Anatomy of the insertion of the tibialis posterior tendon

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Background

► Function of the Posterior Tibial Tendon (PTT)
  ■ stabilize the hindfoot against valgus forces
  ■ dynamic support of foot arch
  ■ adduction of transverse tarsal joints
    → locking of the tarsal joints, hence foot becomes rigid lever during propulsive phase of gait

► Posterior Tibial Tendon Dysfunction (PTTD) can lead to
  ■ persistent pain
  ■ hindfoot eversion, and finally
  ■ flat foot deformity
Treatment of severe PTTD consists of tendon transfer using Flexor Hallucis Longus (FHL) or Flexor Digitorum Longus (FDL) tendon and fixation with

- tendon to bone by bone tunnel or anchor fixation
- suture to stump of PTT

Exact knowledge of tendon anatomy may help to find the most physiologic reconstruction
Method

- 29 embalmed cadavers = 58 feet
  - ♂ age: 83 (± 7.4) yrs
  - 17 female : 12 male
  - All caucasians

Dissection:

- Plantar aponeurosis and flexor digitorum brevis (FDB) lifted proximally, musculus abductor hallucis (ABH) distally
- Flexor hallucis longus with lumbricales and Flexor digitorum longus with M. quadratus plantae lifted distally
- Identify connections to M.flexor hallucis minimi and peroneus longus tendon
- Identify insertion to all bony, tendinous and ligamentary landmarks
Results

- PTT splits before inserting on tuberositas naviculare
  - sesamoid in 86% of the feet
  - anterior band (PTTab): inserts on naviculare and with some fibers on os cuneiforme medial
  - medial band (PTTmb): inserts on bones of the midfoot
  - posterior band (PTTpb): inserts on calcaneus and cuboid

- Diameter of PTT:
  - before splitting: 9.7 (± 1.4) mm
  - lateral part of PTT (PTTmb and PTTpb): 5.0 (± 1.1) mm
Results

► **Anterior band (PTTab):**

- inserts on tuberositas os naviculare
- insertion area on naviculare $72.7\, (\pm 18.0)\, \text{mm}^2$
- flatspread insertion to capsule of NC 1 and plantar aspect of cuneiforme mediale

► **posterior band (PTTpb):**

- inserts on cuboid and medial aspect of Calcaneus, including sustentaculum
- inserts on spring ligament in 3.4 %
- about 15 % of tendon width
Results

► Medial band (PTTmb)

- Represents with posterior stand approx. 50 % of tendon width
- Variable insertion on
  - Cuneiforme intermedium 100 %
  - Cuneiforme laterale 100 %
  - Base MT1 3.5 %
  - Base MT2 90 %
  - Base MT 3 97 %
  - Base MT 4 93 %
  - Base MT 5 93 %
Conclusion

► PTT splits into two nearly equal strong strands before insertion on os naviculare

► PTT has strong insertions into most bones of the mid- and hindfoot with low variability

► Considering the thickness of the lateral bands of the tendon, reconstruction of it during PTTD surgery should be considered

► Clinical comparative studies between reconstruction techniques are required to understand the clinical relevance
References

