

## **Rehabilitation of a surgically repaired Achilles tendon post complete rupture: A case study**

### **Abstract**

*Objective:* This paper will examine a rehabilitation program for a 42 year old male who was 4 weeks post surgical repair of a complete left achilles tendon rupture.

*Results:* Following a 5 week treatment plan focusing on active rehabilitation, utilizing isometric, eccentric, concentric and proprioceptive exercises, a complete resolution of the primary complaint of left achilles pain and significant increase in strength and range of motion was reported.

*Discussion:* Conservative care, specifically rehabilitation is a mainstay treatment for surgically repaired complete achilles tendon ruptures. Treatments included both a passive and active component and in this case were found to be effective in treating this injury, with the patient discharging themselves from an active treatment plan and returning to participation in recreational soccer.

*Key words/MeSH terms:* Achilles tendon, Achilles tendon rupture, surgery, rehabilitation

### **Introduction**

Rupture of the achilles tendon is one of the most common tendon injuries seen in an adult population.<sup>1,2</sup> The incidence of this injury increases as aging adults participate in sports, specifically in men aged 3-50 years old.<sup>4</sup> Is the most commonly injured tendon of athletes in the lower extremity.<sup>1,2</sup> Strenuous physical activity and sports including, but not limited to soccer, badminton, softball, track and field and basketball are among the most commonly participated in when incurring an achilles tendon rupture.<sup>2,4</sup> Although it is the largest and strongest tendon<sup>3</sup> in the human body, it is subjective to extensive static and dynamic loads, up to 2-3 times body weight with walking and up to 10 times the body weight with certain athletic activities.<sup>2</sup>

### **Case Report**

A 42 year old healthy male presented to the clinic 4 weeks post complete achilles tendon rupture and subsequent surgical repair. The patient ruptured his achilles tendon while playing soccer and presented to the emergency room for treatment. Following surgical repair, the patient was immobilized in a fiberglass cast. At the time of the initial assessment the patient was utilizing crutches in combination with a "walking boot" and had not been instructed to weight bearing without utilizing a walking aide, specifically the use of a crutch. The patient reported symptoms of pain and discomfort at planter aspect of heel and inferior aspect of dorsal ankle, particularly with standing. The reported verbal pain level was 3 to 4 out of 10 and the patient expressed concerned about possible re-injury of the achilles. At the time of the initial assessment the patient denied utilizing ice and therefore a recommendation was made for icing of the affected area with a 10 minute on, 10 minute off and 10 minute on, icing protocol. The patient indicated that they are specifically seeking an active rehabilitation program in order to return to pre injury activity levels and avoid re-injury.

## **Rehabilitation of a surgically repaired Achilles tendon post complete rupture: A case study**

During physical examination it was found that the patient was hesitant to elicit full muscle activation during active range of motion, with passive eversion positive for discomfort at the end range of motion. The patient reported pain with palpation directly over incision site without any altered sensation of the achilles, however some pitting edema was noted on the dorsal aspect of foot. Palpation overlying the deltoid ligament very tender. Long axis distraction of the subtalar joint, heel squeeze and forefoot squeeze all unremarkable. Palpation overlying the deltoid ligament was described as tender. Pain localized to the plantar aspect of the heel was reported with weight bearing. No swelling or tissue thickening was noted at the site of surgery.

A diagnosis of disuse atrophy and deconditioning following surgical repair and immobilization was given and a two part treatment plan was initiated. The passive portion of the treatment plan included passive range of motion and joint challenge in all ranges, soft tissue and instrument assisted soft tissue techniques to the affected tissues based on ART and Graston protocols and acupuncture (SP 6,9, ST 36, to the medial and lateral heads of the gastrocnemius, gastrocnemius-soleus complex and the Achilles tendon, medial and lateral to the incision site), with the application of ice directly following for 10 minutes to help decrease any inflammation and address the primary complaint of pain. At the time of the initial assessment the patient had not been cleared by his surgeon to fully weight bear on the affected ankle, thus exercises utilizing a theraband were prescribed (dorsiflexion, plantar flexion, inversion and eversion) in a seated position and isometric ankle exercises in all directions were done against resistance applied by the practitioner at each appointment, as well as isometric exercises for the quadriceps and hamstring musculature. Once the patient received clearance from his surgeon to bear weight on the affected ankle without the use of a walking aide, proprioceptive exercises included one leg balancing on a flat and progressing to a labile surface(s) were initiated. Gait retraining and a recommendation to progressively decrease the amount of time spent in the walking boot was given. By the second week following the initial assessment eccentric calf raises were then implemented as well as closed chain exercises addressing quadriceps and hamstring musculature, including wall sits and pelvic bridging (2 legs and 1 legs). Ankle stretches targeting the gastrocnemius-soleus complex were given as well as eccentric calf raises, utilizing the patient's body weight as resistance.

The patient was instructed to perform the strength and conditioning exercises every other day, with as many repetitions as possible with good form and to cease and desist if excessive pain was produced with any exercise. Paperwork including pictorial representations and written instructions of each exercise were provided to the patient at each appointment when new exercises were prescribed. New exercises were reviewed at the subsequent appointment following their initial prescription in order to ensure that they were being done with the proper form.

## **Rehabilitation of a surgically repaired Achilles tendon post complete rupture: A case study**

Following 5 weeks on an active treatment plan, the patient discharged themselves from an active treatment plan and were instructed to maintain their rehabilitation protocols.

### **Discussion**

The achilles tendon is located in the superficial posterior compartment of the leg and is formed by then tendinous continuations of the gastrocnemius and soleus muscles. Unlike other tendons, the achilles tendon does not have a true synovial sheath or lining. It is instead surrounded by a peritendinous material called the paratenon, which is a multiple layered, connective tissue structure that surrounds the Achilles tendon and is able to stretch 2-3cm with movement, allowing for maximal gliding.<sup>2,4</sup> The primary insertion of this common tendon is on the central middle portion of the posterior calcaneus, with fibers that extend around the heel to blend with the plantar fascia. The achilles tendon is almost entirely comprised of type I collagen and from a biomechanical standpoint provides potential energy and a mechanical advantage with rotational contraction (11-90 degrees in a medial direction). However, it has been postulated that decreased vascularity occurs at this area of rotation, known as the 'watershed area', making it the area most prone to rupture. This proposed area of lowest vascularity is approximately 2-6cm proximal to the insertion area.<sup>2,4</sup> Although this zone of decreased vascularity has been disputed by some researchers, it is commonly accepted that the blood flow decreases with increased age, in males and during certain physical activities<sup>2</sup> making it prone to injury, specifically rupturing, as a result.

### **Conclusion**

Rehabilitation is an accepted treatment following surgical repair to a ruptured tendon. In this instance, it was found that progressive rehabilitation exercises focusing on ankle range of motion and increasing strength (both muscular strength and endurance), specifically a graded approach beginning with eccentric muscle contraction followed by concentric muscular contraction and proprioception, were effective in treating this surgically repaired complete achilles tendon rupture. Following a 5 week rehabilitation program, the patient indicated that their affected ankle "felt great", ambulation without limping was noted, self reported strength and ankle range of motion had both increased. The patient actively discharged themselves from an active treatment plan and reported that they have returned to playing non-competitive soccer. Instruction regarding maintenance of the strength and conditioning program was given. Follow up 2 years post injury revealed no further complications and full participation in pre injury recreational soccer.

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## **Rehabilitation of a surgically repaired Achilles tendon post complete rupture: A case study**

### **References**

1 – Willits, K., Amendola, A., Bryant, d., Mohtadi, N., Giffin, R., Fowler, P., Kean, C., & Kirkley, A. (2010). Operative versus nonoperative treatment of acute achilles tendon ruptures. The Journal of Bone and Joint Surgery. Vol. 92, p. 2767-75.

2- Thompson, J., & Baravarian, B. (2011). Acute and chronic Achilles tendon ruptures in athletes. Clin Podiatr Med Surg. Vol. 28, p. 117-35.

3 – Beneka, A., Malliou, P., & Benekas, G. (2003). Water and land based rehabilitation for Achilles tendinopathy in an elite female runner. British Journal of Sports Medicine. Vol. 37, p. 535-37.

4 – Mazzone, M., & Mccue, T. (2002). Common conditions of the achilles tendon. American Family Physician. Vol. 65, No. 9, p. 1805-10.