

GASTROCNEMIUS COMPARTMENT SYNDROME

The gastrocnemius muscle is made up of two heads. The larger and medial head arises from the medial condyle of the femur, and the lateral smaller head arises from the lateral condyle. The fibers of the two heads unite at an angle in the midline of the muscle in a tendinous raphe which expands into a broad aponeurosis on the anterior surface of the muscle. This aponeurosis gradually contracts, finally uniting with the tendon of the soleus to form the tendo calcaneus (Achille's Tendon).

As the two heads descend from their condylar origins, just distal to the popliteal fossa, a space is formed between them before they merge. This space has been arbitrarily named (by the author) the gastrocnemius compartment. Various vascular, lymphatic, and nervous components pass through this "compartment", supplying their necessary elements to the various structures of the knee and below. The most important of these components, for this discussion, is the tibial nerve. This nerve supplies both sensory and motor components to the knee joint, the muscles of the calf, and the ankle joint. It has become apparent to us that should an inflammation develop in the soft tissues within the area of the Gastrocnemius Compartment the Tibial Nerve may be affected to the degree that the suffering patient will experience pain in the knee joint, calf, and possibly (though more rarely) the ankle. The pain is usually described as a diffuse aching pain that is most apparent when attempting running. The diffuse presence of adhesions will be demonstrated in and around the zone. Some slight swelling of the compartment may also be present.

It should be noted that the vascular components passing through the gastrocnemius compartment may also be affected to the degree that the patient may experience diffuse rubor and an accompanying burning sensation of the feet (usually occurring bilaterally).

The precise etiology of this syndrome is unknown, but it is suspected that direct pressure into the gastrocnemius compartment is the causative agent. Indeed, even the "soft pressure" of the seat of an overstuffed chair or couch pressing into the back of the calf is suspect. It is entirely clear, however, that the direct pressure the posterior thigh on the gastrocnemius compartment during a "sit up" or "crunch" exercise may keep the syndrome going and defeat any attempts at therapeutic resolution.

Treatment

Treatment of a *Gastrocnemius Compartment Syndrome* centers on relieving any inflammation in the Compartment and eliminating any adhesions that may be present.

Application:

- Have the patient keep the involved foot flat on the floor, to prevent calf cramping. Place a negative electrode over the gastrocnemius compartment, and a positive electrode over the popliteal fossa. Preset an 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.
- Manipulate the soft tissues in and around the Compartment to eliminate any adhesions that are present.



The pattern of high skin resistance associated with the Gastrocnemius Compartment Syndrome

- 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.
- 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.

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, 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 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, 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, 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 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 for approximately six minutes. This is performed to “cool off” the manipulated zone by effectively halting the production of prostaglandins (or facilitating enzyme inflammatories being produced) 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.

Generally, there is a marked improvement in the patient’s condition between the first and second treatment session.

Post Treatment Suggestions:

Complete resolution of this problem really depends on the patient being able to avoid pressure to the posterior superior aspect of the calf for **two weeks**. Even the soft pressure of a couch seat pressing against the calf can restart the problem, or keep it going.

All activities which causes the calf to come in contact with the thigh (the lotus yoga position, “crunches” where the heel is almost touching the buttock, cross legged, or with one knee crossed over the other) should be carefully avoided for two weeks.

Trigger Points

The following trigger point formations may, singly or in combination, imitate or contribute to the pain associated with the *Gastrocnemius Compartment Syndrome*: Gluteus minimus, Adductor longus, Biceps femoris, Vastus medialis, Gastrocnemius, and Anterior tibialis.