

Journal of Sports Medicine and Allied Health Sciences: Official Journal of the Ohio Athletic Trainers Association

Volume 3

Issue 1 *Ohio Athletic Trainers' Association Special Edition*

Article 24

May 2017

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Recommended Citation

Parise, Cassandra and Huston, Jeffery (2017) "Bi-lateral Compartment Syndrome in Feet and Gastrocnemius-Soleus Complex of a High School Female Soccer and Lacrosse Player," *Journal of Sports Medicine and Allied Health Sciences: Official Journal of the Ohio Athletic Trainers Association*: Vol. 3 : Iss. 1 , Article 24.

DOI: 10.25035/jsmahs.03.01.24

Available at: <http://scholarworks.bgsu.edu/jsmahs/vol3/iss1/24>

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Bi-lateral Compartment Syndrome in Feet and Gastrocnemius-Soleus Complex of a High School Female Soccer and Lacrosse Player

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OBJECTIVE

The objective of this case study is to evaluate the onset, diagnosis and treatment of bilateral compartment syndrome in both the feet and lower leg compartments in a female high school athlete.

MEDICAL HISTORY/ BACKGROUND

The patient is a 21-year old female retired soccer and lacrosse athlete. Six years ago, in August 2009, the patient began to experience signs and symptoms of exertional compartment syndrome during a three-day pre-season soccer camp. After long durations of running the patient began to feel numbness and tingling, severe cramping and weakness in bilateral medial longitudinal arches of her feet. Following completion of the soccer camp, the patient was seen by her high school athletic trainer. During evaluation, no signs and symptoms of acute fracture or stress fracture were seen and the patient was instructed to stretch and ice to relieve pain. When these regimens did not alleviate symptoms throughout the duration of the soccer season, the high school athletic trainer referred the patient to a lower leg and foot orthopedic physician. After imagery showed no indications of fracture, the physician ordered six to eight weeks of physical therapy. Throughout the duration of physical therapy the patient experienced no change in symptoms of numbness and tingling, cramping or weakness. Due to this lack of change, the patient scheduled a follow up appointment with her physician in mid-October 2009 and was referred for compartment syndrome

testing. The compartment syndrome test came back positive and the patient underwent her first surgery in February 2010.

The patient returned to lacrosse in March 2010 with reduced compartment syndrome symptoms. However, in May 2010 the patient began to experience the same symptoms of numbness, cramping and weakness in bilateral medial longitudinal arches. Due to previous experience with compartment syndrome, no conservative treatment or physical therapy was attempted and the patient immediately made a follow up appointment with a new orthopedic surgeon in June 2010. A second compartment syndrome test came back positive and a second surgery was scheduled for October 22, 2010. Between testing and surgery, pain control treatments such as ice and stretching were used. After the patient's second surgery, she did not participate in soccer during the fall 2010 season. Symptoms were alleviated, therefore, the patient opted to participate in spring lacrosse for the for the 2011 season.

During the fall 2011 soccer season the patient started to experience symptoms similar to those prior however, the symptoms were relocated to her feet and bilateral lower legs. The patient started experiencing mild cramping superior to the Achilles tendon attachment site and throughout the gastrocnemius-soleus complex. Due to the patient's desire to delay operative treatment, the high school athletic trainers used conservative treatments such as

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hydrotherapy and stretching as pain management treatments. Symptoms prolonged throughout 2012 and became severe during lacrosse season in 2013. A third compartment syndrome test was given however, this test was for exertional anterior compartment syndrome of bilateral lower legs. This test also came back positive and a third fasciotomy was scheduled for December 2013. At this time, the patient was enrolled in college and was no longer participating in athletics.

DIFFERENTIAL DIAGNOSIS

When the patient's symptoms first appeared the high school athletic trainer suspected the patient was experiencing the beginning stages of plantar fasciitis due to the rareness of exertional compartment syndrome in the feet. Furthermore, during initial evaluation, there were no indications of acute or stress fracture. Upon initial evaluation of the feet, radiography and magnetic resonance imaging was ordered due to the lack of indications for other possible pathology.

When signs and symptoms appeared for the third time and progressed to the patient's lower leg, exertional compartment syndrome was strongly suspected however, medial tibial stress syndrome and stress fracture were among the pathologies that needed to be ruled out.

TREATMENT

Prior to the patient's fasciotomy, a conservative approach was attempted. With the high school athletic trainer, the patient would stretch before practice and would ice after. Because these regimens did not alleviate any symptoms, referral to an orthopedic specialist was recommended. After evaluation by the physician, the patient was ordered six to eight weeks of physical therapy. During this time the patient would

use electrical stimulation as a pain modulation modality and would do light stretching and strengthening exercises. The physical therapist used a holistic approach and used exercises to target the foot intrinsics as well as ankle stabilizers and lower leg musculature. This treatment protocol did not provide relief for the patient therefore, less conservative treatment was ordered.

The patient underwent her first surgery in February 2009. The surgeon completed a bilateral decompressive fasciotomy of the medial foot compartment using a plantar medial approach. A one inch incision was made along the medial longitudinal arch and the pressure of the medial compartment was released. Following the first surgery the patient was ordered to rest for a short period of time but was cleared for sport participation within six weeks of the surgery.

The patient underwent her second surgery on October 22, 2010. This surgery was completed by a different physician. This physician took a less conservative approach and opted to release all plantar compartments in the foot. Following this surgery, the physician ordered no weight bearing for two weeks immediately post fasciotomy. Following the non-weight bearing period, the patient was allowed partial weight bearing but was not cleared for full sport participation until spring 2011.

The third and final surgery was completed in December 2013. This fasciotomy consisted of release of bilateral anterior and posterior compartments of the lower leg. The same rehabilitation progression was used following this surgery however, the patient was instructed to step away from all sports that included distance running. To this day, the patient has not played another soccer or lacrosse game.

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DEVIATIONS/ UNIQUENESS

This case is particularly unique for numerous reasons. First off, exertional compartment syndrome is not a common condition that athletic trainers tend to deal with. Although much of this case was controlled by a physician, the patient was seen by her high school athletic trainer first. A second aspect of this case that is unique is the fact that in all three instances of compartment syndrome, each instance was bilateral.

CONCLUSIONS

While exertional compartment syndrome is not commonly seen by athletic trainers, it is important for clinicians to understand that compartment syndrome can appear due to daily long distance running and not just from direct trauma. It is also important for us clinicians to be aware of the signs and symptoms of this pathology so we can provide our patients with the best care necessary for correction in a timely manner.

KEY WORDS: *bilateral, exertional anterior compartment syndrome, compartment syndrome, lower leg compartments, foot compartments, high school, female*

CLINICAL IMPLICATIONS

These findings can assist athletic trainers in becoming aware of the common signs and symptoms of exertional compartment syndrome. While, any type of compartment syndrome is not commonly seen in the feet, it is important to take a holistic approach when evaluating a patient.