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An Unusual and Overlooked Cause of Leg Pain

The human body is the most complicated machine ever created. It is an extremely regulated system that can alter its operations based on stressors, weakness, injuries and functional abnormalities. Yet no matter how many checks and balances are present in the body, there is always a chance for pain and injury to occur. And with runners and walkers, this may lead to pain in the lower leg and calf.

At some point, many of you have experienced calf pain or leg pain below the knee. A few common diagnoses include shin splints (medial tibial stress syndrome) and stress reactions/fractures of the bone. Additionally, a rare and often overlooked diagnosis of leg pain is chronic exertional compartment syndrome, which I explain below.

There are four compartments in the leg between the knee and ankle that contain muscles, tendons, nerves and blood vessels. The anterior compartment contains muscles that extend your ankle and toes. The lateral compartment contains muscles that turn your foot to the outside. The posterior superficial compartment contains muscles that flex down your foot. And lastly, the posterior deep compartment contains muscles that turn in the foot, aid in flexion of the ankle and flex the toes. Each of these compartments is separate from the others and is surrounded by a fascial covering. This fascial structure is like a thin plastic wrap that holds all the of the contents in place.

Typically, the fascial covering will have some give that allows flexibility of the compartments and can tolerate fluid increases. As you exercise, there is an increase in blood and fluid flow to the leg to provide nutrients, electrolytes and oxygen to maintain performance. This increase in blood flow will cause the muscles to engorge. Unfortunately, there are times that the fascia does not allow flexibility. As the blood flow increases, it can cause tightening around these compartments, known as compartment syndrome. The pressure can increase in just one compartment or, in some cases, up to all four compartments.

The problem with diagnosing compartment syndrome is that symptoms can be mild to severe and mimic other diagnoses, like shin splints or stress reactions. The pain can be dull, achy, burning, sharp, stabbing, squeezing or throbbing, and can be on the inside, outside or back of the leg, or all over the leg. The pain will increase with exercise. It can start within a few minutes or after longer periods of exercise. In more severe cases, it can even be present when you aren't exercising. Swelling may develop in the leg as pain increases and the disease process progresses. A few of the more significant and concerning indications of compartment syndrome are numbness and tingling in the leg or foot and even discoloration of the leg due to compression on the nerves and the blood vessels in the specific compartments. If compartment syndrome is severe enough and present for a long enough time, it can cause damage to the underlying muscles and nerves.

The work-up for compartment syndrome includes an in-depth history and physical examination. Imaging such as x-rays, MRI and ultrasound will be normal, as the diagnosis is an abnormal function of the fascial and not a structural issue. Most leg pain will be treated

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conservatively with rest, medication and physical therapy. But if there is lack of improvement, chronic exertional compartment syndrome should be on the mind of any medical provider and athlete.

The way to diagnose chronic exertion compartment syndrome is by performing compartment testing, which calls for inserting a needle attached to a pressure monitor into all four compartments, both prior to exercise and then again after exercise. The pre- and post-exercise pressures, and the difference between the two pressures, will determine a diagnosis.

Conservative treatment of compartment syndrome can be difficult and has a high rate of failure. A low level of the syndrome can be treated with physical therapy, which targets the fascial layer of the muscle through stretching and manual soft tissue releases. However, surgery is needed most of the time. The surgery involves a small incision into the affected compartment to release the restricted fascia. The time frame for recovery and a return to exercise is typically around six weeks.

Although chronic exertional compartment syndrome is not as common as shin splints or stress reactions of the bone in runners and walkers, it needs to be considered in cases of chronic shin and calf pain that don't respond to conservative treatments. If you find yourself experiencing pain in the leg and have tried many treatments without success, discuss the possibilities with your physician or sports medicine provider. Corewell Health Medical Group Orthopedics has extensive experience in diagnosing and testing for chronic exertional compartment syndrome.

If you have any questions or concerns regarding an injury or pain, please reach out to one of our experienced sports medicine physicians at Corewell Health Medical Group Orthopedics at (616)267- 8860. You can also find more information about our orthopedic program and providers on our [website](#).
