

# Heel Pain in the Active Patient



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No disclosures to report

# Heel Pain

- Multiple causes
  - Training errors
  - Anatomic variations
  - Biomechanical issues
- Multiple locations about the heel
- Accurate diagnosis is important in order to initiate appropriate treatment



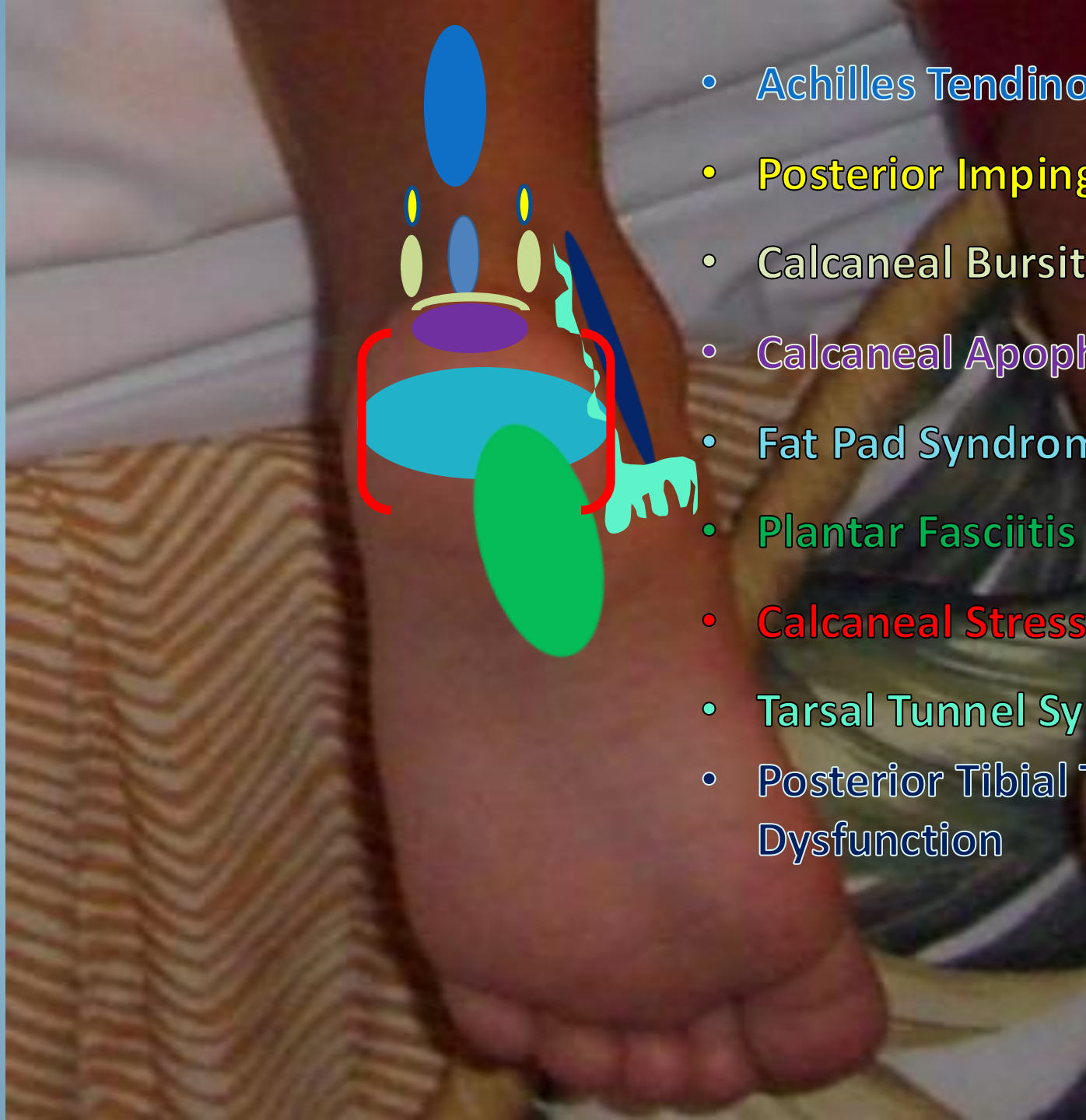












- Achilles Tendinopathy
- Posterior Impingement
- Calcaneal Bursitis
- Calcaneal Apophysitis
- Fat Pad Syndrome
- Plantar Fasciitis
- Calcaneal Stress Fracture
- Tarsal Tunnel Syndrome
- Posterior Tibial Tendon Dysfunction



# Plantar Fasciitis

- Most common cause of heel pain
- Typically presents as pain with **initial steps**, especially with the first step of the day
- Causes include overuse, overpronation, high arched or flat foot, tight heel cord, or worn out shoes



# Plantar Fasciitis



Pathophysiology is thought to involve microtears of the plantar fascia and recurrent re-tearing of the healing tissue



# Plantar Fasciitis



- Findings
  - Foot pain in the anterior/anteromedial plantar aspect of the heel
  - Flat or high arched foot
  - Tight Achilles' tendon
  - X-ray may show bone spur due to chronic pull of the plantar fascia

# Plantar Fasciitis



Heel spurs do NOT correlate with symptoms



# Plantar Fasciitis

- **Treatment** - conservative

- Relative rest
- Ice rolls
- Anti-inflammatory medications
- Stretch bottom of foot and heel cord
- Good supporting shoe
- Orthotics
- Arch supports
- Night splints



# Plantar Fasciitis

- **Treatment** – more invasive
  - Injections
    - Cortisone\*
    - Dry Needling
    - PRP
  - Extracorporeal shockwave therapy (ESWT)
  - Surgery
    - Plantar fasciotomy
    - Exostosectomy





# Fat Pad Syndrome

- The undersurface of the calcaneus is protected by a thick fat pad
- The fat pad can thin and lose elasticity as a result of age, physical stress, or previous cortisone injection
- It can also become contused or injured due to trauma
- Symptoms are persistent localized pain, usually at the center of the heel, worse with standing, walking, or running



# Fat Pad Syndrome





# Fat Pad Syndrome

## Treatment

- Cushioned heel cups
- Heel taping
- Rest, NSAIDs, icing
- Custom orthotics
- High supportive footwear
- Running modifications



# Achilles Tendonopathy

- Most common cause of posterior heel pain
- 7-9% annual incidence of top level runners



## Noninsertional

- usually located 2-6 cm above the Achilles insertion
- related to poor blood supply
- more common

## Insertional

- often associated with retrocalcaneal bursitis and Haglund deformity
- physical impingement of the tendon



# Achilles Tendonopathy

- Not a true “tendonitis”
- The result of accumulative impact loading and repetitive microtrauma to the tendon
- Three phases:
  1. Normal tendon, inflammation around the tendon (peritendinitis)
  2. Degenerative and inflammatory changes within the tendon, with microtears
  3. Visible tears within and around the tendon



# Achilles Tendonopathy

- Physical/Biomechanic factors
  - excessive pronation
  - decreases in subtalar mobility
  - weak or tight gastroc-soleus complex
  - “middle age”
- External factors
  - excessive mileage
  - sudden intensity increases
  - inadequate warm-up or stretching
  - inappropriate footwear

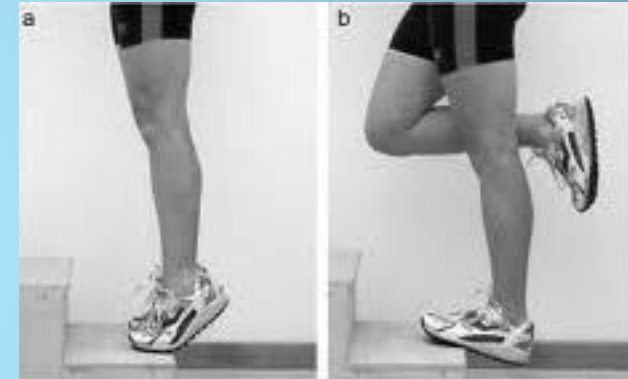




# Achilles Tendonopathy

## Treatment

- Decrease activity to below pain level
- Icing, NSAID course for a few days, then as needed
- **Eccentric loading exercises** →
- **Heel lifts** during most activities
- Cam boot for more severe cases
- Ultrasound therapy
- "Newer modalities"
  - ESWT →
  - Prolotherapy
  - PRP
  - Topical nitroglycerin
- Surgery for refractory cases



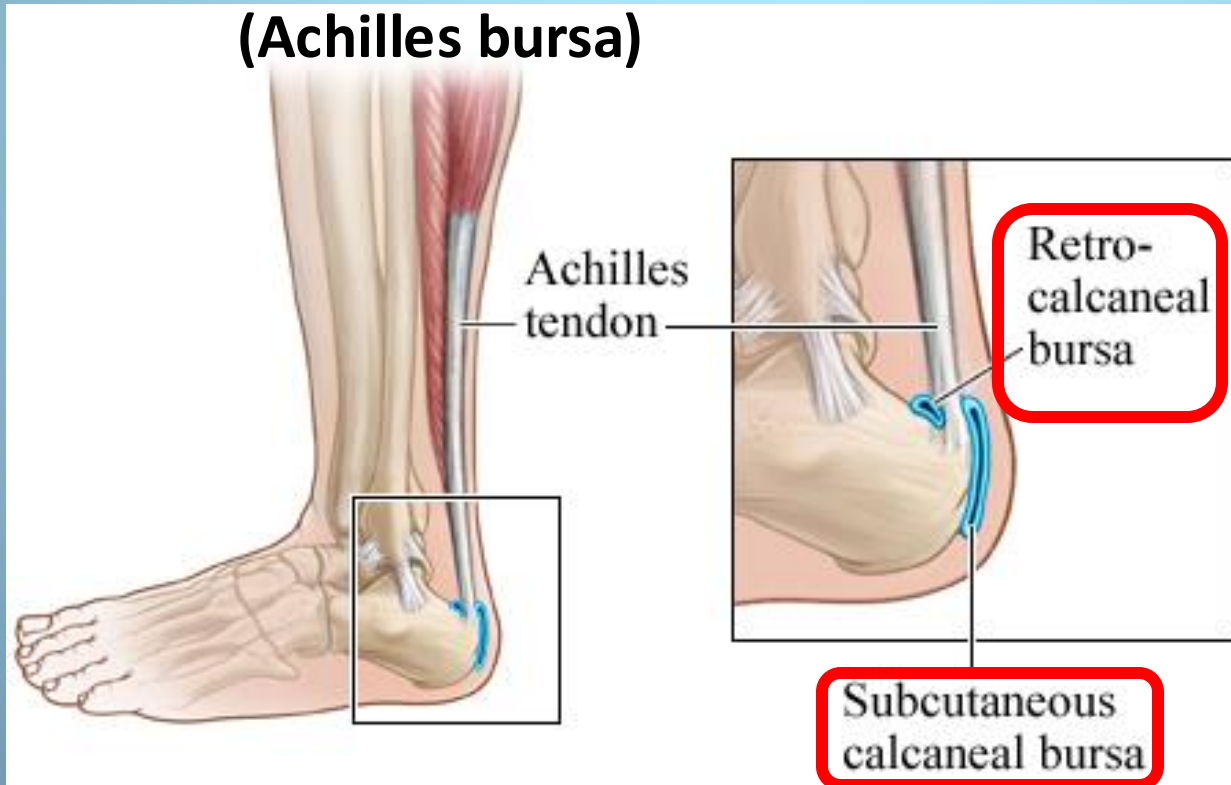
# Calcaneal Bursitis

Two bursae are located at the  
Achilles insertion:

**Retrocalcaneal bursa**

**Subcutaneous Calcaneal bursa**

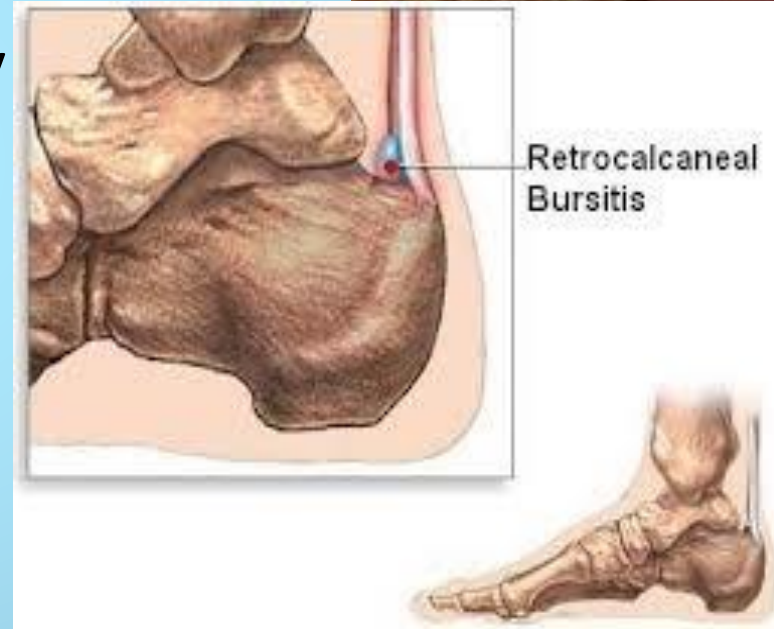
(Achilles bursa)





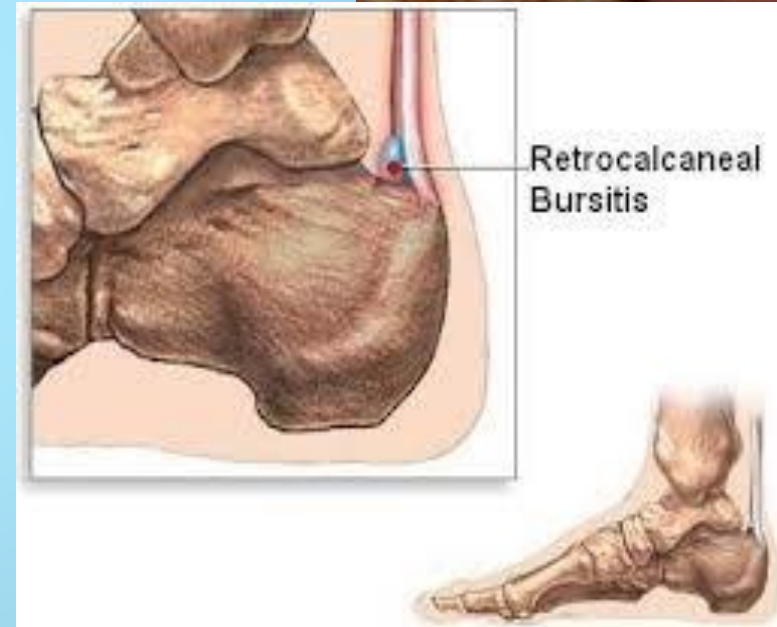
# Retrocalcaneal Bursitis

- The bursa may become inflamed with overuse
- May occur alone or with insertional Achilles tendonopathy
- Commonly associated with pes cavus and the varus heel
- Dorsiflexion of the foot and ankle produces increased pressure in the retrocalcaneal bursa



# Retrocalcaneal Bursitis

- Slow onset of dull, aching pain in the retrocalcaneal area aggravated by activity and certain footwear
- May be worse when arising out of bed in the morning and with start-up after rest
- Swelling in the area of the retrocalcaneal bursa between the Achilles tendon and the calcaneus

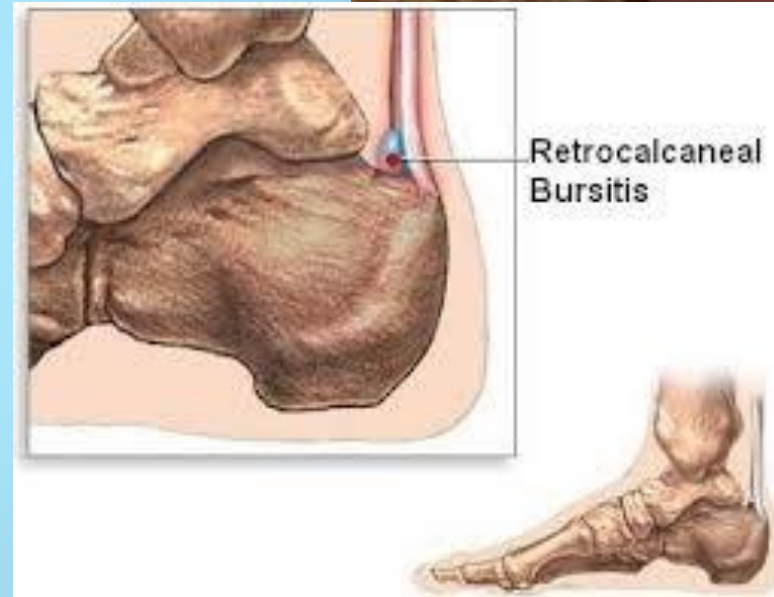




# Retrocalcaneal Bursitis

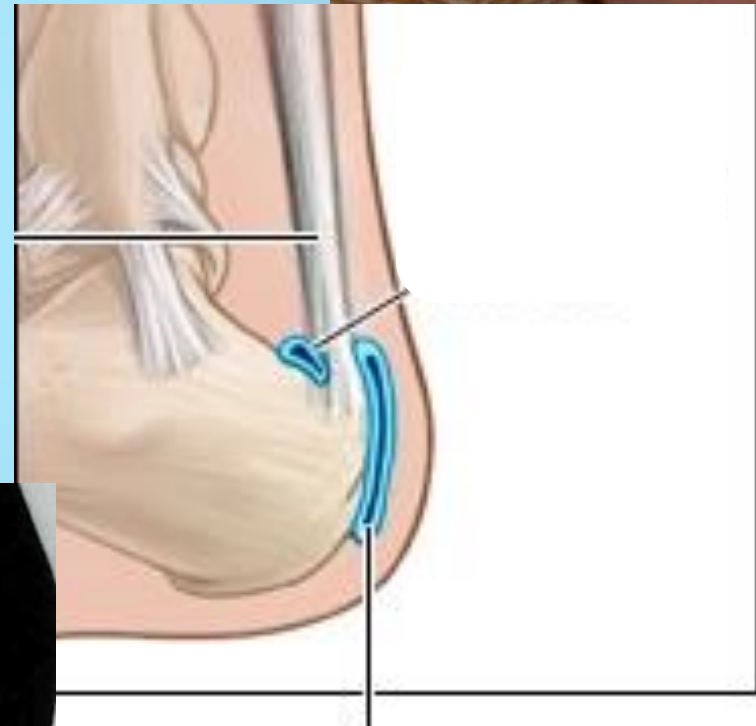
## Treatment

- Rest
- Icing, ice massage
- NSAIDs, topical or systemic
- Heel lifts
- Immobilization when severe
- Gentle Achilles stretching
- Cortisone injection\*



# Subcutaneous Calcaneal Bursitis “Pump Bump”

- Inflamed superficial bursa
  - overuse
  - poorly fitted shoes
- Sometimes associated with **Haglund deformity**



Subcutaneous  
calcaneal bursa

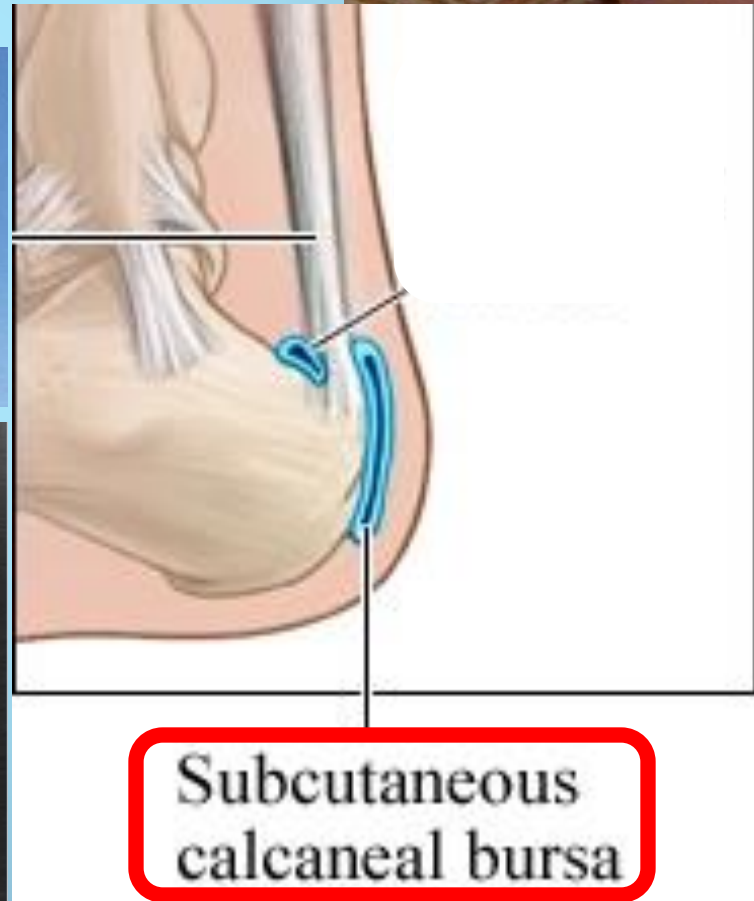
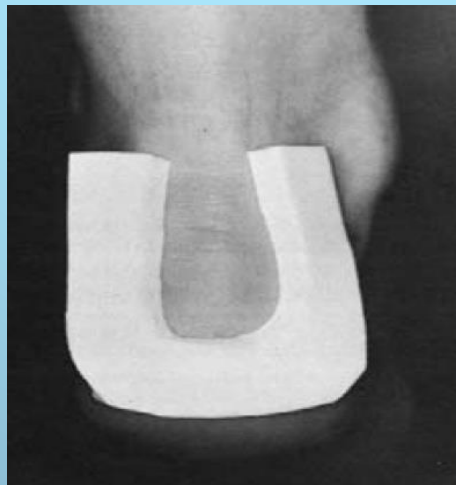




# Subcutaneous Calcaneal Bursitis

## Treatment

- Avoid aggravating contact
- Shoe modifications
- Moleskin
- Icing
- NSAIDs
- U-shaped pad
- Surgery for Haglund's Deformity



# Posterior Impingement

- Posterior ankle pain that occurs in forced plantar flexion
- May have pain with pushing off
- Can be acute as a result of trauma or chronic from repetitive stress
- Most commonly associated with **os trigonum**
- Seen more frequently in downhill runners, gymnasts, and dancers
- **Pain with passive plantarflexion**



# Posterior Impingement

## Causes:

### Bony

- os trigonum – about 7% of adults
- prominent posterior calcaneal or lateral talar process
- loose bodies

### Soft tissue

- synovitis of the flexor hallucis longus tendon sheath
- osteochondritis of the talus
- synovitis of the subtalar and tibiotalar joints





# Posterior Impingement

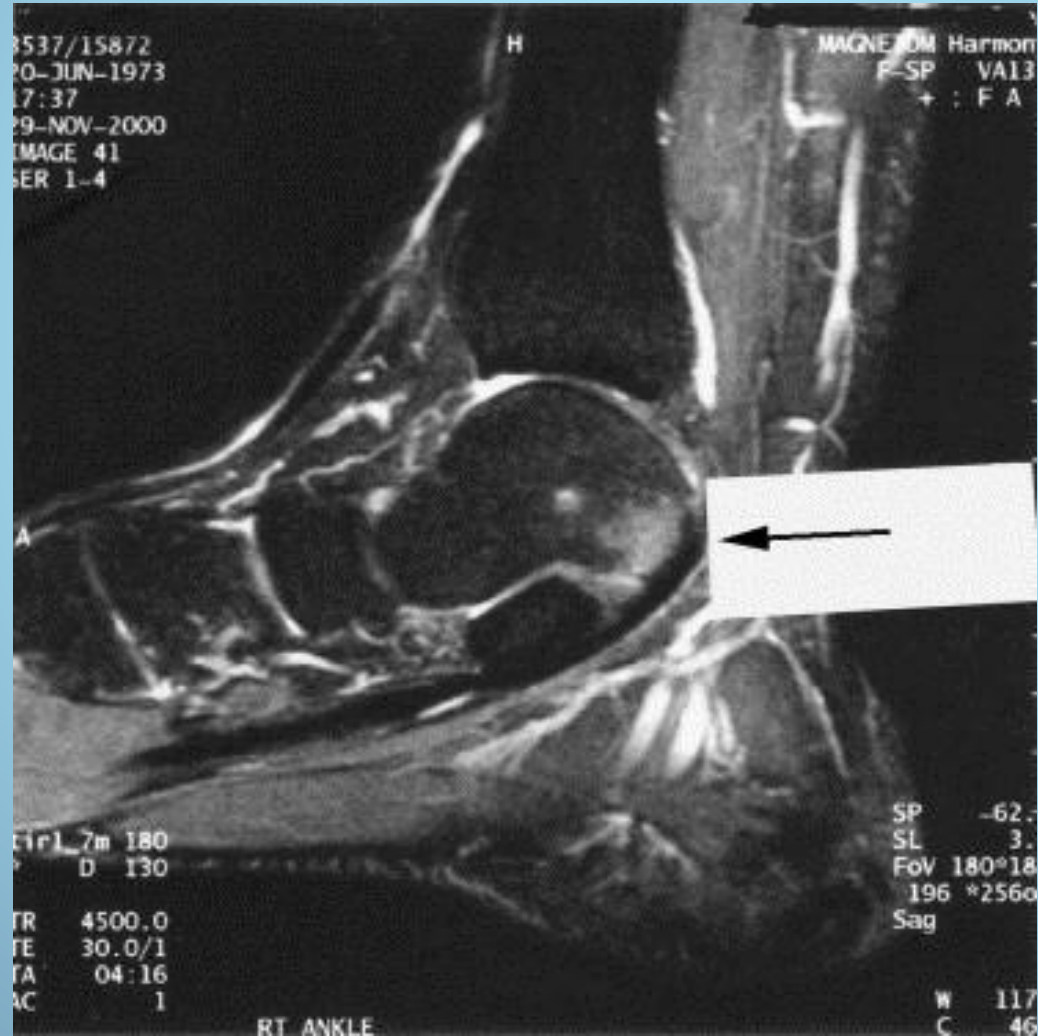
## Os trigonum



# Posterior Impingement Prominent Lateral Talar Process



# Posterior Impingement Osteochondritis





# Posterior Impingement

## Treatment:

- Rest with or without immobilization
- NSAIDs
- Local steroid injection under image-guidance
- Surgery
  - Correction of bony abnormalities
  - Refractory cases



# Calcaneus Stress Fracture

- Can be seen in avid runners and military recruits
- Rule of "toos"
- Pain usually occurs at a predictable point in the run
- As symptoms progress, this point occurs earlier
- Ultimately, may have pain with any weightbearing



# Calcaneus Stress Fracture

- Pain is worse with activity, and improves with rest
- "Squeeze test"
- Tuning fork test
- X-rays usually negative within the first 2-3 weeks
- Triple-phase bone scan
- MRI





# Calcaneus Stress Fracture



# Calcaneus Fracture



# Calcaneus Stress Fracture

- Activity modification below the level of pain
- Low-impact activities
- Nonweightbearing if walking hurts
- After 2-3 weeks of pain-free activity, resume activity slowly
- Runners may return at half their previous distance and increase by 10-15% per week
- Correct underlying medical problems if present



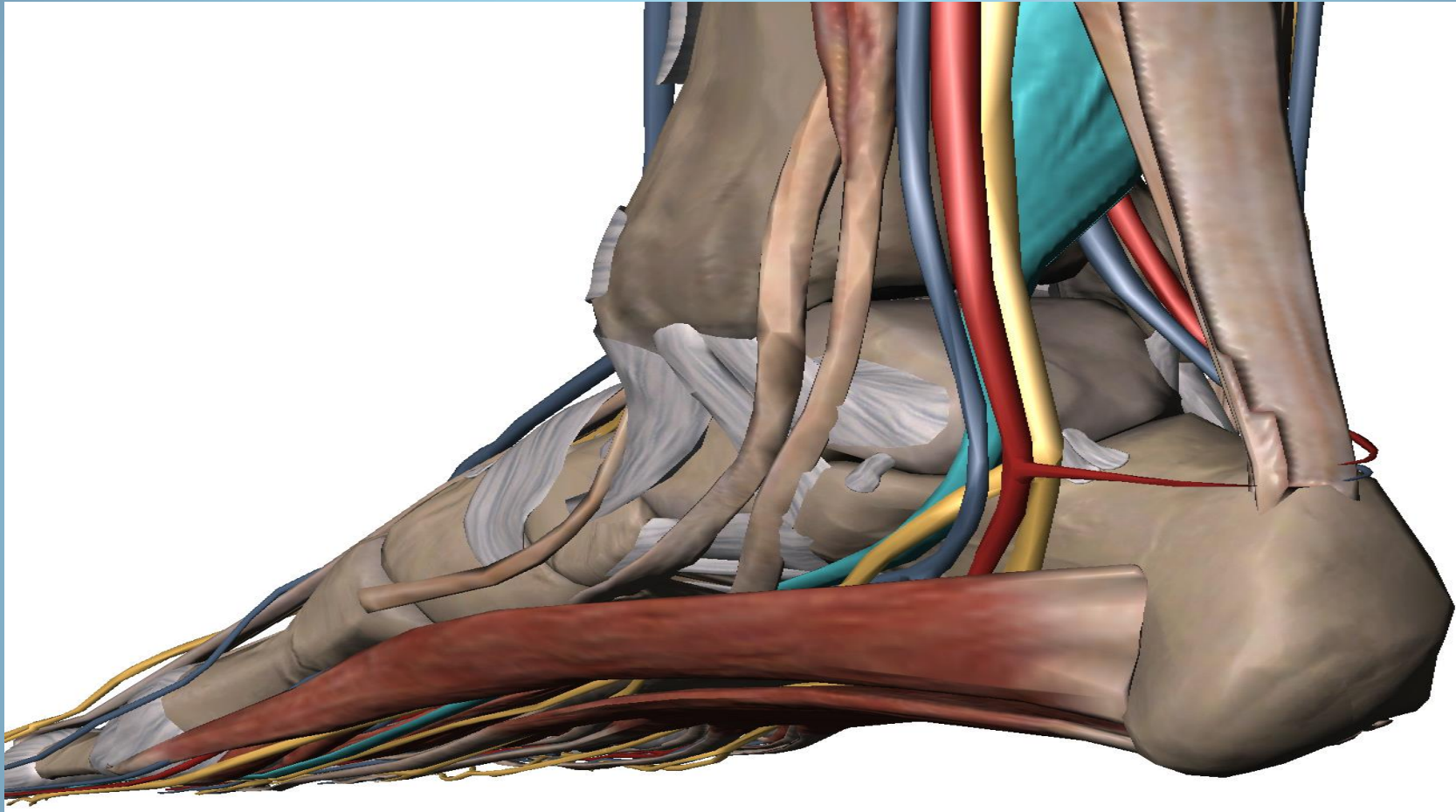


# Tarsal Tunnel Syndrome



- Most common compression neuropathy of the lower extremity
- Caused by tibial nerve irritation as it passes through the tarsal tunnel
- Can be caused by an eversion injury or anatomic compression

# Tarsal Tunnel Syndrome



**Tarsal tunnel contains the tibial nerve, the posterior tibial artery and vein, and the tendons of the tibialis posterior, flexor digitorum longus, and flexor hallucis longus**

# Tarsal Tunnel Syndrome

- Diffuse pain with numbness or burning along the medial ankle, heel, and arch
- Symptoms aggravated by exercise
- May have night pain
- Positive Tinel's over the tarsal tunnel
- Nerve conduction tests can be confirmatory
- Imaging with MRI can identify a structural cause





# Tarsal Tunnel Syndrome

## Treatment

- Activity modification
- NSAIDs, neuromodulatory medications
- Orthotics
- Physical therapy
  - medial arch strengthening
  - Achilles stretching
  - ankle proprioception exercises
- Cortisone injection
- Immobilization
- **Surgery**

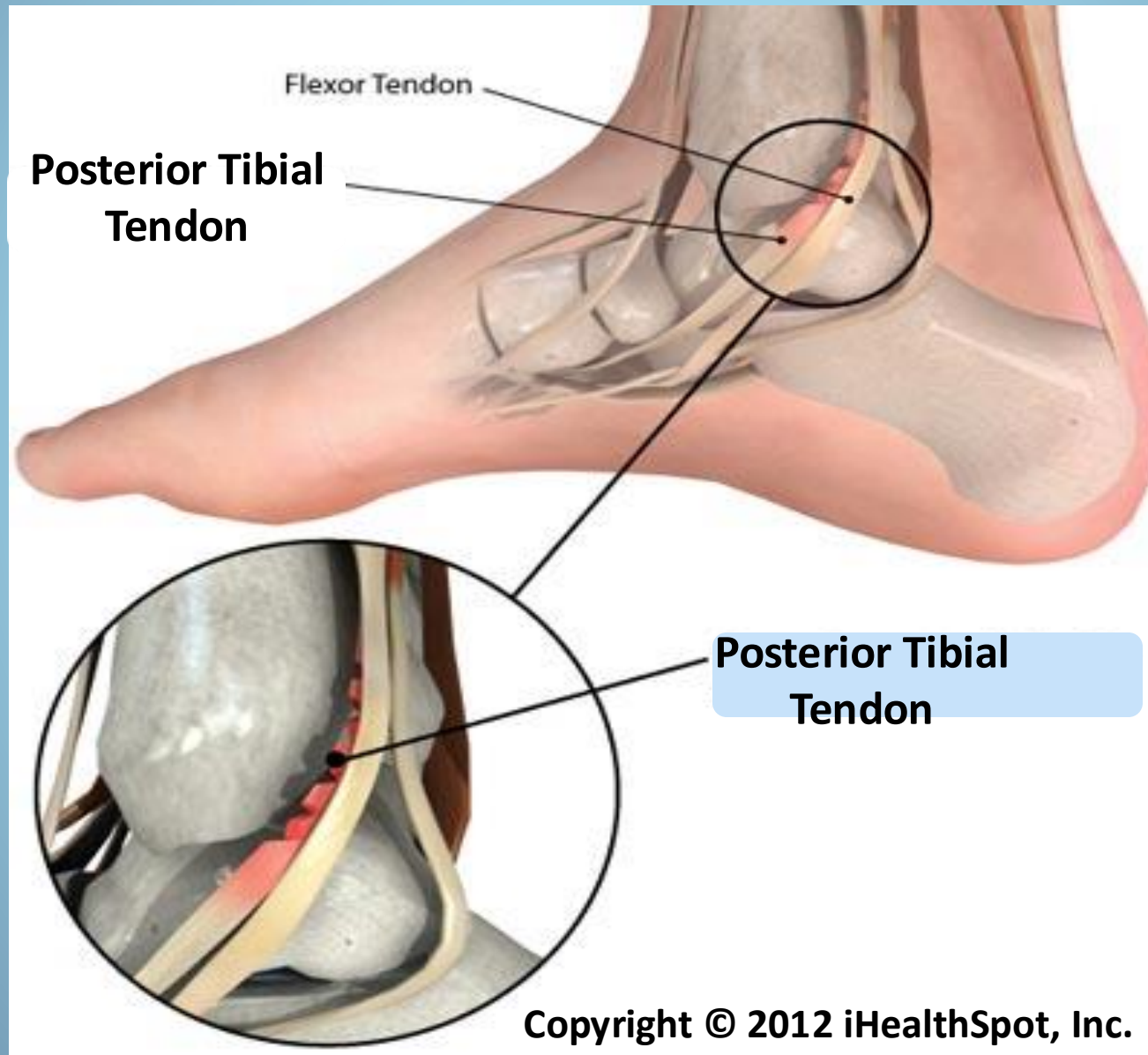


# Posterior Tibial Tendon Dysfunction



- Spectrum of condition from tendonitis to tendon dysfunction or disruption
- Most common cause of acquired flat foot in adults
- Pain at the posterior edge of the medial malleolus that may extend to the proximal arch
- Localized tenderness on exam

# Posterior Tibial Tendon Dysfunction



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# Posterior Tibial Tendon Dysfunction

- Pain with resisted foot inversion and with raising up on the toes of the affected foot
- Unilateral flat foot
- "Too many toes" sign



# Posterior Tibial Tendon Dysfunction

## Treatment

- NSAIDs, icing
- Arch supports or orthotics
- Immobilization (walking cast or cam boot)
- Physical therapy
- Weight loss
- Surgery
  - Tendon repair
  - Tendon transfer
  - Calcaneal osteotomy
  - Fusion



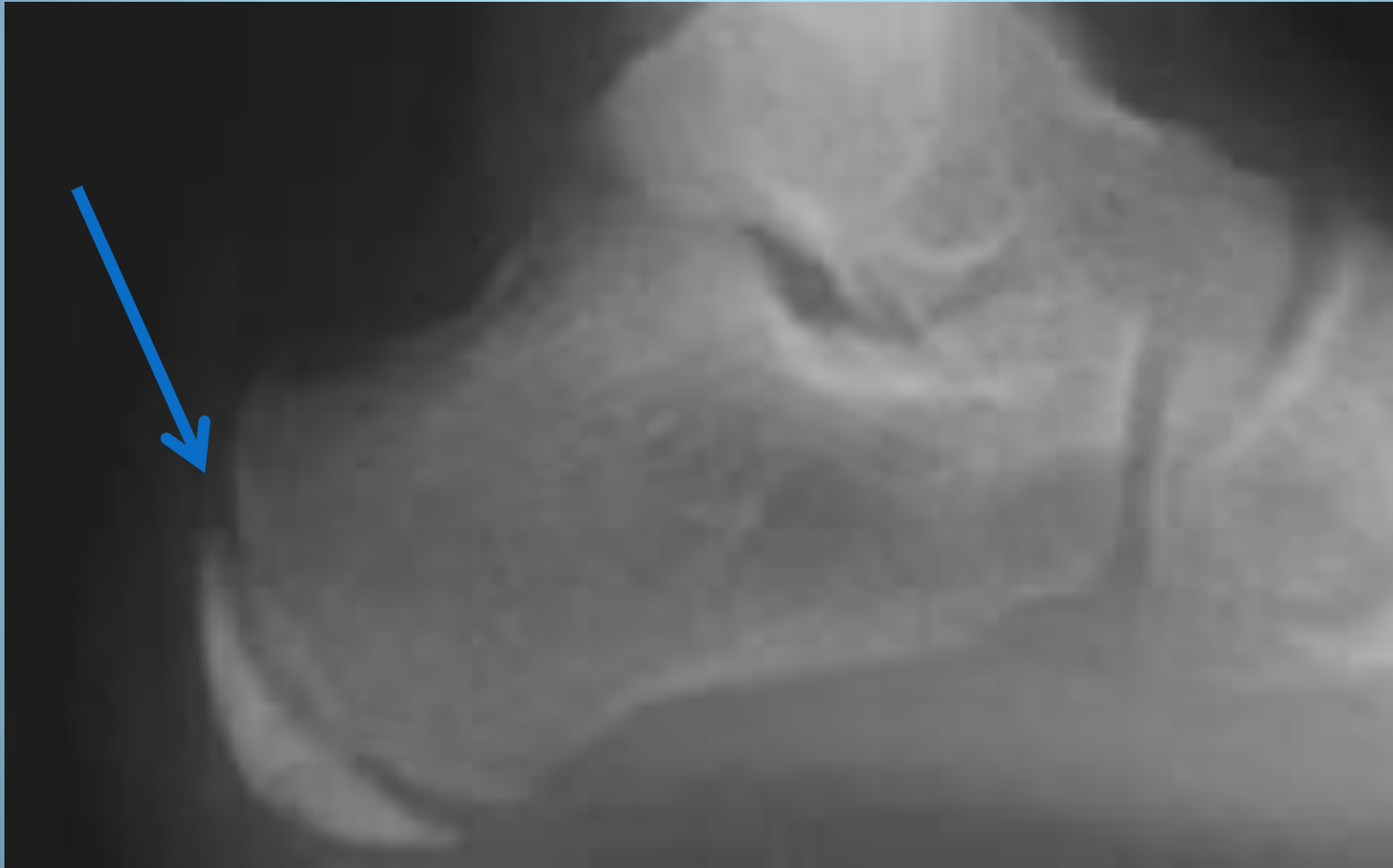
# Calcaneal Apophysitis (Sever's Disease)



- Traction apophysitis of the calcaneus
- Common cause of pre-adolescent heel pain
- Typically occurs during a growth spurt
- The calcaneal physis typically closes between ages 12 and 15



# Calcaneal Apophysitis (Sever's Disease)



# Calcaneal Apophysitis (Sever's Disease)

## Treatment

- Rest
- Reassurance
- NSAIDs
- Ice
- Heel lifts, and/or heel cups
- Calf stretching, quads and calf strengthening

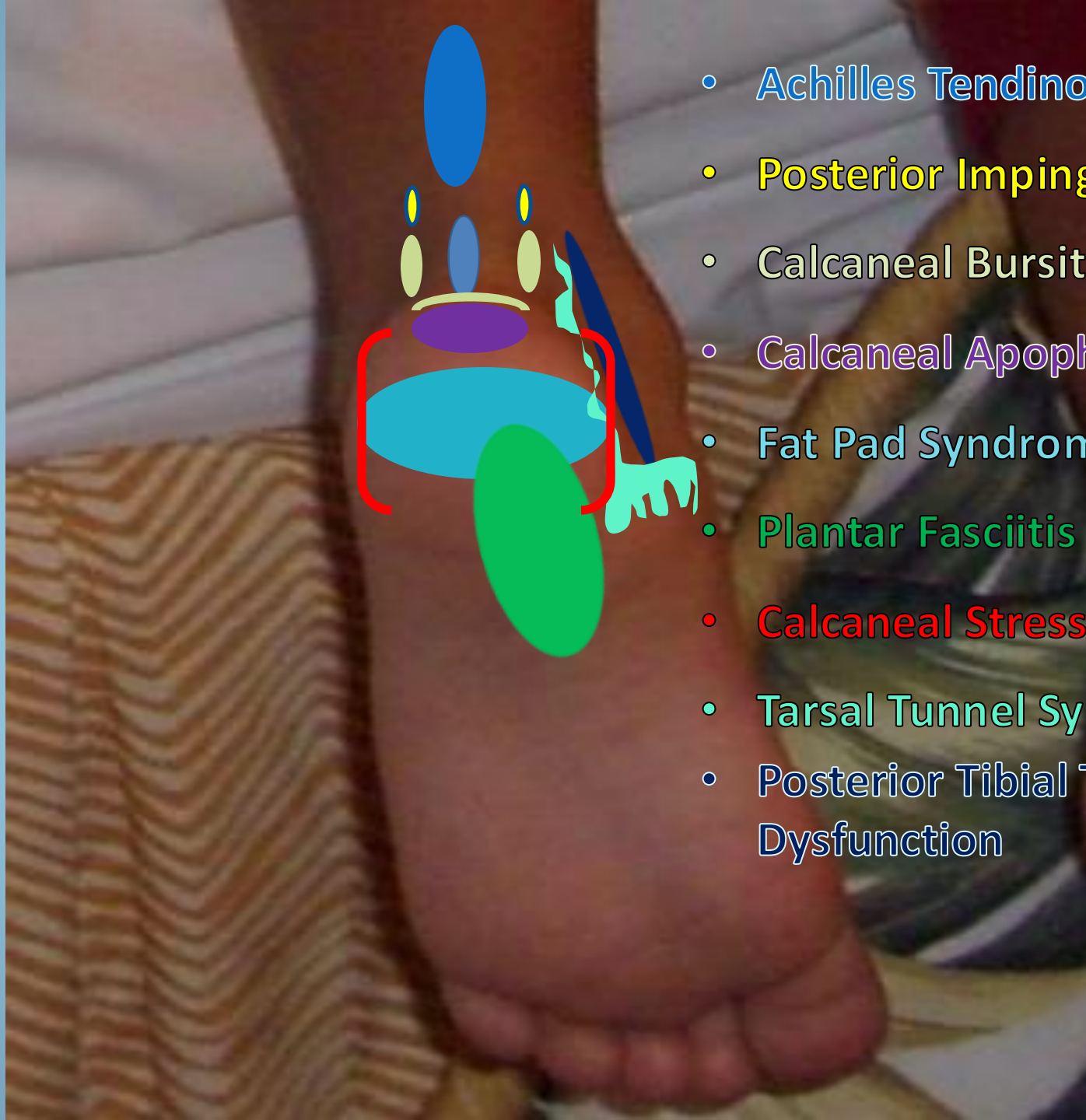




# Questions?







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