International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Effect of Tibial Nerve Mobilization on Pain and Functional Limitation in Subjects with Plantar Fascitis

Monika Yadav[1], Dr. Monika Sharma[2], Dr. Shagun Aggarwal[3], Dr, Kopal Pajnee[4]

[1]Masters scholar (Musculoskeletal), IAMR, Ghaziabad, Uttar Pradesh, India
Email: *monikayadav9917[at]gmail.com*

[2]Assistant Professor, IAMR, Ghaziabad, Uttar Pradesh, India

[3]Profeesor, Principal, IAMR, Ghaziabad, Uttar Pradesh, India

[4]HOD, Physiotherapy Department, Jan Kalyan Healthcare centre, Karol Bagh, New Delhi, India

Abstract: ***Aim: To determine the effectiveness of tibial nerve mobilization on pain and functional limitation in patients with plantar fasciitis. Methods: 30 subjects were recruited in the study in accordance with inclusion and exclusion criteria. The subjects in Group A received conventional treatment which included application of ultrasonic therapy, stretching of plantar fascia, gastrocnemius and soleus, strengthening exercises for ankle evertors & invertors, Toe curl exercise and heel raise exercise. Group B received Tibial nerve mobilization along with conventional treatment. Results: Unpaired t-test was used to compare the data within and between the periods. Both the treatment variables showed significant changes when compared within group whereas neural mobilization treatment proved to be more effective than conventional treatment on between the group statistical comparisons. Conclusion: Tibial nerve mobilisation was shown to be more successful than conventional therapy alone when used in conjunction with it.***

Keywords: Plantar fascitis, Neutral Mobilisation, VAS, PFPS

1. Introduction

Heel discomfort is most often caused by plantar fasciitis. A complex pathogenesis still has to be uncovered. Weight-bearing, obesity, and a lack of plantar flexion are all known risk factors[1]. Heel spurs, Sever's disease, heel bumps, Achilles tendinopathy, heel neuritis, and heel bursitis are among the most common causes of heel discomfort. It is most frequent to discover myxoid degeneration with plantar fascia fragmentation and bone marrow vasculature abnormalities after the first inflammation reaction and repeated micro-trauma of the plantar aponeurosis. In the absence of inflammation, it might be classified as degenerative fasciosis[2]. The enthesis is the junction between the periosteum and plantar aponeurosis and/or the tendon of the flexor digitorum brevis, hence it has also been classified as an enthesopathy[3]. Patients report experiencing stinging and searing discomfort in their medial heel. When you first get up in the morning, you feel a lot of pain, and depending on how active you are during the day, that pain might grow worse[4].To prevent or lessen discomfort, patients move slower than healthy people. Cadence, gait speed, and stride length all drop significantly, but stride duration rises. Walking or weight-bearing exercises, such as weightlifting, may lead to a decrease in muscular strength and flexibility, as well as an increase in body weight[5].

Restoring the nervous system's capacity to withstand the usual compressive, frictional, and tensile pressures of everyday life is the goal of neural mobilisation therapies. Axoplasmic flow, nerve glide facilitation, decreased nerve adhesion, fluid dispersion, and pain reduction are some of the potential advantages that these treatments may provide[6]. The underlying processes that lead to clinical benefits after neuronal mobilisation are still a mystery to us. A variety of hypotheses have been put up, including physiological (removal of intraneuraledoema) and central (reduction of dorsal horn and supraspinal sensitization) as well as mechanical (reduction of intraneural swelling) impacts (enhanced nerve excursion) [7].

Plantar fasciitis research on the effect of neural mobilisation has been very lacking. So the study's goal was to determine the function and effectiveness of neural mobilisation in plantar fasciitis patients.

2. Methodology

The Jan Kalyan Health Care Centre, Karol Bagh, was the site of this long-term investigation. Research Ethics Committee has given its support to the project. The research ran from August 2021 to January 2022, and each participant was required to attend four weekly sessions for three weeks. The study's primary outcome measures were the VAS and PFDS scores obtained at baseline (0 sittings) and three weeks post-treatment.

Inclusion Criteria[8]:

- Age 25-40 years
- Palpable discomfort in the medial plantar calcaneal area.
- After a period of inactivity, the discomfort in the plantar medial heel is most obvious when the patient begins to walk again.
- An increase in weight-bearing activities has led to an increase in heel discomfort.
- Pain while palpating the plantar fascia's proximal insertion
- The windlass worked as expected.

- Tarsal tunnel testing came up negative.
- Limits in both active and passive dorsiflexion of the talocrural joint

Exclusion criteria**:** a calcaneal spur, a calcaneal fracture, or any combination thereof vascular disease of the extremities, surgery on the lower limbs' tendonitis of the Achilles, Arthritis rheumatoid, Low back discomfort with radiculopathy in the past.[9,10]

3. Procedure

Pre- and post-test participants for both groups of 30 were gathered (15 subjects for the control group and 15 subject for the experimental group). There was a random drawing to split the students into groups. Everyone was given an explanation of the study's purpose and asked to sign a permission form if they agreed to participate. Conventional treatment for Group A patients includes ultrasonic therapy (1W/cm^2 for 7 minutes utilising a pulsed mode 1:1 ratio with frequency of 1MHz).[11], Plantar fascia, gastrocnemius, and soleus muscle stretching (6 repetitions of 30-second hold with 15 seconds rest in between each stretch)[12], ankle evertors and invertors strengthening exercises (3 sets of 10 repetitions each), Do three sets of 15 repetitions of the toe curl exercise on a towel on the floor, then do three sets of the heel lift exercise (3 sets of 10 repetitions)[13]. As a supplement to standard therapy, Group B got Tibial nerve mobilisation. The patient was in supine position while the therapist stood by the side of the patient sofa for tibial nerve mobilisation. For the 5 sets of 10 repetitions, each set consisted of Hip flexion 45°, ankle Dorsiflexion and foot Eversion with knee extension, with a 1-minute break in between each set for rest[14].

Data analysis

Data was summarized as mean ±SD. We employed paired t-tests for our analysis of the data within each of the subgroups. Unpaired t-tests were performed to compare the groups' data. p 0.05 was used as the cutoff point for statistical significance.

4. Results

Statistical Package for Social Sciences (SPSS) 21.0 was used to analyse the data. P-values were calculated using paired-t tests.

Table 1: Demographic details of the subjects

Age	Group A	Group B
	34.23±3.1	35.5±4.8

Table 2: Comparison of Pre and post values for VAS and PFDS at 0 and 3 weeks within Group A and Group B

Variables	VAS		PFDS	
	Group A	Group B	Group A	Group B
At 0 week	6.6 ±0.95	6.73±0.99	51.3±3.4	52.6±3.93
At 3 week	1.47±0.88	0.73±0.67	22.98±6.49	9.22±2.36
t-value	14.77	7.21	32.27	18.59
p-value	0.001**	0.01*	0.001**	0.001**

*significant ** highly significant

Table 2 shows the mean values and comparison of VAS and PFDS within the periods. On statistical analysis the data was found to be significant at all levels.

Table 3: Comparison of mean values for VAS and PFPS between group A and group B using unpaired t-test

	t-value	P-value
VAS	2.45	0.02*
PFPS	7.44	0.0001**

*significant ** highly significant

Table 3 shows the comparison of t-values VAS and PFDS between the periods. On statistical analysis the data was found to be significant.

5. Discussion

A total of 30 people were included in the research, which was split into two equal groups of 15. Ultrasonic therapy and exercises were administered to Group A as part of their standard treatment plan (stretching and strengthening). Treatment for Group B included both tibial nerve mobilisation and conventional therapy. Plantar fasciitis patients who received tibial nerve mobilisation in addition to conventional therapy were shown to be more successful than those who had conventional treatment alone.

Restoring normal movement and length relationships, and hence blood flow and axonal transport dynamics in injured neural tissue is regarded to be a key component of neural mobilization's efficacy. Breaking apart adhesions and promoting mobility are the primary goals of neural mobilisation[15]. Neural mobilization's brief oscillatory motions aid to alleviate inflammation and hypoxia in neural tissue. Nerve movement within painless variation may also help diminish nerve mechanosensitivity, according to one theory[16]. Reduced discomfort and relaxation of the skin were further enhanced by the repeated neural glides, which had both local and systemic effects on the nervous system. With neural mobilisation, the sympathetic nervous system and the dorsal periaqueductal grey are stimulated, resulting in changes in skin conductance and temperature, an increase in motor activity, and non-opioid analgesia[17].

Future Scope of the Study;

- Treatment outcomes may be measured using electromyography investigations.
- Neural mobilisation may be compared to other manual treatment techniques.
- It is possible to compare the effectiveness of neural mobilisation with other treatment techniques.
- It is possible to compare the results of neural mobilisation with other functional scales.

6. Conclusion

Tibial nerve mobilization can be effective treatment technique for treatment of subjects with plantar fasciitis.

References

[1] Ling Y, Wang S. Effects of platelet-rich plasma in the treatment of plantar fasciitis: A meta-analysis of randomized controlled trials. Medicine. 2018 Sep;97(37).
[2] Palomo-López P, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Rodriguez-Sanz D, Calvo-Lobo C, López-López D. Impact of plantar fasciitis on the quality of life of male and female patients according to the Foot Health Status Questionnaire. Journal of pain research. 2018; 11:875.
[3] Dunning J, Butts R, Henry N, Mourad F, Brannon A, Rodriguez H, Young I, Arias-Buría JL, Fernández-de-Las-Peñas C. Electrical dry needling as an adjunct to exercise, manual therapy and ultrasound for plantar fasciitis: A multi-center randomized clinical trial. PloS one. 2018 Oct 31;13(10):e0205405.
[4] Akınoğlu B, Köse N. A comparison of the acute effects of radial extracorporeal shockwave therapy, ultrasound therapy, and exercise therapy in plantar fasciitis. Journal of exercise rehabilitation. 2018 Apr;14(2):306.
[5] Thong-On S, Bovonsunthonchai S, Vachalathiti R, Intiravoranont W, Suwannarat S, Smith R. Effects of strengthening and stretching exercises on the temporospatial gait parameters in patients with plantar fasciitis: A randomized controlled trial. Annals of rehabilitation medicine. 2019 Dec;43(6):662.
[6] Gilbert KK, Smith MP, Sobczak S, James CR, Sizer PS, Brismée JM. Effects of lower limb neurodynamic mobilization on intraneural fluid dispersion of the fourth lumbar nerve root: an unembalmed cadaveric investigation. Journal of Manual & Manipulative Therapy. 2015 Oct 20;23(5):239-45.
[7] Ellis RF, Hing WA, McNair PJ. Comparison of longitudinal sciatic nerve movement with different mobilization exercises: an in vivo study utilizing ultrasound imaging. Journal of orthopaedic & sports physical therapy. 2012 Aug;42(8):667-75.
[8] Martin RL, Davenport TE, Reischl SF, McPoil TG, Matheson JW, Wukich DK, McDonough CM, Altman RD, Beattie P, Cornwall M, Davis I. Heel pain—plantar fasciitis: revision 2014. Journal of Orthopaedic & Sports Physical Therapy. 2014 Nov;44(11):A1-33.
[9] Hyland MR, Webber-Gaffney A, Cohen L, Lichtman SW. Randomized controlled trial of calcaneal taping, sham taping, and plantar fascia stretching for the short-term management of plantar heel pain. Journal of Orthopaedic & Sports Physical Therapy. 2006 Jun;36(6):364-71.
[10] Renan-Ordine R, Alburquerque-SendÍn F, Rodrigues De Souza DP, Cleland JA, Fernández-De-Las-Penas C. Effectiveness of myofascial trigger point manual therapy combined with a self-stretching protocol for the management of plantar heel pain: a randomized controlled trial. journal of orthopaedic & sports physical therapy. 2011 Feb;41(2):43-50.
[11] Apeksha O, Lakshmiprabha R. Comparison of the effects of therapeutic ultrasound v/s myofascial release technique in treatment of plantar fasciitis. *Indian Journal of Physiotherapy& Occupational Therapy*. 2012; 6(2):13-16
[12] DiGiovanni BF, Nawoczenski DA, Lintal ME, Moore EA, Murray JC, Wilding GE. et al. Tissue Specific plantar fascia stretching exercise enhances outcomes in patients with chronic heel pain. J Bone Joint Surg Am 2003; 85-A: 1270-7
[13] Rathleff MS, Molgaard CM, Fredberg U, Kaalund S, Andersen KB, Jensen TT, et al. High-load strength training improves outcome in patients with plantar fasciitis: a randomized controlled trial with 12-month follow-up. Scand J Med Sci Sports 2015;25:e292-300.
[14] M. Shacklock, Clinical neurodynamics, New Syst. Musculoskelet. Treat. XXXIII (2) (2005) 258.
[15] Sarkari E, Multani NK. Efficacy of neural mobilisation in sciatica. Journal of Exercise Science and Physiotherapy. 2007 Dec;3(2):136-41.
[16] Das SMS, Dowle P, Iyengar R. Effect of spinal mobilization with leg movement as an adjunct to neural mobilization and conventional therapy in patients with lumbar radiculopathy: Randomized controlled trial. J Med Sci Res. 2018; 6(1):11-19.
[17] Escaloni J, Young I, Loss J. Cupping with neural glides for the management of peripheral neuropathic plantar foot pain: a case study. Journal of Manual & Manipulative Therapy. 2019 Jan 1;27(1):54-61.