

CALF PAIN

The calf is defined as the portion of the lower extremity between the knee joint and the ankle. Its main supporting structures are the tibia and fibula bones.

In the posterior, the popliteus, flexor digitorum longus, and tibialis posterior muscles have their origins on the tibia. The soleus, flexor hallucis longus, and another portion of the tibialis posterior originate on the fibula. The semimembranosus muscle inserts on the tibia just distal to the margin of the articular capsule and the medial condyle. The bulk of the posterior calf is composed of the two heads of the gastrocnemius muscle. They originate from the medial and lateral condyles, respectively, and insert on the calcaneus, after combining with the soleus muscle's tendon to form the tendo calcaneus (the Achilles tendon).

In the anterior, the tibialis anterior originates on the tibia while the extensor hallucis longus, extensor digitorum longus, peroneus longus, peroneus brevis, and peroneus tertius muscles originate on the fibula. The biceps femoris inserts on the proximal head of the fibula just distal to the styloid process. The patellar tendon inserts on the tibial tuberosity.

Other structures of the calf include ligaments, blood vessels, lymph glands, lymph tracts, and various nerves. The nerves, blood vessels, and lymph vessels are numerous and varied in size, the smaller bifurcating from the larger. The anterior tibial artery, dorsalis pedis artery, and the deep peroneal and superficial peroneal nerves descend anteriorly. Posteriorly, the popliteal artery branches to become the posterior tibial and peroneal arteries, and the sural, tibial, and common peroneal nerves follow their paths.

Calf pain may be caused by external blows, muscle stress or strain, benign or malignant tumors, myositis ossificans, osteomyelitis, nerve impingement, deep vein thrombosis, phlebitis, soft tissue swelling, infection of the soft tissues, spinal ligamentous stress, afflictions of the knee or ankle joints, muscle cramps, charley horse (fascial tissue separation), and intermittent capillary claudication. The most common sources of *calf pain* are inflammation of soft tissue structures and referred pain from trigger point formations in and proximal to the calf.

A DSR survey should be made to establish the presence of inflammation and chronic trigger points.

Treatment

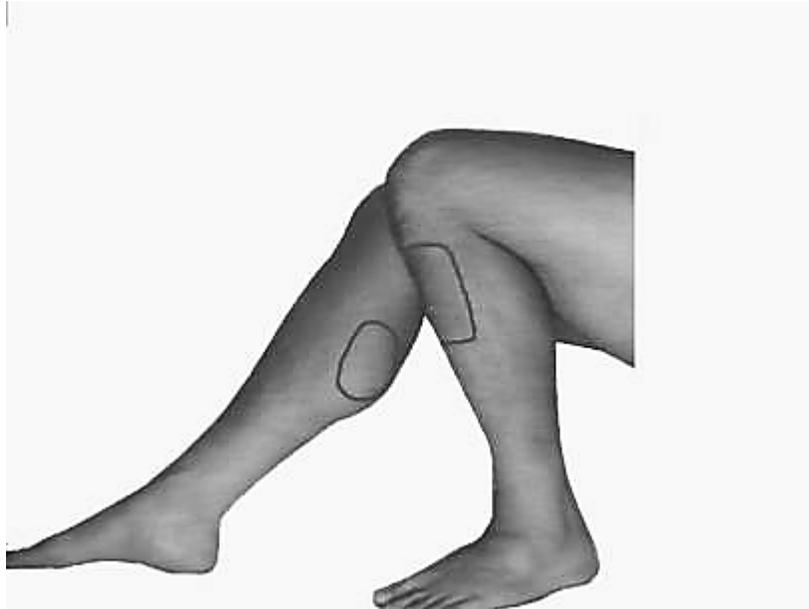
When phlebitis occurs in the calf, without evident thrombosis, it responds remarkably well to a short course of low frequency pulsed galvanic electrical stimulation. The patient can expect almost immediate relief of pain and increases in ambulatory ranges when this electrical stimulation is coupled with the ongoing use of support hose.

Other courses of treatment will depend on what other treatable causes have been identified.

Application:

- If the condition is **acute**, icepack the inflamed zone. If the condition **chronic**, electrically stimulate the inflamed zone. Place a negative electrode over the inflamed zone and a positive electrode over a more proximal site. Set the electrical stimulation unit to deliver a visible contraction, at 7 Hz. Stimulate for 10 minutes. Then set the unit to deliver a medium frequency current, with a duty cycle of 10-seconds on and 10-seconds off, sufficient to produce a near tetanic contraction of the involved muscles. Stimulate for 10 minutes.
- In either case (acute or chronic), the tissues in and around the inflamed zone should be manipulated to eliminate any adhesions that are present.
- Preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.5 W/cm². Ultrasound the inflamed zone, utilizing an effective non-steroidal anti-inflammatory as a coupling agent, for six minutes.

- If the condition is **acute**, electrically stimulate the inflamed zone again. Place a negative electrode over the inflamed zone, and a positive electrode over an associated muscle. Preset the electrical stimulation unit to deliver a visible contraction at 7 Hz. Stimulate for 20 minutes. If trigger points are involved, and are the primary source of the pain syndrome, this technique should be considered optional, since it may irritate or re-trigger the trigger points. The effect, in most cases is only temporary, but in others it may slow recovery or shake the patient's confidence.



Common high skin resistance patterns associated with the medial head of the gastrocnemius and the anterior tibialis trigger point sites

The following treatment forms have also been effective.

Variation:

- Preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.8 W/cm². Ultrasound the inflamed zone(s), utilizing an effective non-steroidal anti-inflammatory as a coupling agent, for six minutes. This procedure is designed to soften the adhesions that may be present.
- Manipulate the tissues in and around the inflamed zone(s) to eliminate any adhesions that may be present.
- Twenty minutes after the first ultrasound, preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.5 W/cm². Ultrasound the inflamed zone(s), utilizing an effective non-steroidal anti-inflammatory as a coupling agent, for six minutes. This is performed to “cool off” the manipulated zone by effectively halting the production of prostaglandins by the stressed tissues.
- Mechanically vibrate the plantar surface of the foot, for two minutes (preferably with a foot vibrator), to further increase capillary circulation and to desensitize the involved tissues.

Variation:

- Preset the ultrasound unit to deliver a 1 MHz pulsed waveform, at 1.8 W/cm². Ultrasound the inflamed zone(s), utilizing an effective non-steroidal anti-inflammatory as a coupling agent, for six minutes. This procedure is designed to soften the adhesions that may be present.
- Manipulate the tissues in and around the inflamed zone(s) to eliminate any adhesions that may be present.
- Apply cold laser (with or without simultaneous electrical stimulation provided by the laser applicator) to the inflamed zone(s) for approximately six minutes. This is performed to “cool off” the manipulated zone by effectively halting the production of prostaglandins (or facilitating enzyme destruction of **all** inflammatory being produced) by the stressed tissues.
- Mechanically vibrate the plantar surface of the foot, for two minutes (preferably with a foot vibrator). This is done to further increase capillary circulation and to desensitize the involved tissues.

As with any trigger point syndrome, patient response to therapy will vary, but in general one or two sessions should ameliorate the problem.

Trigger Points

The trigger point formations listed here may, singly or in combination, refer pain into the calf area: Gluteus minimus, Adductor longus, Biceps femoris (hamstring), Vastus medialis, Gastrocnemius, Anterior tibialis, Long toe extensors, Soleus, and Peroneus longus.