



Chronic Exertional Compartment Syndrome in a Healthy Young Man



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Abstract

Objective: The purpose of this case report is to describe a patient who presented with symptoms of exercise-induced compartment syndrome and was later referred for bilateral fasciotomy surgery.

Clinical Features: A 21-year-old patient presented for chiropractic care with the inability to run due to foot paresthesia and weakness. An exertion test and compartment pressure test diagnosed exercise-induced compartment syndrome. Exertion test and compartment pressure test were used to identify and diagnose exercise-induced compartment syndrome.

Intervention and Outcome: The patient was diagnosed with exercise-induced compartment syndrome. He was treated conservatively and referred for additional testing. The orthopedic surgeon requested that 12 weeks of conservative care be provided prior to testing; treatment consisted of chiropractic care and rehabilitation exercises. Following the 12 weeks of treatment, the patient did not significantly respond to conservative care. A compartment pressure test confirmed the initial diagnosis of exercise-induced compartment syndrome. The patient underwent a unilateral fasciotomy surgery and recovered fully. Following the surgery, the patient returned to the chiropractic clinic with the same presentation in the contralateral leg. The same protocol of management resulted in the same outcome. Two years after surgical intervention, the patient continues to maintain an active lifestyle, able to run 2 to 3 miles per day without any exacerbations or symptomatology.

Conclusion: Clinical awareness, a detailed history, and thorough examination with reproduction of symptomatology are necessary to form a proper diagnosis and treatment plan for these patients. Therefore, multidisciplinary medical communication would prove to be the most beneficial approach for the patient.

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Introduction

Exercise-induced compartment syndrome of the lower extremity affects athletes who increase activity levels in both intensity and duration. One theory explains the reasons for the condition such as vascular compromise and ischemia due to the muscular pressure raises from increased exercise demands.¹⁻⁷

Chronic exertional compartment syndrome (CECS) is a reversible ischemic state that is secondary to a noncompliant osseofascial compartment. During exercise, there is an elevated demand from the muscle for oxygen with increasing the blood flow to the muscle. This causes the muscle to swell. In compartment syndrome, a fascial restriction by the sheaths of the connective tissue surrounding the various levels muscle fibers limits muscle expansion and decreases blood flow to the region as well. The muscle then reacts to the oxygen deprivation with the signs and symptoms of muscle cramping, pain, and/or weakness, which may lead to severe disability in the affected extremity.^{2,8-15}

It is currently hypothesized that, in CECS, exercise increases intramuscular pressure, resulting in symptoms. Chronic exertional compartment syndrome is more prominent in athletes who participate in sports or activities that involve repetitive impact such as running or fast walking.

Overuse injuries are the result of repetitive micro-trauma, leading to damage that occurs to the intra- and intercellular tissue. The changes that occur from the microtrauma damage can range from the formation of scar tissue to tissue degeneration. These changes have been observed in athletes following an increase in training intensity and/or duration. Therefore, CECS and other overuse injuries typically occur when performance training increases at a rate faster than the body can adapt. Some of the conditions to consider for differential diagnosis of CECS include intermittent claudication, lumbar disk herniation, stress fracture, medial tibial stress syndrome, muscle strain, and tibiofibular joint dysfunction.^{2,4,8,12,16-22}

The purpose of this case report is to describe the presentation and management of CECS in a 21-year-old man.

Case Report

A healthy 21-year-old man initially presented to a chiropractic office with a chief concern of pain in the sole of the left foot. The pain was intermittent,

nontraumatic gradual onset for the previous 2 months. The pain was worse after rest, especially first thing in the morning. The patient stated that, previously, he was in a marching band which practices for multiple hours per day and, currently, he was training aerobically in preparation for entrance into the Air Force boot camp. For the previous 3 months, the patient had been running several miles per day and working out to an exercise program that included frequent high-impact intensity jumps for 1 hour per session.

The patient described that during marching band, he was instructed to march by lifting his feet straight up and down, with minimal dorsiflexion or plantar flexion. By walking in this manner, there were decreased shock absorption and increased stress to the kinetic chain. Additional stress from running and jumping resulted in cumulative negative effects leading to soft tissue derangement and chronic tissue injury. The patient also stated that he experienced increased difficulty during running due to pain in the left lower leg. The patient would cease activity after 8-10 minutes, with all symptoms dissipating 5 to 10 minutes after activity ended. The first episode was noted 8 weeks prior while training on hard pavement, and the patient denied any pain while walking during daily activity.

When the pain developed during activity, it would radiate from the midpoint of the anterior lower leg down to the dorsum of the foot, leading to a dorsiflexion weakness developing. Following the development of the left lower leg symptomatology, the patient was examined before and after exertion. To accomplish this, the patient was instructed to restrict his training for 24 hours prior to the examination. During the initial examination, there were no abnormalities noted, and his left lower extremity was not swollen, with no pain or weakness noted. The patient maintained muscle strength during examination. The patient was able to perform functional activities, which included gait assessment, squatting, vertical jump, and stair climbing, without pain or symptomatology.

An active examination was performed on the treadmill with the patient running at a similar pace and intensity to his routine training session. The patient developed pain and weakness in the left tibialis anterior muscle after 6.32 minutes of running, and the patient was instructed to discontinue activity and the physical examination was re-performed.

During the examination, the patient described the pain as a "Charlie horse" sensation. Observation of the left lower extremity becoming swollen was measured from 37.5 to 44.9 cm. The dorsalis pedal and posterior tibia pulses were decreased on the left with reduced

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