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Posterior Tibial Tendon Dysfunction

Anatomy

One of the most important tendons in the lower leg is the posterior tibial tendon. This tendon starts in the calf, stretches down behind the inside of the ankle, and attaches to bones in the middle of the foot.
The posterior tibial tendon helps hold up your arch and provides support as you step off on your toes when walking. If this tendon becomes inflamed, overstretched or torn, you may experience pain on the inner ankle and gradually lose the inner arch on the bottom of your foot, leading to flatfoot.

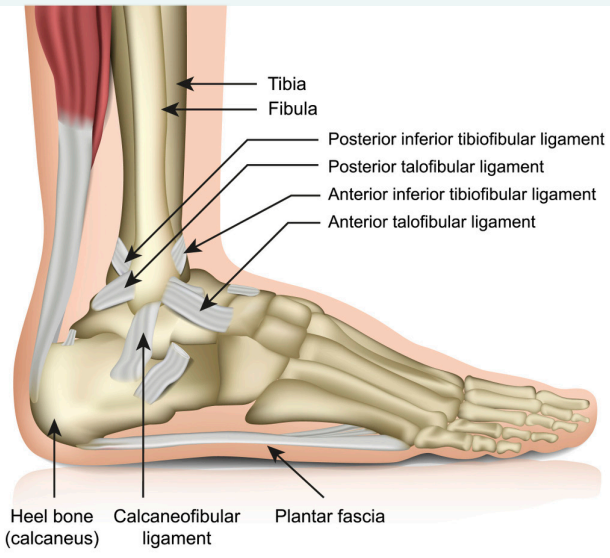
Causes

Progressive flatfoot often occurs in women over 50 years of age and may be due to an inherent abnormality of the tendon. But there are several other risk factors, including:

- Obesity
- Diabetes
- Hypertension
- Previous surgery or trauma, such as an ankle fracture on the inner side of the foot
- Local steroid injections
- Inflammatory diseases such as Reiter's syndrome, rheumatoid arthritis, and psoriasis
- Athletes who are involved in sports such as basketball, tennis, soccer, or hockey may tear the posterior tibial tendon. The tendon may also become inflamed if excessive force is placed on the foot, such as when running on a banked track or road.

Diagnosis

Diagnosis is based on a physical examination and history. Your physician may ask you to stand on your bare feet facing away from him/her to view how your foot functions. You may also be asked to stand on your toes or to do a single heel rise.
You will stand with your hands on the wall, lift the unaffected foot off the ground, and raise up on the toes of the other foot. Normally, the heel will rotate inward; the absence of this sign indicates posterior tibial tendon dysfunction. Your doctor may request X-rays, an ultrasound, or an MRI of the foot.



What are treatment options?

Without treatment, the flatfoot that develops from posterior tibial tendon dysfunction eventually becomes rigid. Arthritis develops in the hindfoot. Pain increases and spreads to the outer side of the ankle. The way you walk may be affected and wearing shoes may be difficult. The treatment your doctor recommends will depend on how far the condition has progressed.

Conservative

Treatment begins with the use of a firm arch support inserted into the shoe. The arch support is useful as it reinforces the arch and takes some of the stress off the tendon. To rest the tendon, you may need to decrease the time you spend up on your feet. Additionally, your doctor may prescribe anti inflammatory medications, such as ibuprofen or aspirin.

Surgical Management

If conservative treatments don't work, your doctor may recommend surgery. Several procedures can be used to treat progressive flatfoot; often more than one procedure is performed at the same time. Your doctor will recommend a specific course of treatment based on your individual case. Surgical options include:

Tendon Repair

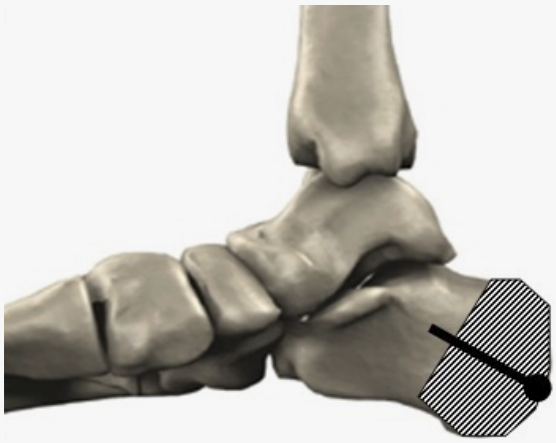
A degenerated tendon that has not ruptured may only need to be repaired. The surgeon divides the sheath around the tendon. Areas where the tendon is degenerated are carefully removed. Tears within the tendon are sutured along the length of the tendon. If the surgeon is concerned that the repaired tendon is at risk for rupturing, a graft procedure to add strength to the tendon may be needed (described below). The tendon sheath is repaired, and the skin is closed with sutures.

Tendon Graft

A badly degenerated or a ruptured tendon may require a tendon graft. Usually, another tendon in the foot such as the tendon that flexes the four smaller toes (the flexor digitorurn longus), is used as a tendon graft to work in place of the posterior tibial tendon.

Calcaneal Osteotomy (Heel Shift)

This procedure changes the alignment of the heel bone (calcaneus). The Heel Bone in the shaded part is moved 1cm underneath the body and held with a 6.5mm screw.



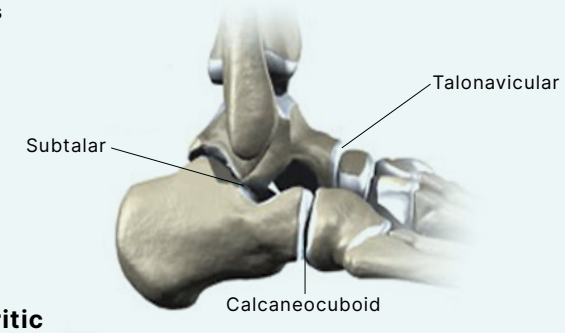
Arthroereisis Plug

This is a new metal device which acts as an internal splint underneath the talus. It may be removed if it is irritating

Arthrodesis

This procedure welds (fuses) one or more bones together, eliminating movement in the joint. This stabilizes the hindfoot and prevents the condition from progressing further. In cases which have been neglected and a fixed flatfoot deformity is present, an arthrodesis may be required. A fusion is an operation where a joint between two bones is removed and the two bones on either side of the joint are allowed to grow together, or fuse. This type of operation is used to stop pain from joints that are worn out. It can be used to realign the bones when the mechanisms for maintaining normal alignment are lost, such as when the tendons and ligaments no longer work properly. Usually, several joints must be fused to control a flatfoot deformity that develops after a posterior tibial tendon rupture.

Triple Arthrodesis Involved Joints



Arthritic Changes

Expected Outcome

- Improved function / mobility
- Improved pain relief, with decreased analgesic requirements Improved arch height and alignment
- Stop the progression of the deformity
- To be able to do single heel raise
- Muscle strength: inversion grade 4 or 5 on Oxford scale
- Return to low impact sports may be possible but strenuous sport unlikely
- Full recovery may take up to twelve months

Potential Complications

Potential complications specific to Achilles tendon surgery include wound infection and delayed wound healing. Re-rupture can also occur. There may be scarring of the tendon or thickening of the surgical scar. A nerve that gives sensation to the outside part of the foot can be stretched or injured during surgery, which can result in numbness or burning.

Initial Rehabilitation Phase 0-6 Weeks

Goals

- To be safely and independently mobile with appropriate walking aid, adhering to weight bearing status
- To be independent with home exercise programme as appropriate
- To understand self-management / monitoring, e.g., skin sensation, colour, swelling, temperature, etc

Restrictions

Flexor Digitorum Longus Transfer:

- Non-Weight Bearing (NWB) in CAM Walker Boot for 4 weeks.
- Touch Weight Bearing (TWB) in CAM Boot at 4 weeks.
- Elevation
- If sedentary employment, may be able to return to work from 4 weeks postoperatively, if provisions to elevate leg, and no complications

Treatment

- **Pain-relief:** Ensure adequate analgesia
- **Elevation:** ensure elevating leg with foot higher than waist
- **Exercises:** teach circulatory exercises
- **Education:** teach how to monitor sensation, colour, circulation, temperature, swelling, and advise what to do if concerned
- **Mobility:** ensure patient independent with transfers and mobility, including stairs if necessary

Recovery Rehabilitation Phase 6 Weeks – 12 Weeks

Goals

- To be independently mobile out of CAM boot
- To achieve full range of movement
- Tendon transfer to be activating
- To optimise normal movement

Restrictions

- Ensure adherence to weight bearing status.
- No strengthening against resistance until at least 3 months post-operatively
- Do not stretch transfer. It will naturally lengthen over a 6-month period

Treatment

- Pain relief
- Advice / Education
- Posture advice / education
- **Mobility:** ensure safely and independently mobile adhering to appropriate weight bearing restrictions. Progress off walking aids as able once reaches FWB stage.
- Gait Re-education
- Wean out of boot once advised to do so, and provision of plaster shoe as appropriate, if patient unable to get into normal footwear
- **Swelling Management:** Manual Therapy - Soft tissue techniques as appropriate. Joint mobilisations as appropriate ensuring awareness of those which may be fused and therefore not appropriate to mobilise
- Monitor sensation, swelling, colour, temperature, etc
- Hydrotherapy if appropriate
- Pacing advice as appropriate

Exercises

- Passive range of movement (PROM)
- Active assisted range of movement (AAROM)
- Active range of movement (AROM)
- Encourage isolation of transfer activation without overuse of other muscles. Bio feedback likely to be useful.
- Strengthening exercises of other muscle groups as appropriate
- Core stability work
- Balance / proprioception work once
- Appropriate

- Stretches of tight structures as appropriate (e.g. Achilles Tendon), not of transfer.
- Review lower limb biomechanics. Address issues as appropriate.

Intermediate Rehabilitation Phase 12 Weeks – 6 Months

Goals

- Independently mobile
- Optimise normal movement
- Pain relief
- Advice / Education
- Posture advice / education
- Mobility: Progression of mobility and function
- Gait Re-education

Treatment

- **Swelling Management:** Manual Therapy- Soft tissue techniques as appropriate. Joint mobilisations as appropriate ensuring awareness of those which may be fused and therefore not appropriate to mobilise
- Monitor sensation, swelling, colour, temperature, etc
- Orthotics if required via surgical team
- Hydrotherapy if appropriate
- Pacing advice as appropriate

Exercises

- Range of movement
- Progress isolation of transfer activation without overuse of other muscles. Biofeedback likely to be useful.

Exercises

- Strengthening exercises as appropriate
- Core stability work
- Balance / proprioception work
- Stretches of tight structures as appropriate (e.g. Achilles Tendon), not of transfer.
- Review lower limb biomechanics. Address issues as appropriate.

Final Rehabilitation Phase 6 Months – 1 Year

Goals

- Return to gentle low impact sports
- To be able to do single heel raise
- Establish long term maintenance programme

Treatment

- **Mobility / function:** Progression of mobility and function, increasing dynamic control with specific training to functional goals
- Gait Re-education
- **Exercises:** Progression of exercises including range of movement, strengthening, transfer activation, balance and proprioception, core stability
- **Swelling Management:** Manual Therapy - Soft tissue techniques as appropriate. Joint mobilisations as appropriate ensuring awareness of those which may be fused and therefore not appropriate to mobilise
- Pacing advice

REFERENCE

In association with Royal National Orthopaedics Hospital & UCL Institute of Orthopaedics and Musculoskeletal Science

https://www.rnoh.nhs.uk/sites/default/files/downloads/physiotherpy_rehabilitation_gudelines_tibialis_posterior_reconstruction.pdf

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