Stretching Exercise versus Local Corticosteroid Injection in Plantar Fasciitis: A Comparative Study

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ABSTRACT

Introduction: Plantar fasciitis is an inflammatory painful condition, one of the most common causes of heel pain. The cause of it is multifactorial; and different treatment modalities are available. **Aims**:To compare the effectiveness between the stretching exercise and corticosteroid injection. **Methods**:This study was conducted at Nepalgunj medical college, in the department of orthopedics from September 2019 to September 2020. Patients were equally divided into two groups. In Group A corticosteroid injection was given and in group B stretching exercise was advised. Patients were followed up at two weeks, 8weeks and 16weeks; pretreatment and post-treatment pain level was assessed by Visual Analog Scale (VAS) and Functional outcome was assessed by Foot and Ankle Ability Measure (FAAM) Scale. **Results**: Both groups were comparable in relation to age and sex. There was significant decrease in pain and improvement of function in steroid group at two weeks and eight weeks follow up; whereas at 16weeks follow up plantar fascia stretching groups improved significantly. **Conclusion**: For short term relief local corticosteroid injection is superior; but for long term relief in pain and improvement in function plantar fascia stretching exercise is better treatment option.

***Keywords*:** FAAM, Local corticosteroid injection, Plantar fasciitis, Stretching exercise, VAS score

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INTRODUCTION

Plantar Fasciitis (PF) is an inflammatory and painful condition occurring at the site where the medial part of the plantar fascia attaches to the calcaneus.[1] The term "plantar fasciitis" has been misleading since degenerative and thickening of the tissue are common than inflammatory changes, so the term 'plantar fasciopathy' better define this disorder.[2] Around 20 lakh people worldwide receive treatment every year for this condition.[3] The etiology of PF is unknown. Various risk factors, including flat foot, advancing age, obesity, inappropriate footwear, and decrease in ankle dorsiflexion, have been associated with plantar fascia disorders.[4,5,6] There is a lack of evidence to confirm an association between the presence of calcaneal spur and PF.[7]

Diagnosis is clinical; typical presentation is 'start-up pain', of the heel on first step in the morning or after a period of rest that gets better after walking for a while. Highest incidence is between 45 and 65 years of age and bilaterality in 1/3 of patients.[8] About 90% of patient can be successfully treated conservatively. Numerous conservative treatment methods include shoe inserts, NSAIDs, night splints, stretching exercises, extracorporeal shockwave therapy (ESWT), corticosteroid injection, botulinum toxin (botox) injection, taping, and casting are described, however, no single treatment has been proven to reduce heel pain.[9] Surgery should be considered last resort for patients who have not responded after 6-12 months of conservative therapy.[10] Commonly used method is partial open or closed plantar fasciotomy and nerve decompression.[11]

This study was done to compare between stretching exercises of plantar fascia and local corticosteroid injection for treatment of plantar fasciitis.

METHODS

The present study was conducted at the Nepalgunj medical college, in the department of orthopedic surgery within the span of one year in between September 2019 to September 2020 after the approval of ethics committee. This was a hospital based comparative study.

Patients with plantar fasciitis satisfying inclusion criteria; were enrolled after taking consent and equally divided into two groups. Group A was managed with local corticosteroid injection and group B with planter fascia stretching exercise. Patients of 18 to 60 years of age with typical features of plantar fasciitis i.e., 'start-up pain', at the plantar medial aspect of the heel on first step in the morning or after a period of rest that gets better after walking for a while were included. Exclusion criteria were the patient with chronic or inflammatory systemic disease, previous history of heel fracture or surgery, and heel pain due to causes other than plantar fasciitis. Patients were followed up for 2weeks, 8weeks and 16weeks; pretreatment and post-treatment pain level was assessed by Visual Analog Scale (VAS) and Functional outcome was assessed by Foot and Ankle Ability Measure (FAAM) Scale.

The method of stretching exercise was as follows: patient seats on a chair and puts affected foot over contralateral knee; and with ipsilateral hand pushes back toes upward toward the shin until a stretch was felt in the sole of the foot. The patient should stretch plantar fascia for 10 second of 10 sets for three times a day. In corticosteroid group, under aseptic precaution with 18-gauge needle attached to 5ml syringe containing a mixture of 40mg methylprednisolone and 2ml of 2% lignocaine was injected at the site of maximal pain at the palm of the foot, the needle was inserted by the medial approach.

VAS score

The visual analog scale (VAS) is a validated, unidimensional, subjective measure of pain intensity, which has been widely used in diverse adult population. A horizontal 10cm line was drawn on a paper and participants were asked to mark a point on the line that best defined the present pain level, where 0 indicated no pain and 10 indicated unbearable pain.[12] Visual analogue scale was taken pre-interventionally and at each follow up.

Foot and Ankle Ability Measure (FAAM)

The FAAM is a self-report outcome instrument developed to assess physical function for individuals with foot and ankle related impairments. FAAM is a 29-item questionnaire that is divided into two sub-scales: Activities of Daily Living (ADL) (21 items) and the Sports sub-scale (8 items).[13] For this study we used only ADL subscale. The response to each item on the ADL subscale is scored from 4 to 0, with 4 being 'no difficulty' and 0 being 'unable to do'. The score on each of the items are added together to get the item score total. The total number of items with a response is multiplied by 4 to get the highest potential score. The item score total is divided by the highest potential score. This value is then multiplied by 100 to get a percentage. Higher scores represent higher levels of function, with 100% representing no dysfunction.

Figure 1: Plantar fascia specific stretching exercise

Figure 2: Local corticosteroid injection

RESULTS

In our study total number of patients was forty-six. The mean age and the gender distribution in both the groups were similar. Out of forty six patients 30 (65.27%) were females and 16 (34.78%) were males, with ratio of 1.87:1 as shown in table I and figure 3.

Study group	Mean value of age	SD of mean age
Stretching group	44.13	11.967
Steroid group	45.65	10.865

Table I: Mean age

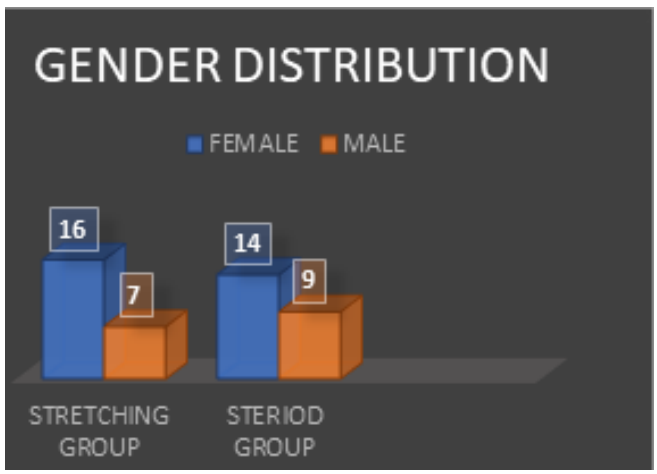

Figure 3: Distribution according to the gender

According to obtained results which are shown in table II and III, FAAM and VAS scores were similar in both groups before any interventions. Our study demonstrated significant improvements in pain relief and functional outcomes in both groups (P <.05) at the 2, 8 and 16weeks followups compared to pretreatment status.

The results of our study suggested that steroid injection group (group A) had better clinical outcomes in term of pain (VAS score) and functions (FAAM score) than stretching group at the follow up periods of 2weeks (VAS P- <0.001, FAAM P- <0.001) and 8weeks (VAS P- 0.018, FAAM P- 0.002). However, at 16 weeks follow up stretching group (group B) had better clinical outcome than compared to steroid group (P value <0.001).

	STRETCHING GROUP FAAM	STEROID GROUP FAAM	P VALUE
PRE-TREATMENT MEAN +/- SD	43.434 ±4.076	44.434±3.526	0.378
2WK MEAN +/- SD	53.130±5.610	63.130±3.298	<0.001
8 WK MEAN +/- SD	60.260±4.514	64.434±4.054	0.002
16 WK MEAN +/- SD	67.391±3.473	62.521±3.102	<0.001

Table II: Mean FAAM score before treatment and at follow up

	STRETCHING GROUP (mean SD) VAS scores	STEROID GROUP (mean SD) VAS scores	P VALUE
PRE-TREATMENT	7.260±1.009	6.869±.814	0.155
2WK MEAN +/- SD	5.087±1.202	3.130±868	<0.001
8 WK MEAN +/- SD	3.695±1.063	2.959±.976	0.018
16 WK MEAN +/- SD	2.304±.822	3.260±540	<0.001

Table III: Mean VAS score before treatment and follow up

DISCUSSION

Plantar fasciitis is the most common cause of heel pain for which patient come to the hospital.[14] Various modalities of treatment are available both in surgical and conservative. Plantar fascitis is a self-limiting condition that responds to conservative treatment in almost 90% of patients within 9 to 12 months from the onset of symptoms and surgery should only be considered when this time had elapsed.[15] Although it is still not clear which treatment options is superior so must of the time in our practice, we use combinations of treatment. Celik et al[16] evaluated patients functional score using foot and ankle ability measure (FAAM) and pain by visual analog score (VAS). Results of their study concluded that patients with planter fasciitis exhibit short term relief with local steroid injection group whereas manual stretching group showed slow but steady decline in pain and functional improvement in one year follow up. The results of our study are comparable suggesting that steroid injection provides better short-term results but stretching exercise provides long term improvements as compared to steroid injection group, as evidenced by the 16weeks follow up data. Genc H et al[17] conducted a study and found VAS score in the plantar fasciitis group decreased significantly after one month of steroid injection and further decrease was noted 6monthpost injection. Thus, they concluded that steroid injection could be used in plantar fasciitis treatment for its long-term effects. Which in contrast to our study we found that effectiveness of steroid injection decreased at 16weeks as compared to 2weeks and 8weeks follow up.

A study done by Benedict et al[18] in 2006 reported that stretching is more effective than other methods. Their results showed that 92% of all patients were satisfied and 77% did not have any problem or limitation in performing stretching techniques. The authors concluded that stretching of plantar fascia is more effective and less expensive in comparison to other treatments. Which is comparable to our study.

Siavashi B and colleagures[19] concluded that there is no difference between corticosteroid injection and stretching exercises in plantar fascitis in long-term follow-up, and considering this fact that complications such as weakness and sometimes rupture of plantar fascia and fat pad atrophy are attributed to frequent corticosteroid injection, long-term injection of corticosteroid is not recommended for plantar fasciitis. For long term management of this condition, it seems that stretching exercises are more safe and appropriate methods. Ryan et al[20] showed that participants who underwent stretching exercises daily over a 12weeks period had significant improvements during the six weeks and 12weeks follow-up compared to baseline, although the improvement was not significantly better than the corticosteroid injection group. Compared to afore mentioned study, in our study we found that effectiveness of stretching exercises was better in long term follow up.

From this study it is recommended that for long term benefit stretching exercise is definitely better than steroid injection. Local steroid injection though more effective than stretching exercise initially, it should be reserved for non-responsive cases having severe pain because it is associated with complications like injection site infection, heel pad atrophy, spontaneous plantar fascia rupture and flattening of longitudinal arch of foot though none of the mentioned complications observed in our study.

LIMITATIONS

Limitations of our study are smaller sample size and short

duration of follow up. The outcomes measures are very simple and stratification exists. The patients could have been followed up for longer duration to evaluate the long-term benefits. Lack of blinding could have resulted in researcher bias. If another investigator would have recorded the outcome, it may have resulted in more reliable readings. As such further new studies are needed over a longer period of time with large enough sample.

CONCLUSION

Our study concluded that for short term relief local corticosteroid injection is superior than stretching group. But for long term relief planter fascia stretching exercise was more effective and safer than local steroid injection. So, our study recommended planter fascia stretching exercise as a preferred method of treatment because it is noninvasive, avoid complications related to steroid injection, cost effective and long-lasting effects.

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