

Surgical Pearls

By Richard T. Braver, DPM



HOW TO DIFFERENTIATE POSTERIOR TRIANGLE ANKLE PAINS

A dancer presents with posterior ankle pain. The examination shows she does have pain on palpation to the Achilles, but she also has pain to the superior surface of the calcaneus and to the os trigonum area (posterior lateral tubercle) of the talus. Therein lies the dilemma: What came first... the Achilles pain or the other posterior ankle pains?

Once you've made an appropriate diagnosis, then you can proceed with an effective treatment plan and determine if a possible surgical approach is warranted.

Start with a good history, manual muscle testing and X-rays before considering other tests, such as diagnostic injections, MRI, diagnostic ultrasound, etc. When treating dancers or other nimble patients, try to take lateral X-rays with the patient on pointe or in releve (on their tip toes or up on the balls of their feet). A correct diagnosis should ultimately help in treating the injury, but surgery may be needed if conservative care doesn't resolve the pain.

Choosing the correct surgical approach is often imperative to seeing and ultimately curing the underlying pathology. Here are a few pearls to help differentiate the structures of the posterior triangle (a.k.a. Kager's triangle) and plan any subsequent surgical approach if necessary.

1. Os trigonum/posterior process of the talus pain.

Lateral x-rays usually help in determining if there is an enlarged lateral process (Steida's) of the posterior talus, if there is a fracture (Shepard's) of this process, or if there is a separate ossicle (os trigonum). Asymmetry of bilateral X-rays should make one cautiously suspicious of pathology. This is a common finding.

There are two major ligaments—the posterior talo-fibular ligament and the posterior talo-calcaneal ligament—that attach to the lateral process of the posterior talus. Determine if there is previous history of ankle or subtalar injury. You

should strongly suspect this bone injury if your patient complains of pain at the back of the ankle when walking stairs, squatting, jumping or upon rising up onto the toes. Direct palpation of this bony area usually reveals pain from both the lateral and medial sides of the foot. The pain could be equal in intensity or be felt more intensely from the lateral side.

Surgical Approach: In the prone position, dorsiflex the ankle and perform a linear longitudinal incision between the Achilles and peroneal tendons, being careful to retract the sural nerve. Once you're into the subcutaneous tissue, palpate the os trigonum/posterior process with your finger or use a Freer elevator as an extension of your finger. Dorsiflex and plantarflex the ankle for better palpation of this structure.

Determine if the os trigonum is freely movable or attached. If it is attached or if there is an enlarged posterior process (lateral) of the talus, this can be removed with an osteotome and mallet.

The trick is to avoid damage of the adjacent flexor hallucis longus (FHL) tendon. You can accomplish this by sliding a malleable retractor or other protective instrument between the tendon and the bone to be removed. If there is separate os trigonum entity, use a collar and crown or other dissecting scissors to remove the entity from its soft tissue attachments.

2. Flexor hallucis longus tendon pain.

Tell your patient to push his or her big toe down while you resist this motion. If they have pain at the back of the ankle,

suspect FHL involvement. There is probably irritation from an enlarged lateral posterior process or an os trigonum/fracture of this area. Plantarflex and dorsiflex the ankle to its end ROM to see if this elicits compression pain of the calcaneus against the posterior talus, or the posterior talus against the distal tibia. Plantarflexion and dorsiflexion of the hallux along with palpation of the FHL at the back of the ankle may elicit crepitation. This is an indicator of FHL pathology.

Surgical Approach: If the pain is predominately at the back of the ankle, then the pathology to the FHL is probably adjacent to the os trigonum/posterior process. Use the lateral surgical approach (described above) in this scenario. Be careful to visualize the FHL tendon after the os trigonum is removed. Put the hallux through its ROM. Check for defects or tethering of the tendon just adjacent to the removed bone. Check for scar tissue/hypertrophy of the tendon. Suturing of a defect or removal of hypertrophied tissue may be needed.

3. Flexor hallucis longus, tarsal tunnel and medial ankle pain.

Athletes who are involved in push off sports and dancers who perform on their toes can overdevelop their FHL muscle. Instead of the FHL being tendinous in the tarsal tunnel, it is muscular in nature. This may cause problems with the muscle sliding through its tendinous sheath.

Additionally, this muscle, upon engorging with blood during activity or through its hypertrophy, is impinged under the lacinate ligament of the tarsal tunnel. This can often exert excessive pressure upon the posterior tibial nerve.

Percuss this nerve and see if Tinel's sign is elicited. Manually test the FHL by having your patient plantarflex their toes against resistance. Pain or numbness to the tarsal tunnel/medial ankle is suspicious. This should also elicit pain at the back of the ankle.

Check for posterior tibial tendon involvement by having your patient adduct and invert his or her foot against resistance.

Pain may be present at the medial ankle or arch, but should not be significant to the deep posterior ankle. It should be just behind the medial malleolus.

Likewise, check the function of the flexor digitorum tendons by having the patient plantarflex his or her toes against resistance. Determine where the pains are elicited. It should be noted that the diagnoses of tarsal tunnel syndrome may be based on the patient's complaints of burning, pins and needles, etc., but this diagnosis may also include complaints of heaviness or a sense of "fullness" to the medial ankle.

Many nerve conduction tests for tarsal tunnel are determined to be normal. However, if the pain is only present during exercise (perhaps because the FHL or surrounding vessels engorge with blood), then have your patient exercise until symptoms are reproduced just prior to testing. Some practitioners also consider this problem to be a "functional tarsal tunnel syndrome" or mini exertional compartment syndrome.

Surgical Approach: The patient is supine without a tourniquet. Make a medial curvilinear incision inferior and posterior to the palpated pulsations of the posterior tibial artery. Deepen the incision by cutting through the laciniated ligament. Inspect the neurovascular bundle and address pathology appropriately. The key here is to visualize the function of the FHL as you dorsiflex and plantarflex the hallux. Release the tendon sheath of this muscle if necessary in order to help decompress its contents.

Proceed to examine and remove the os trigonum/post lateral process of the talus. Anatomically, this portion of the posterior talus is directed out closer to the medial surface than to the lateral side. The FHL and other soft tissue structures are retracted. Inspect the os trigonum area with the Freer elevator. Removal is accomplished similarly as discussed above.

4. Medial posterior process of talus pain.

This is far less likely to be the source of injury than the lateral process, but increased pain upon palpation from the

medial side—when compared to the lateral side—helps in making the diagnosis.

Surgical Approach: Use the medial incision (as discussed above in the surgical approach to flexor hallucis longus, tarsal tunnel and medial ankle pain) to visualize and remove or smooth down a prominent medial process of the posterior talus.

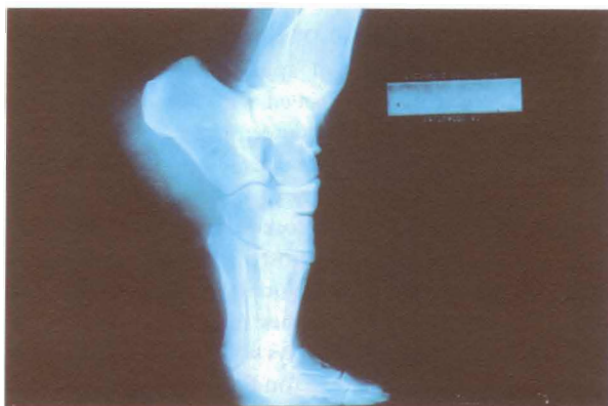
5. Lateral ankle pain along with posterior triangle pain.

Check for peroneal tendon involvement. Have the patient abduct and evert his or her foot against the resistance of your hands. Try to pinpoint if there is an increase in posterior ankle pain. Also check for lateral calcaneus pain. There are fibers of the Achilles insertion or of the extensor retinaculum that extend into the lateral calcaneus. These fibers can cause inflammation with subsequent posterior triangle pain. Rule out subluxing peroneal tendons as a source of potential posterior ankle pain.

Surgical Approach: The various incisions for these pathologies are more localized directly over the source of the pathology. Proceed with the appropriate repair. Normally, the patient is prone. Position a bean bag under the hip so it directs the lateral portion of the ankle more directly into the surgical site. This makes it easier to operate.

6. Achilles tendon pain with posterior triangle pain.

Appropriate manual testing—including toe rising on the affected side, visual



Note the os trigonum at the back of the ankle and the potential for impingement of soft tissues in the demi-pointe and pointe positions.

inspection and hands-on palpation—should easily identify Achilles involvement.

When posterior triangle pain is present along with Achilles pains, pathology is usually found on the tendinous portion of the Achilles superior to the heel. This is usually a separate entity as opposed to Achilles insertion problems with spurring. When the Achilles is irritated and inflamed, there is a direct connection to

the posterior triangle, and hence, generalized posterior ankle pain. Likewise, when the structures surrounding the posterior process of the talus are inflamed, then there may be excessive, painful pressure on the Achilles. A careful clinical exam, as discussed above, should help you determine where the pathology lies. Surgical care may be warranted if conservative care fails to render the patient asymptomatic.

Surgical Approach: With the patient prone, make a linear longitudinal incision, either medial or lateral, to the Achilles depending on where other pains are located. Proceed laterally if a documented os trigonum is present. This way, you can inspect the Achilles and have easy access to the os trigonum without the added dissection required from the medial approach.

7. Retrocalcaneal bursitis or other soft tissue mass pain.

Direct palpation at the back of the posterior triangle at or above the level of the calcaneus and just anterior to the Achilles will elicit this pain. Palpation of the actual bursa is difficult. In the absence of other significant findings, one can make this diagnosis.

Surgical Approach: To remove this soft tissue mass, make a linear longitudinal incision medial to the Achilles tendon. This avoids potential complications of the sural nerve. Use a collar and crown or other dissecting scissors to assist in removal.

Final Notes

Ask the patient questions to see if there is any morning stiffness or any stiffness after sitting for an extended period of time. If the pain eases up and goes away, then there is probably a soft tissue problem. Try to locate the source of stiffness or pain. Treatments may vary from initial soft or hard cast immobilization to diagnostic anesthetic or therapeutic corticosteroid injections. One may also use orthotics, heel lifts or physical therapy modalities to cure pain. Pearls for diagnoses and surgical intervention have been discussed.

Surgical intervention should be highly successful when indicated. Concomitant involvement of the tarsal tunnel tissues may require the use of the medial ankle approach to release the lacinate ligament and explore this region and/or remove an involved os trigonum. Straightforward os trigonum pathology may be more simply reached from the lateral side of the ankle. Make sure to visually inspect the adjacent flexor hallucis longus tendon for defects through this incision. Incisions for other diagnoses are based on location of the pathology, and with proper differentiation, the problem should be successfully treated. ■



Dr. Braver is board certified in foot and ankle surgery by the American Board of Podiatric Surgery. A Fellow of the American College of Foot and Ankle Surgeons, he practices in Englewood, NJ.