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Original Research Article

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

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Abstract:

Background and Objectives: A painful ailment with a insidious onset, plantar fasciitis affects the area where the plantar fascia inserts in the calcaneus. One of the most common causes of heel discomfort in the inferior portion is plantar fasciitis. Effective techniques for treating symptoms include appropriate physical programmes, stretching of the plantar fascia and Achilles tendon, removing their stiffness, and strengthening of the interosseous plantar muscles. However, using corticosteroid injections or NSAIDs (steroidal and non-steroidal anti-inflammatory medicines) at the location of pain has been shown to reduce discomfort. For patients who have not improved after 6–12 months of conservative treatment, surgery should be the final option. While several techniques have been attempted in conjunction for therapy, none of them has proven to be particularly effective. This study compared two popular treatment modalities: plantar fascia stretching exercises and topical corticosteroid injections.

Material and Methods: 120 patients participated in this clinical research, which was carried out at Government Bundelkhand Medical College in Sagar, MP, between 2019 and 2023. The Foot and Ankle Ability Measure (FAAM) Scale was used to measure functional result, and the Visual Analogue Scale (VAS) was used to measure pain level before and after the intervention, between weeks two and ten. The chi-squared and t tests were used to compare the outcomes of the two groups. P value ≤0.05 was used as the significance level. For all statistical studies, SPSS software for Windows (Version 11.5) was used.

Results: Regarding the two groups' demographic profiles, they were likewise similar. When compared to the group that underwent stretching activities, the pain and functioning (FAAM score) in the corticosteroid group significantly improved on the second evaluation during the second week of the trial. After ten weeks, both groups experienced less severe pain, although it was still equivalent.

Conclusion: Our research found that stretching groups are not as effective as local corticosteroid injections for providing temporary comfort. However, local steroid injection proved less safe and less effective than plantar fascia stretching exercise for long-term alleviation. As a result, our research suggested plantar fascia stretching exercise as the recommended course of therapy due to its noninvasive nature, ability to prevent steroid injection-related problems, affordability, and long-lasting benefits.

Keywords: Local Corticosteroid Injection; Plantar Fasciitis; Stretching exercise.

Introduction

A painful ailment with a sneaky beginning, plantar fasciitis affects the area where the plantar fascia inserts in the calcaneus. One of the most common causes of heel discomfort in the inferior portion is plantar fasciitis. [1] Common symptoms include discomfort during the patient's first weight-bearing stride in the morning, pain relief following these initial steps, pain returning during the day after rising from extended sitting or resting positions, and a clinical diagnosis can be made. Since pathological examination of the fascia usually indicates degeneration over inflammation, some doctors prefer to refer to the condition as plantar fasciopathy instead of plantar fasciitis in order to downplay the inflammatory component. [2]. the most frequent aetiology of plantar fasciitis is biomechanical stress of the plantar fascia at its enthesis of the calcaneal tuberosity, albeit the reason might be complex. [3] Plantar fascia biomechanical stress can be caused by obesity, restricted ankle joint dorsiflexion, prolonged weight bearing, posterior muscle group tension, and

unnatural gait or running patterns. [2] Other aetiologies, such as certain vocations, anatomical differences in the foot, biomechanic issues in the foot, and wearing improper shoes, have been hypothesised, nevertheless. The majority of cases of this illness are reported by women in their 40s and 60s. [11]

Other aetiologies, such as certain vocations, anatomical differences in the foot, biomechanic issues in the foot, and wearing improper shoes, have been hypothesised, nevertheless. The majority of cases of this illness are reported by women in their 40s and 60s. [5]

The majority of the time, resting with no weight on the foot relieves discomfort [6], and occasionally, switching to soft insole footwear for shoes reduces the symptoms. Effective techniques for treating symptoms include appropriate physical programmes, stretching of the plantar fascia and Achilles tendon, removing their stiffness, and strengthening of the interosseous plantar muscles. As a result, some patients have attempted to turn a tennis ball with their plantar aspects or bend forward while standing close to a wall with their plantar aspects on the ground [7]. However, using corticosteroid injections or NSAIDs (steroidal and non-steroidal anti-inflammatory medicines) to the location of discomfort has been shown to be useful in reducing pain. [8]

Additional therapeutic approaches, such as though many conservative treatment approaches are described, no single treatment has been shown to be effective in treating heel pain.

These approaches include shoe inserts, night splints, stretching exercises, extracorporeal shockwave therapy (ESWT), corticosteroid injection, botulinum toxin (botox) injection, taping, and casting.

For patients who have not improved after 6–12 months of conservative treatment, surgery should be the final option. Nerve decompression and partial or closed plantar fasciotomies are often employed techniques.

While several of these methods have been employed in conjunction for therapy, none of them have proven to be very effective. [9-10] this study compared two popular treatment modalities: plantar fascia stretching exercises and topical corticosteroid injections.

Aim and Objectives:

This study compared two popular treatment modalities: plantar fascia stretching exercises and topical corticosteroid injections.

Materials and Methods:

This research was carried out as a clinical trial at Government Bundelkhand Medical College in Sagar, MP, between 2019 and 2023. Treatment for planter fasciitis, which was identified clinically based on physical examination and manifested as heel discomfort and sensitivity on the plantar medial aspect of the calcaneal tuberosity, close to the plantar fascia's insertion, was administered to 120 patients. Based on the therapy they got, the patients were split into two groups, and the outcomes of each group were compared. Patients having a history of at least six months of heel pain and a clinical diagnosis of plantar fasciitis were included in the study. The first sixty consecutive patients with a planter fasciitis diagnosis made up Group A, while the next sixty patients made up Group B.

Exclusion criteria:

- Previous foot surgery
- Acute traumatic rupture of the plantar fascia
- PF in immature bones
- Baxter’s neuropathy
- Associated chronic systemic diseases
- Preexisting inflammatory disorder
- Severe trauma to the heel or fracture of the heel
- Heel pain due to causes other than plantar fasciitis

Complete blood count, blood sugar, serum calcium, phosphorus, alkaline phosphatase, erythrocyte sedimentation rate, and C reactive protein were assessed in order to rule out any potential reasons of heel discomfort.

Radiographs of the problematic foot taken laterally and anteroposteriorly were also assessed. Following signed agreement, the patients were then split into two therapy groups. In the corticosteroid group, an 18-gauge needle was inserted via the medial approach at the site of maximal pain at the planter aspect of the foot, using aseptic precaution. The needle was attached to a 5 ml syringe containing a mixture of 40 mg methylprednisolone and 2 ml of 2% lignocaine. The patient was then placed on bed rest for 24 hours.

The Foot and Ankle Ability Measure (FAAM) Scale was used to measure functional result, and the Visual Analogue Scale (VAS) was used to measure pain level before and after the intervention, between weeks two and ten. In the other group, plantar fascia stretching was recommended. The exercise involved the patient sitting in a chair, placing the afflicted foot over the contralateral knee, and using the ipsilateral hand to press the rear of the foot upward towards the shin until the sole of the foot felt stretched.

Similar to the first group, the patient should stretch their plantar fascia three times a day for ten seconds each of ten sets, both before and after the intervention at weeks two and ten. Both the functional outcome (FAAM) and the pain assessment (VAS) were utilized.

VAS score: The visual analogue scale (VAS) is a commonly used subjective one-dimensional pain intensity measure in a broad adult population that has been validated. On a piece of paper, a horizontal 10 cm line was created. Participants were asked to identify the position on the line that best represented their current pain threshold (0 being no pain and 10 being excruciating agony). [12] Before beginning the intervention and during each follow-up, a visual analogue scale was used.

Foot and Ankle Ability Measure (FAAM): A self-report outcome tool called the FAAM was created to evaluate physical function in people with disabilities connected to the foot and ankle. The Activities of Daily Living (ADL) sub-scale (21 items) and the Sports sub-scale (8 items) make up the two sub-scales of the 29-item FAAM questionnaire. [13] All ADL subscales were employed in this investigation. Every response on the ADL subscale has a value between 4 and 0, where 4 represents "no difficulty" and 0 represents "unable to do." The overall item score is calculated by adding the scores for each item. To obtain the maximum possible score, multiply the total number of items with an answer by 4. The greatest possible score is divided by the total item score. The percentage is then obtained by multiplying this figure by 100. Greater scores indicate greater functioning levels, while a score of 100% indicates no malfunction.

The chi-squared and t tests were used to compare the outcomes of the two groups. P value ≤0.05 was used as the significance level. All statistical analyses were performed with Windows SPSS programme (Version 11.5).

Results:

Up until the study's conclusion, 80 patients were still there. The mean age of the two groups was 51.5 years for the stretching exercise group and 52.5 years for the corticosteroid group, respectively, based on the obtained data. The genders of the two groups were likewise similar. The two groups' mean weight and height were likewise comparable, with no discernible statistical differences.

The clinical examination, which is shown in Tables 1 and 2, indicates that before any intervention, the two groups' pain functions and severity (FAAM score) were essentially equal. In contrast to the group that underwent stretching exercises, the pain and functioning (FAAM score) in the corticosteroid group shown a substantial improvement on the second evaluation during the second week of the trial. After ten weeks, both groups experienced less severe pain, although it was still equivalent.

Table 1: Pain severity before intervention and after 2 and 8 weeks following intervention

	Mean pain severity with stretching group	Mean pain severity in corticosteroid group	P value
Before Intervention	7.5	7.3	0.7
After 2 week	4.5	2.2	0.3
After 10 week	2.4	2.0	0.23

Table 2: Mean FAAM score before treatment and at follow up

	Mean FAAM with Stretching group	Mean FAAM corticosteroid group	P value
Before Intervention	43.434 ±4.07	44.434±3.52	0.378
After 2 week	53.130±5.61	51.025±2.34	0.251
After 10 week	64.391±3.47	62.156±6.45	0.002

Discussion:

The most frequent reason for heel discomfort that patients visit the hospital is plantar fasciitis. [14] There are several treatment options, including both conservative and surgical methods. Surgery should only be considered after this period of time has passed because plantar fasciitis is a self-limiting illness that responds to conservative therapy in almost 90% of patients within 9 to 12 months after the beginning of symptoms. [15] In our practice, we frequently employ combinations of treatments, even if it is still unclear which choice is better. Celik et al. [16] assessed the functional score of the patients using the Visual Analogue Scale (VAS) for pain and the Foot and Ankle Ability Measure (FAAM). According to their study's findings, individuals with planter fasciitis who receive a local steroid injection have immediate relief, while those who receive manual stretching see a gradual improvement in their pain and functional abilities over the course of a year.

Our study's comparable results indicate that while stretching exercise improves long-term outcomes compared to the steroid injection group, the 16-week follow-up data shows that steroid injections produce superior short-term effects. In a research

by Genc H et al. [17], it was discovered that the plantar fasciitis group's VAS score considerably dropped following a month-long steroid injection, and that the decline continued six months later. They came to the conclusion that steroid injection might be employed to treat plantar fasciitis in the long run. Contrary to what we discovered in our trial, the efficacy of steroid injection dropped after 16 weeks as opposed to the 2 and 8 week follow-up periods.

According to a 2006 research by Benedict et al. [18], stretching is more successful than other techniques. According to their findings, 77% of patients reported having no difficulties or limitations while using stretching techniques and 92% of patients expressed satisfaction. Similar to our study, the authors determined that stretching the plantar fascia is a more cost-effective and successful therapy than other approaches.

In long-term follow-up, Siavashi B and colleagues [19] found no difference between corticosteroid injection and stretching exercises for plantar fasciitis. Taking into account that frequent corticosteroid injection is linked to complications like weakness and occasionally rupture of the plantar fascia as well as atrophy of the fat pad, long-term corticosteroid injection is not advised for plantar fasciitis.

In terms of long-term care of this problem, stretching exercises appear to be a safer and more suitable approach. According to Ryan et al. [20], individuals who performed stretching exercises every day for duration of 12 weeks exhibited substantial improvements at the 6- and 12-week follow-ups in comparison to the baseline; nevertheless, the improvement was not statistically greater than that of the group that received corticosteroid injections. In contrast to the previously cited study, we discovered in our study that stretching activities were more helpful in the long run.

According to this study, stretching exercises are unquestionably preferable to steroid injections in the long run. Although initially more effective than stretching exercises, local steroid injections should only be used in cases of non-responsiveness and severe pain because they can lead to complications such as injection site infection, heel pad atrophy, spontaneous rupture of the plantar fascia, and flattening of the foot's longitudinal arch, none of which were seen in our study.

Limitations

Our study's short follow-up period and lower sample size are its limitations. There is stratification and very basic outcome measurements. For a longer period of time, the patients may have been monitored in order to assess the long-term advantages. Researcher bias can have occurred from a lack of blinding. Readings may have been more accurate if the results had been recorded by a different researcher. As a result, more recent research with a sufficiently big sample size over a longer time frame is required.

Conclusion

Our research found that stretching groups are not as effective as local corticosteroid injections for providing temporary comfort. However, local steroid injection proved less safe and less effective than plantar fascia stretching exercise for long-term alleviation. As a result, our research suggested plantar fascia stretching exercise as the recommended course of therapy due to its noninvasive nature, ability to prevent steroid injection-related problems, affordability, and long-lasting benefits.

References

1. Roxas M. Plantar fascitis: diagnosis and therapeutic considerations. Alter Med Rev. 2005; 10: 83-93.
2. Beeson, P. Plantar fasciopathy: revisiting the risk factors. Foot Ankle Surg. 2014; 20: 160–165.
3. Fuller, E. A. The windlass mechanism of the foot. A mechanical model to explain pathology. J Am Podiatr Med Assoc. 2000; 90: 35–46.
4. Riddle DL, Pulisie M, Sparrow K. Impact of demographic and impairment-related variables on disability associated with plantar fascitis. Foot Ankle lnt. 2004; 25: 311-317.
5. Wolgin M, Cook C, Graham C, Mauldin D. Conservative treatment of plantar heel pain: long term follow-up. Fool Ankle Int. 1994; 15: 97-102.
6. Niedleldt MW. A friend told me my heel pain is probably plantar fascitis. What is this condition and how is it treated? Health News. 2002; 8:12.
7. Tallia AF, Cardone DA. Diagnostic and therapeutic injections of the ankle and foot. Am Fam Physician. 2003; 68: 1356-1362.
8. Barrett SJ, O'Malley R. Plantar fascitis and other causes of heel pain. Am Fam Physician. 1999; 59: 2200-2206.
9. Davies MS, Weiss GA, Saxby TS. Plantar fascitis: how successful is surgical intervention? Foot Ankle Int. 1999; 2: 803-807.
10. Pfeffer G, Bacchetti P, Deland J, Lewis A, Anderson R, et al. Comparison of custom and prefabricated orthoses in the initial treatment of proximal plantar fasciitis. Foot Ankle Int. 1999; 20: 214-221.

11. Leinont H, Ammirati KM, Usen N. Plantar fascitis: a degenerative process (fasciosis) without inflammation. J Am Podiatr Med Assoc. 2003; 93: 234-237.
12. Farrar JT, Young JP JR, La Moreaux L, Werth JL, Poole RM. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. Pain. 2001; 94(2):149-58.
13. Martin RL, Irrgang JJ, Burdett RG, Conti SF, Van Swearingen JM. Evidence of validity for the Foot and Ankle Ability Measure (FAAM). Foot Ankle Int. 2005; 26(11):968-83.
14. Cutts S, Obi N, Pasapula C, Chan W. Plantar fasciitis. Ann R Coll Surg Eng. 2012; 94(8): 539-42.
15. Schepsis AA, Leach RE, Gorzyca J. Plantar fasciitis. Etiology, treatment, surgical results, and review of the literature. Clin Orthop Relat Res 1991:185-96.
16. Celik D, Kuş G, Sırma SÖ. Joint Mobilization and Stretching Exercise vs Steroid Injection in the Treatment of Plantar Fasciitis: A Randomized Controlled Study. Foot Ankle Int. 2016; 37(2):150-6.
17. Genc H, Saracoglu M, Nacir B, Erdem HR, Kacar M. Long-term ultrasonographic follow-up of plantar fasciitis patients treated with steroid injection. Joint Bone Spine. 2005; 72(1):61-5.
18. Digiovanni BF, Nawoczenski DA, Malay DP, Graci PA, Williams TT, et al. Plantar fascia-specific stretching exercise improves outcomes in patients with chronic plantar fasciitis. A prospective clinical trial with two-year follow-up. J Bone Joint Surg Am 2006; 8: 1775- 81.
19. Siavashi B, Naghshbandi SF, Golbakhsh MR. Comparison of Stretching Exercises and Corticosteroid Injection in Pain Reduction of Patients with Plantar Fasciitis. Orthopedic Muscul Sys 2011; 1:106.
20. Ryan M, Hartwell J, Fraser S, Newsham-West R, Taunton J. Comparison of a physiotherapy program versus dexamethasone injections for plantar fasciopathy in prolonged standing workers: a randomized clinical trial. Clin J Sport Med. 2014; 24:211-7.