

# Effectiveness of Massage Including Proximal Trigger Point Release for Plantar Fasciitis: a Case Report

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**Background:** Plantar fasciitis (PF) is a common degenerative condition of the plantar fascia. Symptoms include tenderness on the plantar surface of the foot, pain on walking after inactivity, and difficulty with daily activities. Rest, non-steroidal anti-inflammatories, and manual therapies are frequently used treatments for PF. Trigger point release (TrPR) for PF has been found as a viable treatment option.

**Objective:** To determine the effects of massage, including proximal TrPR, for pain and functional limitations in a patient with PF.

**Method:** A student massage therapist from MacEwan University administered five massages, one initial and one final assessment over five weeks to a 46-year-old female with diagnosed PF. She complained of unilateral plantar heel pain (PHP) and deep pulling from mid-glutes to the distal lower limb bilaterally. Evaluation involved active and passive range of motion, myotomes, dermatomes, reflexes, and orthopedic tests. The treatment aim was to decrease PHP by releasing active trigger points (TrPs) along the posterior lower extremity to the plantar surface of the foot, lengthening the associated muscles and plantar fascia. Hydrotherapy, Swedish massage, TrPR, myofascial release, and stretches were implemented. Pain was measured using the numerical rating scale pre- and post-treatments, and the Foot Function Index was used to assess function at the first, middle, and last appointments to assess the effectiveness of massage including proximal TrPR for PF.

**Results:** PHP and functional impairments decreased throughout the five-week period.

**Conclusion:** The results indicate massage, including proximal TrPR, may decrease pain and functional impairments in patients with PF. Further research is necessary to measure its efficacy and confirm TrPR as a treatment option.

**KEYWORDS:** plantar fasciitis; plantar heel pain; trigger points

## INTRODUCTION

Plantar fasciitis (PF), a common musculoskeletal foot pathology, causes plantar heel pain (PHP) in approximately 10% of the population.<sup>(1)</sup> Although previously defined as inflammatory, PF has more recently been described as degenerative.<sup>(2,3)</sup> PF affects the plantar fascia from the medial tubercle of the calcaneus to the base of each proximal phalanx.<sup>(4)</sup> The fascia supports the medial and lateral arches, distributes approximately 14% of forces throughout the plantar surface, and helps propel the body during the late stance and toe-off phases of walking.<sup>(2,4)</sup> PF typically affects middle-aged people, and females more than males.<sup>(1,2)</sup> Causes of PF are multifaceted, and risk factors include repetitive overuse of the plantar fascia, pes planus, limited dorsiflexion, sedentary lifestyle, and high body mass index (BMI).<sup>(1,2,5,6)</sup>

Often chronic, symptoms of PF include<sup>(2,6)</sup> pain on the plantar surface by the calcaneal attachment (usually severe after inactivity and while weight-bearing on the affected side); pain diminishing with rest; tenderness on palpation; antalgic gait; limited dorsiflexion and first metatarsophalangeal extension; and hypertonicity of hamstrings and plantar flexors.<sup>(1,2,4,5,7,8)</sup> Clinical assessment determines diagnosis.<sup>(8)</sup> Foot pathologies such as tarsal tunnel, nerve entrapment,

† L. Juchli conducted this study while a student in the fifth of six semesters of MacEwan University's 2200-hour Massage Therapy Program.

and fractures must be ruled out.<sup>(8)</sup> Treatments are varied and typically sought after prolonged discomfort.<sup>(2,6)</sup> Noninvasive treatments include physiotherapy, nonsteroidal anti-inflammatories, orthotics, and manual therapy.<sup>(7)</sup> Plantar fasciotomies are used when conservative treatments are ineffective.<sup>(2)</sup>

Connections between trigger points (TrPs) and PF symptoms have been found.<sup>(3,9,10)</sup> TrPs are hyperirritable points in muscles or fascia that are tender on palpation, produce distal referred pain, and autonomic responses.<sup>(9,1)</sup> Primarily formed from overuse, TrPs are categorized as active or latent.<sup>(11)</sup> Active TrPs are responsible for causing local and referred pain, replicating symptoms of a patient.<sup>(9,11,12)</sup> Latent TrPs do not cause pain unless mechanically stimulated or activated.<sup>(9,11)</sup> Both active and latent TrPs cause stiffness after inactivity, decreased range of motion (ROM), and weakness of associated muscles.<sup>(9,11-13)</sup> The superficial back line (SBL), a myofascial chain connecting the plantar fascia, Achilles tendon, gastrocnemius, hamstrings, sacrotuberous ligament, sacrolumbar fascia, erector spinae, galea aponeurotica, and epicranial fascia, proposes that stress to any aforementioned tissue can result in dysfunction along the chain.<sup>(14)</sup> It is feasible that TrPs along the SBL could exacerbate pain and discomfort in PF patients.

Studies have supported manual treatment of TrPs for patients with PF;<sup>(12,15-17)</sup> however, all included additional treatments such as self-stretching.<sup>(12,15-17)</sup> Two studies assessed the presence of TrPs in participants with PHP and found positive correlations between active TrPs and PF symptomology;<sup>(9,10)</sup> one proposed adding TrPR to clinical guidelines for treating PF.<sup>(9)</sup> Nguyen's study suggested the use of TrPR in tissues proximal to the gastrocnemius for PF but did not specify muscles treated, treatment timeline, or assessment measures monitoring patient progress.<sup>(16)</sup>

This case report involved TrPR in SBL tissues proximal to the gastrocnemius; it was unique in that it identified all muscles of the lower limb with latent or active TrPs and measured the patient's response to treatment. The objective of this study was to ascertain the effectiveness of massage, including proximal TrPR, on pain and functional limitations in a PF patient.

## METHODS

### Participants

A 46-year-old administrator presented to MacEwan Massage Therapy Clinic with right PHP from the calcaneus to the first and second metatarsal head and deep pulling from mid-glutes to the distal lower limb bilaterally. The patient had a full-time desk job, sedentary lifestyle, but walked to, from, and around work, and occasionally practiced yoga. In 2018, the patient sought X-rays due to PHP upon waking and after inactivity, revealing a bone spur on the plantar surface of the right medial calcaneal tubercle. In 2019, one year prior to the initial visit with the therapist, her physician diagnosed PF and prescribed custom insoles (not purchased due to cost); she trialed drugstore-brand insoles but ceased use due to discomfort. The patient received no PF treatment until attending MacEwan Massage Therapy Clinic.

The patient's history included diagnosed Sjogren's syndrome, monitored annually. No history of high BMI or excessive activity was reported.

The patient's goals were to reduce PF pain and improve function; she specifically wanted to walk to, from, and around work without pain or limping.

### Intervention

The therapist performed a clinical orthopaedic lumbar scan to assess whether the pain occurred due to lumbar pathologies, peripheral pathologies, or both.<sup>(18)</sup> The scan included history, subjective complaints, myotomes, reflexes, dermatomes, and active ROM of lower extremity joints.<sup>(18)</sup> As TrPs can cause pain and tightness in tissues, posture, gait, and ROM were evaluated.<sup>(19,20)</sup> Pertinent postural findings included a slight anterior pelvic tilt bilaterally and slight external rotation of the right tibia. Gait was normal. Due to pain along the posterior legs and plantar surface of the right foot, hip and ankle joint assessments were performed;<sup>(18)</sup> assessments entailed active and passive ROM, isometrics, sensation testing, special tests, and palpation.<sup>(18)</sup> Lower extremity special tests were conducted to identify pathologies.<sup>(18)</sup> Leg length discrepancies, metatarsal fractures or neuromas, and tarsal tunnel syndrome were ruled out with the Weber-Barstow Maneuver, Morton's test,

and Tinel's sign, respectively.<sup>(18)</sup> A positive piriformis test indicated a left piriformis strain.<sup>(18)</sup> A positive Thomas test indicated tightness of the right hip flexors.<sup>(18)</sup> Active dorsiflexion, with the test leg straight and bent, was performed with the patient in supine to assess gastrocnemius and soleus lengths, respectively; bilaterally, dorsiflexion was greater with the soleus length test compared to the gastrocnemius.<sup>(21)</sup> Windlass test results for PF were unreliable due to the patient's fear of placing weight on the test leg with no support under her toes.<sup>(22)</sup> On palpation, tenderness was noted bilaterally along the posterior iliac crest, sacral attachment of piriformis, and plantar surface by the medial calcaneal tubercle; tenderness was more intense on the right foot than the left.

A student in the fifth of six semesters of MacEwan University's 2200-hour Massage Therapy Program conducted the study. In addition to other courses, the student therapist had completed approximately 72 hours of assessment training, 24 hours of TrPR, and three terms of clinical practice.

The treatment plan was designed to meet the patient's goals of reducing PF pain and improving function; she specifically wanted to be able to walk to, from, and around work without pain or limping. Due to deep pulling from mid-glutes to the distal lower limb bilaterally, the therapist included treatment of the entire lower extremities bilaterally. The first session was assessment only and the last included the final assessment. Treatments occurred weekly at a consistent time and location, and were 50 minutes in duration with 10 minutes for follow-up, assessment measures, and consent. Progress was measured using the verbal Numerical Rating Scale (NRS) for pain and the Foot Function Index (FFI).<sup>(23,24)</sup> Frictions, contraindicated with acute inflammation, use of anti-inflammatories, or sites of repeated corticosteroid injection were avoided due to the potential for irritation and inflammation.<sup>(25)</sup> No other contraindications were noted.

The treatment plan, outlined in Table 1, consisted of moist heat applied to the glutes and inferiorly to increase tissue extensibility, Swedish massage and myofascial techniques to increase venous return and lengthen tissues, TrPR to return tissues to normal resting lengths, and passive stretches to lengthen muscle fibres.<sup>(11,26-29)</sup> Other than specific TrPs released (see

Table 2), the treatment plan remained consistent for the five weeks. TrPs were identified by tenderness locally within a taut myofascial band.<sup>(1)</sup>

The therapist provided written and illustrated home care documents after the first treatment and asked about home care every appointment. Home care included stretches, hydrotherapy, and a calendar to record pain intensity every morning on standing. The therapist recommended application of moist heat to the glutes, hamstrings, and plantarflexors bilaterally for 10 minutes, twice daily, to reduce pain.<sup>(25)</sup> Following heat application, the therapist suggested standing gastrocnemius and soleus stretches to lengthen calf muscles (see Appendix A).<sup>(6,12)</sup> The plantar fascia stretch (extending the plantar surface with the toes and metatarsal heads on a wall and the heel on the floor; initially with the knee extended, followed by knee flexion) was recommended to provide short-term pain relief.<sup>(6)</sup> It was suggested that the patient perform stretches bilaterally and hold each for 30 seconds.<sup>(6)</sup> To reduce pain, the therapist recommended rolling the plantar surface of the foot on a frozen plastic water bottle each evening for 5 minutes or until the patient felt a burning sensation.<sup>(25)</sup>

## Analysis

Pain was measured using the verbal NRS which has been established as reliable and valid.<sup>(23,30)</sup> The patient rated pain from zero to ten, zero being no pain and ten being the worst pain imaginable, like placing a hand on a hot stove.<sup>(23)</sup> She reported her NRS in the initial and final assessments, before and after every treatment, and on a calendar daily on waking. The FFI is a 23-question self-reporting survey measuring the effects of pain, disability, and activity limitations of foot pathologies.<sup>(24)</sup> The FFI has been recognized as reliable and valid.<sup>(7,24)</sup> Questions are answered numerically from zero to ten. A score is calculated by totaling the value of responses and dividing that by the greatest possible total for each category. The value of unanswered questions is subtracted from the total score. A higher score indicates greater functional limitations. The patient completed the pain and disability sections of the questionnaire immediately before the first, middle, and last treatments.

TABLE 1. Treatment Plan

<i>Position</i>	<i>Technique and Location</i>	<i>Interval (minutes)</i>	<i>Objective</i>
Prone	Moist heat to the left glutes and hamstrings	5 min.	Reduce pain, increase tissue extensibility, and reduce hypertonicity <sup>26</sup>
	Effleurage thoracic and lumbar spine bilateral	1 min.	Spread oil and increase venous return <sup>27</sup>
	Petrissage thoracic and lumbar spine bilateral	2 min.	Reduce resting muscle tension <sup>27</sup>
	Muscle stripping erector spinae bilateral	1 min.	Lengthen shortened sacromeres <sup>27</sup>
	Effleurage thoracic and lumbar spine bilateral	1 min.	Analgesic effects <sup>27</sup>
	Moist heat to the left gastrocnemius/soleus	5 min.	Reduce pain, increase tissue extensibility, and reduce hypertonicity while massaging the left glutes and hamstrings <sup>27</sup>
	Effleurage to left glutes and hamstrings	1 min.	Spread oil, increase venous return, and decrease sympathetic firing <sup>27</sup>
	Petrissage to left glutes and hamstrings	2 min.	Reduce resting muscle tension and stretch muscle fibres <sup>27</sup>
	TrPR (Travell method) to the left glute and hamstring locations (see Table 2)	3 min.	Release and soften TrPs to normal resting length <sup>11</sup>
	Effleurage to left glutes and hamstrings	1 min.	Analgesia effects and increase venous return <sup>27</sup>
	Moist heat to right glutes and hamstrings	5 min.	Reduce pain, increase tissue extensibility, and reduce hypertonicity while massaging the left gastrocnemius and soleus <sup>26</sup>
	MFR and skin rolling to left gastrocnemius and soleus	2.5 min.	Lengthen fascia, increase tissue mobility, and break adhesions <sup>27</sup>
	Effleurage to left gastrocnemius and soleus	1 min.	Spread oil, decrease sympathetic firing, and analgesia effects <sup>27</sup>
	Compressions to left gastrocnemius and soleus	30 sec.	Stimulate proprioceptors and stretch muscle fibres <sup>27</sup>
	TrPR (Travell method) to the left lower limb locations (see Table 2)	1 min.	Release and soften TrPs to normal resting length <sup>11</sup>
	Petrissage to left gastrocnemius and soleus	1 min.	Reduce resting muscle tension and stretch muscle fibres <sup>27</sup>
Compressions to piriformis with passive internal and external rotation of the hip	30 sec.	Decrease hypertonicity and improve mobility <sup>27,28</sup>	
Repeat the above techniques contralaterally, starting from the moist heat applied to the left gastrocnemius/soleus.			
Supine	MFR to left plantar fascia	1 min.	Lengthen fascia, increase tissue mobility, and break adhesions <sup>27</sup>
	Effleurage to left plantar surface	1 min.	Spread oil, decrease sympathetic firing, and analgesic effects <sup>27</sup>
	Petrissage to the left plantar surface	1 min.	Reduce resting muscle tension and stretch muscle fibres <sup>27</sup>
	TrPR (Travell method) to foot locations (see Table 2)	1 min.	Release and soften TrPs to normal resting length <sup>11</sup>
	Sustained stretch to the left gastrocnemius and soleus	1.5 min.	Lengthen muscle fibres <sup>29</sup>

TABLE 2. Trigger Point Release

Treatment	Area of Application
1	Right soleus Quadratus plantae
2	Gluteus medius bilateral Right biceps femoris
3	Right gluteus minimis Right piriformis Left semimembranosus
4	Gluteus medius bilateral Gluteus minimus bilateral
5	Gluteus medius bilateral

**Ethical Review and Consent**

Written and verbal consent was obtained during the initial assessment and ongoing, prior to, and during each session. Consent included therapist credentials, privacy and disclosure agreements, risks, benefits, clinical findings, treatment plan and objectives, and right of refusal. Prior to each treatment, the patient was asked to provide feedback and participate in treatment planning.

**RESULTS**

Pre- to post-treatment PHP intensity decreased, except for treatment five, where no pain was documented pre- or

post-treatment (see Figure 1). The intensity of pre-treatment PHP decreased from treatment one to four, with no pain prior to treatment five (see Figure 1); there was no post-treatment pain from Week Two onwards. The FFI score showed improvements in function (see Figure 2).

The patient attended all sessions and reported completion of daily home care. She stated sufficient attention was given to PF, home care was highly effective, and pain with walking and standing had disappeared completely by the last treatment. She expressed gratitude for the treatments and her ability to walk pain free.

**DISCUSSION**

Proximal TrPR combined with massage, hydrotherapy, and home care reduced this patient’s pain and improved function. It is feasible that pressure applied to sarcomeres during TrPR lengthened tissues and decreased associated local and referred pain and tension through the SBL;<sup>(9,12,14,17)</sup> however, more research is needed to evaluate reliability.<sup>(9,12,14,17)</sup> The results of this case report supported current research on TrPR for PF.<sup>(12,15-17)</sup>

Three studies of PF patients used TrPR and self-stretching as treatments.<sup>(12,16,17)</sup> Nguyen’s study<sup>(16)</sup> included TrPs proximal to the gastrocnemius on a 29-year-old runner. TrPs were treated in the gluteus medius and minimus, piriformis, tissues proximal to the medial aspect of the knee,

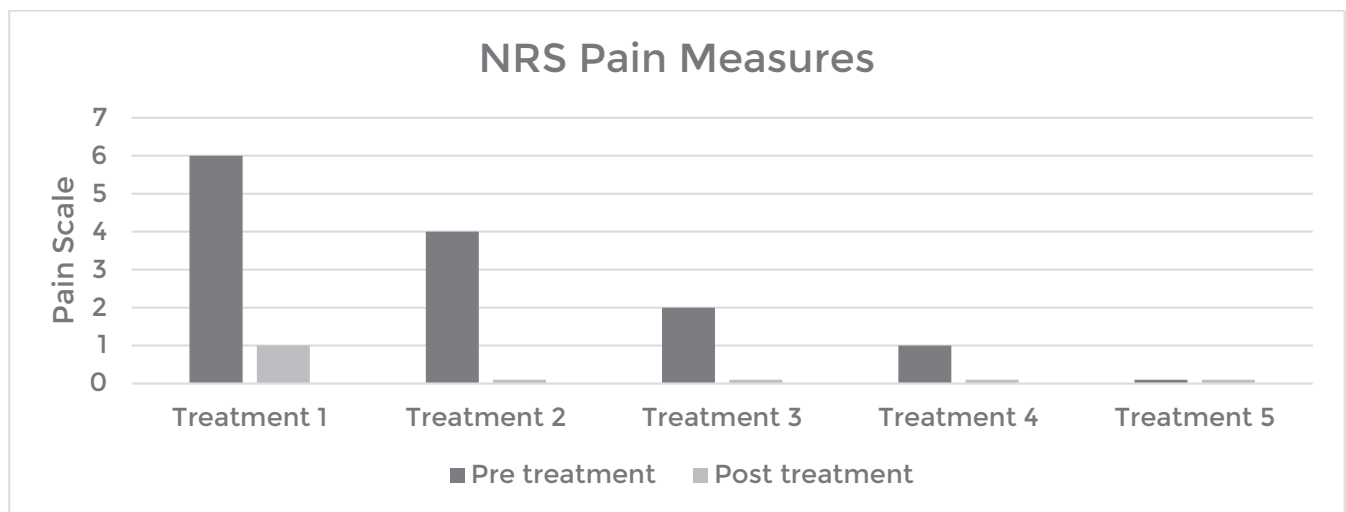


FIGURE 1. Pre- and post-treatment NRS pain measures; zero means no pain and 10 means the worst pain imaginable, like burning a hand on a hot stove.

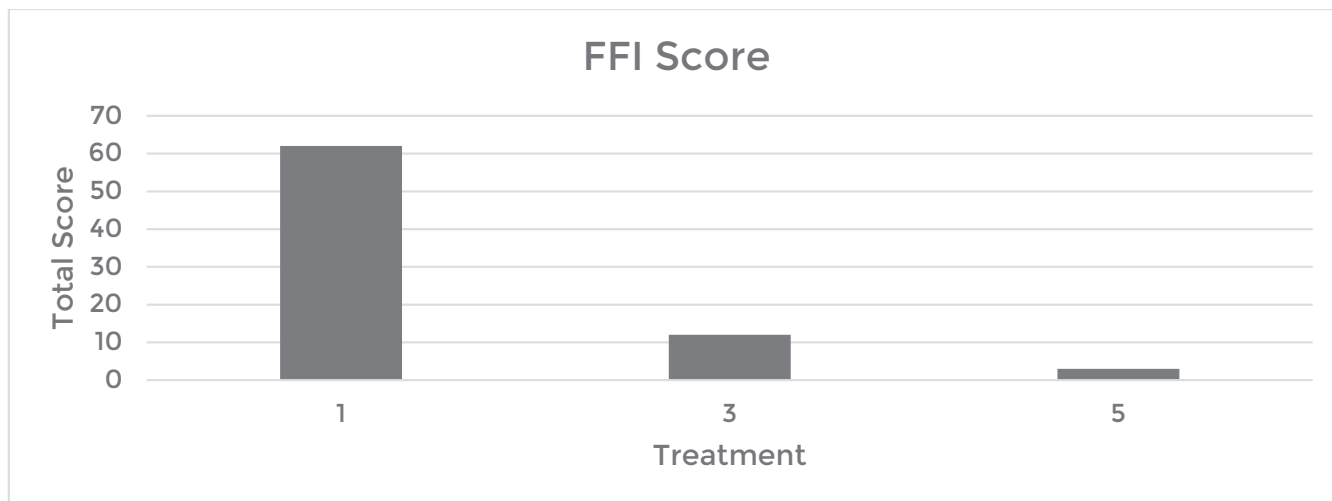


FIGURE 2. FFI is a functional questionnaire measuring functional limitations of foot pathologies; a higher number indicates a greater level of dysfunction.

and gastrocnemius.<sup>(15)</sup> In the Nguyen study, standing gastrocnemius and hamstring stretches were performed after TrPR. Treatment plan duration was not stated, but immediate improvement in symptoms post-treatment was noted. While the results match those of this case report, no information was given about types, frequency, and duration of other massage treatments or if home care was performed. This case report detailed all active and latent TrPs, massage techniques utilized, and home care provided.

A clinical trial divided patients (mean age 44 years) into two groups of approximately 27 patients.<sup>(12)</sup> One group applied self-stretches to the gastrocnemius, soleus, and plantar fascia, while the other additionally included TrPR. Treatment was four days weekly for one month, and progress was measured using a functional questionnaire and the pressure pain threshold (PPT). The TrPR group showed greater reductions in pain and improved function compared to the self-stretching group. The clinical trial findings support those of this case report; however, in the trial, locations of the TrPs were not specified, making it difficult to analyze significance of referral patterns for PF.<sup>(12)</sup>

A feasibility study by Grieve and Palmer,<sup>(15)</sup> featuring an intervention and control group, compared the effects of adding TrPR to a physiotherapy and home care treatment plan for PF. Similar to the results of this case report, there were improvements in tenderness of TrPs, pain,

and function. The location of the TrPs and physiotherapy treatment were not specified, making it difficult to determine if improvements were related to TrPR or other treatments.

An interventional trial by Preethi et al.<sup>(17)</sup> divided 42 patients (mean age 43 years) into control and experimental groups. The control group was treated solely with ultrasound and self-stretching; the other was additionally treated with TrPR and cryotherapy. Treatments were implemented five days weekly for two weeks, evaluating demographics, pain, ankle ROM, PPT, and function. The TrPR group showed greater reductions in pain, function, and PPT. The clinical findings support those of this case report; however, in the trial, only the gastrocnemius, soleus, and peroneals were treated with TrPR rather than all TrPs of the lower extremity.<sup>(17)</sup> If all SBL or lower extremity TrPs had been treated, results may have differed.

Two studies assessed the presence of TrPs in PHP patients to determine if symptoms of TrPs in the distal lower limb and foot correlated with those of PF.<sup>(9,10)</sup> A case-control study by Ortega-Santiago et al.<sup>(9)</sup> involved patients with PHP and healthy participants to determine if symptoms of TrPs in the distal lower limb and foot correlated with PF. Flexor hallucis brevis, adductor hallucis, quadratus plantae, and medial gastrocnemius were palpated to locate TrPs. The other, a cross-sectional study by Thummar et al.,<sup>(10)</sup> assessed the presence of TrPs in 100 PF patients.

The same muscles were palpated with the addition of biceps femoris, adductor magnus, semitendinosus, semimembranosus, peroneus longus, lateral gastrocnemius, soleus, tibialis posterior, flexor hallucis longus, abductor hallucis, flexor digitorum longus and brevis. Correlations were found between the TrPs and PF, but neither study used TrPR.<sup>(9,10)</sup> The cross-sectional study authors suggested physical examination of the muscles for TrPs.<sup>(10)</sup> The case-control study authors suggested including TrPR for treatment of PF.<sup>(9)</sup> Active TrPs are responsible for causing local and referred pain, replicating the patient's symptoms;<sup>(9,11,12)</sup> it is feasible that TrPR would have been effective in reducing PF. In this case report, TrPR was performed, and symptoms of PF resolved.

There are limitations to this study. This case report followed one patient; a larger study, including middle-aged women of similar sedentary lifestyles, and a control group would have allowed more comprehensive analysis. All lower extremity TrPs were identified and released, but specific referral patterns were not documented to determine which TrPs were responsible for the symptoms. PPT as an assessment measure could have increased the gravitas of results. TrPR was not the sole treatment utilized; other treatments may have contributed to the positive results.

Limited research exists on the effects of TrPR for PF; most studies use combinations of treatments.<sup>(12,15-17)</sup> This case report is unique because it treats TrPs proximal to the gastrocnemius, documents TrP locations, specifies treatment durations and home care, and measures pain intensity and dysfunction throughout. To improve the understanding of TrPR for PF, research with larger groups identifying TrP locations, referral patterns, isolation of TrPR is recommended, along with inclusion of follow-ups for long-term effects. Despite the limitations of this case study, inclusion of proximal TrPR resulted in alleviation of pain and restoration of function in a patient with PF.

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## CONFLICT OF INTEREST NOTIFICATION

The author declares there are no conflicts of interest.

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## APPENDICES

### Appendix A. Standing Gastrocnemius and Soleus Stretch

Instructions: Stand towards a wall with the arms directly out in front of you, parallel to the floor, with the palms placed on the wall. Step back with the affected leg into

a lunge keeping the heel of the affected leg in contact with the floor. To stretch the gastrocnemius, keep the affected leg completely straight and to stretch the soleus bend the knee of the affected leg.