DIFFERENTIAL DIAGNOSIS:
WHEN HEEL PAIN IS NOT PLANTAR FASCIITIS

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THE HEEL PAIN PATIENT WHO DOES NOT HAVE PLANTAR FASCIITIS

• If every patient who came in with “heel pain” had plantar fasciitis, things would be much simpler.

• We have all had the self diagnosed plantar fasciitis patient, or the “my sister, my aunt, my friend or co-worker” had plantar fasciitis and told me I have it.

• Or the patient who looked up their symptoms online, so it must be plantar fasciitis. Now they’re in the office and your and MA presents with “Mr./Mrs. Smith is here for initial evaluation and their plantar fasciitis”.

• But when is heel pain NOT plantar fasciitis.
POSSIBLE CAUSES OF HEEL PAIN

- plantar fasciitis
- infracalcaneal fat pad atrophy
- medial calcaneal nerve entrapment
- tarsal tunnel syndrome
- RA
- Reiter’s
- Ankylosing Spondylitis
- PA
- Sever’s
- Plantar fascia tear/rupture
- Systemic Lupus Erythematosus
- Fibromyalgia
- Sciatica
- Lateral plantar nerve branch to abd digiti quinti
- Calcaneal stress fracture
- Calcaneal tumors/cyst
- Intraosseous edema of calcaneus
- Posterior enthesopathies
DIFFERENTIAL DIAGNOSIS ALGORITHM

Additional Etiologies of Heel Pain

NEUROLOGIC
- Radiation
- Sensory abnormalities

ARTHRITIC
- Inflammatory arthritis
- Other joint pain or swelling

TRAUMATIC
- History of trauma
- Global pain with compression
- Pain worsens with activity

OTHER
- Tumor
- Infection
- Vascular
- Calcaneal apophysitis
- Fat Pad Atrophy

DIAGNOSTIC TESTING
- Clinical maneuvers
- Electrodiagnostics
- Imaging studies
- Laboratory testing

LOCALIZATION OF PATHOLOGY & DEFINITIVE DIAGNOSIS
- Tarsal tunnel
- Entrapment neuropathy
- Radiculopathy
- Disc disease
- Systemic neuropathies

POSITIVE DIAGNOSIS OF SPECIFIC DISEASE
- Rheumatoid arthritis
- Ankylosing spondylitis
- Reiter's disease
- Systemic lupus
- Gout
- Psoriasis
- Fibromyalgia
- Other

RADIOGRAPHS

(+)
- Fracture or other
- TREAT OR REFER APPROPRIATELY

(-)
- TC99 Scan
- REevaluate
- Consider other diagnostic studies

REfer or treat appropriately

REfer or treat appropriately

Testing, treatment, referral as appropriate
PATIENT HISTORY

- Acute: traumatic, stress fracture, gout or fascial tear/rupture
- Chronic: consider nerve entrapment, fracture, cyst, plantar calcaneal tendon tear
- Bilateral: usually 2/2 systemic disease/etiology
- What makes the pain better or worse? Fracture, masses, cyst, nerve entrapment, fascia tear - PAIN WORSE WITH ACTIVITY. The opposite is true for fasciitis.
- Wearing orthotics makes their heel pain worse — almost pathognomonic for neurogenic etiology.
If orthotics made heel pain worse— check for tibial nerve entrapment at the medial ankle and entrapment of the medial and lateral plantar nerves.

First check Tinel’s at the tarsal tunnel. + Just to the foot, or also + to the heel?

IF + to the heel, test more distal to check medial calcaneal branch/Lateral plantar nerve branch.

If both are + then both tarsal tunnel and calcaneal nerve entrapment are present.

MC neurogenic heel pain: UNILATERAL
NERVE ANATOMY PLANTAR HEEL

- Med. Cal. N.
- Med. Plant. N.
- Lat. Plantar N.
- Origin of Plantar Fascia
1) X-ray
2) US
3) MRI
4) CT scan
5) three-phase bone scan
6) NCV
7) EMG
8) Neurosensory Testing
TESTING NEUROLOGICAL HEEL PAIN
that type of sensory device offers computerized one- and two- point sensory testing, picking up lower levels of nerve problems AND earlier then EMG/NCV testing. These devices can effectively test peripheral nerve entrapment.

It works by applying repetitive neurosensory junction paired tactile stimuli to a discrete piece of skin surface, by doing so, it is possible to identify the earliest stage of chronic nerve compression and neuropathy.
IMPORTANCE OF NEUROSENSORY MEASUREMENTS

- When used initially helps identify the need to proceed with nerve decompression rather than plantar fasciotomy.

- Also identifies the need to proceed with fasciotomy instead of nerve decompression when the sensibility is normal at presentation.
EMGs and NCVs are **electrical tests** to help diagnose problems that can occur in the peripheral nervous system. **most useful if peripheral neuropathy suspected.**

If the nerve compression causes pain and/or sensory changes, but not motor involvement, the EMG/NCV is less useful and probably can not identify this disorder.
peripheral neuropathy occurs when the membrane of the nerve malfunctions 2/2 vascular or internal insult. The signals that propagate up the nerve become disturbed and symptoms of foot burning and numbness ensue. NCV is very useful to determine if this problem exists.

NCV for medial calcaneal nerve can be falsely negative > 50% of the time.
EMG & SWMFW TESTING

- EMG records fibrillations and sharp waves that takes 2-3 weeks to show up. If preformed prior to the “golden period”, it will not reveal changes and be much less effective for diagnosing a deinnervated muscle.

- 5.07 SWMFW is ONLY + in VERY LATE STAGE nerve entrapment & SEVERE neuropathy. SWMFW is also good with suspected back issues.
CAUSES OF NERVE COMPRESSION

- 1) obesity
- 2) venous insufficiency
- 3) space occupying lesions
- 4) trauma
NEUROLOGICAL HEEL PAIN DIAGNOSES

- Tarsal tunnel syndrome (posterior tibial nerve)
- Entrapment of medial calcaneal nerve
- Entrapment of lateral plantar nerve
- Entrapment of the first branch of the lateral plantar nerve (Baxter’s nerve)
- Sural, including lateral calcaneal nerve
- Diabetic neuropathy
TRAUMATIC HEEL PAIN

- Symptoms usually acute
- MC: FALL FROM HEIGHT -> intra-articular fx
- Other causes:
  - calcaneal stress fracture
  - planar fascial tear
  - plantar fascial rupture
CALCANEAL STRESS FRACTURE

- Stress fractures calcaneus:

- consequence of repetitive load on the heel.

- Exact mechanism unknown. Most patients report increased walking before symptoms.
CALCANEAL STRESS FRACTURE PHYSICAL EXAM

- MC site: immediate posterior and inferior to posterior facet of STJ
- PE: tenderness to LATERAL wall of calcaneus, IMMEDIATE posterior to facet
- PAIN with COMPRESSION of calcaneus.
- ** onset of symptoms frequently precedes x-ray findings**
IMAGING MODALITIES

1) x-ray: linear sclerosis

2) MRI: low signal intensity on T1, bright on T2, fat suppressed T2

3) Technetium bone scan: hot in the calcaneus in 3rd phase

* of note: progression to acute fracture is uncommon.
CALCANEAL STRESS FRACTURE X-RAY
CALCANEAL STRESS FRACTURE MRI
TECHNETIUM BONE SCAN CALCANEAL STRESS FRACTURE

- 3rd phase of Technetium bone scan
- calcaneus hot throughout
PLANAR FASCIAL TEAR/RUPTURE

- Common causes:
  - traumatic
  - corticosteroid injection
  - chronic overuse of fascia
Immediate sharp, tearing pain in the sole of the foot with activity
patient feels a “pop”
bruising
difficulty to walk on the foot
swelling
Figure 1: Bruising in the sole of the foot after plantar fascia rupture
• **X-rays**: initially normal.

• **US**: focal fluid filled defects in the fascia with interruption in the normal fibrillar architecture. They can be intrasubstance and/or partial thickness, arising from the deep or superficial margins or be full thickness.

• **MRI**: will show partial or complete tear/rupture.
PLANTAR FASCIAL RUPTURE  US

- Normal: 2 - 4 mm
- Abnormal: > 4 mm
PLANTAR FASCIAL TEAR MRI

- Normal Plantar Fascia
- Ruptured Plantar Fascia
- Measurement of 8.12 mm
PLANTAR FASCIAL TEAR MRI

Tear of the Plantar Fascia


