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## Outpatient Physical Therapy Management of a Patient with Left Medial Plantar Myofascial Pain

Kayana Trottier

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Outpatient Physical Therapy Management of a Patient  
with Left Medial Plantar Myofascial Pain

by

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University of North Dakota, 2020

A Scholarly Project Submitted to the Graduate Faculty of the

Department of Physical Therapy

School of Medicine

University of North Dakota

in partial fulfillment of the requirements for the degree of

Doctor of Physical Therapy

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This Scholarly Project, submitted by Kayana Trottier in partial fulfillment of the requirements for the Degree of Doctor of Physical Therapy from the University of North Dakota, has been read by the Advisor and Chairperson of Physical Therapy under whom the work has been done and is hereby approved.



\_\_\_\_\_  
(Graduate School Advisor)



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Date 10/10/2020

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## ABSTRACT

**Background and Purpose:** This article describes a 6-week outpatient physical therapy management of a 62 year old female who had a posterior tibial tendon Repair with flexor digitorum longus transfer surgery in 2013 on the left foot following foot pain that worsened over the years. The patient presented with decreased left ankle range of motion, strength, activity tolerance, endurance, marked swelling and sharp pain on the medial and plantar surface of left foot. The purpose of this article is to describe the interventions used for this patient and the results from the physical therapy interventions provided. **Description.** The treatment of this patient involved range of motion, stretching, joint mobilization, manual therapy, strengthening, neuromuscular re-education, soft tissue massage, pain management treatment progression. **Outcomes.** Following ongoing PT intervention, the patient achieved normal limits of ROM of the left ankle, normal strength, eliminated pain and swelling, decreased scar tissue adhesions, increased activity tolerance and endurance. **Discussion.** The rationale for the client's treatment is based on evidence-based practice and clinical protocols following the diagnosis of left medial plantar myofascial pain and subsequent posterior tibial tendon repair. Treatment was adjusted to the patient's signs and symptoms (ROM, strength limitation, pain, swelling, activity tolerance etc.) Outcomes were evaluated using standard clinical assessments.

## CHAPTER I

### BACKGROUND AND PURPOSE

Myofascial pain can be described as a chronic aching, diffuse pain in the muscles and joints. It is commonly associated with trigger points that may be described as latent or active. There is no known etiology for myofascial pain, but according to Chowdhury, N. & Goldstein, L. it is hypothesized that free nerve endings (nociceptors) associated with the area of pain have a sensitized low-threshold with defective motor end plates. The prevalence of myofascial pain disorder is reported to range from 21% of orthopedic clinic visits to 93% of pain

clinic visits.<sup>1</sup> If myofascial pain persists it may be known as myofascial pain syndrome (MPS). The pain and dysfunction from MPS may derive from a variety of factors (see Table 1) . The difference between myofascial pain and

**Table 1. Etiology of Myofascial Pain Syndrome <sup>2</sup>**

Etiology
Direct(surgery, falls, accidents) or indirect(not affected by external factors)
Trauma
Spine Pathology
Repetitive strain
Postural dysfunction
Physical deconditioning

MPS is that MPS is characterized by myofascial trigger points (MTrPs) in the skeletal muscle.<sup>2</sup> With myofascial pain there may not be MTrPs present or causing the source of pain.

Latent MTrPs have been found to be common in the feet of individuals with a lower medial longitudinal arch (MLA) and the flexor digitorum longus as the FDL supports the arch of the foot.<sup>3</sup> The MLA is supported by tendons, ligaments and

bone structures. The function of the MLA is to transmit ground force reactions and act as a shock absorber in standing and gait. The FDL flexes toes 2- 5, inverts, plantarflexes and supports the MLA. It can be hypothesized that trauma to the FDL may cause dysfunction to the MLA.

Although there is no known etiology of medial plantar myofascial pain, it is commonly developed as a secondary impairment. Some primary impairments that may preclude medial plantar pain are posterior tibial tendon dysfunction (PPTD), flat foot, and post-surgical procedures. These impairments are often related to individuals who are required to stand and walk for long periods or experience traumatic injuries to the foot. Middle aged women from 35-55 years old also commonly experience myofascial pain. Posterior tibial tendon dysfunction however is one of the most common causes of acquired flat foot in female adults. If the dysfunction is identified early, conservative care has shown to increase quality of life and decrease pain. Interventions commonly utilized for the dysfunction of myofascial pain are short foot exercise and manual therapy.<sup>4,5</sup> The Manual therapy techniques and exercises decrease pain and improve function but eventually patients will require surgery as the tendon continues to experience degenerate changes.

Research regarding the outcomes of patients after posterior tibial tendon transfer surgery of the FDL is controversial. Across research articles reviewed it was found that younger patients had a higher quality of life and success rate. J. T. Wacker et al. researched the effects of surgical intervention and found a calcaneal osteotomy and FDL transfer produced higher quality of life and decreased pain. In

a follow up study of this surgery, the authors found a majority of the patients had a successful surgery with an improvement of symptoms and pain post-surgery. The surgery was deemed successful if the patient's quality of life was improved as well as the function of the FDL.<sup>7</sup> At the Virginia Commonwealth University researchers found that FDL transfer increases weight on the medial arch that supports the foot and heel. The increased weight on the medial arch, contributes to an acquired flat foot. Taking all of that into consideration, conservative treatment is favored with PTTD and is shown to decrease symptoms and delay the time to surgical treatment. Conservative care allows individuals to complete their activities of daily living, plan for recovery and prevent atrophy after surgery. Conservative treatment may involve the use of orthotics, strengthening, stretching of the posterior leg muscles, invertors, evertors of the foot, and continued reexaminations.<sup>9</sup> Additional comprehensive research studies and case studies are needed to evaluate the outcomes of FDL transfer and post-surgical physical therapy interventions to aide in successful recovery.

Since there is little research regarding the prognosis of patients with myofascial pain, there are similar disorders such as plantar fasciitis (PF) that will be described in this case study to relate to myofascial pain. PF has similar affected structures such as the plantar fascia, foot intrinsics, Achilles tendon, and posterior tibia. The prognosis for PF is not related to age, BMI, or fascial thickness and symptoms continue to occur in 50% of patients after 5 years. The long term prognosis of symptomatic patients showed a risk of having PF at 50% after 5 years.<sup>10</sup> Subjects in this study had a diagnosis of PF, they were separated into

groups of symptomatic and asymptomatic. Regardless of symptoms or heel spurs fascia thickness decreased over time, only 24% of asymptomatic patients over time had an appearance of normal plantar fascia.<sup>10</sup>

The emphasis of this case study will be to describe clinically based interventions for myofascial pain at the foot and ankle post-surgical transfer of the FDL tendon. The interventions that impacted the outcome of the patient were strengthening of the tibialis posterior, and foot intrinsics, stretching of the leg, foot, ankle complexes, and manual therapy. The purpose of this case study is to discuss posterior tibial tendon dysfunction in relation to the procedure performed. The current literature discussing a poor recovery from a flexor digitorum longus (FDL) transfer is not at this time very well researched. Outcomes of this surgery suggest that most patients are satisfied and are able to return to their prior level of activities with little or no impairments. In the case of the patient I am presenting in this article, the above statement is reversed.

## **CHAPTER II**

### **CASE DESCRIPTION**

The patient is a 62 year old female, suffering from left foot pain since her FDL transfer surgery in 2013. The pain has increased over the past several months with no indication of recent trauma to the left foot since her surgery. It should be noted that the patient did not receive physical therapy after her surgery. As a retired nurse she was quite active in her community and with friends and family. Some of her activities included attending a cardio class with friends, playing with her grandchildren and volunteering for her church. She takes up residence in a one level condo, where she lives alone. There are no reports of stairs into the home. According to the patient, she has not had any issues with stairs but has not attempted to climb any stairs since her pain has increased in recent months.

Her husband died recently and the patient states that has taken an emotional toll on her worsening health condition. She reports having a good support system which includes her children, friends, and pastor. Currently she cannot walk more than 10 minutes and requires rest for 15 minutes before resuming activities. She does not use any assistive devices but finds herself hanging onto objects near her when her pain increases while walking or standing. When grocery shopping, she needs a cart to hang onto or a motorized

scooter to relieve her symptoms. Her goal is to decrease her pain so she can resume her exercise class and activities in her home and community.

She was not previously seen for this condition and reports taking over the counter pain relief medications. A randomized controlled study relating to plantar fasciitis (PF) taking non-steroidal anti-inflammatory medication (NSAID) found that NSAIDs may reduce disability and increase pain relief with conservative treatment.<sup>11</sup> As mentioned in the introduction, early PF exhibits similar signs and symptoms of patients with myofascial pain. It can be hypothesized that the NSAIDs she used may have prolonged her impairment allowing her to complete activities of daily living. According to the patient's recent visit at the hospital she is overweight for her age (62 yr.) and height of 5'3". See the patient's past medical history in Table 2.

Table 2. Past Medical History
<ul style="list-style-type: none"><li>• Type 2 diabetes mellitus without complication</li><li>• Posterior Tibial Tendon Repair with a left Flexor Digitorum Longus Transfer</li><li>• Resolved right breast cancer</li><li>• Osteopenia</li><li>• Anemia</li><li>• Hypertension</li><li>• Hypertriglyceridemia</li><li>• Insomnia</li><li>• Kidney stone.</li></ul>

The surgical intervention the patient underwent is a vital piece to understand in order to comprehend her current impairment. The flexor digitorum longus transfer is performed by locating the FDL tendon and cutting it to be transferred to

the insertion of the tibialis posterior. This can be completed two ways: suturing the FDL tendon to the posterior tibialis tendon or screwing onto the navicular. The surgery is commonly completed in combination with other procedures such as, lateral column lengthening, medial calcaneal osteotomy, and gastrocnemius recession.<sup>12</sup>

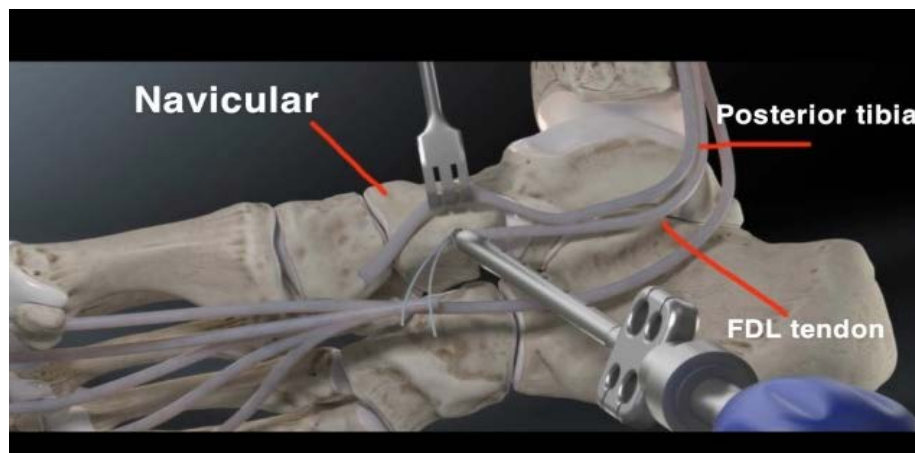


Figure 1. Surgical Suture of the FDL tendon to the navicular bone. (Adapted from youtube flexor digitorum transfer)

Patients receiving this surgery are in a protective boot for 6 weeks or more to allow the tendon and other tissues involved to heal. From 0 to 6 weeks the patient is generally advised to be non-weight bearing on the involved foot. After 6 weeks post-surgery, the patient may begin weight bearing exercises with physical therapy. It is important to note that some patients do require a foot and ankle orthotic post-surgery.<sup>14</sup>

The patient was referred by her primary care provider and accepted under the physical therapist care after reviewing the referral note, and history. While reviewing the referral note it was under assumption the patient had plantar fasciitis, which would explain some of the tests performed during the examination and



evaluation. The following section will explain the examination and evaluation of the musculoskeletal system related to the patient's impairment. The examination included range of motion (ROM), special tests, strength, mobility of the ankle/ foot complex. The test outcomes corresponding to her signs and symptoms will aid in developing practical interventions.

### **Examination**

Upon observation of the patient, she had a forward head and rounded shoulders. She ambulated with an antalgic gait and toed out on the left extremity. After taking her history and questioning of the home environment she was asked to give a numerical rating of her pain from 1-10 while active and at rest. Her pain at rest was 0/10 and 7/10 while active. Her pain is described as sharp, nagging, and intense. There were no reports of numbness or tingling experienced. Prior to the exam she completed the Lower Extremity Functional Scale (LEFS). She received a score 56/68 (questions 16-18 excluded per patient request). A systemic review of "Measurement Properties of the Lower Extremity Functional Scale" reported the LEFS to be reliable, valid, and responsive to the LEFS score. Although this functional scale is supported by research to be reliable and valid, there could have been better functional scales used for this patient. The Foot and Ankle Ability Measure is a functional scale that is more fitting her for health condition of a foot and ankle impairment.<sup>24</sup>

The following tests were performed on the examination table. it was noted that she had an orthotic and marked edema of the left foot and ankle complex. She stated the swelling was constant and started to appear a couple months prior. The

edema was further addressed by assessing the skin and measuring the edema and comparing to the other ankle. The skin did not appear to have any changes in comparison to the right ankle. The left ankle had +1 pitting edema. The scar tissue was reddish purple and raised while moderate to maximal pressure was applied on and around scar tissue from the FDL transfer did not produce any discomfort.

Initial patient ankle ROM was measured with a goniometer (see Table 3). Her toe ROM was within functional limits. Initial patient ankle strength was assessed following manual muscle testing guide (see Table 4). Her toe strength was within normal limits, but the left toes 2-5 lack the ability to grip a towel in comparison to the right toes. A potential complication from her FDL transfer could be weakness in flexion of the toes 2-5. One of the main actions of FDL is flexion of toes 2-5. It is without saying a complication she acquired post-surgery, in which now the intrinsic muscles of the foot are responsible for flexion of the toes. This complication is rare and has not been found clinically significant.<sup>14</sup> While the patient completed the towel grabs, she experienced intense cramps in her left foot. Further evaluation of foot intrinsic strength was discontinued after the cramping, but she was able to complete 8 repetitions. See appendix for description of within normal limits.

Table 3. Initial Goniometric Ankle Range of Motion		
	<b>Right Ankle AROM (degrees)</b>	<b>Left Ankle AROM (degrees)</b>
Plantarflexion	45	40
Dorsiflexion	20	16
Eversion	WNL	WNL
Inversion	WNL	WNL

Table 4. Initial Ankle Strength		
	<b>Right Ankle Strength</b>	<b>Left Ankle Strength</b>
Plantarflexion	4+/5	4/5
Dorsiflexion	5/5	5/5
Eversion	4+/5	4-/5
Inversion	4+/5	4-/5

The remaining exam included special tests to provoke signs and symptoms of medial plantar myofascial pain. The tests used were the Windlass, fibular instability, and the squeeze test. All of the tests above were negative bilaterally. The special tests were utilized to assess signs of fractures, syndesmosis injury, instability, and plantar fasciitis. The tests completed do not officially rule out any of the above disorders but do identify if additional testing may be required or a referral to another health care provider. According to De Garceau D, et al. the windlass test has lower sensitivity when performed in a non-weightbearing position compared to the weightbearing position.<sup>15</sup> During the exam of the patient she was put in a non- weightbearing position to complete the windlass. With taking all into consideration this could have skewed the results of the windlass since it was not performed in a weight bearing position. Fibular instability is often recognized by the fibular tendon subluxing behind the lateral malleoli during resisted plantarflexion and dorsiflexion.<sup>26</sup> This was performed on the patient in supine. The squeeze test of the leg was performed while the patient was lying on her back. Pressure was applied to the tibia and fibula from the middle portion of the leg to the ankle. This test shows a moderate reliability ( $\kappa = 0.50$ ).<sup>25</sup> The last test completed was myotomes to rule out any neural involvement due to the patients

past medical history. The myotomes that were tested (L4, S1, S2) were found intact bilaterally.

The initial examination data aligned with her signs and symptoms of medial plantar foot pain. This can be seen in the International Classification of Functioning (ICF) disablement model. (See Appendix ) The model is used to conceptualize how her impairments relate to her health condition, environmental and personal factors. The subsequent paragraphs will evaluate the data found in the examination, which will aid in determining the diagnosis and prognosis of the patient.

### Evaluation, Diagnosis, and Prognosis

The initial evaluation was based on Magee's Orthopedic evaluation of the ankle, and foot complex.<sup>16</sup> The data gathered from the examination showed she had decreased left ankle ROM, strength, activity tolerance, endurance, impaired tissue mobility, marked swelling and sharp pain on the medial plantar surface of the left foot. These are all listed on the patient's problem list (see Table 5), as well as environment or personal factors contributing to her health condition. Initial evaluation data indicated her signs and symptoms align with the physical therapy diagnosis of medial plantar myofascial pain.

Table 5. Problem List developed after the physical examination

<b>Problems</b>
<ul style="list-style-type: none"><li>• Pain</li><li>• Edema</li><li>• Combating mental health disorders</li><li>• Limited social activity</li><li>• Decreased lower extremity strength</li><li>• Decreased ROM</li><li>• Decreased endurance</li><li>• Decreased mobility</li><li>• Decreased tissue mobility of scar</li><li>• Decreased activity tolerance</li></ul>

During the first encounter with the patient, the physical therapist began to develop a rapport with the patient. This began by the patient confiding in the physical therapist and explaining in detail personal and environmental factors contributing to her health condition. Some of these factors are described in the case description and the ICF model. (see Appendix) Although these factors contributed to her health condition, she was highly motivated to begin her rehabilitation journey. With encouragement and patient education of her health condition from the physical therapist, she was engaged in the following interventions and trusted the plan of care developed. The rapport developed with the patient, her motivation, support, and her involvement of the plan of care all contributed to her prognosis and outcome.

The low level of complexity of the patient and the data gathered from her initial examination and evaluation indicated she had a good prognosis. The goals for her were focused on the activities she had difficulty completing and what she would like to achieve from therapy. The patient goals were: 1 Perform daily activities with 4/10 pain to increase comfort and go to exercise classes with friends, to be met in 3 weeks. 2. Demonstrate 2/10 pain with walking more than 10 minutes to be able to play with grandchildren, to be met in 6 weeks. The goals were measurable using the pain scale and achievable within the time framed stated above. These goals are realistic and reflect what she does every day. The next section will describe the interventions performed with this patient with regard to any changes that were made in the plan of care to optimize her functional outcomes.

## **CHAPTER III**

### **INTERVENTION**

The interventions for this patient were developed to address deficits identified during the examination and reported signs and symptoms. The majority of her exercises were researched on patients that have chronic myofascial plantar pain. As it was difficult to specifically identify articles that related directly to the patients' health condition since there was little research of unsuccessful post-operative FDL transfers. The patient had a total of 12 sessions from her insurance for physical therapy.

The patient was seen twice a week for a month. The last two visits were spread out across two weeks. Each session was approximately 30 - 45 minutes long. Each session began with warming up the patient on the treadmill or Nu-step for 8 minutes with resistance and speed of 3.5 miles per hour and steps per minute. The treadmill was utilized as a form of increasing endurance and desensitization to pain experienced in the left foot. During first and second week the interventions involved desensitization, manual therapy, strengthening, and stretching. Desensitization involved patient education of why she is experiencing pain and manual therapy. The manual therapy consisted of soft tissue massage utilizing the Graston technique to the left foot planter surface, Achilles and calf regions. The stretching consisted of passive stretching in all four ankle motions

for 15-30 seconds. (plantarflexion, dorsiflexion, eversion, inversion). Then the patient performed a standing Achilles stretch off a half foam roller for 20- 30 seconds. It has been found that isolated gastroc tightness is associated with foot and ankle pathologies in middle aged women. Such pathologies would include plantar fasciitis, flat feet and tendinopathy.<sup>17</sup> Biomechanically this article is consistent with the patients' health condition. Strengthening exercises emphasized throughout her plan of care are in Table 6.

Strength Exercise	Reps/Sets
1. Bilateral Heel Raises	12 x 3
2. Short foot exercises with green TheraBand	12 x 3
3. 4 way ankle strengthening (PF, DF, INV, EVR) with orange/ blue TheraBand's	10 x 3
4. Toes fans	12 x 3

Short foot exercises included towel grabs, towel holds, and domes. See Appendix for an additional description of short foot exercises. The short foot exercises were intended to strengthen the intrinsic foot muscles. As stated above the patient had weak toe flexors due to her FDL transfer and other factors such as being flat footed. Intrinsic foot strengthening is shown to support the medial longitudinal arch , decrease pain and disability with individuals with flat feet.<sup>18</sup> In the examination the patient did experience a cramp in her left foot because of the short foot exercises but insisted that she would try them at home. It was advised that if cramps began again to discontinue the exercise. The patient reported after completing short foot exercises she did not experience cramps unless she held

the muscle contraction for more than 15 seconds. Home exercise program over the course of treatment can be seen in Table 7.

Table 7. Home exercise program	
Exercises	Reps/Sets/ times a week completed
1. Standing Achilles stretch bilateral	1. 20-30 sec holds/3 sets/ 5 x week
2. Heel raises bilateral	2. 15 reps/ 3 sets/ 5 x week
3. Soleus stretch in runners form bilateral	3. 20-30 sec holds/3 sets/ 5 x week
4. 4 way ankle exercises with orange/ blue TheraBands	4. 14 reps/ 3 sets/ 5 x week
5. Towel curls/ towel holds	5. 10-15 sec holds & 12 reps/3 sets/ 5 x week
6. Supine 90/90 hamstring stretch	6. 20-30 sec holds/3 sets/ 5 x week
7. Seated hamstring stretch	7. 20-30 sec holds/3 sets/ 5 x week
8. Great toe stretch	8. 20-30 sec holds/3 sets/ 5 x week
9. Tennis ball rolling on plantar side of Left foot	9. Roll 30 sec- 2 min/3 sets/ 4 x week or as needed
10. Foot domes	10. 14 reps/ 3 sets/ 5 x week
11. Toe fans	11. 12 reps/ 3 sets/ 5 x week

Since she was progressing well with her exercises they were not changed and only progressed by increasing repetitions, adding stronger TheraBand's, and adding isometric holds. After each session from week one she reported decreasing pain. During the second and third week she was able to ambulate around home without pain and ambulate in the community for more than 30 minutes with minimal pain. After the third week she reported no pain and she was able to walk the shopping visit with no pain for 1.5 hours and has noticed decreased swelling. At this time, she has met all of her short term goals.

During the fourth week the patient reported 3/10 pain in the leg and posterior thigh. The patient related the increased pain to climbing numerous stairs the day before. She further reported because of pain she did not do home exercise program for the next three days. She was tested for hamstring tightness



with the tripod test and supine 90/90 hamstring test; both tests were positive bilaterally.

Interventions for week four included seated hamstring stretching with dorsiflexion to increase stretch and supine 90/90 hamstring stretch with dorsiflexion. Standing Achilles stretch, strength exercises (1,2,4 in Table 6) and manual therapy were continued into week four. At the end of week four she described having less hamstring tightness and no cramps since the initial incident and no pain. The second session in week four hamstring tightness was reassessed and demonstrated decreased tightness.

The last three sessions the interventions were focused on advanced strengthening, stretching, and manual therapy that could be replicated at home for a long-term home exercise program (See Table 8) . She was provided new TheraBand's ranging from green to purple and a new HEP sheet that explained each exercise. The items used in the exercises the patient has access to at home. These sessions were geared to prepare for discharge since she met both short and long term goals at the end of week six.

<b>Exercises</b>	<b>Reps/Sets/ times a week completed</b>
1. Standing Achilles stretch bilateral	1. 20-30 sec holds/3 sets/ 5 x week
2. Standing Heel raises bilateral on step	2. 18 reps/ 3 sets/ 5 x week
3. Towel curls with 1 lb. weight on towel	3. 12 reps/ 3 sets/ 5 x week
4. Towel holds	4. 20-30 sec holds/3 sets/ 5 x week
5. Seated hamstring stretch	5. 30 sec to1 min holds & 12 reps/3 sets/ 5 x week
6. Lacrosse ball rolling on plantar side of Left foot	6. Roll 30 sec- 2 min/3 sets/ 4 x week or as needed
7. Foot domes with orange/blue TheraBand	7. 14 reps/ 3 sets/ 5 x week

## CHAPTER IV

### OUTCOMES

The outcomes of this patient were positive from the initial evaluation of a low complexity. Meaning she clinically presented as stable, and with the results from her functional outcome scale she had good prognosis. Subjective and objective measurements were taken at discharge to determine the efficacy of physical therapy. Subjective measures were based off the patient's verbal report during each visit. The lower extremity functional scale used in the evaluation was not given at discharge due to miscommunication. Objective measures included range of motion (ROM) and strength testing. ROM was measured with a goniometer in same position as the initial evaluation and examination. Strength was assessed in the same position as the initial evaluation and examination as well. The special tests used in the evaluation and examination were not reassessed as they were not clinically relevant to the patients' health condition. Objective measures can be seen in tables 9 and 10. See appendix for description of within normal limits.

Table 9. At Discharge Ankle Range of Motion (in degrees)		
	<b>Right Ankle AROM (degrees)</b>	<b>Left Ankle AROM (degrees)</b>
Plantarflexion	WNL	45
Dorsiflexion	WNL	20
Eversion	WNL	WNL
Inversion	WNL	WNL

Table 10. At Discharge Ankle Strength		
	Right Ankle Strength	Left Ankle Strength
Plantarflexion	4+/5	4+/5
Dorsiflexion	5/5	5/5
Eversion	4+/5	4+/5
Inversion	5/5	5/5

The patient has improved her range of motion and strength within normal limits and no pain nor swelling was observed in the left ankle and foot. Meaning she had sufficient ROM and strength to function in her activities of daily living. The patients subjective report of pain improved every visit. At discharge, her pain was 0 of 10, no pain. With each week she reported she was able to walk farther with a decrease in pain or cramps. By the end of week four the patient was able return to community activities with her church, friends, and family.

She tolerated all interventions well and had positive effects from therapy. The patient did experience some cramps from the short foot exercises and the exercise was altered to decrease the time of the towel holds. It was apparent that the longer she held an intrinsic foot muscle contraction she would experience a cramp. In therapy sessions, she was able to decrease her cramps with the towel holds with sensitization, in which she was able to tolerate longer towel holds.

All of the patients' goals were met by discharge which included reduced pain with daily activities and walking at least 10 minutes without pain. It was important to focus therapy on decreasing pain while walking so she could get back to her daily activities. With decreasing pain in therapy, she was able to strengthen her left foot and increase her activity tolerance as well as endurance.

The patient stated that only fear limits her now from walking further distances, but physical therapy has shown that she can walk the distance she did prior to her pain. The patient was satisfied with the therapy provided and was given the physical therapist clinic number for questions or to come back and visit.

## **CHAPTER V**

### **DISCUSSION**

During the patient's outpatient therapy experience, she increased strength, range of motion, functional mobility, and tissue mobility. The greatest achievement was in range of motion and activity endurance. These achievements were seen due to interventions focused on those areas and patients' interest. The factors that contributed to the patient's success in therapy included her motivation, external support, rapport with therapist, patient education, and interventions tailored to her health condition and lifestyle. Since she was a retired nurse, she was able to understand medical terms and physiology processes of the body. It should be noted when the patient had a minor setback it was unrelated to her original health condition. It could be hypothesized that hamstring tightness she experienced was due to her sedentary lifestyle before she began therapy. During therapy she became more active which included at least 100 minutes of aerobic exercise per week outside of therapy. The patient did not have many limiting factors to her therapy besides experiencing self-doubt and fear from previous injuries. When this became apparent, the physical therapist provided emotional support and listened to her concerns.

The therapy provided could have increased if the evaluation and examination included skills to detect myofascial pain. Criteria to detect myofascial pain can include, but is not limited to, taut palpable band of tissue, spot of tenderness in taunt band, patient recognition of pain while pressure is applied, and full stretch accompanied by pain.<sup>21</sup> Although there are no special tests to detect myofascial pain, palpation is seen as a gold standard to identify myofascial pain.<sup>19,20</sup> This can be seen as a problem if a clinician is not experienced in identifying myofascial pain, taut band of tissue or nodule. With intramuscular needle electromyography it is shown that spontaneous electrical activity is present in myofascial trigger points, making that characteristic of myofascial pain. Spontaneous electrical activity also known as continues low action potentials is a dysfunction of the alpha motor end plate potential. This dysfunction may arise with a spontaneous release of acetylcholine. In other words when a muscle is constantly stimulated and abnormally loaded it may develop myofascial trigger points that contribute to local or referred pain.<sup>27</sup> The clinical examination of patients with a foot pathology should look at footwear and mechanics of the foot. The presence of foot over pronation, flat feet, obesity, and a tight Achilles tendon, decreased dorsiflexion has shown to increase pain in the plantar and heel aspect of the foot.<sup>22</sup>

These are all factors that increase the ability to detect myofascial pain and help properly treat the patients' health condition. More research is needed to identify myofascial pain such as cluster tests, symptoms and history. Specifically, for patients that have myofascial pain in the plantar aponeurosis after trauma.

Most recent articles with pain in the plantar aponeurosis consist of a diagnosis of plantar fasciitis versus a possible different diagnosis with similar clinical presentation. The hope of this case study is to bring awareness of the under researched work of patients with myofascial pain after surgery and how to detect this health condition.

There were sections of this case study, that if repeated again, would be completed differently. Such as assessing gait, to determine if there were any deviations in the gait and when her pain occurred during gait. Completing her functional scale at discharge to compare to her initial scores. The foot and ankle ability measure has been determined to be more effective than the lower extremity functional scale. In a study of with 243 subjects, Martin, R. L. et al compared the validity of the FAAM to subjects that were supposed to change and stable subjects. The FAAM was found to be reliable, valid and responsive measure for individuals involved in physical therapy with a broad range of musculoskeletal disorders specific to the leg, ankle, and foot.<sup>24</sup> The FAAM test is more appropriate as it relates to more leg, ankle and foot musculoskeletal pathologies. There also should have been continued edema measurements at the ankle and foot complex. Including more plantarflexion and eversion strengthening, since those are the areas, she showed less strength in. Adding interventions such as walking from a self-paced to fast paced to better determine endurance and activity tolerance. To increase her patient centered care, there should have been more research into her past medical history before evaluation.

The patient was satisfied with the therapy provided at discharge and felt more comfortable returning to prior activities and more. Although the therapy provided was effective more research is needed for myofascial pain after surgery. More importantly to research measures to appropriately identify myofascial pain. This will allow clinicians to provide therapy that will enhance the outcome of their patient.



## APPENDIX

**Short Foot Exercises:**

**Towel Grabs:** Grab towel with toes, the towel is placed under the foot. This is completed by flexing the toes to grab the towel.

**Towel Holds:** Grab towel with toes and raise foot in the air and hold towel. Slowly lower foot then release towel slowly.

**Domes:** While seated with feet flat on the ground press the ball of the foot into the ground and press the heel into ground, lifting the arch of the foot off of floor.

## International Classification of Function Model

HEALTH CONDITION
Patient is a 62 year old female who presents with left medial myofascial adhesions due to past a Posterior Tibial Tendon Repair

BODY STRUCTURES/FUNCTION (IMPAIRMENTS)
<p style="text-align: center;"><b>Body structure Impairments</b></p> <ul style="list-style-type: none"> <li>Left ankle</li> <li>Left foot and medial plantar surface</li> </ul> <p style="text-align: center;"><b>Body function Impairments</b></p> <ul style="list-style-type: none"> <li>Lower extremity weakness</li> <li>Impaired Left ankle range of motion</li> <li>Decreased endurance</li> <li>Impaired tissue length of Left hamstring and leg</li> <li>Increased myofascial adhesions in Left medial foot</li> </ul>

ACTIVITY (TASKS)	
Abilities	Limitations
<ol style="list-style-type: none"> <li>1. Can ambulate independent on level surfaces with AFO up to 25ft.</li> <li>2. Independent in standing balance and sitting balance</li> <li>3. Independent in transfers</li> <li>4. Patient can climb stairs independently</li> </ol>	<ol style="list-style-type: none"> <li>1. Requires assistive device when walk more than 25ft.</li> <li>2. Requires contact guard assist during single leg balance activities</li> </ol>

## PARTICIPATION

Abilities	Restrictions
<ol style="list-style-type: none"> <li>1. Can perform grooming/ dressing activities independently</li> <li>2. Independent in dishwashing</li> <li>3. Can drive car with no difficulties</li> <li>4. Patient is able to attend church services</li> </ol>	<ol style="list-style-type: none"> <li>1. Limited to participation with peers due to pain</li> <li>2. Limited to participation in community due to pain</li> <li>3. Cannot participate in exercise group therapy</li> <li>4. Limited to ADL's due to pain                             <ul style="list-style-type: none"> <li>• Patient requires assistant with household activities, due to pain while standing or walking more than 10 minutes</li> </ul> </li> <li>5. Patient requires assistance while grocery shopping due to pain</li> </ol>

## ENVIRONMENTAL FACTORS

External Factors		Internal Factors	
+	-	+	-
<ul style="list-style-type: none"> <li>• Supportive family and church friends</li> <li>• Support from third party payer for physical therapy</li> </ul>	<p>Does not want to stress out daughters and friends</p>	<ul style="list-style-type: none"> <li>• Very Motivated</li> <li>• previously worked in health care</li> </ul>	<ul style="list-style-type: none"> <li>• Anxiety and depression</li> <li>• Coping and grief with husbands recent passing</li> <li>• Scared or reinjury, self-doubt</li> </ul>

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