

Introduction:

Peroneal tendinopathy is an uncommon but underappreciated source of lateral hindfoot pain and dysfunction (Heckman et al, 2009). With ineffective intervention, the peroneal tendons can frequently cause persistent lateral ankle pain and functional problems (Molloy & Tisdell, 2003). While the pathogenesis of peroneal tendinopathy has not been well studied, tendinopathy in the supraspinatus; the common wrist including extensor digitorum and extensor carpi radialis brevis and longus; patellar; and Achilles tendon have been described. Histological analyses of affected tendons have identified four predominant changes, collectively termed angiofibroblastic hyperplasia (Coombes et al, 2009): (1) hypercellularity and increase in ground substance; (2) vascular hyperplasia or neovascularization; (3) increased concentration of neurochemicals (Alfredson et al, 2000) and (4) disorganized and immature collagen (Nirschl, 1992; Astrom & Rausing 1995; Movin et al, 1997; Benjamin et al, 2006; Fredberg & Stengaard-Pedersen, 2008). Consistent absence of inflammatory cells in chronic cases has resulted in the general consensus that the process is degenerative in nature, although an inflammatory neurogenic component may exist (Danielson, 2009; Fredberg & Stengaard-Pedersen, 2008; Alfredson & Lorentzen, 2003; Uchio et al, 2002; Ljung et al, 1999; Ljung et al, 2004).

Little scientific evidence has been reported on the management of peroneal tendinopathy (Selmani et al, 2006). Some authors advocate for the use of lateral heel wedges (Heckman et al, 2009; Hodgkins et al, 2008; Simpson & Howard, 2009; Selmani et al, 2006). However, this treatment technique poses a problem in that the peroneal tendons are most active when the heel is off the ground during gait (Molloy & Tisdell, 2003; Neumann, 2002; Sutherland, 1966). Others advocate for eccentric exercises as has been

effectively demonstrated in other tendons throughout the body in cases of tendinopathy (Simpson et al, 2009).

Manual therapy has demonstrated promising results in individuals with lateral epicondylalgia. Specifically, a lateral glide at the elbow has resulted in a rapid reduction in pain, improved pain-free grip force, and improved function (Vicenzino & Wright, 1995; Vicenzino et al, 2001; Paungmali et al, 2003). To our knowledge, there is no existing evidence suggesting that joint mobilizations are effective in those with lower extremity tendinopathy. The purpose of this case report is to describe the evaluation and management of a patient with peroneal tendinopathy, with emphasis on manual therapy intervention.

History:

The patient was a 49 year old female seen in August of 2010. She presented with a 15 month history of left lateral ankle pain (Figure 1) that prevented her from performing her exercise routine, which consisted of walking outside 3-5 miles on level ground three times per week and performing the Stair Master machine for 30-45 minutes two times per week. On the Numeric Pain Rating Scale (NPRS), she reported 6 out of 10 (6/10) pain, on a scale of 0 to 10 (0 being no pain, 10 being the requirement of an Emergency Room visit). She worked as a school administrator and reported increased pain when her job required her to walk more often than normal and negotiate multiple flights of stairs throughout her day. She also complained of a generalized stiffness throughout her ankle while negotiating stairs, with more difficulty going down. Her past medical history included a left distal fibular fracture (January 2009). She was immobilized for six weeks in a boot following. After appropriate healing, she received physical therapy intervention over three weeks to progress her activity tolerance. The patient reported that she never regained the ability to

sit with her involved limb flat on the floor due to stiffness and limited range of motion (ROM) in her ankle. In May of 2009, she began to complain of increased lateral ankle pain and subsequently was diagnosed with peroneal tendinopathy. Following two months of physical therapy intervention consisting of a general strength and conditioning program, she was discharged with less pain and returned to her prior exercise routine as stated above. However, her pain never completely subsided. In January of 2010, her lateral ankle pain worsened. At this point, she had stopped exercising on the Stair Master but continued to walk with pain after one mile that started at a 1/10 and steadily rose to as high as 6/10. A MRI in July of 2010 revealed no significant findings. She denied any popping, snapping, clicking, giving way, loss of balance, burning, numbness, or tingling.

Outcome Measures:

The Lower Extremity Functional Scale (LEFS) (Binkley et al, 1999) was administered to determine the level of difficulty with various functional tasks. It is scored from 0-80, with 80 indicating no limitations. The minimally clinically important difference (MCID) has been reported by Binkley et al (1999) to be 9 points. Global Rating of Change (GRoC) Scale (Jaeschke et al, 1989) is a 15 point Likert scale from -7 to +7 indicating perceived changes in condition. Reports of “+5” or better has been used to represent a successful outcome and has correlated with at least a 50% change in Oswestry Disability Index scores (Fritz et al, 2009). The NPRS was administered to monitor pain during and across physical therapy sessions. The MCID has been reported to be 2 points (Farrar et al, 2001). The primary objective outcomes included the anterior reach portion of the Star Excursion Balance Test (SEBT) (Olmstead et al, 2002; Plisky et al, 2006), unilateral heel raises, and prone ankle dorsiflexion (DF) ROM (Table 1). The anterior reach portion of the SEBT has

demonstrated moderate correlation with the weight bearing lunge DF ROM test (Hoch et al, 2011).

Objective Examination:

Mild calf atrophy on the involved limb was noted grossly via observation, but no edema was noted throughout the foot and ankle. Gait examination revealed greater toeing out and midfoot pronation on the involved limb during terminal stance compared to the non-involved side. Her concordant pain was increased to 4/10 during terminal stance and during stair descent when her involved heel was off the ground. Symmetrical hindfoot and forefoot varus with plantarflexed first ray positioning were noted bilaterally. Pain to palpation was elicited over the peroneal tendons posterior to the lateral malleolus. Manual muscle testing revealed peroneal weakness (4/5 on involved compared to 4+/5 on non-involved) without pain. Active and passive inversion also increased her concordant pain to 3/10. All other active supine and passive prone ankle and foot ROM testing was pain-free. All ankle ROM testing was equal to the non-involved side except talocrural DF, measured in prone with knee straight and bent (Table 1). Hypomobility with anterior-posterior (AP) joint assessment was noted at the talocrural joint on the left. Bilateral, symmetrical hypomobility was found at the inferior tibiofibular joint with AP and cephalad glides. Subtalar joint mobility was deemed equal to the non-involved limb with medial and lateral glides. Joint mobility of the remainder of the ankle and foot was unremarkable. There were no signs of ligamentous laxity or nerve entrapment throughout the foot and ankle. Static unilateral balance testing was deemed normal in quality of control and duration of time (30 seconds) when compared to the non-involved side with eyes open and closed.

Impression:

The symptoms and signs lended towards a diagnosis of peroneal tendinopathy. in conjunction with ankle stiffness that she described and what was found during the physical examination. Although her MRI findings were deemed non-significant, the sensitivity and specificity of peroneal tendinopathy on MRI compared to surgery were 83.9% and 74.5%, respectively (Park et al, 2010). This may be secondary to non-inflammatory changes that occur in tendinopathy. Consistent with the findings of this patient, the research indicates that patients with peroneal tendinopathy will have pain posterior to the lateral malleolus (Heckman et al, 2009) that is often precipitated by prolonged or repetitive activity after a period of relative inactivity (Molloy & Tisdell, 2003; Simpson & Howard, 2009). Also consistent with gait research, her pain occurred when the peroneals were most active during the gait cycle (Molloy & Tisdell, 2003; Neumann, 2002; Sutherland, 1966), with heel raises (Reischl & Noceti-Dewit, 2006) and with passive inversion (Heckman et al, 2009). Weakness in the peroneals with manual muscle testing (Zgonis et al, 2005; Reischl & Noceti-Dewit, 2006) and a hindfoot varus (Heckman et al, 2009, (Hodgkins et al, 2008; Molloy & Tisdell, 2003; Zgonis et al, 2005) are commonly found. Finally, limitation in DF has been postulated to lead to peroneal tendon dysfunction (Tiberio, 1988; Donatelli, 1985).

Intervention:

During the initial evaluation and second visit, treatment was directed at educating the patient regarding the disease process. Based on current research and her increased level of pain, unloading the tendon with various types of prefabricated rearfoot and forefoot posts on the medial and lateral side from 1/8-1/4 inches was initiated. In addition, anterior to posterior talocrural joint mobilizations into 75% of the resistance (grade 4+) as described

by Maitland (2005). Calf stretches with knee straight and bent were held for 30-60 seconds for a target time of 20 minutes per day, 5x/week, as this regime has demonstrated a right shift of torque/angle curves (Guissard & Duchateau, 2004). Finally, peroneal strengthening (Figure 2) was conducted for three sets of 15 repetitions three times per week on non-consecutive days with theraband (Table 2).

Visit 3:

One month after her initial evaluation, her pain had worsened. She attributed to a busy work schedule. She was not wearing any orthotic posting because she felt they were uncomfortable. Her pain with gait remained painful and she was able to perform only one unilateral heel raise due to pain reported at 4/10. Both subjective and objective outcomes had worsened (Table 1). Given this, it was decided to abandon the addition of posting and attempt a different manual technique. A lateral calcaneal glide going into 50% of the resistance (grade 3) as described by Maitland (2005) (Figure 3) was conducted over 10 repetitions. Immediately after, she conducted ten unilateral heel raises pain-free. At this point, the activity was stopped by the primary author so as to not potentially alter further reassessment of gait. The patient then ambulated pain-free over 100 feet. At the end of the treatment session, peroneal strengthening was progressed with increased resistance (Table 2).

Visit 4-7:

Two weeks following the third visit, the patient was walking 30 minutes 3-4 times per week with pain no greater than 3/10 and had no difficulty with negotiating one flight of stairs. She was now able to perform 17 unilateral heel raises before pain increased from her baseline pain. There was no increase in pain with gait. Subjective outcome measures had

improved (Table 1). A lateral calcaneal glide was performed as described above, with no change in pain or ability to perform unilateral heel raises. Intervention during sessions 4 through 7 targeted progression of peroneal theraband strengthening and talocrural mobility and stretching as described above.

Visit 8:

The last session was 3.5 months after initial evaluation. The patient reported 0/10 pain and had returned to her previous exercise routine without problems. All subjective and objective measures demonstrated improvement (Table 1).

Discussion:

Improvements in function and pain after a course of physical therapy intervention have been demonstrated in this patient with peroneal tendinopathy. It is interesting to note that changes were not noted until a lateral calcaneal glide was performed. The lateral glide improved symptoms and function despite the fact that there were no restrictions found at the subtalar joint. It has been hypothesized that joint mobilizations alter pain through biomechanical (Bialosky et al 2009), chemical (Degenerhardt et al, 2007), spinal (Malisza et al, 2003a), and supraspinal (Malisza et al, 2003b) mechanisms. It is unclear which of the above mentioned mechanisms, if any, are true in this case. However, analogously, a lateral glide at the elbow has resulted in a rapid reduction in pain, pain-free grip, and improved function (Vicenzino & Wright, 1995; Vicenzino et al, 2001; Paungmali et al, 2003). The analgesic effects after mobilization in those with lateral epicondylalgia have been proposed to be mediated via non-opioid, descending pain inhibitory mechanisms (Paungmali et al, 2003; Vicenzino et al, 2001).

The results of this case report should be interpreted with caution. This is the first study to our knowledge that has reported joint mobilizations targeting the calcaneus in the management of peroneal tendinopathy. Nonetheless, other reasons for improvement should be considered. This patient also received peroneal strengthening exercises along with talocrural DF stretches and joint mobilizations. It is unclear as to the effect these other treatments had on the improvement of this patient. However, the authors in this case considered a combination of manual intervention and therapeutic exercise essential to this patient's management.

Future Directions:

This case report raises several issues. First, as manual therapy has demonstrated improvement in those with lateral epicondylalgia, the question remains as to whether manual therapy can be an effective treatment method in those with tendinopathy in other parts of the body, specifically in this case, the peroneal tendons. Second, as exercise targeted at excessively loading pathologic tendons has demonstrated improvement in pain and function in those with Achilles (Alfredson et al, 1998), posterior tibialis (Kulig et al 2009) patellar (Bahr et al, 2006), common wrist extensor (Slater et al, 2010) and rotator cuff (Bernhardsson et al, 2011) tendinopathy, it would be interesting to note if the same is true in the peroneal tendons. Finally, the efficacy of orthotic use in those with peroneal tendinopathy needs further examination.

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