments insert into the talus, main stability must be provided by the articular surfaces. In vitro, the highly congruent talocrural joint has been found to provide as much as 100% talar frontal plane stability while the foot is loaded, suggesting that incompetence of collateral ligaments will not affect talar position within the ankle. In daily practice, however, we often see patients with a varus or valgus tilt of talus within the ankle mortise that even may increase under loading.

One explanation may be that loss of peritalar stability, for instance after trauma, which allows the talus to rotate and translate on calcaneal and navicular bone surfaces, thereby undergoing a three dimensional positional change. This peritalar destabilization process is, to date, poorly understood.

Radiographic appearance of peritalar instability

Talar position can be as follows:

A) Frontal (coronal) plane
   - neutral
   - valgus tilt (the calcaneus can follow the talus, or counteract it)
   - varus tilt (the calcaneus can follow the talus, or counteract it)

B) Horizontal plane
   - neutral
   - internal rotation
   - external rotation

C) Sagittal plane
   - neutral
   - dorsiflexion
   - plantar flexion

Clinical appearance of peritalar instability

Despite of varus or valgus tilt of talus, clinical appearance is often not evident:

A) For valgus-tilt of talus, the calcaneus
   - can follow the talus (valgus misalignment of hindfoot)
   - can counteract the talus (neutral alignment of hindfoot, e.g. zick-zack deformity)

B) For varus-tilt of talus, the calcaneus
   - can follow the talus (varus misalignment of hindfoot)
   - can counteract the talus (neutral alignment of hindfoot, e.g. zick-zack deformity)

C) For neutral position of talus, the calcaneus
   - can tilt into valgus (valgus misalignment of hindfoot)
   - can tilt into varus (varus alignment of hindfoot)

The height of hindfoot does decrease in all instances, but more in the case of a counteracting tilt of calcaneus.

Preliminary study

- Frontal, sagittal and horizontal weightbearing standard X-rays in 126 varus, 81 valgus and 48 neutral ankles (with inframalleolar varus or valgus misalignment) were assessed
- Besides frontal varus and valgus, determination of talar sagittal and horizontal position was done:
  - sagittal talocalcaneal inclination angle (TCI)
  - horizontal talometatarsal I angle (TMT I)
• In addition to frontal varus or valgus, 67% of the varus and 46% of the valgus ankles showed talar malpositioning in one or both additional planes
• All of the 48 ankles with neutral frontal plane position of talus showed talar malpositioning in one or both additional planes

Conclusions
• Peritalar instability obviously results in complex and variable three dimensional talar instability and malpositioning
• Anatomical configuration may explain that there are some predominant talar malposition patterns, while others are not seen
• Peritalar instability may be caused by:
  - wearing out of the peritalar ligaments
  - changes in osseous stability, applied forces and peritalar joint congruency

References