

To Study the Effectiveness of Dry Needling on Functional Performance with Plantar Fasciitis

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Abstract

Background: Plantar fasciitis (PF) is a chronic and progressive disease that impairs patients' quality of life and daily activities. PF is caused by repeated tissue injury at the origin of the calcaneus' medial tuberosity. The symptoms include Pain expanding from the heel's medial aspect into the arch of the foot. Pain is frequently worse in the morning, after a period of rest, or after engaging in physical exercise. These signs and symptoms can become paralyzing as the illness advances, reducing the individual's ability to bear weight. According to recent research, the condition should be called fasciitis because the pathology is more similar to that of tendinosis. The thickness of the plantar fascia increases, as does degeneration

Purpose: The purpose of the study to determine the effectiveness of dry needling for the subjects with plantar fasciitis

Materials and Methods: 68 subjects in total were chosen based on the inclusion and exclusion criteria. Experimental group (n=34) patients received dry needling of intended sites using a 30 mm needle that was gradually withdrawn after 15 minutes. The conventional group (n=34) received the Ultrasound therapy was applied at 3.0-MHz frequency .Patients taken from the five plus hospital. The study period was from December 2022 to March 2023.

Results: Statistical analysis of 6 minute Walk test and NPRS examination post values revealed the constantly significant differences, With the P value of <0.0001.

Conclusion: Dry needling with strengthening exercise was found to be comparatively more effective than ultrasound therapy with strengthening exercise

Key Word: Plantar fasciitis, dry needling, ultrasound therapy, 6minute walk test, NPRS

Introduction

The plantar fascia is a connective tissue made up of fibers that maintains the static structure of

the foot's longitudinal arch. In response to elevated temperatures loads, The plantar fascia lengthens, thereby serving as an absorber; still its ability to

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lengthen is limited.¹ The structure's maximum probable elongation is around 4%, and failure requires a force of around 1000 N². Plantar fasciitis (PF) is a chronic progressive illness, interferes with patients' everyday activities and quality of life. PF is produced by repetitive tissue injury.³ The plantar fascia's thickness rises, as does degradation.^{4,5} It is a common cause of heel pain in adults.^{6,7} 90% of the time, symptoms resolve within 10 months⁸, it is irritating for both physicians and their patients⁹. The symptoms include radiating discomfort of the foot. Pain is typically worse in the morning, after rest, or warming up with activities on the medial side.¹⁰ In the feet and ankles, there are numerous structures are involved in the stability and function required to walk and bear weight.¹¹ muscle tendon is the primary inverter of the foot in plantar flexion. The spring and deltoid ligaments, as well as the tibialis posterior muscle tendon, which connects to the navicular tuberosity, are essential for foot and ankle stability.¹² Plantar fasciitis is a self-limiting natural history and usually resolves within a year. The majority of plantar fasciitis cases have a satisfactory treatment outcome, and various specialists have stated typically respond to conservative treatment. Before attempting more intrusive treatments, individuals with plantar fasciitis should normally try conservative therapies first.¹³ Traditional workouts include touch and heel lift¹⁴. The patients were given directions to perform the physical activities on a daily basis for three months.¹⁴

As less intrusive options, dry needling and acupuncture target myofascial trigger points [MTPs]. This is a popular method for managing chronic pain that has few adverse effects.¹⁵

Aim

The aim is to study the effectiveness of dry Needling for the subject with plantar fasciitis on functional performance

Material and Method

Subjects: Subjects were collected based on eligibility criteria

Sampling Technique: Convenient sampling.

Sample Size: 68 Samples.

Inclusion Criteria:

- The study was conducted in patients with plantar heel pain
- Absence of Raynaud's disease.
- Individuals under the age 35 to 45 complaining of foot pain for over a week
- Having a heel pain on the first step during morning

Exclusion Criteria:

- Dermatological disease in the area of needling;
- Injury, trauma, foot ulcer over the foot
- Treatment for plantar heel pain within four weeks prior to the study
- Presence of a chronic medical condition like rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, septic arthritis, neurological abnormalities, sciatica, and/or chronic pain; history of plantar fascia surgery; history of injection therapy in the heel during the previous three months; and known hypersensitivity to metals

Outcome Measures

- Numeric pain rating scale (NPRS)¹⁸
- 6 minute walk test (6MWT)¹⁹

Procedure:

For inclusion and exclusion criteria, patients who were willing to engage in the study were evaluated. The total number of subjects (68) are divided into 34 subjects for the experimental group (Group A), they are given dry needling with strengthening exercises. The control group (Group B) consisting of 34 subjects, are ultrasound therapy with strengthening exercises. NPRS and 6 Minute walk test are used as outcome measures. Both the groups were treated with strengthening exercise.

Experimental Group (group A)

The experimental group was given dry needling with strengthening exercises. Patients in the dry-needling group had their intended areas dry-needled with a 0.30-mm needle that was progressive for 30 seconds, moved back and forth in the same place. For possible consequences, patient tolerance and discomfort were assessed. We located plantar foot muscles' myofascial trigger points (MTrP). In all situations, the medial aspect of the heel pad was

respected. After 4 weeks, post-test NPRS and 6 minute walk test scores are collected, tabulated, and statistically assessed.

Control Group (group B)

The control group received ultra sonography along with strengthening exercises. The therapy was administered while the patients were lying prone, with longitudinal movements along the entire plantar fascia. The US therapy was used for 8 minutes intermittently at an oscillation rate of 3.0 MHz and an output power of 1 W/cm². During the applications, gel was placed between the US cap and the skin to ensure conductivity. The patients were given four weeks of treatment. When the episode is over, of the treatment approach, post-test data for the NPRS and the 6-minute walk test are recorded, tabulated, and statistically assessed.

Both the groups were provided with strengthening exercise like towel scrunches, toe curls, seated heel raises and resisted band exercise. The treatment is given for 2-3 days per week and starts with 2-3 sets of 10-15 repetitions for each exercise.

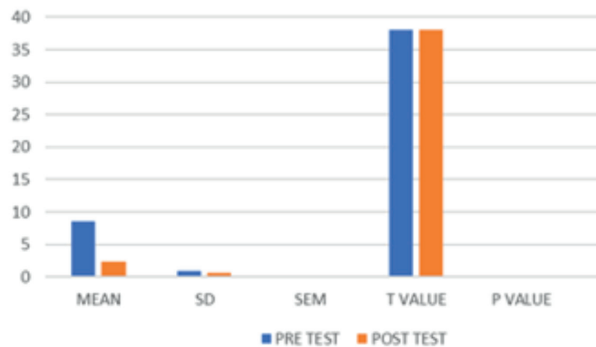
Clinical Evaluation

- Numerical pain rating scale [NPRS] for measuring pain, both when standing still and while walking.
- (6MWT) is used to determine functional ability. The individual walked swiftly for six minutes along a 100-foot hallway, recording the distance travelled in total.

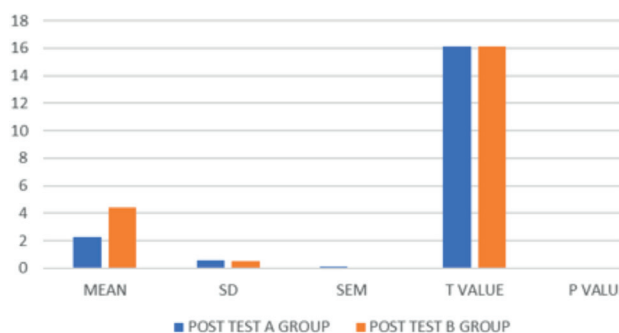
If a person with plantar fasciitis has pain or discomfort in the foot during the test, it can suggest the presence of the condition. During the 6-minute walk test, look for indicators of plantar fasciitis as follows

1. Start by having the individual warm up properly, including stretching exercises for the feet, ankles, and calves.
2. During the walk, observe the person’s gait and posture. Look for any abnormalities such as limping, favouring one foot, or changes in stride length.
3. Pay attention to any signs of pain or discomfort expressed by the individual. That may indicate pain in them.
4. After the walk, ask the individual about any pain or discomfort they experienced during the test. Inquire about the specific location, intensity, and duration of the pain

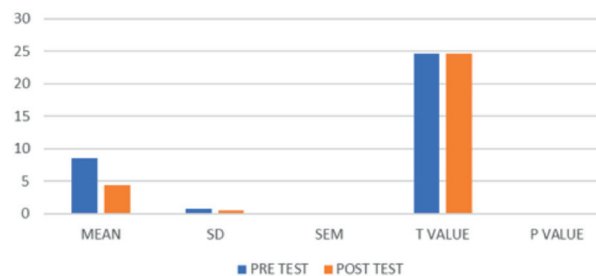
Data Analysis



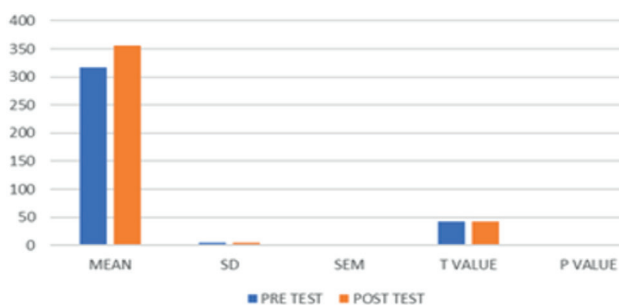
Graph 1- Pre and post test values of experimental group a using NPRS



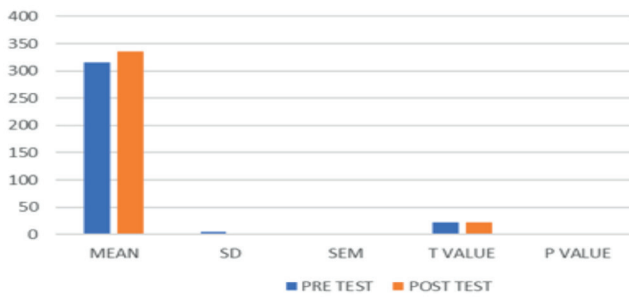
Graph 2- Pre and post test values of conventional group B using NPRS



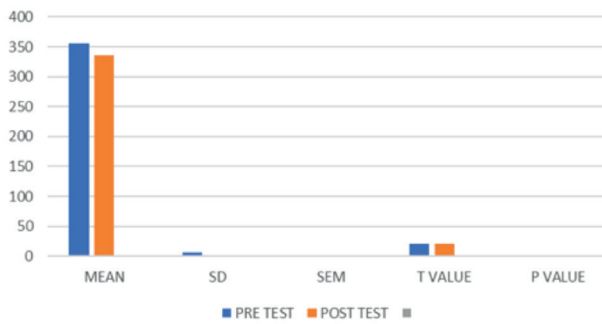
Graph 3-Comparison of both the post test values of group a and b using NPRS



Graph 4- Pre and post test values of experimental Group using 6 minute walk test



Graph 5- Pre and post test values of conventional group using 6 minute walk test



Graph 6- Comparison of both the post test values of group a and b using 6 minute walk test

Result

A statistical comparison of quantitative data between the groups using dry needling and ultrasound demonstrated a statistically significant difference between the two. **Table 1** - the statistical analysis of dry needling by using numerical pain rating scale pre and post values are 8.53 and 7.29 the SD values are 0.83 and 0.58 and P value of <0.0001 and were considered as statistically proved. In **Table 2**- the statistical analysis of Ultrasound therapy by using numerical pain rating scale pre and post values of 8.50 and 0.41 the SD values are 0.79 and 0.50 and P value of <0.0001 and were deemed to have statistical significance.. In **Table 3**- includes the comparison of post test of both. By comparing the both dry needling with strengthening exercise and ultrasound therapy with strengthening exercise, the result with the dry needling with the strengthening exercise is more effective than the ultrasound with strengthening exercise. The post test values of dry needling with strengthening exercise is 2.29 and the post test values of ultrasound therapy with strengthening exercise is 4.42. The SD values of group A is 0.58 and 0.50. The T Value of the post test values is 16.1487 and the P value

is <0.0001 and the values are extremely statistically significant. In **Table 4** - the statistical analysis of dry needling by using 6 minute walk test pre and post values are 316.12 and 356.12 the SD values are 4.58 and 5.00 and P value of <0.0001 were deemed to have statistical significance. In **Table 5**- the statistical analysis of Ultrasound therapy by using 6 minute walk test pre and post values of 315.26 and 336.12 the SD values are 4.85 and 1.81 and P value of <0.0001 and were considered as statistically significant. In **Table 6**- By comparing the both dry needling with strengthening exercise and ultrasound therapy with strengthening exercise, the dry needling with the strengthening exercise is more effective than the ultrasound with strengthening exercise. The post test values of dry needling with strengthening exercise is 356.03 and the post test values of ultrasound therapy with strengthening exercise is 336.12. the SD values of group A is 5.28 and 1.81.the T Value of the post test values is 20.8174 and the P value is <0.0001 and the values are extremely statistically significant. These differences indicated that dry needling with strengthening is more effective than the ultrasound therapy with strengthening exercise.

Discussion

This research was carried out to find the effectiveness of dry Needling for plantar fasciitis on functional performance. The study objective was to evaluate the efficacy of dry needling in the healing process of plantar fasciitis using 6 minute walk test. The discussion may focus on whether there is a correlation between plantar fasciitis and walking performance as measured by the 6-minute walk test. Researchers might explore if individuals with plantar fasciitis exhibit lower walking distances or experience pain or discomfort during the test. The discussion may show how plantar fasciitis can impact functional limitations and endurance, which are key components assessed by the 6-minute walk test. Researchers might discuss if plantar fasciitis affects an individual’s ability to walk for an extended duration or maintain a consistent walking pace. Researchers may discuss the appropriateness of using the 6-minute walk test as an outcome measure for plantar fasciitis. They might consider whether the test adequately captures the functional limitations and endurance challenges experienced by individuals with plantar fasciitis. Dry needling has a significant

favorable impact on impairment over time when compared to a comparator intervention, according to moderate- to low-quality data we evaluated.¹⁵ Eftekharsadat B in 2016 conducted a study on A single-blind technique. Despite its minimal effect on ankle joint range of motion, This study discovered that by limiting the severity of heel discomfort, trigger point dry needling.¹⁶ Rathleff et al. (2014) were the only researchers to look at a symptomatic population. It was especially significant because High-load strength training has shown potential benefits in the treatment of degenerative tendon ailments such as achilles and patellar tendinopathy.¹⁷

Conclusion

In conclusion, this study provides compelling evidence supporting the effectiveness of dry needling as a treatment for plantar fasciitis. The significant improvements observed in plantar fasciitis symptoms and pain levels following the intervention align with recent research emphasizing the positive impact of pain relief on plantar fascia function. The combination of dry needling with strengthening exercises demonstrates promising results in reducing pain and providing relief for individuals suffering from plantar fasciitis.

Limitations

Because the findings of this study depend on the remarks made by each of the participants, they can be applied to the age groups that were examined. The study's sample was made up of individuals around the ages of 35 and 45; results could differ depending on the age group. Future studies with individuals who possess various levels of education could be done.

Ethical Clearance: Taken from institutional ethical committee (application number: (03/092/2022/ISRB/SR/SCPT)

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Conflict of Interest: The authors state that there is no conflict of interest

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