

The Spring Ligament, PTT Tear, and Adult Acquired Flatfoot Deformity On MRI

(Part 2) By William Renner, M.D.

This and other topics will be discussed in:



30
CPD Points
RANZCR

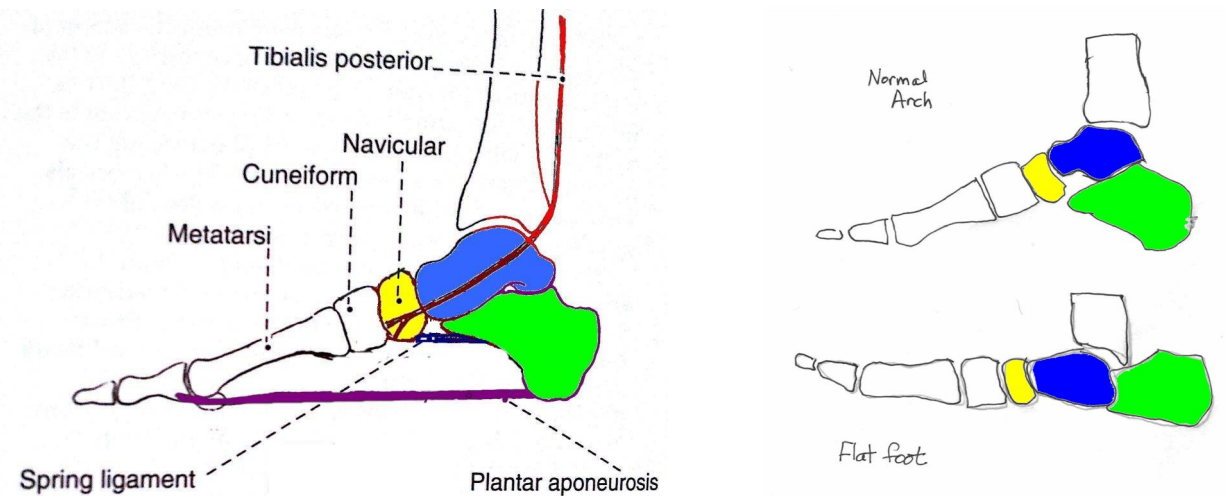
A Weekend Workshop:
One-on-One
Musculoskeletal MR

Interactive Cases and Lectures
by William Renner, M.D.

2017 Course - 30 CPD Points RANZCR

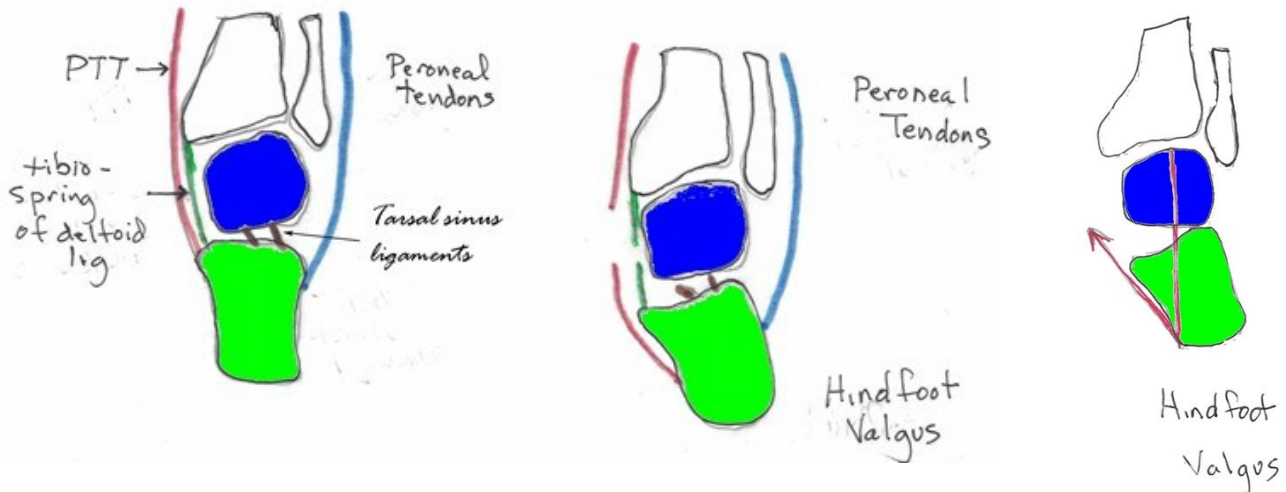
Melbourne – July 29-30
Brisbane – Aug 5-6
Sydney – Aug 12-13
Perth – Aug 19-20
Adelaide – Aug 26-27
Hobart – Sept 2-3

Register at www.MSKMR.com NOW and save 10%!

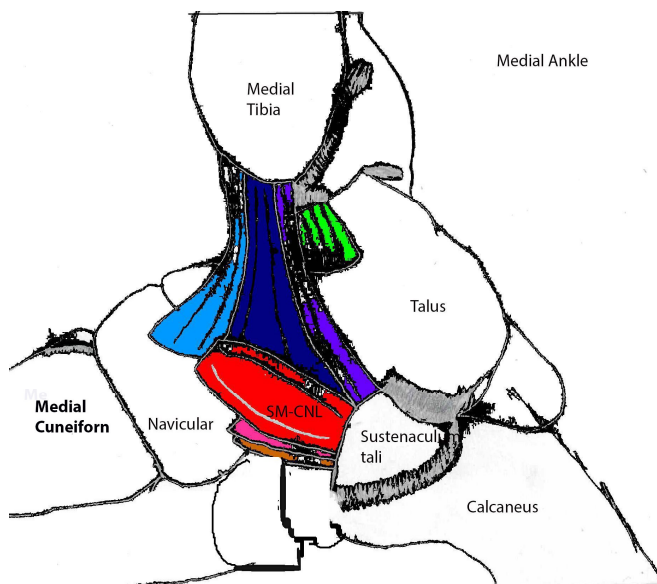


The **posterior tibial tendon** is the primary stabilizer of the foot. Other stabilizers include the **spring ligament**, the **tarsal sinus ligaments** and **plantar fascia**. The spring ligament complex consists of the tibio-spring component of the deltoid ligament and the calcaneonavicular ligament, which limits plantar flexion of the talus

and stabilizes the talocalcaneal navicular joint. The tarsal sinus ligaments (cervical and interosseous ligaments) limit medial deviation of the talar head. To surgically correct flatfoot deformity both PTT and Spring Ligament injuries must be addressed.

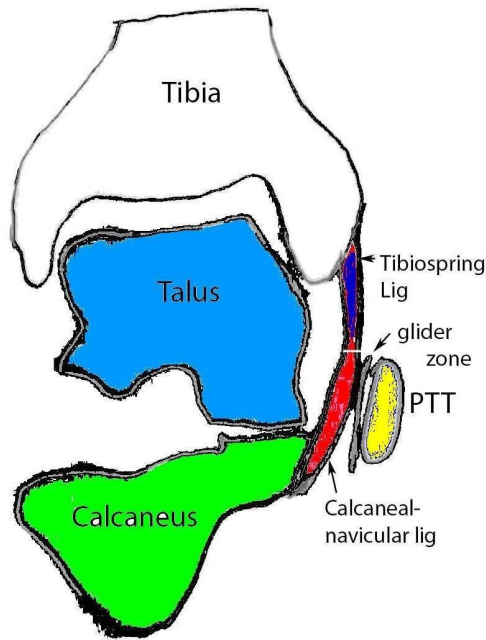


Frequently there is a combination of posterior tibial tendon injury, spring ligament injury and tarsal sinus ligament injury that leads to flatfoot deformity in adults and results in hindfoot valgus deformity.



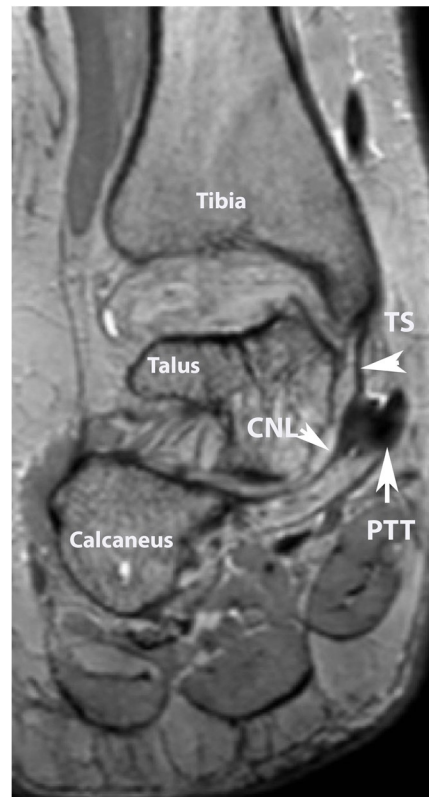
The tibio-spring ligament is a portion of the del- toid ligament and has a wide attachment to the SM-CNL. The spring ligament (navicular calcaneal ligament) has 3 components that extend from the calcaneus to the navicular. The superior medial (SM-CNL) band is the most important portion of the ligament. Inferior to the SM-CNL band is the medioplantar oblique ligament and most inferior is the inferoplantar ligament. The SM-CNL is the strongest component and should be emphasized when reading MR exams. The SM-CNL extends from the sustentaculum tali to the dorsal aspect of the medial navicular. Immediately superior to the SM-CNL is the posterior tibial tendon. A thin synovial layer separates the spring ligament and the posterior tibial tendon and this is called the glide zone.

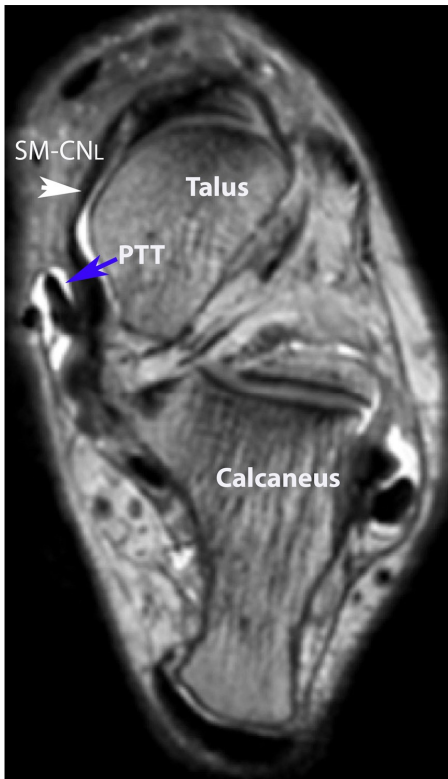
The tibio-spring ligament in blue is a portion of the deltoid ligament. The SM-CNL band (red) of the Spring Ligament is the most important portion of the ligament. Inferior to the SM-CNL band is the medioplantar oblique ligament (pink) and most inferior is the inferoplantar ligament (brown)



Coronal Diagram: The tibio-spring ligament in blue is a portion of the deltoid ligament. Attached to the tibio-spring ligament inferiorly is the SM-CNL band in red, the most important portion of the spring ligament. The superior medial calcaneal navicular ligament (SM-CNL) forms a sling that holds the talar head in its correct position.

Coronal MR: The tibio-spring ligament (TS) is a portion of the deltoid ligament. Attached to the tibio-spring ligament inferiorly is the CNL (spring ligament, medial to the posterior tibial tendon (PTT)).





Axial MR: SM-CNL band of the Spring Ligament is the strongest and most important portion of the ligament. This can be seen between the talar head/neck and the posterior tibial tendon (PTT).

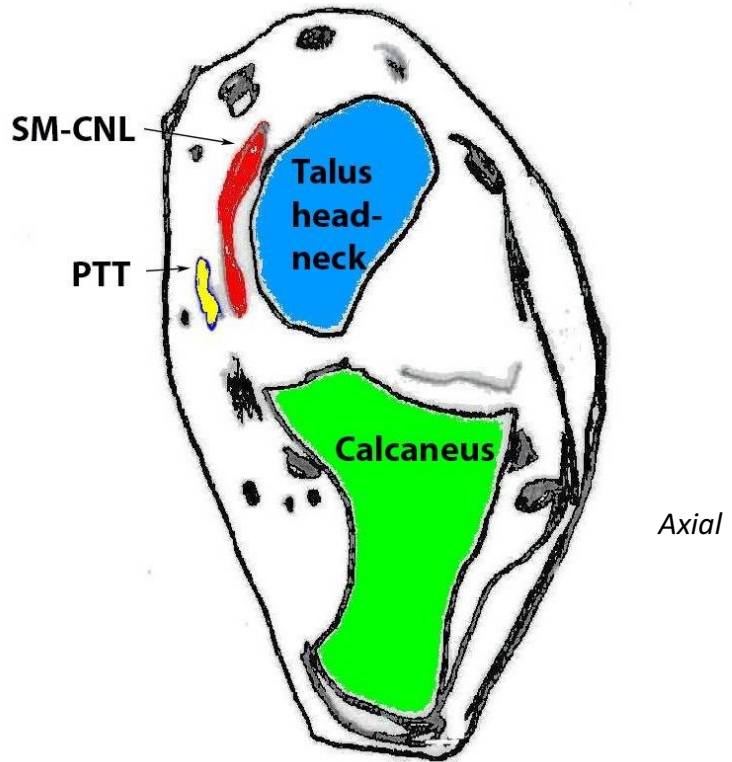


Diagram: SM-CNL band of the Spring Ligament, in red, is the most important portion of the ligament. This can be seen between the talar head/neck and the posterior tibial tendon (yellow).

When the surgeons are discussing the spring ligament they are frequently referring to the tibio-spring ligament and the SM-CNL, which I call the spring ligament complex. In fact, a tear at the junction of the tibio-spring ligament and the SM-CNL is one of the more common tears and is called the “spring ligament tear” by the surgeons.

The best MR signs of clinically important spring ligament tears are increased signal on PD or T2 weighted images within the ligament with thickening

of the ligament greater than 5 mm or thinning of the ligament to less than 2 mm. Partial or complete tears result in a gap with fluid signal within the ligament.

In a study of MR findings of spring ligament tears: 100% had increased signal on T2-weighted images, 93% had abnormal caliber, 79% had a gap within the ligament, 64% had a wavy ligament, and 93% had associated PTT tears.



T2 FS Coronal MR Image: thickening of the SM-CNL greater than 5 mm consistent with spring ligament injury.

MR findings of spring ligament injury:

The SM band is most commonly injured. The SM band injury may show thickening greater than 5 mm or be atretic if less than 2 mm. A gap in the ligament with fluid signal within the band is the strongest finding of a tear. Tears of the spring ligament are accompanied by posterior tibial tendon tears in >90% of cases, flatfoot deformity, and sinus tarsus syndrome

Checklist for adult acquired flatfoot deformity:

- Posterior tibial tendon injury**
- Spring ligament complex tear including tibial spring ligament**
- Sinus tarsi syndrome**
- Plantar fasciitis**
- Tarsal coalition: the most common coalitions are the calcaneonavicular and the talocalcaneal coalition**