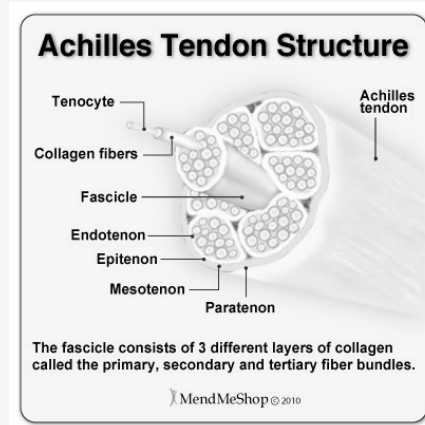


### Anatomy



- Achilles tendon contains type I collagen fibres
- Paratenon = contains an abundance of elastin , keeps collagen bundles together and allows movement

### Tendinosis vs Tendinitis

#### Tendinosis

- Degenerative Change in tendon's structure and sheath - more vulnerable to breakage
- Chronic inflammation promotes neovascularisation - makes it more likely to rupture tendon

#### Tendinitis

- Acute Inflammatory process from trauma, excessive use, lack of training

**Paratenonitis** - inflammation of outer layers of the tendon - part of tenosynovitis and tenovaginitis

- Oedema + Exudate + inflammatory cells

### Types

Can be insertional or non-insertional

**Insertional:** damage to tendon fibres at their insertion - Haglund deformity

**Non-insertional:** 2-6cm proximal to insertion (hypovascularity)

**Haglund deformity:** bony exostosis - enlargement of posterior calcaneus

### Demographics

Often affects middle aged males in 3rd/4th decade

Likely to occur again in the contralateral side

Runners are most commonly affected - especially those with midfoot/forefoot strike pattern

Women wearing high heeled shoes - shortens gastrocnemius/soleus



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 Page 1 of 4.

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### Risk Factors

Can be Extrinsic/Intrinsic

**Extrinsic:** improper warm up, overtraining, cold weather, running on hard surfaces, excessive stair/hill climbing, improper arch support/footwear, poor conditioning, returning to activity after inactivity, mechanical overload, obesity, medication (steroids, fluoroquinolones), direct trauma

**Intrinsic:** age, sex, lateral instability of the ankle/prior lower limb f#, hyperpronation, pes planus/cavus, gastroc-soleus inflexibility/weakness, limited ankle dorsiflexion, limited subtalar motion

**Systemic:** Diabetes, hypertension, inflammatory arthropathy, gout, corticosteroids/quinolones

Obesity

### Presentation

Pain/Tenderness in the tendon/heel that intensifies with activity (walking/running)

Difficulty standing on toes or walking downstairs

Morning pain/stiffness

Warmth and swelling increasing throughout the day

Palpation in the 2-6cm from insertion or insertion to determine insertional from non-insertional

Fusiform swelling/bony enlargement = chronic

ROM - passive dorsiflexion + resisted plantarflexion affected

+ve calf squeeze test (for achilles rupture)

### Considerations

- Plantaris can be involved - tenderness on medial mid tendon

- If plantaris is involved, US or MRI can be considered

- Assess for functional deficits in the kinetic chain (ankle, knee, hip, lx spine, glut meds)

- Overhead squat, Trendelenberg, single leg squat (glut med)

- **Hallux limitus functional exam:** Place thumb under patients metatarsal head

force patients foot into dorsiflexion and pronation

pinch patient's great toe with opposite hand and passively moves it into dorsiflexion

jamming/locking on dorsiflexion or lack of metatarsal PF = Hallux limitus

### Diagnostic Imaging

**Only should be considered if:**

Plantaris involvement

significant trauma + altered gait

rule out other pathology - Calcaneal epiphysitis/avulsion

- Ultrasound

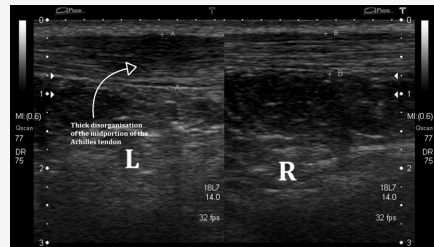
- MRI (lower sensitivity than US)

- CT - rules out trabecular structural alterations at the insertion

- VISA -A (Victoria Institute of Sports Assessment) - post treatment follow up pain and function scale



### Ultrasound



Ultrasound can assess the injury

Left side shows achilles tendinopathy (increased thickness of tendon + hyperemia + hypervascularity - Assess using the Doppler)

Right = normal

### DDx

F#

Avulsion

Neoplasm

Infection

Ankle Sprain (Ottawa Ankle rules)

Retrocalcaneal Bursitis

Posterior Ankle impingement

Os-Trigonom syndrome

Tenosynovitis

Tendon dislocation

Tennis leg

Sural Neuroma/ Nerve entrapment

Systemic inflammatory disease

Calcaneal apophysitis

Plantar Fasciitis

Haglund deformity

Sever Disease

Heel Pad syndrome (deep pain in the middle heel - feels like a bruise)

Erdheim Chester Disease (abnormal multiplication of Histiocytes)

C

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### Management

- Rest, NSAIDs, eccentric rehab, correction of mechanical faults
  - Crutches/brace
  - Runners can be switched to swimming/cycling
  - Avoidance of shoes with heels
  - Single leg eccentric heel drop offs (slow and knee straight and bent) 3 sets of 15 twice per day for 12 weeks
  - Slow and progressive loading is more effective (10% per week)
  - Increase of patient's night pain = excessive load
  - Soft tissue work, myofascial release and stretching recommended
  - Manipulation of ankle, knee and hip (kinematic chain)
  - Athletes should perform a warm up routine before exercise and introduce new activities slowly and avoid increasing activity - runners should begin on smooth surfaces
  - Avoid compression socks
  - Return to play criteria (triple 5)
  - Shockwave if not responsive to initial management
  - Surgery if not better within 6 months
- 
- Patient should use non-injured leg to return to heel up start position (avoids concentric contractions)
  - Moderate pain is common, but if patient has excessive pain, patient should assist downward motion with non-injured leg

### Triple 5

- Ankle dorsiflexion <5 degrees on the uninjured side
- Calf circumference <5mm of uninjured side
- Patient able to perform 5 sets of 25 single leg heel raises

### Prognosis

- Good with early management
- Surgical care is mostly successful (80%)

**risk of complications:** Ruptured tendon, DVT, reflex dystrophy, persistent neuralgia, deep infections, wound problems, discomfort, hypertrophy

- As number of risk factors increases, failure of non-operative treatment increases

