Peroneal and Posterior Tibial Tendons

Kent Ellington, MD, MS
OrthoCarolina
Foot and Ankle Institute
Jan. 21, 2012

Anatomy

• Peroneus Longus
  – Originates on lateral fibular head and proximal shaft
  – Inserts on base 1st MT and medial cuneiform
  – Nerve supply SPN and some DPN
  – Blood Supply – Ant tibial artery

Anatomy

• Peroneus Longus Functions
  – Eversion of the Foot
  – Plantar flexion of the Ankle
  – Plantar flexion of the 1st ray

Anatomy

• Peroneus Brevis
  – Eversion of the ankle
  – Plantar flexion that ankle

Anatomy

• Peroneus Brevis
  – Originates on the lateral fibular shaft
  – Inserts on the base of the 5th MT
  – Innervated by SPN
  – Blood Supply – peroneal artery

Anatomy

• Superficial Peroneal Retinaculum
  – Originates on the posterolateral aspect of the fibula
  – 1-2 cm wide
  – Variable insertion
  – Most common variant - 2 bands
    • Superior inserts on Achilles
    • Inferior inserts on calcaneus at the peroneal tubercle
Anatomy

- Fibular groove key stabilizer
- 6-7mm wide
- 2-4mm deep
- Sulcus lined with fibrocartilage—determines the groove morphology
- 4 walls of the tunnel

Peroneus longus function

- Supports the arch
- Plantarflexes 1st metatarsal
- Weak evertor of subtalar joint
- Weak ankle plantarflexor

Peroneus longus tenosynovitis

- PL tenosynovitis occurs
  — in the sheath behind the lateral malleolus
  — More distally at the peroneal tubercle
- Peroneal pathology occurs more frequently in lateral ankle ligament instability
  — PB and PL are the secondary restraints
  — Sammarco, FAI 1989
- Peroneus quartus may cause increased pressure in the peroneal tunnel
  — Sobel, FAI 1990

Order the H&P

- History
  — Questions to ask....
  — h/o instability, clicking or popping
  — h/o recurrent sprains, overuse
  — +/- lateral pain
  — Acute vs chronic trauma vs insidious onset
  — Personal or family history of autoimmune disorders

Physical Exam

- Observe
  — Hindfoot and Midfoot Position (Brandes, FAI 2000)
- Palpate
  — Tendons
  — With active and passive motion
  — Mass
  — Edema
  — Warmth
- Strength Testing
  — J Pain

Physical Exam

- Dynamic Testing
  — Inversion of the foot
  — Plantar flexion
  — Peroneal tunnel compression test
    — Knee flexed at 90
    — Compress retromalleolar groove
    — Assess ability to plantar first ray below their resting position
  — Anterior Drawer
  — Talar Tilt
- Functional Testing
  — Single leg stance
  — Gait examination
• Peroneal injuries can happen in many ways...

Case #2

Differential diagnosis for lateral ankle pain
• Fibula fracture
• Talar OCD lesion
• Lateral ankle ligament sprain
• Lateral process talus fracture
• Anterior process calcaneus fracture
• Base of 5th metatarsal fracture
• Calcaneo-cuboid joint avulsion fracture
• Syndesmosis injury
• Peroneal pathology

Painful os peroneum syndrome (POPS) –
• Injuries related to the peroneus longus
  – Peroneus longus tenosynovitis
  – Peroneus longus tear
  – Complete rupture of the peroneus longus proximal or distal to os
  – Os peroneum fracture
  – Enlarged peroneal tubercle
  – Sobel, Foot Ankle 1994

Differentiating peroneus longus and peroneus brevis injuries
• Peroneus brevis injuries usually tender in retro-malleolar area
• Peroneus longus injuries typically tender distally below fibula in region of os peroneum
Non-operative treatment of PL injury

- Boot or cast
  - 20% successful, 80% will need surgery
  - (Sobel, Foot Ankle 1994)
- Ice
- Rest
- NSAID’s
- Injection
- Orthotics (lateral posting)
- PT after settled down

Surgical management of PL pathology

- Tenosynovectomy
- Repair of partial tears
- Tenodesis to peroneus brevis
- Excision of os peroneum
- Excision of peroneal tubercle

Mechanism of peroneus brevis injury

- Subluxation over posterolateral edge of fibula due to SPR laxity
- Mechanical attrition between the PL and posterior fibula
  - Munk, J Trauma 1976
- Shallow or convex fibular groove contributes to subluxation
- Hindfoot varus increases forces through PL and PB
- Recurrent lateral ankle ligament instability
- Peroneus quartus may overstuff peroneal sheath

Clinical findings

- Posterolateral ankle pain and swelling
- +/- history of injury
- Weakness and retromalleolar pain with eversion
- Palpable click with provocative maneuver
- Frank subluxation

Conservative management

- NSAID’s
- Rest
- Lateral heel wedge
- Ankle brace
- CAM boot
- PT when able
- 83% fail conservative treatment
  - Brodky, AOFAS
  - Martin, 1990

Surgical management

- Tenosynovectomy
- Resect degenerated, fibrillated tendon
- Side to side repair; tubularize
- Grade 1 tears
  - Less than 50% of cross-sectional area torn
  - Recommend debridement and primary repair
- Grade 2 tears
  - Greater than 50% of cross-sectional area torn
  - Resect diseased tendon and tenodesis to peroneus longus
  - Krause, FAI 1998
Results of peroneus brevis repair

- Return to maximum function prolonged
- Post-operative AOFAS score 85
- Good-excellent results in a majority of patients
  — Krause, FAI 1998

Peroneal tendon dislocation

- Superficial peroneal retinaculum is primary restraint to subluxation

Diagnostic Studies

Radiographs
- Usually normal (+/- cavovarus)
- “Fleck sign” = osteochondral fracture of distal fibula
- Stress views - association with lateral ankle instability

SPR variations

- Type I
  - 1 band to Achilles sheath
  - 1 band to calcaneus
- Type II
  - 2 bands to calcaneus
- Type III
  - 1 band to Achilles sheath
- Type IV
  - 1 band to calcaneus
- Type V
  - 1 band to fascia anterior to Achilles
  - 1 band to calcaneus
  — Davis, Foot Ankle 1994

Shape of the posterior aspect of the fibula

- 82% Concave
- 11% Flat
- 7% Convex

Mechanism of peroneal dislocation

- Dorsiflexion, inversion injury during contraction of the peroneals
- Disrupts SPR
Diagnosis

- Resisted dorsiflexion and eversion from plantarflexed/inverted position causes subluxation
- Apprehension test
  - Same test with tendons manually held stable feels better

Conservative treatment of acute peroneal dislocation

- Cast in plantarflexion and inversion x6 weeks
- Contain peroneals while SPR heals
- High failure rates
  - Eckert 86%
  - Escalas 74%
  - Stover 43%
  - McClennan 44%

Surgical management of peroneal dislocation

- Due to high failure rates, surgery may be indicated for acute dislocations in younger athletic patients
- Surgery always indicated for chronic peroneal subluxation

• Diagnosis= peroneal tendon rupture
• MRI confirms rupture of longus and degeneration of brevis

• Surgical findings!
Now what?

Postoperative Management
- Cast/splint: NWB x 2 weeks
- SLWC x 4 weeks
- Air stirrup x 6 weeks
- Gradual strengthening

Don’t forget about cavovarus foot position
- Had dorsiflexion osteotomy of 1st MT

Posterior Tibial Tendon

Anatomy
Anatomy

- Hindfoot Invertors
  - Gastroc-Solius Complex
  - Posterior Tib
  - Tib Ant

PTTD = Adult Acquired Flatfoot

- Usually middle aged
- Occasional history for twisting injury
- Medial foot/ankle discomfort
- Progressive deformity

Physical examination

Subtalar Motion
- Compare to uninvolved side
- Floor accommodation must be assessed
- Check for fixed forefoot varus with hindfoot reduced

Subfibular impingement sign
- Tenderness fibula tip/sinus tarsi
- Peroneal tenderness
Physical examination
Achilles Tightness
• Reduce subtalar and Talo-Navicular joints prior to measurement
• Assess equinus contracture with knee flexed and extended

Physical examination
• Skin quality
• Vascular status
• Sensation
• Strength — Single limb heel rise

Operative Treatment
• Stage I - Tenosynovitis
  — decompression of tendon sheath (maintain retinaculum at medial malleolus)
  — tenosynovectomy
  — better early than late!

Operative Treatment
• Stage II – attenuation/rupture
  — excise diseased tendon
  — replace/reconstruct
  — option for bony correction

Calcaneal Osteotomy
History
• Gleich, 1893
• Koutsogiannis, 1971
  — for mobile flatfoot
• Corrigan/Myerson, 1996
  — for stage II PTTD

Calcaneal Osteotomy
Indications
• PTTD - progressive flatfoot, passively correctable
• Pain
• Failure of nonoperative treatment
How do you do that?...

19 yo female flex flatfoot
25 yo female flex flatfoot coalition

Operative Treatment
• Stage III - bony correction
How do you do that?...

Postop

- 6wks NWB

- 6wks in boot, TDWB, begin PT

- Advance PT at 12 wks to focus on strengthening