

**BILATERAL ACHILLES TENDINOPATHY: CASE REPORT**

**By**

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## **Abstract**

**Background and Purpose:** Achilles tendinopathy is a pathology that is very common for runners. While this patient did have tendinopathy symptoms, some of the test results did not add up regarding how the tendon was loaded and his symptom provocation. With this, it was also discovered there were nerve-based symptoms present as well. The purpose of this paper is to highlight the investigation of his symptoms with testing, and the treatment for this atypical Achilles tendinopathy case.

**Case Description:** The patient reported with chronic Achilles pain after running for 2 miles, onset one year prior to the evaluation. Clinically, he presented with bilateral plantarflexor weakness, pain limiting function and participation in running, and neural tension in the tibial nerve pattern. The majority of his treatments consisted of manual therapy, progressive bilateral tendon loading exercises, and nerve glides.

**Outcomes:** Throughout the patient's plan of care, his straight leg raise response had improved on both limbs (and finally became negative on the right halfway through the course of care). The patient demonstrated an increase in strength and tolerance to plyometric activity, and was even able to return back to running by the time his plan of care ended.

**Discussion:** When performing an evaluation and examination, be mindful of how a pathology would typically present itself. If it present atypically, utilize other tests and measures to address the sources of the patient's symptoms and to provide interventions that will address their impairments.

**Key Words:** tendinopathy, achilles, tibial nerve, tendon

## **Introduction**

Achilles tendinopathy is a condition characterized by pain and swelling around the tendon area, often leading to a decrease in tolerance of activity, whether it be ADL's or recreational. This can be present in a variety of populations. On one hand, this can be seen with overweight patients with no increase in activity level<sup>1</sup>. On the other hand, it can also be commonly seen in the athletic population due to overuse, and is seen in those who partake in sports such as running, soccer, racquet sports, and volleyball<sup>2</sup>. Factors that are related to incidences of Achilles tendinopathy include vascularity of the tendon, weakness and flexibility of the gastrocnemius/soleus complex, and structural ankle issues such as pes cavus and lateral ankle instability<sup>3</sup>. Differential diagnoses include calf strain, lumbar radiculopathy, os trigonum, and sural nerve entrapment<sup>4</sup>. One study examining the incidence of Achilles tendinopathy in recreational runners found it could occur at a rate of one in twenty runners. Not much data is present on the incidence of bilateral Achilles tendinopathy<sup>5</sup>. However, one study did find that changes in the tendon structure are present on the asymptomatic side when one is dealing with a tendinopathy, possibly due to compensation<sup>6</sup>. Due to the more unique presentation of this case, the purpose of this case study is to highlight the management of Achilles tendinopathy bilaterally, as well as highlight the importance of the examination process and its findings to formulate a diagnosis and course of treatment.

## **Case Description**

The patient is an 18 year old male who reports to the clinic with a diagnosis of bilateral Achilles Tendinopathy from his doctor, with an onset starting 10 months ago. Patient reported getting new running shoes for high school cross country running and would notice his symptoms and stated they were fairly severe. The patient changed back to his original brand of shoes and noted it felt

better for a period of time. Since then, he said his symptoms would come and go intermittently. He noticed his symptoms would start when running into his 2nd mile and would spike to a 7/10 about 2-3 mins after onset, and would be so severe he would stop at mile 3, when he was able to do 6 miles without issue beforehand. He tried icing and taking a week or two off where his pain would be at a 0/10 before starting up running again. His symptoms would eventually return. Patient said he last ran about 1 week prior to his initial evaluation. His prior medical history is insignificant, and no red flags were detected with screening by the therapist and his physician. His primary complaints include pain in both of his Achilles tendons and up his calves when running, spending a lot of time on his feet, and navigating stairs.

## **Examination**

The patient began the assessment by being in long sitting on a treatment table, with his feet and ankles cleared from the edge of the table. The patient's active range of motion was relatively even on both sides, besides a slightly less amount of dorsiflexion on his left side (but still in normal range). He did report some discomfort going into eversion that went up into his calf. All his ankle based MMT (inversion, eversion, and dorsiflexion) were a 5/5 with no increase in symptoms, and was done in the same position. The patient was then asked to stand, take off their shoes, and perform a single leg heel raise test (using the wall to balance) to fatigue or until symptoms were brought on. He was only able to do 13 on his right side and 10 on his left side, and he stopped due to reporting his symptoms of pain on both sides (7/10). He was able to perform a single leg in place hop test, which he was able to complete 29 seconds on his right side and 38 seconds on his left side. He did report some pain with those also (4/10), but not as much as he did with the single leg heel raises. Due to the fact his hop test performance was significantly better than his single leg heel raise performance, a straight leg raise test with a tibial nerve bias was conducted to see if his tibial nerve could be a source of pain. This was done by having the patient lie on his back, hands by his side. The therapist would then have one hand above the patient's knee to keep his leg straight, and the other holding the patient's foot into ankle dorsiflexion and eversion to stress the tibial nerve. The patient was instructed to inform the therapist when he felt a stretch or his symptoms and where he felt it. Then, the therapist would instruct the patient to lift his head off the table and inform the therapist if his symptoms changed. With this test, he was positive on both sides. The straight leg raise test was done based off of the fact that the patient performed better on a plyometric based test than a concentric based test, which does not fit the continuum of loading for tendons. One study did note that Achilles

tendinopathy may also have a neural origin, that can arise in a multitude of ways. Regardless, neurodynamic tests will still possibly be positive if nerves are affected<sup>7</sup>.

The clinical impression of the patient's presentation did indicate possible Achilles tendinopathy, indicated by pain with single leg hopping and loading of the both his Achilles tendon, but a tibial nerve irritation as well. Because of both of these issues, the patient had a decreased tolerance in recreational activities due to pain. The patient's prognosis was excellent, based on the patient's active lifestyle and his motivation to get back to running.

## **Intervention**

His initial exercise program given to him on day one consisted of sciatic nerve glides in supine with a tibial nerve bias (foot dorsiflexed and everted), and a seated heel raise isometric hold.

Repetitions, sets, and times per day are in the tables listed at the end.

The remainder of his treatment sessions followed the same pattern, with his treatment sessions divided into 3 parts. First, his straight leg raise with a tibial nerve bias response was re-tested each time. From there, different forms of manual therapy would be implemented and his straight leg raise response with tibial nerve bias would be retested. Most commonly, a grade 5 talocrural thrust was performed on both ankles. Then, either soft tissue massage to his medial gastric bilaterally were performed, a grade 5 proximal tibiofibular joint thrust, or, on one occasion, a grade 5 lumbar gap bilaterally, were performed. Details on how each of these were performed are in table 1. The purpose of the manual therapy is to induce hypoalgesic effects and sympathetic activity on the nervous system and in the surrounding area<sup>8</sup>. These areas of manipulation were chosen based on the anatomy of where the tibial nerve branches off and derives from.

After improvement was seen in his straight leg response, the patient was instructed to warm up on an upright exercise bike for 8 minutes. Following this, the patient was guided through strengthening exercises targeting the Achilles tendon. These are highlighted in table 2. Emphasis was placed on both the gastrocnemius and the soleus. The exercises were initially given as isometrics due to a descending inhibition causing mechanical hypoalgesia<sup>9</sup>. The patient was also instructed as far as exercise goes, he should monitor his symptoms and to not exceed a 5/10 on the pain rating scale, and that anything 5 or below is okay. This is based on studies showing pain

levels in that range are safe and won't cause further damage<sup>10</sup>. With each session, as long as his symptoms weren't exacerbated, the patient's exercises were progressed. Progression usually involved an increase in weight, going from sitting to standing calf raises, moving on from isometrics to eccentric, concentric, or plyometric exercises, and going from double leg to single leg. These various methods of progression gradually increased the load placed on the patient's tendons<sup>11</sup>. Gradually, we were able to progress him to a modified running program as his symptom severity decreased. By this time, the patient was no longer going to be seen, as he was leaving for college. The patient was educated on slowly building his running volume based on his symptom irritability, to continue working on plyometrics (double and single leg) and to continue with single leg strengthening of his calves.



## **Outcomes**

After his initial evaluation and during his first treatment session, the patient did note some irritation in both Achilles tendons, which was at a 5/10 at its worst. He did mention he had walked a lot one of those days, which coincided with when his symptoms were the most irritable. With that, the patient was educated that his symptom irritability should not rise above that, and to monitor (and possibly limit) activity levels when he can. Each session from hereon out consisted of those two items for his subjective. His straight leg raise response was assessed, and demonstrated improvement each time and, at one point, was completely negative on his right leg. As the sessions progressed, the patient also reported much less symptomatic pain in his Achilles' tendons, especially with increased activity (walking, hiking, being on his feet, etc) and loading, noting that the pain was a 4/10 at its worst with a large increase in activity. The second to last visit, he was able to trial running and hopping for the first time, which did not aggravate his symptoms.

Compared to his initial evaluation, the patient's single leg heel raise test had improved a great deal, going from 13 to 25 on his right side and 10 to 19 on his left side. The patient was also able to tolerate single leg hops for 30 seconds on each side without any pain or discomfort. There were no adverse events or setbacks during his course of treatment.

## **Discussion**

The patient's course of treatment had definitely went well, especially given the fact that his symptoms had two sources. For the patient's neural tension symptoms, they displayed a steady improvement over time, as indicated by his improved straight leg raise response. This can be attributed to the neural gliding exercises given, inducing descending cortical inhibition and producing hypoalgesic effects<sup>12</sup>. One case study followed a collegiate athlete that had positive neurodynamic tests in the lower extremity was also treated this way. The patient in said study saw improvements across all outcome measures with the addition of nerve mobilization<sup>13</sup>. The patient's nerve related pain would have gone under the radar had an idea of how Achilles tendinopathy presents and what type of loads stress tendons the most. From the testing done, a single leg hop would have loaded the Achilles tendon nearly twice as much as a single leg heel raise and, thus, would have provoked more of his pain<sup>10</sup>.

The strengths in our approach derive from the management of tendinopathy and neural tension symptoms individually. There is a fair amount of research on both of these topics, which helped with intervention selection<sup>8-11</sup>. The primary weakness in this approach is that there is a scarce amount of literature on bilateral Achilles tendinopathy itself. Differential diagnosis for this condition may look different than if it was presented unilaterally. Also, the literature regarding the differential diagnosis of Achilles tendinopathy often involved the sural nerve rather than the tibial nerve.

While the diagnosis of bilateral Achilles tendinopathy was correct, the patient's presentation did not fully fit the symptom pattern typical of the condition. Having knowledge of these presentations is key, as well as deducing other sources of nociception and deciding which tests

would be most appropriate to follow up with. In the future, investigation into what can cause bilateral Achilles tendinopathy, differential diagnosis, and studies examining the efficacy of different treatment methods for this kind of presentation, would be beneficial in gaining a better understanding of this pathology.

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## Tables and Figures

**Table 1: Manual therapy techniques**

<b>Technique</b>	<b>Explanation</b>
Grade 5 talocrural (TC) joint thrust	Patient lying on his back, feet hanging off the edge of the table slightly. The therapist would grasp the patient's foot hand over hand, and would provide a distraction with slight dorsiflexion. With the patient's permission, the therapist would quickly thrust in to distraction after taking out all tissue slack.
Grade 5 proximal tibiofibular joint thrust	Patient lying on his back, knees bent to about 45 degrees. Therapist places one hand on medial part of tibia, and the other hand over the proximal tibiofibular joint. The therapists grasps the joint to where all soft tissue slack is taken out. From there, the patient delivers a quick thrust by pulling anteriorly after getting patient permission.
Soft tissue massage to the medial gastrocnemius	Patient lying on their stomach, the therapist would apply a massage cream to the patient's medial gastrocnemius area. While wearing gloves, the therapist would perform an eflourage stroking motion up on the patient's medial gastrocnemius area.
Grade 5 lumbar gap	Patient lying on their side, the therapist would measure 2 fists width from the edge of the table to the patient's torso. The therapist would then have the patient grab the therapist's elbow and the therapist would pull to where the patient was now lying on their scapula, slightly rotating their trunk. The patient would have the patient straighten their bottom leg and keep the top leg bent. The therapist would thread his elbow through the patient elbow to further rotate the top portion of the trunk back. The therapist would then place his forearm over the patient's lateral hip and rotate the patient's lower body toward the therapist. From there, once the soft tissue slack was taken out, the patient would deliver a grade 5 thrust with the patient's consent.

**Table 2: Interventions based on session**

Treatment Session #	Manual Therapy	Exercise
1	<ul style="list-style-type: none"> <li>• Bilateral TC thrust grade 5</li> <li>• Bilateral STM popliteal area and medial gastrocnemius</li> </ul>	<ul style="list-style-type: none"> <li>• Upright bike 10 minutes</li> <li>• Seated heel raise isometrics 4x45 seconds, 1 minute break in between sets</li> <li>• Sciatic nerve glides 3x15</li> <li>• Double leg heel raise isometric 4x45 seconds, 1 minute rest between sets</li> <li>• Squat to an arm raise 3x10</li> </ul>
2	<ul style="list-style-type: none"> <li>• Bilateral TC thrust grade 5</li> <li>• Bilateral proximal tibiofibular thrust grade 5</li> </ul>	<ul style="list-style-type: none"> <li>• Upright bike 10 minutes</li> <li>• Tempo step up to box on toes (60 bpm) 3x30</li> <li>• 2s up/3s down heel raise 3x12</li> <li>• Squat to arm raise 3x10</li> </ul>
3	<ul style="list-style-type: none"> <li>• Bilateral TC thrust grade 5</li> <li>• Bilateral proximal tibiofibular thrust grade 5</li> </ul>	<ul style="list-style-type: none"> <li>• Upright bike 10 minutes</li> <li>• Tempo step up to box on toes (60 bpm) 3x30</li> <li>• 2s up/3s down heel raise 3x12</li> <li>• Squat to arm raise 3x10</li> <li>• 3 rounds of toe walks (15 yds/lap) and deadlift 25# x12</li> </ul>
4	<ul style="list-style-type: none"> <li>• Bilateral TC thrust grade 5</li> <li>• Bilateral proximal tibiofibular thrust grade 5</li> </ul>	<ul style="list-style-type: none"> <li>• Upright bike 10 minutes</li> <li>• Toe walks (knees straight and bent) 4 laps</li> <li>• Split stance eccentric heel raise 3x12 each leg</li> <li>• Tempo step up to box on toes (60 bpm) 3x30</li> </ul>
5	<ul style="list-style-type: none"> <li>• Bilateral TC thrust grade 5</li> <li>• Bilateral proximal tibiofibular thrust grade 5</li> </ul>	<ul style="list-style-type: none"> <li>• Upright bike 10 minutes</li> <li>• Single leg heel raises 3x12 bilaterally</li> <li>• Lunge to SL heel raise 3 laps (1 lap = 10 yards down and back)</li> <li>• Squat hold with soleus heel raise (25# weight) 4x12</li> <li>• Tempo step up on box on toes (100 bpm) 3x30</li> </ul>

6	<ul style="list-style-type: none"> <li>• Bilateral TC thrust grade 5</li> <li>• Bilateral proximal tibiofibular thrust grade 5</li> <li>• Lumbar gap grade 5 bilaterally</li> </ul>	<ul style="list-style-type: none"> <li>• Upright bike 10 minutes</li> <li>• Single leg heel raises 3x15</li> <li>• Squat hold with soleus heel raise (25# weight) 3x12</li> <li>• Hops 4x20 seconds</li> <li>• Skater hops 4x20 seconds</li> </ul>
7	<ul style="list-style-type: none"> <li>• Bilateral TC thrust grade 5</li> <li>• Bilateral proximal tibiofibular thrust grade 5</li> </ul>	<ul style="list-style-type: none"> <li>• Jog 2 minutes, walk 1 minute, 4 rounds</li> <li>• Skater hops 3x30 seconds</li> <li>• Forward and backward bounds 3 laps (1 lap = 12 yards)</li> <li>• Single leg heel raises 3x15 bilaterally</li> <li>• Squat hold to heel raise (25# weight) 3x10</li> </ul>