

Evidence in Action

Treating Heel Cord and Calf Pain, Part II: When Answers Aren't Easy

By Makani Lew, DC

For quick review, here is the beginning of Part I of this two-part article: "A 50-year-old female has left posterior heel (retrocalcaneal) pain and tight calves. Heel pain on palpation was 8/10 on numeric rating scale (NRS) and 5/10 during stretching. Pain and minor swelling was just medial to the Achilles tendon, 1 inch above its calcaneal insertion." (For Part I, see March ACA News, Page 38 at <http://mydigimag.rrd.com/publication?i=290080>)

THE ORIGINAL WORKING DIAGNOSIS based on heel cord pain was Achilles tendinopathy with possible partial tear and associated muscle tightness. By taking into account the knee issues, the extreme flexibility of the patient and the fact that pain increased under differing concentric and eccentric loading of the ankle joint in different amounts of ankle dorsiflexion and plantar flexion, the diagnosis appeared wrong.

This is where the doctor's gestalt and research skills, combined with the patient's description of the pain, came into play.

While sitting, body position caused the posterior thigh muscles (hamstrings) to be lengthened at the hip and shortened at the knee, whereas the anterior thigh muscles (quadriceps) were short-

ened at the hip/pelvis, and the rectus femoris of the quadriceps was lengthened at the knee.

Perhaps if the patient concentrated on strengthening the hamstrings' hip extension component and stretched the quadriceps (and iliacus-psoas) hip flexors, the guidewires across the knee could be normalized. This hip phenomenon is well-documented in Janda's Lower-Crossed Syndrome.¹ A search for "knee pain automobile drivers" in PubMed yielded two articles. One demonstrated a connection to driving duration in relation to knee pain in English taxi drivers.²

Heel pain is said to be a common finding in those who drive a lot,³ but a literature search for "heel pain," "motor vehicle," "automotive" and "driving" yielded no results. A search for "calf pain sitting" yielded few results. However, one article did evaluate how constrained and prolonged postures (either sitting or standing) were associated with distal lower-extremity pain.⁴

The second component to consider is how the ankle/calf issue worsened after adding the loaded ankle concentric and eccentric contractions (dorsiflexion on walking downstairs, heel lowering off the curb, etc.). What else would be painful during eccentric loading of the ankle during dorsiflexion? What would be painful medial to the Achilles? What would hurt in the posterior medial aspect of the calf? The plantar flexors that have tendons that travel through the medial ankle tunnel are flexor hallucis longus.

Flexor Digitorum Longus and the Tibialis Posterior

If there is calf/heel pain that hurts on walking or running and is felt in the posteromedial calf, look to the tibialis posterior.⁵ When the posterior tibialis muscle plantar flexes and inverts the ankle, it also locks midtarsal movement, stabilizes the hindfoot and lifts the arch, thereby acting as the primary stabilizer of the medial longitudinal arch. This causes

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FIGURE 1. CALF AND HEEL PAIN EXERCISES



FIGURE 2. CALF AND HEEL PAIN CUPPING



better activation of the other muscles of the leg and foot. If the middle foot isn't locked during the gait's push-off phase, the gastrocnemius/soleus will cause excessive force to the midtarsal joints. This can lead to collapse of the medial arch and eversion of the subtalar joint.⁶

Standing on tip toes is one of the best ways to test for posterior tibialis problems. The classic presentation of mild (stage 1) posterior tibial tendon dysfunction (PTTD) is the following:

- 1) swelling of the medial to the posterior tibial tendon (from the lower leg into the foot/ankle region);
- 2) valgus deformity of the hindfoot (a lateral calcaneus), flattening of the medial arch (pronation) and foot flare/"too many toes" sign;
- 3) a set of single-leg heel raises is difficult or impossible due to weakness or discomfort; and
- 4) the foot may have limited flexibility.⁷

Another name for PTTD is adult-acquired flatfoot deformity.⁸ Although this patient did not have a flattened, painful medial arch or "too many toes" sign, her calf-pain location and limited ability to stand on her tip toes were key to shifting the diagnosis.

Treatment

With the correct diagnosis, a quick search on PubMed of "posterior tibialis tendon dysfunction treatment" resulted in a series of articles on conservative management. Kulig, et al., designed an exercise device that allowed either concentric or eccentric loading of the inversion component of the posterior tibialis. Kulig suggested that since eccentric loading causes a three times greater muscle capacity over concentric loading, focusing on the eccentrics might yield better results. Kulig's study showed that patients did respond better with elimination of the concentric phase.⁹ However, since this patient hurt herself when she added more eccentrics and weight, the treatment design was modified. She performed only concentric inversion and avoided eccentric dorsiflexion for the first few weeks.

Exercises chosen for the active care component came from several articles:

Active Care (4-7x/week):

1. Continue: exercises and stretches she did before that didn't exacerbate the problem.
2. Stretch: using PNF (proprioceptive neuromuscular facilitation, isometric contraction of the muscle before the stretch) of the lower extremity in all directions using Thera-Band stretch straps.
3. Strengthen hip/knee: hip ROM with knees neutral (straight), move legs in all directions (front, back, out, in) adding weight with resistance bands or ankle weights, standing or lying down.
4. Strengthen posterior tibialis/isolated strengthening: concentric-only ankle inversion with slight plantar flexion using a Thera-Band Stretch Strap or against a tennis or Thera-Band exercise ball (variation from TibPost Loader).⁹
5. Strengthening and coordination of the ankle/foot, targeting the posterior tibialis: heel raises while holding a ball between the calcaneus, starting with 20/day. (See Figure 1, *Calf and Heel Pain Exercises*). Goal: 100/day.¹⁰ Progressing to single-support heel raises. Goal: 200/day.¹¹

Passive Care (2x/week):

1. Traction adjustments/mobilizations performed to the hip and knee, in the position of relief.
2. Diversified chiropractic adjustments were performed as needed on the spine and feet.
3. For pain: suction cupping, with added active ROM with multiple static cups or with sliding motion of a single cup along a painful area. These were done with cocoa butter, pressure set to patient's tolerance, 10-15 second application. The multiple static cups had added loaded and unloaded movements of the body region. Sliding location, cup size and amount of suction were done to patient tolerance.¹² (See Figure 2, *Calf and Heel Pain Cupping*).

This new plan worked. Focusing on the inversion/adduction component and eliminating the eccentric loads on the posterior tibialis appeared to be key. Once her heel stopped hurting, her knee felt

less painful and she was able to slowly get back to her walks and aerobics.

Working through pain didn't help the patient. The "thorn" in her foot was finally discovered and removed. As you have seen, a cookie-cutter approach would not have worked in this case. It was the doctor's knowledge and detective skills that revealed the underlying issue, leading to resolution of the patient's pain. ■

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