

## Outcome of Corticosteroid Injection Versus Physical Therapy for the Treatment of Plantar Fasciitis. A Comparative Study

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### Abstract

**Objectives:** To assess the effect of physical therapy and corticosteroid injections injection on the intensity of pain in patients with plantar fasciitis and compare them to find the better option for first-line management and thereafter, to clarify and improve the management protocol of plantar fasciitis with the acceptable and simplest way.

**Materials and Methodology:** This is a randomized controlled trial conducted at the Department of Orthopaedics, Jinnah Post Graduate Medical Centre (JPMC), Karachi, Pakistan, from 1st January to 31st December 2017. Group A 50 participants underwent physical therapy and Group B 50 participants were given a single dose 80 mg Depomedrol (corticosteroid) injection deep under the planter fascia at planter fascia attachment on calcaneus. All patients were followed up two weeks, four weeks and at three months interval. Outcomes were assessed in terms of the mean visual analog scale (VAS) score, compared between the two treatment groups, first prior to treatment (baseline) and then after three months (final).

**Results:** Out of a total of 100 patients, the mean age of patients was  $41.83 \pm 14.07$  years. There were 62 males (53%) and 38 (47%) females. The mean duration of symptoms was  $4.37 \pm 4.81$  weeks. Group A reported a mean VAS score of  $3.62 \pm 2.63$  as compared to Group B reporting a mean score of  $1.13 \pm 1.24$ . A relatively greater improvement in final VAS ( $2.16 \pm 1.97$  from  $7.51 \pm 4.8$ ) was observed in group A as compared to group B ( $2.97 \pm 1.73$  from  $5.30 \pm 4.7$ ).

**Conclusion:** Long acting Corticosteroid injection has been sorted out as a better mode of treatment in comparison to physical therapy for short term symptomatic relief.

Although more comparative studies on larger scales are needed for labeling the best option and producing a centralized guideline for the treatment of plantar fasciitis.

**Keywords:** Corticosteroid Injection; Physical Therapy; Plantar Fasciitis

### Introduction

Post rest Painful heel commonly denotes plantar fasciitis (PF) is a most frequently consulted symptom in Orthopaedic practice [1]. The "plantar fasciopathy" suites most to this condition than Fasciitis as none of the inflammatory changes and markers are found raised on ultrasound, histopathology or in blood tests respectively [2,3]. An increased basal metabolic index has commonly been associated with PF [2-4]. Habitual runners are more prone to developing the condition, but it can also occur in people with sedentary lifestyles and with recently putting on weight. 80% of cases improve within 12 months after the appropriate treatment [3]. It usually incepts by a strong tensile stretch in the fascia that is aggravated with repetitive activation and loading [5]. Flat foot deformity and post trauma ankle deformity are other causative factors.

It is usually diagnosed clinically on complains of a stabbing, non-radiating pain that is worse at the start of the day and post rest, resolving quickly, with increasing intensity on continued weight bearing and walk. Moreover, tenderness is felt on palpating deep on the medial calcaneal tubercle at the plantar surface. Ultrasound and radiography is a handy tool in chronic cases, with or without formation of a spur.

There are several ways of treating PF, however, there is very little consensus on a solitary clinical approach supported by an evidence based research [6]. Commonly practiced in 90% of cases, conservative treatment includes nonsteroidal anti-inflammatory drugs, physical therapies and heel care sponges, these have been observed to produce the same kind of temporary pain relief [2,7]. Whereas, in refractory cases having no relief in 6 - 12 months standing symptoms are prone to surgical management [8,9].

Various studies including a meta-analysis comparing CS injections with and other modes of treatment including local injection of platelet-rich plasma (PRP) and foot orthoses revealed corticosteroid local injections were found to be more effective than the other two, although their effectiveness was similar to placebo [10]. Whereas, other two studies [1,11] comparing CS usage with PRP, reported better outcomes in the PRP group with greater reduction in visual analog scale (VAS) scores and thickness of plantar fascia, and better improvement in limb function [11].

However, PRP therapy could not gain popularity in our natives due to its cumbersome technique and significantly high cost.

There are very limited studies available that directly compare CS injection with physical therapies. The main objective of our study has been designed to assess the effect of physical therapy and CS injection with reference to intensity of pain (scored on VAS) and compare them to find the better, simple option for first-line management. And thereafter, to clarify and improve the management protocol of plantar fasciitis in the simplest and low-cost methodology, then to facilitate health care professionals in countering this painful condition.

### Materials and Methodology

This randomized controlled trial was conducted at the Department of Orthopaedics, Jinnah Post Graduate Medical Centre (JPMC), Karachi, Pakistan, for a period of one year from 1<sup>st</sup> January to 31<sup>st</sup> December 2017. The study was conducted with prior ethical approval from Institutional Review Board (IRB) at JPMC and an informed written consent from the patients.

A total of 100 patients (50 in each group) of either gender, aged 25 - 60 years were diagnosed clinico-radiologically with plantar fasciitis and without any other comorbidity (such as gout, diabetes mellitus, hypertension, ischemic heart disease, osteomalacia) were registered. Only those having heel pain for 2 - 24 weeks and VAS score > 5 were included. Patients with foot deformity (including pes cavus or pes planus), those receiving previous/alternate treatments (like herbal or acupuncture), and those with recurrent heel pain were not taken into consideration.

Patients were randomized at the time of presentation with their choice of selection for groups A and B.

Group A underwent physical therapy by a trained physiotherapist. This included cryotherapy (10 minutes), therapeutic ultrasound (3 minutes) and stretching exercises of the plantar fascia (5 minutes), Achilles tendon (5 minutes) and calf muscles (5 minutes) for two weeks (12 sessions with each session of 28 minutes). Group B participants were given a single dose long acting corticosteroid injection (Depomedrol 80mg) admixed with 0.5 cc local anesthetic (plain xylocaine 2%) injected by a 10 cc disposable syringe under all aseptic measures. The injection was given deep under planter fascia at the tender most area of the heel at the attachment of planter fascia at the calcaneum using the palpation method.

All patients were also advised to take an analgesic, once a day tablet Piroxicam 20 mg for two weeks. They were followed-up at two weeks, four weeks and at three months interval. Clinical assessment and mean VAS scoring were done at presentation and on follow-up

visits. Data were recorded on a predesigned proforma. Outcomes were assessed in terms of the mean VAS score, compared between the two treatment groups, first prior to treatment (baseline) and then on the final visit after three months.

Data was analyzed in SPSS version 16. Continuous variables i.e. age, mean VAS and duration of pain, were analyzed as means with standard deviations. Categorical variables i.e. gender and the side of foot were analyzed as proportions and percentages. The mean values of age, duration of symptoms and pain score (VAS) were compared between the two groups by using a paired-sample t-test and at two instances (baseline and last follow-up visit) were compared by using independent samples t-test. P-values < 0.05 were considered significant.

Potential confounders and effect modifiers for pain were controlled after stratification of data by age, gender, baseline pain scores, final pain score, side of foot and duration of pain and paired sample t-test were applied to see the effect of these on the outcome variable.

**Results**

The table 1 reflects the basic demographics that shows mean age of patients as 41.83 ± 14.07 years, male gender preponderance i.e. 62 (53%) and left side laterality involvement little higher. The mean duration of symptoms was 4.37 ± 4.81 weeks.

|                              | Group A (Physical therapy) (n = 50) | Group B (corticosteroid injection) (n = 50) | Total | p-Value |
|------------------------------|-------------------------------------|---|-------|---------|
| Age (years)                  | 29.83 ± 8.8                         | 44.1 ± 21.9                                 |       | 0.0001  |
| <b>Gender</b>                |                                     |   |       |         |
| Male                         | 35 (70%)                            | 27 (54%)                                    | 62    | 0.099   |
| Female                       | 15 (30%)                            | 23 (46%)                                    | 38    |         |
| Duration of symptoms (weeks) | 4.75 ± 5.187                        | 3.93 ± 4.413                                |       | 0.396   |
| <b>Side of foot</b>          |                                     |   |       |         |
| Left                         | 18 (36%)                            | 21 (42%)                                    | 39    | 0.577   |
| Right                        | 22 (44%)                            | 26 (52%)                                    | 48    |         |
| Bilateral                    | 8 (16%)                             | 5 (10%)                                     | 13    |         |

**Table 1:** Baseline characteristics (n = 100).

The table 2 reflects on visual analogue score pre and post treatment for both groups. The overall mean pain score achieved was 2.27 ± 2.31. Group A reported a mean pain score of 3.62 ± 2.63 as compared to Group B reporting a mean score of 1.13 ± 1.24. The mean pain scores were found to be highly significant between the two groups (p = 0.001). Statistically significant differences were found and injection therapy was found to be more effective in reducing pain.

|                              | Group A (Physical therapy) (n = 50) | Group B (corticosteroid injection) (n = 50) | p-value |
|------------------------------|-------------------------------------|---|---------|
| Baseline visual analog score | 5.30 ± 4.7                          | 7.51 ± 4.8                                  | 0.017   |
| Final visual analog score    | 2.97 ± 1.73                         | 2.16 ± 1.97                                 | 0.031   |

**Table 2:** Visual analog score of both groups.

In table 3, the VAS scores are distributed on the basis of other variables where significant differences were found in baseline scores of both genders, final score of females, and all scores of the two age groups.

|                                     | Group A (Physical therapy) (n = 50) | Group B (corticosteroid injection) (n = 50) | p-value |
|-------------------------------------|-------------------------------------|---|---------|
| <b>Baseline visual analog score</b> |                                     |   |         |
| Male                                | 1.20 ± 1.08                         | 3.18 ± 2.74                                 | 0.002   |
| Female                              | 1.24 ± 0.32                         | 2.63 ± .58                                  | 0.0016  |
| <b>Final visual analog score</b>    |                                     |   |         |
| Male                                | 0.20 ± 0.56                         | 0.76 ± 0.97                                 | 0.059   |
| Female                              | 0.00 ± 0.00                         | 0.94 ± 0.19                                 | 0.008   |
| <b>Baseline visual analog score</b> |                                     |   |         |
| Age 18 - 35 years                   | 0.772 ± 0.193                       | 2.507 ± 0.573                               | 0.001   |
| Age 36 - 80 years                   | 1.453 ± .388                        | 2.755 ± .601                                | 0.001   |
| <b>Final visual analog score</b>    |                                     |   |         |
| Age 18 - 35 years                   | 0.250 ± 0.062                       | 0.991 ± 0.227                               | 0.003   |
| Age 36 -80 years                    | 0.535 ± 0.091                       | 0.956 ± 0.171                               | 0.039   |
| <b>Baseline visual analog score</b> |                                     |   |         |
| Left                                | 0.54 ± 0.13                         | 2.00 ± 0.44                                 | 0.311   |
| Right                               | 1.39 ± 0.53                         | 2.64 ± 0.73                                 | 0.004   |
| Bilateral                           | 1.25 ± .34                          | 2.76 ± .83                                  | 0.09    |
| <b>Final visual analog score</b>    |                                     |   |         |
| Left                                | 0.00 ± 0.00                         | 1.00 ± 0.50                                 | 0.041   |
| Right                               | 0.79 ± 0.29                         | 0.99 ± 0.27                                 | 0.114   |
| Bilateral                           | 0.00 ± 0.00                         | 0.93 ± .29                                  | 0.113   |

Table 3: Visual analog scores (pain scores) on the basis of different characteristics.

## Discussion

Plantar fasciitis very frequently disturbs the quality of life, yet in most instances it has shown to resolve without causing any irreversible damage with various treatment modalities used. The use of corticosteroid injection at painful heel has become a common practice in 75% of Orthopedic consultations due to its significant relief for a year or 2 and thereafter. However, few patients get temporary relief of few weeks and no significant effect [11,12]. Eslamian F, *et al.* in their clinical trial evaluated local CS injections versus Extracorporeal shock-wave therapy (ESWT) for chronic PF and found that although statistically insignificant, ESWT gave better functional results, with greater patient satisfaction [8]. Whereas, Verma D., *et al.* and Crawford F., *et al.* [11,12] compared the use of CS injections and PRP in plantar fasciitis and found significantly reduced scores in the initial 12 weeks when CS injections were used. On the other hand, PRP showed a slower but continuous decline in the VAS [11]. Although significant efforts have been made to evaluate the efficacy of all individual treatments of PF in the long-term and comparing them with each other, there is no significant data that highlights the most effective first-line or acute management technique. In our situations the PRP and ESWT are not available everywhere, even in our cosmopolitan cities, the option remains use of corticoid injection and physical therapy modalities. Similar to few studies [8,12-15], we found more satisfaction amongst our patients with corticoid injection therapy compared to who got PRP injection therapy and Physical therapies, as that needs a cumbersome

preparation and regular visits to physiotherapist, respectively. The lower cost, less complexity and rapid pain relief as similar as with PRP and other modalities, are thus the positive factors with corticosteroid therapies and most acceptable by the patients.

Similar to reports [1,4-9,12-15] using the commonly practiced VAS for the calibration of pain in our study, a relatively greater improvement in final VAS ( $2.16 \pm 1.97$  from  $7.51 \pm 4.8$ ) was observed in CS group as compared to physical therapy group ( $2.97 \pm 1.73$  from  $5.30 \pm 4.7$ ), which elaborates the effectiveness of CS injections in the resolution of pain in plantar fasciitis.

Johannsen FE., *et al.* reported study on three groups, one in which strength training and stretching were done, second provided with CS injections, and the last one getting both. The combination strategy overshadowed the rest, by producing the best outcome in both the short and long-term [16]. Interestingly, best therapeutic outcomes are expected by combining CS injections with the physiotherapy that also needs further investigation.

The third and fourth decade is the most vulnerable age group for plantar fasciitis [17], just like our results, where the majority of the individuals belong to this age group. Although a subtle male predominance (53%) is seen in our study, the other authors revealed females preponderance, with increasing risk as the age progresses [9,17].

A certain period of rest is required post-corticosteroid therapy, though claimed to have a good safety profile, good relief with corticoids but chances of relapse are there. Additionally, multiple injections pose a risk of rupture of the plantar fascia, atrophy of fat pad and lesion of medial plantar nerve. Keeping these in mind, many investigators have tried to find a more appropriate first-line management technique for PF by working on available options and compared those with CS injections [1,6,8,10-12,18,19].

The limitation of the current study is, that it was a short-term follow-up and the status of pain was only assessed after three months, not beyond that, which if done would have determined the long-term efficacy, or changing patterns of the included management techniques.

Further point to look up for in the future efforts include the efficacy of local anesthesia in the reduction of pain while injecting CS, comparing the advantages and disadvantages of different administration techniques (palpation guided or ultrasound-guided injection) of CS and weighing the risk and benefits of CS for further clarifying the way of treating plantar fasciitis.

### Conclusion

Although the PRP and ESWT has been found more effective than corticosteroid injection therapy, but in our situations where this facility is not available, except at very few centers that too at only at cosmopolitans and generally non-affordable. The evidence-based reports including this report support the use of low cost, less cumbersome technique of corticoid injection for short to long term relief.

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