

SUBTALAR INSTABILITY : VIDEO PRESENTATION OF CADAVER STUDY

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Subtalar joint (ST) instability is often misdiagnosed as simple lateral ankle instability or even totally missed. It is defined as a varus tilt with anterior and medial subluxation of the calcaneus in relation to the talus. Clinical assessment, range of motion testing and stability of the ST are often not exact.

Clinical:

Examination of ST instability must be done with the tibiotalar joint in dorsiflexion, thus blocking the talus within the mortise limiting tibiotalar motion (Fig 1 top panel). Internally rotating the foot in association with a varus stress on the calcaneus in patients with subtalar instability leads to a medial shift of the calcaneus and an increased talocalcaneal angle (Fig 1 bottom panel).



Figure 1, Top: foot dorsiflexion and talar locking in ankle mortise, Bottom: varus stress

Bony component:

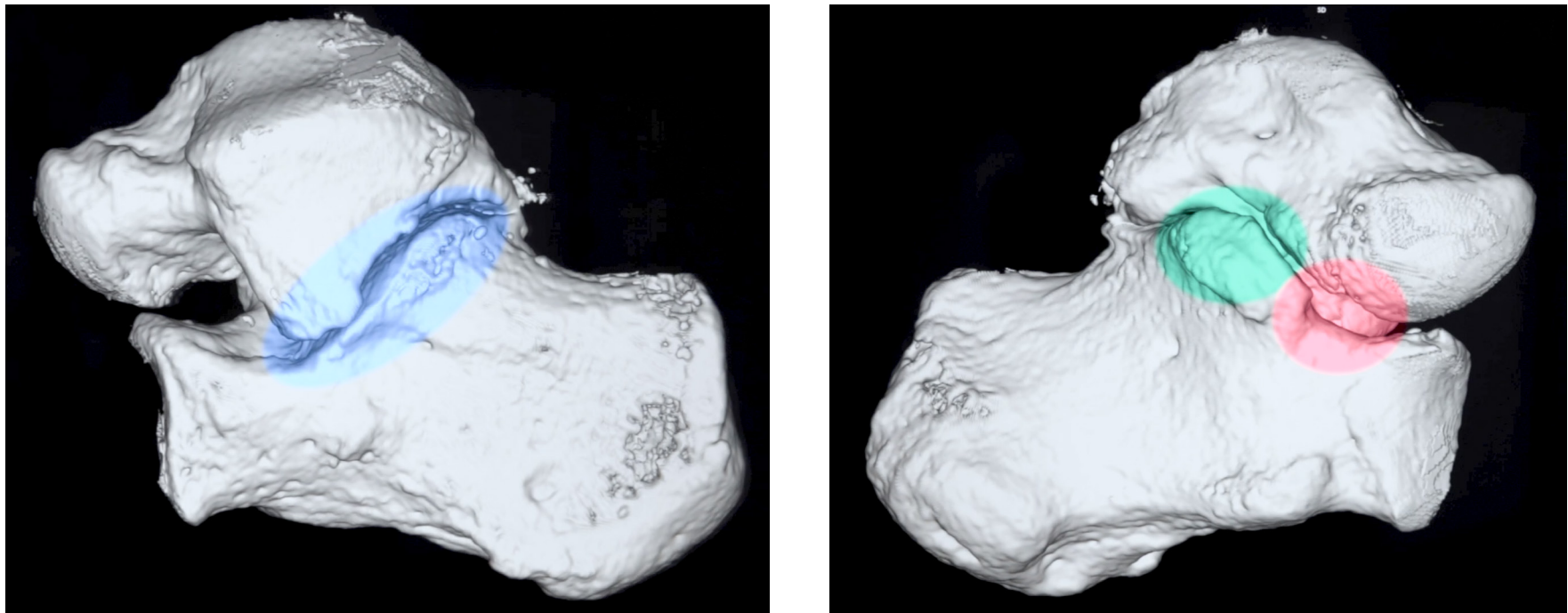


Figure 2, A: lateral view, posterior convex facet of calcaneus, B: medial view, anterior and middle calcaneus facets

Congruency of the posterior compartment of the ST joint determines mobility and guidance of motion. No single axis of motion has been identified, but several planes exist due to the curvatures of the facets. A Shallow angle of the posterior facet is thought to be a predisposing factor to developing subtalar instability in the anteroposterior plane.

Ligamentous componant:

Intrinsic ligaments of the ST joint are: interosseous talocalcaneal ligament (ITCL), oblique talocalcaneal ligament (TCO), anterior cervical ligament (ACL), and lateral talocalcaneal ligament (LTCL), they are derived from the inferior extensor retinaculum.

Extrinsic ligaments; fibulocalcaneal ligament (FCL) and tibiocalcaneal portion of the deltoid ligament, they control sliding, rolling and torsional ST motion.

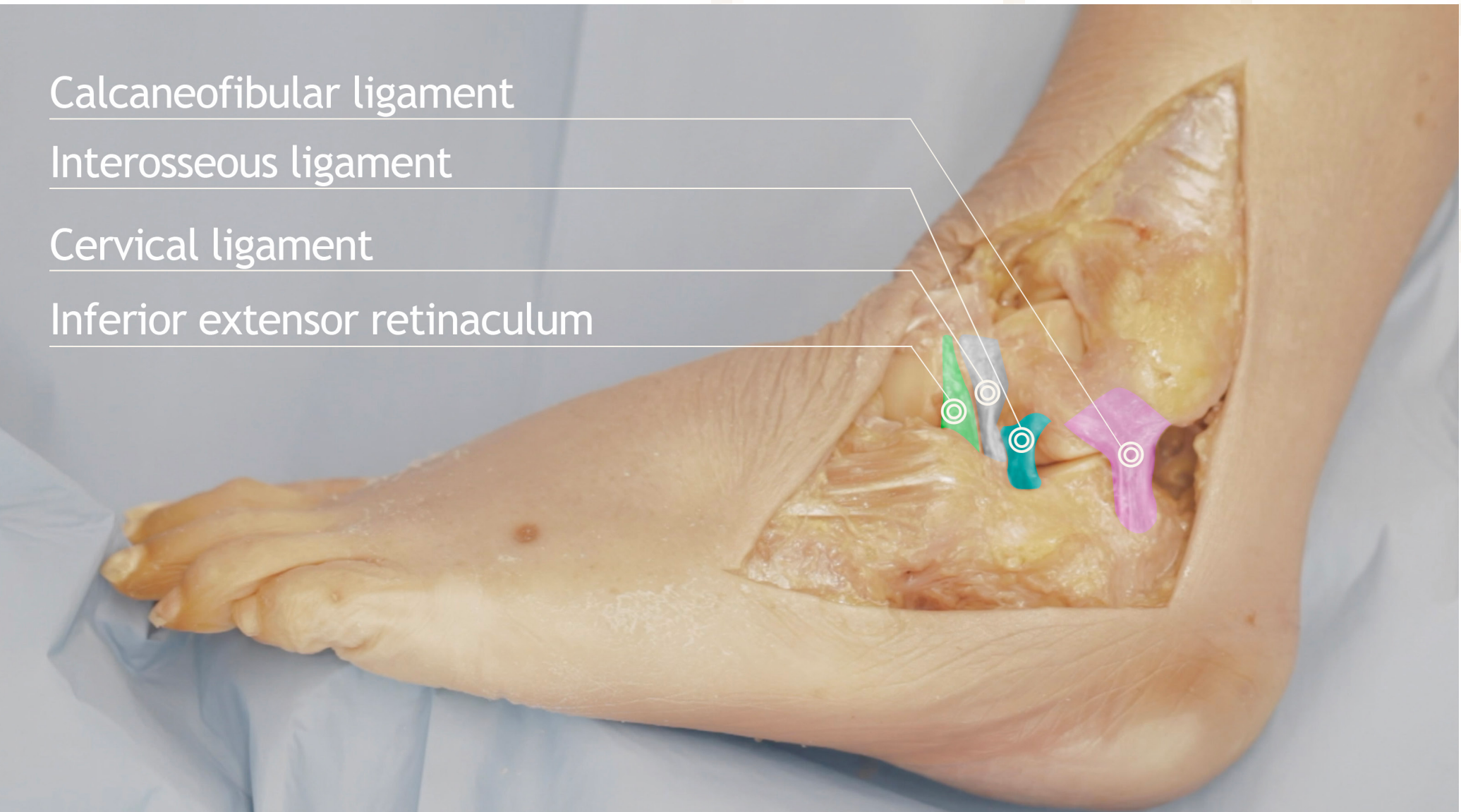


Figure 3, Representative cadaver showing highlighted ST ligaments

Methodology:

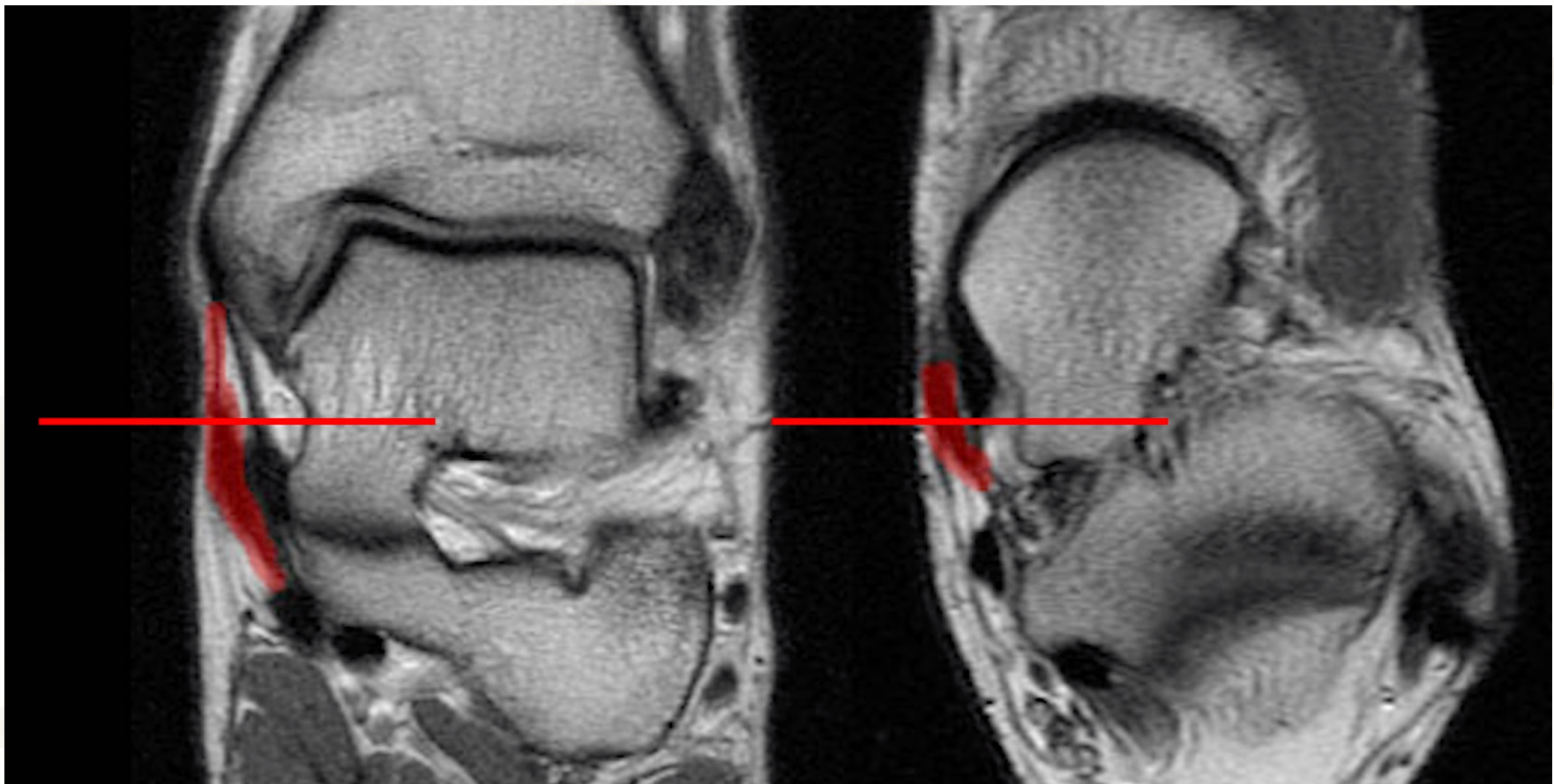


Figure 4, MRI showing the level of deltoid sectioning in red, A: Coronal, B: axial

After skin and soft tissue careful removal, we identified the individual ligamenous structures (Fig 3). On the first cadaver, we selectively cut the deltoid ligament then the intrinsic ligaments (Fig 4). On the second cadaver, we cut the FCL then the intrinsic ligaments. On the third cadaver we cut only the intrinsic ligaments. The clinical assessments of the increase in motion and ST instability of the subtalar joint was performed by varus tilting and by anterior and medial subluxation.

Results:

Each group of ligaments has a different contribution to axes of rotation. Complete tearing of the ACL, CFL and the ATFL were responsible for inducing ST instability.

Observations:

1. Isolated section of the Calcaneo Fibular ligament **does not** increase ST motion.
2. Extensor retinaculum section **increases** ST motion.
3. Isolated Cervical ligament section **does not** increase ST motion.
4. **Increased medialization** of the calcaneus after deltoid section.
5. **Fibular tendons** contribute to overall ST stability.

Clinical relevance:

- Rupture of extrinsic ligaments and interosseous ligament lead to a **varus** instability
- Rupture of deltoid and cervical ligaments leads to **valgus** instability

