CASE REPORT

Conservative management of a saphenous nerve entrapment in a female ultra-marathon runner

Roy Settergren, MS, DC, MS a,b,*

a National University of Health Science, MS Advanced Clinical Practice Program, 200 E. Roosevelt Rd., Lombard, IL 60148, USA
b University of Illinois Chicago Athletic Program, Team Chiropractic Physician, 839 W. Roosevelt Rd., 730 North Franklin Suite 602, Chicago, IL 60654, USA

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Summary Entrapment of the saphenous nerve is a frequently overlooked cause of medial knee pain. Delayed or misdiagnosis is a result of a lack of detailed reporting of the vastoadductor membrane, and by direct visualization of the entrapment only being accomplished at the time of surgical decompression. To date there are no documented conservative interventions discussed in the literature. This is a case of diagnosis and conservative resolution of a spontaneous saphenous nerve entrapment in a competitive female ultra-marathon runner. In-office Active Release Technique® combined with an at-home rehabilitative exercise program relieved the patient’s subjective pain and paresthesia with two treatments provided over a one week period of time.

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Introduction

Entrapment of the saphenous nerve is a frequently overlooked cause of knee pain (Kopell and Thompson, 1960a,b). A delay in diagnosis or misdiagnosis is due to several concomitant factors: lack of detailed reporting of the vastoadductor membrane; direct visualization of the nerve entrapment only being accomplished during surgical decompression; and clinical presentation of the nerve entrapment mimicking other more common causes of knee pain (Kalenak, 1996). The most common location of spontaneous saphenous nerve entrapment is at the point it pierces the vastoadductor membrane to exit the adductor canal (Arthornthurasook and Gaew-Im, 1990). This is a case of diagnosis and resolution of a spontaneous saphenous nerve entrapment in a competitive female ultra-marathon runner treated with Active Release Technique® (ART) and rehabilitative exercises.

* University of Illinois Chicago Athletic Program, Team Chiropractic Physician, 839 W. Roosevelt Rd., 730 North Franklin Suite 602, Chicago, IL 60654, USA. Tel.: +1 312 756 7839; fax: +1 312 253 4453. E-mail address: rdsettergren@gmail.com.

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Case report

A 29-year-old female competitive ultra-marathon runner presented with a one month history of constant, nonspecific (poorly localized) anterior medial left knee pain. The patient described the pain as a diffuse ache with associated intermittent numbness slightly medial and inferior to the patella. The patient rated her pain as a 6 out of 10 on the visual analog scale (VAS), and reported that running significantly exacerbated the pain. Her pain began while she was training for a 100-mile ultra-marathon, running an average of 80 miles per week. She denied a history of trauma, surgery and previous occurrence of left knee pain.

Inspection of the left knee and lower extremity revealed no evidence of venous stasis, ecchymosis or pedal edema. Palpation over the subsartorial canal, approximately 10 cm proximal to the medial femoral epicondyle elicited a painful response. Repeated palpation over the medial thigh produced a Tinel sign with pain distally. Neurologic examination of the left and right lower extremities was unremarkable for motor deficits or paresthesia at the time of presentation. There was no evidence of meniscal, ligamentous or bony pathology (i.e. fracture) with orthopedic evaluation. Bilateral hip flexor shortening was noted with Thomas test. Active range of motion of the left knee was full, however, pain increased after 100 degrees of flexion. A functional exam was performed as pelvic instability and hip external rotator fatigue have been cited by Kellis and Liassou (2009) as being a risk factor for the development of a spontaneous saphenous nerve entrapment. The patient performed a single leg stance on the left, and displayed a contralateral pelvic drop of approximately 3 cm, indicating a positive Trendelenburg’s sign consistent with insufficient frontal plane pelvic stability. The patient performed five single leg squats on the left with a depth of approximately one foot to further assess functional stability of the pelvis, the right pelvic drop increased and a valgus motion at the left knee was apparent. During the single leg squat the patient stated that her pain level increased, rating the intensity as an 8 out of 10 on the VAS.

The patient was diagnosed with spontaneous saphenous nerve entrapment at the vastoadductor membrane. Conservative management was prescribed over a one-week time period, including both in-office treatment and at-home exercises to address pelvic instability and prevent recurrence. The in-office treatment was done over two visits, one week apart, and consisted of ART® to release the saphenous nerve from its entrapment. The focus of this process is actively placing tension into the surrounding tissues as well as the vastoadductor membrane at the point which the saphenous nerve pierces it. This technique differs slightly from neuromobilization techniques in that neuromobilization as described by Elvey (1986) as a passive motion of the nerve sheath to decrease neural edema and hypoxia restoring neurodynamics. Neuromobilization is achieved without the use of active tissue tension, while the technique used in this case attempts to affect the soft tissues surrounding the entrapment site while incorporating neuromobilization.

During the first ART® session an audible and palpable release was elicited, coinciding with an acute, but brief, increase in the patient’s pain. Immediately following the release, the patient rated her pain intensity as a 2 out of 10 on the VAS. At the second in-office treatment session, the patient stated that following her first visit the pain had remained a 2 out of 10 on the VAS. The same protocol was performed without an audible or palpable release. Following the second treatment, while in office, the patient’s pain fully resolved, and she was able to resume her ultra-marathon training.

In addition to the in-office treatment, three at-home rehabilitative activities were prescribed to be performed as three sets of ten repetitions bilaterally, once per day. These exercises were aimed at addressing the patient’s pelvic instability in an effort to prevent recurrence of the saphenous nerve entrapment. The first of the rehabilitative exercises was the ball squat exercise (Fig. 1) to re-train neuromuscular patterns of recruitment, with emphasis on gluteal activation in the sagittal plane, and to limit shifting of weight through the quadriceps. The second rehabilitative exercise consisted of a single leg stance, with the contralateral hip holding a physioball against the wall (see Fig. 2). The patient was instructed to allow the hip holding the ball to drop slowly, via eccentric contraction of the stance leg abductors, and then concentrically contract the stance leg abductors to raise the ball-side hip above the level of the stance leg hip. The focus of this exercise is coronal plane stability and neuromuscular recruitment. The third of the rehabilitative exercises was a single leg excursion exercise (see Fig. 3). This exercise is similar to the single leg squat evaluation that was used during the physical examination to assess for poor endurance in the pelvic stabilizing muscles. However, this rehabilitative exercise is designed to increase multiplanar endurance and neuromuscular coordination of the hip stabilizing musculature.

Following one week of conservative management of a saphenous nerve entrapment including in-office therapy and initiating an at-home rehabilitative exercise regime to minimize recurrence, the patient’s pain resolved and she was able to resume her ultra-marathon training. The patient’s resolution of symptoms had remained without recurrence of pain or paresthesia at a 16-month follow-up. At this follow-up the patient stated that she periodically performed the prescribed rehab exercises. During the function reevaluation the patient displayed a normal Trendelenburg and Thomas test. However, while performing the single leg squat test the patient displayed 2 cm of contralateral pelvic drop, as well as a mild valgus motion at the knee.

Discussion

The saphenous nerve is the largest sensory nerve branching from the femoral nerve, derived from the L1–L4 nerve roots. It descends as part of the femoral nerve and, at the level of the inguinal ligament, branches medially, traversing the femoral triangle before entering the adductor canal. The adductor canal extends distally, bordered anterolaterally by the vastus medialis muscle, and posteriorly by the adductor longus and adductor magnus muscles (Balaji and DeWeese, 1981). The roof of the adductor canal is the vastoadductor...