



**Philip M. Watkins, DPM**  
**Foot and Ankle Surgery**  
370 N 120th Ave.  
Holland, MI 49424  
616.396.5855

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8251 Westpark Way Ste 150  
Zeeland, MI 49464

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3509 Kelly St  
Hudsonville, MI 49426

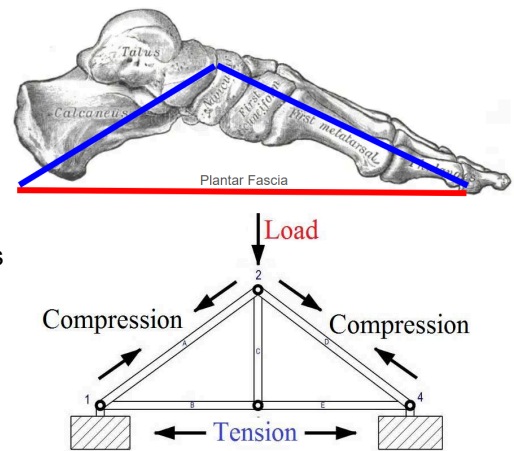
## Plantar Fasciitis

### Anatomy:

The plantar fascia is a thick ligament that runs along the bottom of the foot from the heel bone to the toes. It is important for supporting the bones in the foot and plays an integral part in creating the arch of the foot. There are three bands of the fascia; the medial (inside), central, and lateral (outside) bands. Of these three, the central band is the largest. Most pathologies or pain that arise in the plantar fascia occur in the medial or central bands.

### Biomechanics:

The plantar fascia forms a strong soft tissue connection joining the heel bone with the bones in the front part of the foot. The **bone/fascia** connection forms a type of "truss" that helps load and distribute the weight of the body being transferred down to the foot via the leg. The fascia also plays an important role in helping to form the arch during toe-off while walking or running. As the big toe goes up, the fascia tightens and pulls on the heel bone, thus bringing the heel and the toes closer together to form the arch. This makes the foot a more rigid structure, which allows for more optimal push off strength.



### Pathomechanics:

Over tensioning the fascia may cause inflammation at its insertion on the heel bone. This can be due to a single event of overloading or it can be due to more subtle repetitive stress over time.

### Symptoms:

Patients will typically experience pain to the bottom inside of their heel. This is often worse when they first wake up in the morning or when they get up and stand on their feet after being seated for a period of time. Walking may lead to a reduction in pain once the foot is "warmed up". Barefoot walking often makes pain from plantar fasciitis more pronounced.

### Clinical Features:

On exam, patients are often point-tender at the insertion of the plantar fascia on the bottom inside of their heel. This pain can sometimes be produced with extending the big toe, which activates the fascia and pulls on the heel. Evaluation of the tightness of the calf muscle provides important information as the Achilles tendon and the fascia have fibrous attachments with each other.

### Imaging and Testing:

Plain x-rays are helpful to evaluate a number of bony aspects of the foot. First, weightbearing x-rays help evaluate the structure of the foot. Oftentimes, a lower arch (flat) foot will place tension on the fascia as the arch collapses. A high arch foot may localize body weight to the heel and cause swelling within the tissues. X-ray evaluation of the heel bone also helps rule out other less common conditions of the foot, including bone cysts or tumors in the calcaneus (heel bone).



### Conservative Treatments:

Plantar fasciitis responds very well to conservative treatments. There are two main categories of conservative options for plantar fasciitis:

- Primary:
  - Stretching the calf and leg muscles
  - Icing with a frozen water bottle
  - Making sure to have a good, supportive pair of shoes
  - Pre-made inserts
  - Deep massage with a tennis or lacrosse ball
  - Cortisone injections
- Secondary
  - Night splint to stretch leg muscles overnight
  - PRP injections
  - Boot immobilization
  - Physical therapy
  - Custom orthotics



Depending on the length and severity of symptoms, secondary treatment modalities may be initiated on the initial visit. If done consistently, conservative measures usually lead to symptom relief within 3-6 months in 90% of people.

### Surgical Options:

When conservative treatments have proven ineffective at alleviating symptoms, surgical treatment options are considered. There are two main goals when considering surgical treatments of plantar fasciitis:

- Reduce fascial tension or tightness
- Aid in cellular repair

To accomplish these objectives, a number of soft tissue releases and/or injections can help. These involve either directly relaxing the plantar fascia (plantar fasciotomy), or lengthening the muscular connection to the fascia further up on the back of the leg (gastrocnemius recession):

- Soft tissue releases

- Gastrocnemius (calf muscle) recession (lengthening): the achilles tendon and the plantar fascia are connected via a fibrous attachment. By relaxing the muscle in the back of the leg pulling on the achilles tendon, the tension within the plantar fascia is reduced.
- Plantar fasciotomy: releasing the inside 50% of the fascia at the heel bone can relax the fascial pull on the heel bone and alleviate symptoms.



- Cellular repair:

- Platelet rich plasma (PRP) injections: your blood has most of the healing factors needed to assist in cellular healing. A small amount of blood is drawn off and spun in a centrifuge to isolate and concentrate these healing factors, which are then injected into the fascia.



### **Surgical Recovery:**

If performed in isolation with no other procedures, both soft tissue releases and PRP injections can walk the day of surgery in a surgical boot. Sutures are usually removed at 2 weeks. Physical therapy is started early on in the recovery process, often as early as 2 weeks after surgery. A boot may be worn for 6-8 weeks depending on how post operative recovery is progressing.

### **Complications:**

As with any surgical procedure, complications can arise. These include: infection, pain, recurrent heel pain, numbness or tingling, scarring of skin or deeper tissue, or wound healing complications. Most complications are minor and can be treated clinically without a return to surgery.