



South County

Orthopedics Specialist

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Posterior Tibial Tendon Dysfunction Disorder

The posterior tibial tendon acts as a plantarflexor and inverter of the hindfoot. It passes posterior to the medial malleolus and inserts onto the navicular tuberosity, with several additional attachment points to the cuneiform and metatarsal bases. The etiology of PTTD is most attributed to microtrauma of repetitive loading of the tendon leading to dysfunction. An area of hypovascularity, watershed area, is found 1-1.5cm distally from the medial malleolus, which has been shown to attribute to the most common area of dysfunction in the tendon as this area is under increased tension making it more susceptible to more friction and eventual rupture. Overtime as the PTT degrades it attributes to adult-acquired flatfoot deformity.

On physical exam the pain and swelling are located on the medial side of the foot around the medial malleolus. In more severe cases the lateral ankle pain may be present attributed to impingement. The arch may appear flattened, pes planus, with a valgus heel, and equinus contracture may also be observed. Flexibility of the hindfoot is tested as well as the strength of the tendon which is done with manual muscle testing of the foot inverting against resistance or a single-leg heel raise. This functional testing assists with clinical staging of PTTD allowing your clinician to determine the best treatment plan.

- Stage 1:** Pain over posterior tibialis, but tendon has normal function and length able to do all functional testing
- Stage 2A:** Inability or difficulty to perform function testing, hindfoot remains flexible, partial injury to the tendon
- 2B:** inability to perform function testing and a full injury to the tendon, >30-50% talonavicular uncoverage
- Stage 3:** Inability to perform functional testing and development of hindfoot rigidity, arthritis of the hindfoot
- Stage 4:** All the above with involvement of the ankle joint, and ankle arthritis

X-rays of the foot and ankle will be taken to determine the extent of midfoot and hindfoot deformity. The relationship between the talus, navicular, and first metatarsal are evaluated. An elevated talonavicular coverage angle >20 degrees represents forefoot abductus. On the anteriorposterior radiographs an elevated talo-first metatarsal angle >16 degrees denote flatfoot while on the lateral radiographs, the talo-first metatarsal angle >15-20 degrees is associated with flatfoot deformity. MRI and CT scan may also be helpful for pre-operative planning.



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Treatment Options Nonsurgical

Conservative treatment includes using a brace (Trilok/PTTD brace), walking boot, or casting to help off load the tendon, ice, NSAID's, and a home exercise program that emphasizes inversion ankle strength training. An arch support with supportive shoes can also be helpful. A more custom brace or insert may also be used, UCBL's or Arizona brace.

Treatment Options Surgical

Several surgical options are utilized when patients remain symptomatic after 3-6 months of conservative therapies and dependent on the stage of dysfunction and deformity.

PTTD stage 2 treatment options:

Calcaneal Osteotomy is used to change the pull of the achilles tendon to an inverter of the foot and assist with hindfoot valgus and realignment of the hindfoot. A lateral incision over the heel is made, the calcaneus is cut shifted medially and fixed with screws. This new alignment offers a better mechanical lever and decreases strain on the ligaments that are on the medial side of the foot.

Cotton osteotomy is used to stabilize the medial column and treat forefoot supination which is compensatory for the foot to remain plantigrade when the hindfoot is in valgus and the medial arch is collapsed. An incision over the top of the foot is made, a cut in the medial cuneiform and an implant is wedged between the cut bones to plantarflex the first ray down.

First tarsometatarsal fusion is also used to stabilize the medial column. An incision over the top of the foot is made, the first TMT joint is prepped by cleaning the joint and its articular surface and fused together with the use of screws or plates.

Lateral column lengthening may be used when there is a lot of talonavicular uncoverage and forefoot abductus.

Soft tissue surgical procedures include PTT repair and tendon transfer which is done most often in conjunction with bony realignment surgical procedures as studies show the combination of these significantly improve outcomes. The most common tendon transfer is the flexor digitorum longus as this tendon is adjacent to the PTT. This is done with an incision on the medial ankle. The PTT is debrided and surgically repaired if possible. If the tendon is ruptured, or significantly damaged the FDL is transferred to take the place of the PTT.

PTTD Stage 3 treatment options:

The stage consists of fixed deformity involving the triple-joint complex (subtalar, calcaneocuboid, and talonavicular joint). Correction is achieved by fusing the talonavicular, subtalar, and calcaneocuboid joints. Whenever possible, the calcaneocuboid joint is spared to



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minimize the amount of foot rigidity that is noted when all three joints have been fused. Screws and or plates may be used to fuse the bones together.

PTTD Stage 4 treatment options:

Stage 4 may be addressed in two different ways depending on age, comorbidities, and bone quality. A total ankle replacement can be used which will preserve ankle motion. Patients that are not eligible to a total ankle replacement are treated with ankle fusion.

Post-operative care

Immediately after surgery you will be placed in a non-weightbearing soft splint.

At 2 weeks post-op: sutures will come out, splint will come off and will transition into a walking boot or cast depending on what surgical procedures were performed you will be non-weightbearing.

At 6 weeks post-op: transition out of short leg cast into walking boot, and you will be able to progressively transition to weightbear as tolerated. Ankle ROM, calf stretching, scar massage

At 12 weeks post-op: can begin transitioning to light aerobic exercises

At 4-6 months post-op: can begin to return to activities with arch support in shoes

Additional links

<https://footcaremd.org/conditions-treatments/midfoot/progressive-flatfoot>

<https://footcaremd.org/conditions-treatments/midfoot/acquired-adult-flatfoot-deformity>

<https://www.orthobullets.com/foot-and-ankle/7020/posterior-tibial-tendon-insufficiency-ptti>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4094099/>