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The Association of Night Splint to NSAID+ ADL Instruction in Improving Pain and Functional Performance: An Observational Study

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Abstract **Original Research Article**

Background: Plantar fasciitis causes heel pain. The disease normally develops without injury. Clinically, standing or walking causes sole of foot pain, usually under the heel. Planter fasciitis is diagnosed clinically. Rest, stretching, strengthening exercises, shoe modification, arch supports, orthotics, night splints, anti-inflammatory medications, and surgery can treat plantar fasciitis. Injections and NSAIDs provide brief relief. Calf and plantar fascia stretching may help. When conservative treatment fails for chronic plantar fasciitis, surgery is recommended. In this trial, night splints were used to treat plantar fasciitis**.** ***Objective:*** In this study our main goal is to evaluate the association of Night splint to NSAID + ADL instruction in improving pain and functional performance**.** ***Method:*** This randomized clinical experiment was undertaken on 50 plantar fasciitis patients at NITOR, Dhaka. Group A and Group B was randomly assigned. Group A received NSAID, ADL, and a night splint; Group B received NSAID and ADL. Pain score, Tenderness index, and Visual analogue scale data were gathered from both groups every 2 weeks from the initial visit for up to 6 weeks. SPSS version 23 analyzed all data. ***Results****:* The present study showed pain and tenderness were significantly improved in Group A who were treated with Night Splint, NSAID & ADL instructions than in Group B who were treated with NSAID & ADL instructions after 6 weeks (P<0.05). ***Conclusion:*** The results of this study suggest that application of Night Splint along with NSAIDs and ADL instructions is more effective in reduction of pain and other symptoms in patient with planter fasciitis than the drugs and ADL.

Keywords: Planter Fasciitis, pain, Night Splint, ADL.

INTRODUCTION

Plantar fasciitis, often known as PF, is an excruciating inflammatory condition that affects the plantar fascia. The arch tendon or plantar fascia of the foot is frequently overworked, which can lead to this condition. When standing or walking, there is a sharp pain and discomfort in the bottom of the foot, most prominently under the heel [1]. It is unknown what causes plantar fasciitis, even though it is a widespread disease. Sometimes there is a history of a sudden rise in physical activity such as running and long distance walking, and whose employment involves continuous weight bearing or a change in footwear or the surface on which they run [2]. This can lead to foot problems. People who are overweight, middle-aged, who spend most of the day on their feet are at an increased risk of developing the condition [3, 4]. The pathophysiological basis for this illness is a change in the collagen matrix of the plantar fascia [4].

The diagnosis of a patient suffering from plantar fasciitis is primarily made by clinical examination. It is believed that between 90 and 95 percent of people who have genuine plantar fasciitis will make a full recovery with conservative treatment [5].

Rest, stretching, and strengthening exercises, shoe modification, arch supports, orthotics, night

splints, anti-inflammatory medications, and surgical intervention are among treatment options for plantar fasciitis. Injections and non-steroidal anti-inflammatory drugs (NSAIDs) can deliver relief, although their effects are frequently just temporary. The use of therapeutic workouts and orthotics to rectify the biomechanical defects that athletes have been shown to have brings about improved results [6]. There is some evidence that stretching the calf and plantar fascia can be beneficial. When treating chronic plantar fasciitis, physical therapy treatments such as ultrasound at 3 MHz for 10-15 minutes per day may be helpful [7, 8]. Only in cases of persistent plantar fasciitis that do not respond well to sufficient conservative care is surgical treatment recommended.

OBJECTIVE

To evaluate the association of Night splint to NSAID+ ADL instruction in improving pain and functional performance

METHODOLOGY

50 patients with planter fasciitis who met the selection criteria were included in a randomized clinical trial from April 1st, 2013 to September 30th, 2013 at Dhaka's National Institute of Traumology and Orthopedic Rehabilitation (NITOR), where the study was conducted. Two groups of patients were formed (Group A and Group B). There were 25 patients in each group. There were no exceptions to this rule. Clinical results, plantar fasciitis features, limitations, and functional skills were all taken into consideration during the evaluation. Patients in Group A were given a Night splint and NSAID medication, while those in Group B were given ADL guidelines and NSAID treatment. The first visit was used to collect data from both groups using a pre-designed data collection form. For a total of six weeks after the initial visit, researchers collected further data on each patient. The VAS on Pain, the Tenderness Index, and the pain scale were used for the evaluation. By using SPSS version 23, all data was evaluated.

RESULTS

A total of 50 patients were enrolled in this study. Of which, half (n=25) of the patients were provided with Night splint along with NSAID & ADL instructions, referred as Group A patients and the rest of the patients, who received NSAID treatment & ADL instructions referred as Group B patients.

Table-1 shows mean pain score of pretreatment in group-A were 14.31(±2.33) and 13.40(±1.68) were in group-B, p value was (p>0.05) that was not statistically significant. Mean pain score in first follow up 10.80(±1.43) were in group-A and 10.48 (±1.42) were in group-B. P value was (p>0.05), that was statistically not significant.

Table-I: Mean pain score (0-4) at pre-treatment and 1st follow up of the study population (N=50)

Group	Pre-treatment	1st Follow up	P value
	Mean (±SD)	Mean (±SD)	
Group-A	14.31(±2.33)	10.80(±1.43)	0.06
Group-B	13.40(±1.68)	10.48(±1.42)	0.35

In Figure-1 shows that mean group-A is significantly better than group-B in first follow up but not different in pretreatment.

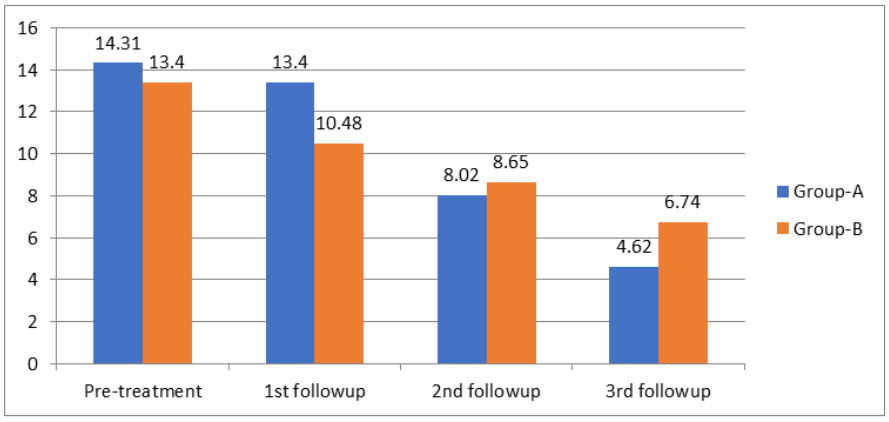

Figure-1: Mean pain score at pre-treatment, 1st follow up, 2nd and 3rd follow up according of the study population (N=50)

Table-2 shows mean pain score of 2nd follow up in group-A were 8.02(±1.31) and 8.65(±1.31) were in group-B, p value was (p<0.05), that was statistically significant. Mean pain score in 3rd follow up 4.68(±1.58) were in group-A and 6.74(±1.89) were in group-B. p value was (p<0.05), that was statistically significant (Fig-1). That mean group-A is significantly better than group-B in 2nd and 3rd followed up.

Table-2: Mean pain score at 2nd and 3rd follow up of the study population (N=50)

Group	2nd Follow Up	3rd Follow Up	P value
	Mean (±SD)	Mean (±SD)	
Group-A	8.02(±1.31)	4.68(±1.58)	0.04
Group-B	8.65(±1.31)	6.74(±1.89)	<0.001

Tenderness index (Table-III, Fig-2) was 2.20 ± 0.76 in group A and 2.20 ± 0.61 in group B at their pre treatment observations. Tenderness indexes were improved significantly ($p < 0.05$) in their second follow up at the end of 4th week. However, the differences between groups were highly significant ($p < 0.001$) at their 6th weeks follow ups. Significant difference at the end of 4th week and highly significant difference between group A & B: where group A noticed far improvement at the end of 4th and 6th weeks (t-test) was seen (P <0.001).

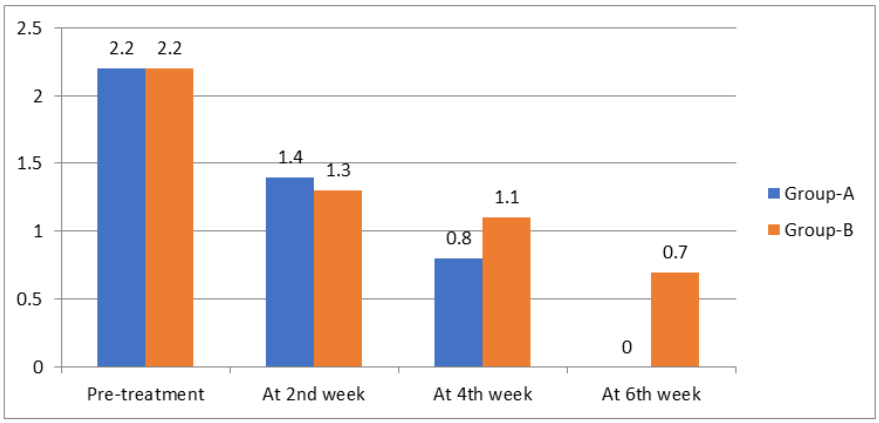

Figure-2: Mean Tenderness index at different time period

Table-3: Mean Tenderness index at different time period

Time Period	Group A (n=25)	Group B (n=25)	P value
	Mean ±SD	Mean ±SD	
Tenderness index pre treatment score	2.20(0.76)	2.20(0.61)	1
Tenderness index score at 2nd week	1.40(0.49)	1.30(0.46)	0.42
Tenderness index score at 4th week	0.80(0.61)	1.10(0.30)	0.01
Tenderness index score at 6th week	0.10(0.30)	0.70(0.46)	<0.001

In Table- 4, the mean patient's assessment of pain on a 0-10 visual analogue scale (VAS) was 7.10 ± 1.32 in Group A and 7.30± 1.11 in Group B on their respective treatment modalities. Pain scores on VAS scale after 2, 4 and 6 weeks showed progressive improvement on both group A and B. However, statistically highly significant ($p < 0.005$) improvement was observed at 6th week of management among patient of Group A, who received Night splint along with NSAID and followed ADL instructions. Group A patient showed more improvement than Group B patient (<0.001).

Table-IV: VAS on pain before treatment, after 2th, 4th and 6th weeks

Time Period	Group A	Group B	P value
	Mean ±SD	Mean ±SD	
VAS score at pre treatment	7.10(1.32)	7.30(1.11)	0.53
VAS score at 2nd week	5.30(1.29)	5.60(1.13)	0.34
VAS score at 4th week	2.50(1.30)	3.0(1.43)	0.16
VAS score at 6th week	0.20(0.40)	1.10(0.71)	<0.001

DISCUSSION

This study examined the effect of night splints on plantar fasciitis. This randomized clinical trial was conducted at NITOR, Dhaka. Before and every 14 days, patients were evaluated. Same examiner conducted all 3 visits. Pretreatment VAS pain scores for group A were 7.10 1.32 and group B 7.03 1.11 (P=0.53). After 2 weeks, group A's VAS was 5.30 1.29 and group B's was 5.60 1.13 (P=0.34). None after 4 weeks P 0.16. Both groups' problems improved after 6 weeks. Group A patients improve significantly more than group B (P 0.001). In a similar study, Beyzadeolu T, Gökçe A, and Bekler H found no significant differences between the two groups' initial VAS ratings, however patients

wearing a night splint showed considerably larger improvements in both scores after six weeks [9]. Pretreatment tenderness index was 2.20 .76 in group A and 2.20 .61 in group B. After 2 weeks, A and B had 1.40 .490 and 1.30 .46, then 0.80 .61 and 1.10 .30, and 0.10 .30 and 0.70 .46. Group A (Night splint+ NSAID + ADL instruction) showed a substantial difference after 4 weeks and a highly significant difference after 6 weeks (P = 0.001). Ahmed H. Alghadir found that night splint treatment significantly reduced plantar fasciitis discomfort index after six weeks [10]. In the current investigation, group-A had a mean pretreatment pain score of 14.31(2.33) while group-B had a score of 13.40(1.68). First follow-up pain scores in group-A were 10.80(1.43) and 10.48(1.42). (p>0.05) which is statistically insignificant. Group-A is better in first follow-up but not pretreatment. Powell *et al*., observed that 1 month of night splint use reduced discomfort by 88%. 37 plantar fasciitis patients [10]. According to limited data, a night splint should be worn for 1 to 3 months to improve symptoms [11]. In our country, studies on night splints and plantar fasciitis pain reduction are sparse. Planter fasciitis patients may prefer external devices like night splints. Most of our impoverished can afford a night splint produced locally using cheap materials. Our study indicated that adding Night splint to NSAID and ADL education in patients with plantar fasciitis improves pain and functional performance.

CONCLUSION

We have few statistics on planter fasciitis in Bangladesh, although it's rising. Despite traditional treatment (NSAIDs, thermotherapy, exercise, soft-soled shoes, heel pads), many patients have recurrent attacks. Night splints increase dorsiflexion ROM, morning discomfort, and foot function. Night splint is uncomplicated, non-surgical, and cost-effective.

REFERENCES

1. Abu-Laban, R. V., & Ho, K. 2009). Ankle and foot. In: Marx, J. A., Hockberger, R. S., & Walls, R. M., eds. Rosen's Emergency Medicine: Concepts and Clinical Practice. 7th ed. Philadelphia, Pa: Mosby Elsevier; chap 55.
2. Edward, P. M. (1989). Achillis tendinitis. *Sports medicine Update*, 4(4), 19-21.
3. Sheon, R. P., & Buchbinder, R. (2011). Plantar fasciitis and other causes of heel and sole pain. http: // www. uptodate .com/home/index.html Jan. 27 2011. (October 27 2013).
4. Sharma, N., & Singh, G. (2010). Splinting and stretching for plantar fasciitis pain. *Lower Extremity Review*, 2(10), 15-19.
5. Powell, M., Post, W. R., Keener, J., & Wearden, S. (1998). Effective treatment of chronic plantar fasciitis with dorsiflexion night splints: a crossover prospective randomized outcome study. *Foot & ankle international*, *19*(1), 10-18.
6. Digiovanni, B. F., Nawoczenski, D. A., Malay, D. P., Graci, P. A., Williams, T. T., Wilding, G. E., & Baumhauer, J. F. (2006). Plantar fascia-specific stretching exercise improves outcomes in patients with chronic plantar fasciitis: a prospective clinical trial with two-year follow-up. *JBJS*, *88*(8), 1775-1781.
7. Singh, D., Angel, J., Bentley, G., & Trevino, S. G. (1997). Fortnightly review: plantar fasciitis. *Bmj*, *315*(7101), 172-175.
8. Riddle, D. L., Pulisic, M., Pidcoe, P., & Johnson, R. E. (2003). Risk factors for plantar fasciitis: a matched case-control study. *JBJS*, *85*(5), 872-877.
9. Alghadir, A. (2006). *Conservative treatment of plantar fasciitis with dorsiflexion night splints and medial arch supports: a prospective randomized study* (Doctoral dissertation, University of Pittsburgh).
10. American Physical Therapy Association. (2008). Heel pain--plantar fasciitis: clinical practice guildelines linked to the international classification of function, disability, and health from the orthopaedic section of the American Physical Therapy Association. *The Journal of orthopaedic and sports physical therapy*, *38*(4), A1-A18. doi:10.2519/jospt.2008.0302.
11. Powell, M., Post, W. R., Keener, J., & Wearden, S. (1998). Effective treatment of chronic plantar fasciitis with dorsiflexion night splints: a crossover prospective randomized outcome study. *Foot & ankle international*, *19*(1), 10-18.