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THE EFFECTS OF EXTREMITY MANIPULATION ON PLANTAR FASCIA PAIN: A CASE REPORT

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ABSTRACT

Objective: To document the observed effects of a single intervention of extremity manipulation on a patient with plantar fascia-related pain.

Clinical Features: A 32-year-old athlete had sharp pain and stiffness around the inferior/medial portion of his left heel and midfoot.

Intervention and Outcomes: An extremity manipulation was performed, aimed at the midfoot across the tarsals. Following the manipulation, there was an immediate reduction of pain, an improvement in range of motion and perceived gait biomechanics, and a decreased sensitivity to manual palpation. He received no additional intervention. A follow-up was conducted over the course of 3 weeks at 1-week intervals. He reported no pain or stiffness at each follow-up.

Conclusion: Those suffering from heel pain, specifically plantar fasciosis, may be strong candidates for extremity manipulation. More research is needed to establish a stronger association between extremity manipulation and plantar fasciosis. *(J Contemporary Chiropr 2023;6:88-91)*

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INTRODUCTION

Many clinicians and therapists within the rehabilitation industry loosely diagnose all plantar pain under the same banner of plantar fasciitis (PF), an inflammatory or degenerative irritation of the deep plantar fascia which runs from the medial tubercle of the calcaneus to each metatarsal. (1,2) This triangle-shaped aponeurosis (fascia) not only protects various structures beneath but contributes to gait and movement quality by absorbing and redistributing forces and maintaining an appropriate longitudinal arch. (2) Although traditionally PF was classified only as an inflammatory issue ("fasciitis," "itis," meaning inflammation), research has emerged challenging this belief, with histological findings showing no inflammation present, leading many to believe this condition is more accurately a "degenerative fasciosis." (4) Research shows the cause of PF to be multifactorial. However, some common etiologies include microtears from repetitive use, overuse, misuse, trauma, limited range of motion (ROM), restricted or "tight" musculature & altered biomechanics. (1) Around 1 million recorded office or hospital visits were due to PF in the United States alone, with the primary treatment strategies being nonsteroidal anti-inflammatory drugs (47%), exercise prescription (26%), and physical therapy (19%). (5) Spinal manipulation has been associated with a decrease in perceived pain, an increase in ROM & strength, and various balance and proprioceptive improvements. (6-9) Spinal manipulation is a rehabilitative intervention classified as a high-velocity, low-amplitude thrust (HVLA) which can be applied to synovial joints. (10) Extremity manipulations or HVLAs, like spinal HVLAs, have been shown to modulate pain and ROM effectively. (11) This study attempts to

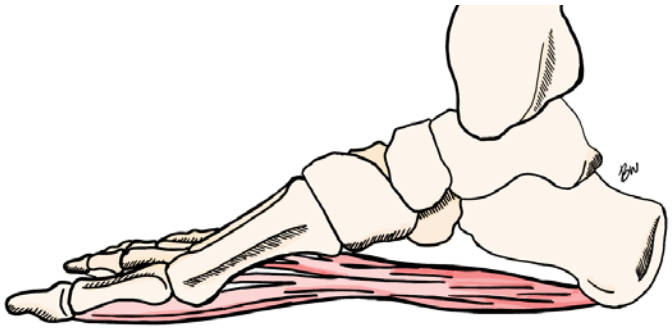

Figure 1. *The plantar fascia. Side View. (2)*

observe the effects of a single intervention of extremity manipulation on a patient with plantar fascia-related pain.

METHODS

Case History

A 32-year-old male strength athlete complained of sharp pain and stiffness around the inferior/medial portion of his left heel and midfoot. There was no history of trauma. He reported infrequent and intermittent PF discomfort, which occurred following prolonged standing or sitting, particularly while wearing tight-fitting shoes. This would happen once every 1-2 months and linger for weeks at a time (the patient noted that the times varied greatly). It has been a problem for the last 2-3 years. The PF is self-reported as "excruciating in the morning." Pain is described as "sharp" in the morning and "achy" in the afternoon and is rated 7/10 at worst, 1/10 at best, and 4/10 on average. Walking and other activities, such as squatting and deadlifting, were self-reported as "impaired." The pain may occasionally move proximally and distally, but this is uncommon. The patient frequently described the pain as being accompanied by stiffness.

Assessment

The patient had increased midfoot stiffness and restricted passive and active dorsiflexion on the left foot/ankle compared to the right. Palpation found tenderness in the medial calcaneus region. Other differential diagnoses, including but not limited to calcaneal bursitis, gout, L5 disc herniation, nerve entrapment, contusion, fracture, and atrophy, as well as potentially serious pathologies or large fractures, were ruled out using a comprehensive history, vitals, ROM measurements, palpation, orthopedic testing, and a neurological examination. In severe and persistent cases, additional tests, such as X-rays and/or ultrasound scans, may be used to rule out osteochondral defects, heel spurs, calcification, ligament thickening, and stress fractures. However, in this instance, further testing was not necessary. Myotomes, reflexes, and neurological tests were all normal. Orthopedic testing, Jack's test (passive dorsiflexion of the hallux) elicited pain.

Intervention

An extremity manipulation was used as a single treatment. With the participant prone, the examiner flexed the participant's knee to 90 degrees while standing medially to the left leg, facing laterally to the left. As the examiner's inferior hand secured the dorsal aspect of the foot (with the fingers pointing superiorly across the anterior surface of the distal tibia/fibula), the foot was lowered to 30-45 degrees. As the foot/ankle was placed into plantar flexion and inversion, the examiner's superior hand made a firm hyper-thenar contact across the plantar surface of the foot between the tarsals and metatarsals. One high-velocity, low-amplitude thrust was applied in a posterior to anterior with slight medial to lateral vector causing multiple cavitations to occur.

An immediate reduction in pain and a significant improvement in range of motion was noted following extremity manipulation. The patient also perceived increased movement quality with his gait. A post-assessment revealed an improvement in ROM and a decrease in sensitivity to manual palpation. He received no additional intervention. A patient follow-up was conducted over the course of 3 weeks at 1-week intervals. The patient reported no pain or stiffness at each follow-up. Active and passive dorsiflexion ROM restrictions were still present but improved.

DISCUSSION

It is possible that the tissue quality in this specific case was degenerative and was, indeed, a case of plantar fasciosis, not plantar fasciitis. Documented risk factors associated with the development of PF include overuse, prolonged sitting or standing, a sedentary lifestyle, or excessive wearing of poorly designed shoes. (12) Although a multifactorial condition, some believe that vascular entrapment of the lateral plantar artery (LPA) is the cause of this degenerative process. Narrow toe-box shoes have been hypothesized to force the hallux into prolonged adduction, causing the abductor hallucis to compress the LPA and reduce blood flow to

the calcaneus. (13) Interventions consisting of NSAIDs or corticosteroid injections should be re-evaluated as potential treatment options before ruling in/out inflammation of the plantar fascia due to their anti-inflammatory qualities and common side effects. (14) Alternatively, rehabilitative methods, such as manual therapy techniques (like extremity manipulation), should be considered due to symptom modulation efficacy. (7-9)

Though misclassification of the plantar fascia symptomatology is seen clinically, understanding the underlying mechanism is crucial to how the condition is managed. (15) 75% of PF cases spontaneously resolve within 12 months; however, over that time, it can impact one's ability to move, altering gait and likely causing other structures to compensate. The various forces that would normally be efficiently absorbed and redistributed through the plantar fascia system likely migrate into other tissue, causing dysfunction - this could present itself as tight muscles and/or even stiff joints. (1) The immediate and lasting effects of the extremity manipulation suggest that there likely was no inflammatory component. However, the consistent ROM restrictions may suggest a degenerative tissue morphology, whether to the plantar fascia itself or the joints and other soft tissues surrounding it.

Limitations

There is a small sample size (n=1) due to the nature of a case study.

CONCLUSION

Those suffering from heel pain, specifically plantar fasciosis, may be ideal candidates for extremity manipulation. To properly diagnose this condition, a detailed and comprehensive history and assessment must be performed. More research is needed to establish a stronger link or association between extremity manipulation and plantar fasciosis.

REFERENCES

1. Buchanan BK, Kushner D. Plantar fasciitis [Internet]. PubMed. Treasure Island (FL): StatPearls Publishing; 2020. Available from: https://www.ncbi.nlm.nih.gov/books/NBK431073/
2. Williams B. The plantar fascia (personal image). 2023.
3. Chen D, Li B, Aubeeluck A, Yang Y, Huang Y, Zhou J *et al*. anatomy and biomechanical properties of the plantar aponeurosis: a cadaveric study. PLoS ONE 2014;9(1):e84347
4. Lemont H, Ammirati KM, Usen N. Plantar fasciitis. J Am Podiatric Med Assoc 2003;93(3):234–237
5. Riddle DL, Schappert SM. The volume of ambulatory care visits and patterns of care for patients diagnosed with plantar fasciitis: a national study of medical doctors. Foot Ankle Intern 2004;25(5):303–310
6. Williams B. An investigation into the impact spinal manipulation may have on the performance of strength athletes: a research survey. Int J Res Applied Sci Engineering Tech 2022;10:1284–1291 https://doi.org/10.22214/ijraset.2022.45442.
7. Haavik H, Kumari N, Holt K *et al*. The contemporary model of vertebral column joint dysfunction and impact of high-velocity, low-amplitude controlled vertebral thrusts on neuromuscular function. European Applied Physiol 2021;12(5)
8. Williams BS. The clinical and subjective outcomes associated with spinal manipulation: a case study. J Med Res Innovation 2022;6:19–21
9. Williams B, Woodbury M. The improvement of balance, coordination & proprioception following an MPI cervico-thoracic junction seated adjustment: a case report. Int J Res Applied Sci Engineering Tech 2022;10(9):1339–1342
10. Gyer G, Michael J, Inklebarger J, Tedla JS. Spinal manipulation therapy: is it all about the brain? A current review of the neurophysiological effects of manipulation. J Integrative Med 2019 Sep [cited 2019 Oct 27];17(5):328–37. https://www.omttaining.co.uk/wp-content/uploads/2019/09/OMT-Training-Research-Journal-Published.pdf
11. Vicenzino B, Cleland JA, Bisset L. Joint manipulation in the management of lateral epicondylalgia: a clinical commentary. J Manual Manipulative Therap 2007;15(1):50–6. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2565595/
12. Whitney K. Plantar fasciosis - musculoskeletal and connective tissue disorders [Internet]. MSD Manual Professional Edition. 2023. https://www.msdmanuals.com/en-nz/professional/musculoskeletal-and-connective-tissue-disorders/foot-and-ankle-disorders/plantar-fasciosis

13. Jacobs JL, Ridge ST, Bruening DA *et al*. Passive hallux adduction decreases lateral plantar artery blood flow: a preliminary study of the potential influence of narrow toe box shoes. J Foot Ankle Res 2019;12(1)

14. Vanbeek C. Cortisone Injections: worth the stick? 2005 https://www.stamfordhealth.org/healthflash-blog/orthopedic-spine-sports-medicine/cocortisone-injections/

15. Kennedy B. Plantar fasciitis. Physiopedia 2013. https://www.physio-pedia.com/Plantar_Fasciitis