THE EFFECTS OF INTERFERENTIAL THERAPY FOR INDUSTRIAL WORKERS IN CASE OF PLANTAR FASCIITIS

1Himashree Das P.T.  
2Dr. Abhijit Dutta P.T.

ABSTRACT

Background: In the recent industrial set up, plantar fasciitis is one of the commonest problems faced by workers. It occurs mainly in the prolonged standing workers. There are some studies where some authors mentioned about interferential therapy as a treatment modality in plantar fasciitis but there is no such evidence supporting the use of IFT. Here comes the need of the study to find out the effects of the interferential therapy and also to find out whether the conventional therapy and interferential therapy are effective in plantar fasciitis for industrial workers. The aim of the study is to find out the benefit of the interferential therapy with the conventional therapy and also use conventional therapy alone for industrial worker in case of planter fasciitis.

Methods: A sample of 30 subjects were distributing randomly in two groups. These subjects were referred by the consultant physician and orthopedic surgeon. All the subjects were signed a consent form prior to participation in the study. Before receiving any intervention, on day zero outcome measures assessment were carried out for both groups subjects by VAS (Visual analog scale) for pain measurement, FFI (Foot Function index ) scale for activity limitation scores and goniometric measurement of active dorsi-flexion of ankle joint. Range of Motion (ROM) measurement for both group A and B were taken usual in slandered goniometry according Martin and White. On day 15th, all outcome measures re-assessment will be carried out for the result.

Results: In comparison of both interventions group B (IFT with conventional therapy) is more effective in decreasing pain (p = 0.00) improving functional ability (p = 0.00) than group A (only conventional therapy). For ROM, t = -0.642 the difference is not significant (p = 0.526). It has been inferred that conventional therapy and IFT with conventional therapy are equally effective for improving ROM.

Conclusion: In conclusion, this study indicating that there is a significant difference in the effectiveness of Interferential therapy over conventional therapy in plantar fasciitis for industrial workers. Even though improvement in range of motion is not differing in both group, pain and functional improvement is more in the group treated with IFT.

Keywords: plantar fasciitis, interferential therapy, industrial workers

Received 19th August 2015, revised 11th September 2015, accepted 27th September 2015

DOI: 10.15621/ijphy/2015/v2i5/78233

CORRESPONDING AUTHOR

2Dr. Abhijit Dutta P.T.  
Associate Professor  
HOD Dept. of Physiotherapy  
Assam down town University, Assam.
INTRODUCTION

Plantar fasciitis is one of the most common foot conditions, involving pain, tenderness, and inflammation in the plantar fascia. It is a prevalent problem affecting millions of people worldwide, with an estimated prevalence of more than 10% of the population. 

Plantar fasciitis is characterized by a gradual onset of pain, tenderness, and inflammation at the origin of the plantar fascia, often occurring during the early morning, especially after prolonged weight-bearing activity. The pain is exacerbated with activities involving repetitive use of the plantar fascia and is relieved with rest. In some cases, the pain may persist for months or even years. 

The pathophysiology of plantar fasciitis involves micro-tears and collagen degeneration at the origin of the plantar fascia, leading to inflammation and pain. Various factors, both intrinsic and extrinsic, contribute to the development of plantar fasciitis. Intrinsic factors include mechanical stress, poor footwear, and excessive pronation of the foot. Extrinsic factors, such as occupational stress, repetitive strain injuries, and obesity, also play a role in the development of plantar fasciitis. 

The primary treatment for plantar fasciitis involves conservative management, including rest, ice, compression, elevation, and the use of orthotics. In some cases, more invasive treatments such as injections, extracorporeal shockwave therapy, and surgery may be necessary. However, despite these treatments, there is no definitive cure for plantar fasciitis, and the condition may persist in some cases. 

Considering the prevalence and impact of plantar fasciitis, understanding its etiology, pathophysiology, and management is crucial for effective treatment and prevention. Further research is needed to identify potential preventive measures and to develop more effective treatment options for this common and often debilitating condition.
15th, all outcome measures re-assessment will be carried out for the result.

**Procedure**

**Group A:** In this group, the participants are treated with conventional therapy as follows;

a. Ultrasound for 5 minutes using continuous mode with frequency 1MHz is given three times once a week for 15 days. [fig 1]

b. Contrast bath was given for 20 minutes for 15 days. [fig 2]

c. Stretching exercises including plantar fascia stretching with tennis ball. For this subject was sitting on the chair rolling foot on the ball for 5 minutes. TA (pendo-achillis) stretching, done in standing by leaning against the wall, holding each stretch for 1 minute and repeating 5 times each session. Advice towel stretch to be done in home at least before getting out of bed. [fig 3,4,5]

d. Strengthening exercises for intrinsic muscles was done mainly towel curl up. For towel curl ups subject sat with foot flat on the end of towel which placed on a smooth surface. Keeping the heel of the floor, the towel was pulled towards the body by curling the towel with the toes, for 10 minutes. [fig 6]

**Group B:** In this group subjects received conventional treatment as group A, but added with interferential therapy. Interferential electrical stimulation was performed for 15 minutes, with four electrodes placed surrounding the plantar fascia and distally, two proximally at the calcaneus posteriorly [fig 7]. Subjects were treated 3 times per week for 15 days. Outcome measures were assessed, at the end of 15 days of intervention, based on VAS for pain, Foot Function Index and ROM of ankle dorsi-flexion.

**Data Analysis:** All analysis was carried out in SPSS Windows Version 20.0. Demographic data of patients include age is descriptively summarized. An alpha level of 0.05 was used to determine.
statistical significance. Statistical technique used for analysis the study was paired t-test and independent sample t-test. Paired t-test was performed to find out the effectiveness of interferential therapy and conventional therapy in plantar fasciitis for industrial workers. In other hand, independent sample t test was carried out to compare the both groups i.e. between control group and experimental group.

Table 1: within group analysis of Group A and Group B of VAS

<table>
<thead>
<tr>
<th>Group</th>
<th>Before Treatment</th>
<th>After Treatment</th>
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<tbody>
<tr>
<td>Group A</td>
<td>3.46 ± 0.83</td>
<td>2.46 ± 0.51</td>
</tr>
<tr>
<td>Group B</td>
<td>3.46 ± 0.74</td>
<td>1.60 ± 0.50</td>
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Table 2: within group analysis of Group A and Group B of FFI

<table>
<thead>
<tr>
<th>Group</th>
<th>Before Treatment</th>
<th>After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>42.61 ± 2.22</td>
<td>26.96 ± 3.97</td>
</tr>
<tr>
<td>Group B</td>
<td>43.68 ± 2.56</td>
<td>20.81 ± 3.17</td>
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</tbody>
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Table 3: within group analysis of Group A and Group B of ROM

<table>
<thead>
<tr>
<th>Group</th>
<th>Before Treatment</th>
<th>After Treatment</th>
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<tbody>
<tr>
<td>Group A</td>
<td>15.80 ± 2.85</td>
<td>17.86 ± 1.64</td>
</tr>
<tr>
<td>Group B</td>
<td>15.53 ± 2.66</td>
<td>18.33 ± 2.28</td>
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Table 4: To compare the effectiveness of interventions of A & B group for industrial workers in plantar fasciitis.

For ROM, t = -0.642 which is not significant (p = 0.526). It has been inferred that conventional therapy and IFT with conventional therapy are equally effective for difference in ROM.
Although the result of the study demonstrated that interferential therapy and conventional therapy both are effective for industrial workers in plantar fasciitis. But, when the subjects were treated with Interferential therapy, showed an additional benefit in terms of reduction of pain on VAS, functional ability in terms of FFI and significantly increase ROM in ankle dorsi-flexion.

RESULTS
Statistical interpretation shows results that pain decrease in both groups but group B shows better result than group A. It was found that in group A, t = 7.246 which is significant (p = 0.00). On other way, in group B, t = 11.297 which is also highly significant (p = 0.00). In comparison of both interventions group B (IFT with conventional therapy) is more effective in decreasing pain (p = 0.00) than group A (only conventional therapy). In case of FFI, there will be increase functional ability with t value = 13.74 in group A and t = 21.13 in group B where both are highly significant p = 0.00. However, the results concluded that more improvement of functional ability (p = 0.00) in group B than group A. For ROM, t = -0.642 the difference is not significant (p = 0.526). It has been inferred that conventional therapy and IFT with conventional therapy are equally effective for improving ROM.

DISCUSSION
Plantar fasciitis is a diseased condition which can be treated with wide variety of physiotherapeutic methods alone or sometimes along with some medical interventions. Various methods of physiotherapy exists with own claims success without any attempts of comparing the maximal effective methods.

The aim of the study is to determine the effectiveness of interferential therapy for industrial workers in case of plantar fasciitis. For this study, 2 groups were given interventions, where group A treated with only conventional therapy and group B treated with IFT combined with conventional therapy. For comparison, the effects of the interventions were measured by outcome measures VAS scale, FFI scale and objective measure ROM of ankle dorsi-flexion. Both groups showed significant improvement. But in case of group B, the amount of improvement was higher with decrease in pain, increasing functional ability when compared to group A and increasing ankle dorsi-flexion range is equal in both groups.

James Kofoworola Borlarin, mentioned about the interferential therapy which is a form of electrical stimulation commonly used to treat pain. According to him, it might use in treating plantar fasciitis as it has some similar effects like low frequencies which generally used to activate the mechanism, again providing a degree of pain relief. But he also reported that there will be no such evidence to support the use of effectiveness of interferential therapy for treating planter fasciitis.11

Sergio Jorge et.al, studied about the effectiveness of interferential therapy in reducing inflammatory pain and oedema. In their study they applied interferential therapy (4000Hz carrier frequency, 140-HZ amplitude modulated beat frequency, pulse duration 125 milliseconds, current intensity 5 mA) for 1 hour on the formation induce nociceptive response and edema and on carrageenan-induced mechanical hyperalgesia and edema was evaluated. In results they suggested that, interferential is effective in reducing inflammatory pain and should be considered as primary use in the control of acute inflammatory pain.12 Absorption of exudates is accelerated by a frequency of 1-10 Hz(rhythmic), as a rhythmical pumping action is produced which assists the normal absorption of exudates.13 Kelly A Long studied about the clinical decision making process related to choosing different interventions options with cost consideration for two patients with a diagnosis of planter fasciitis. Both received conservative physical therapy treatments 3 times per week for 3 weeks. Patient A’s treatment plan included iontophoresis with dexamethasone and on the other hand patient B’s treatment plan included interferential electrical stimulation. In the results, patient A had improved range of motion, strength, and decrease pain as compared with initial evaluation. On the other hand patient B did have some improvements in strength and pain levels but no range of motion.

Mark I Johnson et.al investigated the analgesic effects on interferential currents and Transcutaneous Electrical Nerve Stimulation on experimentally induced ischemic pain in otherwise pain-free volunteers. In the result they get that there were no difference in the magnitude of analgesia between IFT and TENS. Interferential currents reduced pain intensity to a great extent than shape electro-therapy. Whatever the proposed mechanism IFT is effective in relieving pain in plantar fasciitis patients. Further studies need to evaluate the mechanisms for therapeutic effects of IFT in treating planter fasciitis.

CONCLUSION
In conclusion, this study indicating that there is a significant difference in the effectiveness of Interferential therapy over conventional therapy.
in plantar fasciitis for industrial workers. Even though improvement in range of motion is not differing in both group, pain and functional improvement is more in the group treated with IFT.

REFERENCES


