CASE REPORT: COMPREHENSIVE MANAGEMENT OF MEDIAL TIBIAL STRESS SYNDROME

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ABSTRACT

Activity or exercise-induced leg pain is a common complication among competitive and "weekend warrior" athletes. Shin splints is a term that has been used to describe all lower leg pain as a result of activity. There are many different causes of "shin splints," one of which is medial tibial stress syndrome, and the treating clinician must be aware of potentially serious causes of activity related leg pain. Restoring proper biomechanics to the entire kinetic chain and rehabilitation of the injured area should be the primary aim of treatment to optimize shock absorption. The role inflammation plays in medial tibial stress syndrome is controversial, but in this case, seemed to be a causative factor as symptomatology was dramatically decreased with the addition of proteolytic enzymes. Medial tibial stress syndrome can be quite difficult to treat and keeping athletes away from activities that will slow healing or aggravate the condition can be challenging. "Active" rest is the best way in which to allow proper healing while allowing the athlete to maintain their fitness. (J Chiropr Med 2002;1:122-124)

KEY INDEXING TERMS: Shin Splints, Chiropractic, Rehabilitation, Proteases

INTRODUCTION

Activity induced leg pain is a frequent condition seen by physician's among competitive and "weekend warrior" athletes. Running and walking are the most common activities associated with distal leg pain. The catch-all term "shin splints," has been used by health-care providers to classify all lower-extremity pain associated with activity. Exercise-induced or exertion-induced leg pain is a more appropriate term until a clear diagnosis is made. Estimates have shown that "shin splints" account for 10%-15% of running injuries and up to 60% of all leg pain syndromes. (1) The condition Exercise-Induced Leg Pain includes leg disorders due to stress fracture, tibial stress syndromes or periostitis, and acute and chronic exertional compartment syndromes. The exact

cause of leg pain can be difficult to diagnose and many causes may actually be a continuum of the normal stress response of bone. (1)

Medial tibial stress syndrome is one of the most common causes of lower extremity pain and the mechanism of pain generation is open to debate. It may include musculotendinous strains, tendinitis, interosseous membrane pain, or periostitis. (2) Specifically with periostitis, the exact cause is unknown and "it is controversial whether there is any active inflammation at the site of maximal tenderness." (1)

CASE REPORT

A 28-year-old female presented with acute lower extremity pain of the right medial lower leg. The patient stated that the pain started after jogging on a treadmill at her health club. She stated that she recently had started to increase her mileage on the treadmill in preparation for some spring-time races she had planned on running with her co-workers. On one specific occasion, the patient stated she finished her running regimen and when she got off the treadmill she noticed that her shoe was "falling apart." By this, she meant the inside heel of her shoes had worn unevenly. When she palpated her distal leg, she stated that she had sharp pain on the inside. The patient had no previous history of same or similar conditions with exercise or other activity.

A focused orthopedic, physical and neurologic examination was performed on the patient. Dorsal pedal and posterior tibial pulses were normal. Knee and ankle range of motion were within normal limits. Gross muscle testing of the lower extremities showed no abnormal findings. Digital percussion of the tibia produced diffuse sharp pain along the medial aspect of the tibial shaft. A "Bow-test," which I learned in a current sports medicine post-graduate program, was performed to evaluate for possible stress fracture. This was performed by placing the patient's mid-lateral lower leg in question against the examiner's shin. Contact was made with the doctor's hands at the tibial tuberosity and the distal tibiofibular joint. A valgus stress was applied to the patient's lower leg by pulling the patient's leg over the examiner's leg, theoretically "bowing" the tibia in attempt to produce localized pain along the medial aspect

which may signify fracture. This was negative. Soft tissue evaluation produced moderate pain and showed adhesion formation in the medial gastroc/soleus muscles. In the weight-bearing position, the patient had bilateral pronation of the feet as was noted by loss of the medial longitudinal arch and a "bowing" of the achilles tendon just proximal to the insertion at the calcaneous. Joint assessment of the lumbosacral region, right knee and right talocrural joint and foot showed dysfunction in the mid-lumbar spine and the right sacroiliac joint, loss of medial to lateral glide of the tibia on the femur, loss of long axis distraction of the talocrural joint, and loss of plantar flexion of the cuboid. As a result of the findings in the examination, the doctor decided against plain-film radiographs of the distal leg.

Diagnosis for this patient consisted of an acute medial tibial stress syndrome with associated periostitis, myofascitis and joint dysfunction of the low-back region, right knee, ankle, and foot.

Treatment consisted of chiropractic manual adjustive techniques with the intention to restore normal biomechanical function and alignment to the articulations and to facilitate joint afferentation in an effort to enhance proprioceptive input of the lower extremity. Muscle stripping was performed to the adjacent soft tissues to "break-up" adhesions. Acupuncture was utilized approximately every other visit to stimulate endogenous endorphin release to the area. Recommendation was made to the patient to go to a running specialty store and be fitted with new shoes. Lastly, the patient was restricted from weight-bearing exercise until further notice.

The patient was seen, including the first visit, five times over ten days. Subjectively, the pain was decreased on the fifth visit. Adhesion formation was still noted in the soft tissues, so stretches for the gastrocnemius, soleus, and peroneus were given to the patient. The patient was also referred for custom-fit orthotics for the purpose of maintaining foot biomechanics and alignment as well as for shock attenuation. (Due to patient insurance benefits/limitations, the author did not perform the casting and fitting of the orthoses. A licensed orthotist performed these.) The patient had progressed to being virtually symptom free for approximately four weeks and was on a PRN treatment basis with restriction of weight-bearing exercise to a stair-climber for two more weeks until a relapse due to a previously entered "benefit" race that she ran. Due to this increase in symptomatology, non-weight bearing AP and lateral plain-film radiographs were performed on the distal right leg. No lesion or callous formation was detected along the cortex and

the study was deemed unremarkable. The sensitivity of roentgenogram's early with stress fracture is low and a fracture line or the associated periosteal or medullary reaction is difficult to visualize. (2)

Treatment proceeded as before, but additionally supplementation of a proprietary blend of proteolytic enzymes and a Bromelain-Vitamin C-Pantothenic acid product were introduced approximately one week later. These two products were chosen for their anti-inflammatory effects, pain reducing action, their decreasing of healing time and edema reduction, as well as their few to no negative side effects reported with their use. (3-6) Proteolytic enzymes, including Bromelain, are contraindicated in patients that are on anticoagulation pharmaceutical drugs, such as Cumadin and Warfarin. Within days, the leg pain had subsided dramatically even to doctor palpation. Objectively, fewer adhesions were noted in the soft tissues. One week later the patient was evaluated again and she still had no complaints and objective findings were negligible. At that time, strengthening exercises with rubber tubing were incorporated into the treatment plan for her. The inverters, dorsiflexors, evtor muscles and specifically the tibialis anterior were targeted mainly to increase muscle to aid in shock attenuation of the lower extremity. Running was finally resumed with a gradual increase in distance and frequency. The patient started out at two miles a run twice a week for two weeks with instruction that discomfort in the lower leg be a "guide" to exercise intensity parameters. Once again, the leg symptoms directly over the bone started to increase again. Therefore, a bone scan was ordered on the patient to better evaluate the integrity of the patient's tibia. Results of the scan showed there was an increased uptake in the area of question and consultation with radiologist confirmed that a periosteal reaction was taking place but was not consistent with a stress fracture. The patient continued her activity, once again letting pain guide activity, until she was able to run consistently with no resumption of symptoms.

DISCUSSION

This case is a classic example of an exertional-induced repetitive trauma injury that may present to a chiropractic clinic, especially one with a chiropractic physician that specializes in sports medicine and sports injury treatment. Medial tibial stress syndrome can be recalcitrant, as was in this case, and a multi-faceted approach seems most appropriate.

Differential diagnosis for a competitive or everyday athlete with similar presenting signs and symptoms in-

cludes compartment syndromes, fascial herniation, stress reaction/fracture, medial tibial stress syndrome/periostitis, tendinitis, exercise-induced ischemia, myofascitis or any combination of the above. (1,2) The clinician must be aware of potentially more serious causes of leg pain as immediate referral may be necessary, specifically, an acute compartment syndrome, which is characterized by an onset of increasing leg pain that is not alleviated by rest and extreme tenderness to palpation. With passage of time, the distal pulses may become diminished, the skin may become shiny and discolored, and the patient will be unable to give a significant muscle contraction due to pain and/or pathological process. An acute compartment syndrome is a medical emergency that requires immediate referral for surgical decompression. (2)

Chiropractic physicians can be the treating providers in these cases due to our diagnostic capabilities as well as our treatment protocols. Manual adjustive techniques should be used to restore joint function and alignment and enhance afferent information. In selective cases, orthotic intervention should also be used for the same purpose. Though the role inflammation plays in this common condition is debatable, in this case, even after manual therapy had reached maximal benefit, it was not until the addition of a natural anti-inflammatory supplement that healing was achieved at a faster rate. I feel that due to the safety of the aforementioned products, inflammation reduction should be utilized in the comprehensive case management plan for a patient presenting with medial tibial stress syndrome. More research is needed to fully understand the role, if any, inflammation plays in medial tibial stress syndrome. Obviously, rest of the afflicted area is also very important and its role in the healing of this patient must not be diminished. With competitive and driven "everyday" athletes, getting them to rest the injured area can be quite challenging. In this case, one "race" did result in a setback in healing. It is important to give the individual "active" rest so he or she can maintain their level of fitness but not slow or prevent healing. In this case, it meant starting with non-weight bearing stationary biking, progressing to a stair climber and finally working back into running. One last modification was also made in this patient's life. Due to the large re-occurrence rate of exercise-induced leg syndromes, maximizing bone density was of utmost importance. Therefore elimination of her current birth control, Depo-Provera was

suggested. Long-term use, 3–4 years, had lead to the patient having amenorrhea which may lead to bone density loss/osteoporosis.

Limitations of the case study presented must be noted. First and foremost, many different treatment variable from a variety of disciplines, ie. physical therapy, acupuncture, chiropractic, podiatry and nutritional intervention were utilized. Therefore, no definitive conclusions can be made with any one-treatment method. Secondly, with only one patient, this sample size makes it impossible to draw conclusions on treatment on a population for a given diagnosis. Lastly, this was a retrospective case report with the patient outcome known to me prior to its inception. My intent was to present a reasonable treatment regimen for exertion-induced leg pain to practicing chiropractic physicians. Future studies should address the most cost and time-effective way at treating exercise induced injuries, include a larger study population, randomization of variables, and having a placebo group.

CONCLUSION

Treatment for medial tibial stress syndrome, whatever the cause, should be multi-faceted and restoring proper biomechanics and alignment to the foot and lower extremity should be the primary aim of treatment in order to improve shock attenuation to the entire lower extremity. Due to the large percentage of re-occurrence with exertional-induced leg syndromes, it is imperative that a full recovery is achieved before return to activity and all contributing factors are eliminated. Doctors of chiropractic are more than able to meet the needs of patients presenting with this and other similar conditions of the lower leg.

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