

To Compare The Effectiveness of Calcaneal taping Versus Conventional Therapy in the treatment of plantar fasciitis.

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Abstract

Introduction

Plantar fasciitis (PF) is defined as a inflammation and degeneration of the proximal plantar in deep fascia and fibrous tissue. It is one of the most common causes of heel and foot pain, accounting for 15% of all foot pathologies.

Need of Study

Studies on this topic have shown that calcaneal taping and conventional physiotherapy may have beneficial effects in treatment of plantar fasciitis.

Methods

Subjects were randomly assigned to, two Groups, experimental and control Group. In experimental Group (fifteen subjects) allow in Group A were treated with Exercise (Stretching exercise and strengthening exercise) for ten times in each sitting for three times a day than after Calcaneal Taping were done. Dynaplast tape were used for Taping Purpose. Remain fifteen subjects allow in control Group (Group B) were treated with conventional therapy (Stretching exercise and Strengthening exercise) three times per day. VAS was the tools to measure the pain score.

Result

Paired t-test was applied between Group A and Group B at 1st, 7th, 15th day, the 't' values were 0.757 (P > 0.05), -3.892 (P < 0.05) and -3.696 (P < 0.05). The comparison of mean difference for VAS between Group A and Group B at (15th – 1st) day, the 't' values was 4.036 (P > 0.05). The result shows that Reduce the pain score in experimental group as compare to control Group.

Interpretion and Conclusion

The study shown significant change in both Group. When post test value compare with pre test value in inter group comparison Group A (Calcaneal Taping) shows better result as compare to Group B (Conventional Therapy).

Key Words: Plantar Fasciitis, Calcaneal Taping, Stretching exercise, Strengthening exercise, Visual Analog Scale (VAS).

INTRODUCTION

Plantar fasciitis (PF) is defined as a inflammation and degeneration of the proximal plantar in deep fascia and fibrous tissue. It is one of the most common causes of heel and foot pain, accounting for 15% of all foot pathologies.

Plantar Fasciitis is the most common cause of heel Pain. It may have several different clinical presentations. Although pain may occur along the entire course of plantar fascia. It is usually limited to the inferior medial aspect as the point of origin of the anatomic central band of plantar fascia and the abductor hallucis, flexor digitorum brevis and abductor digiti minimi muscle.

Plantar fasciitis has been classified as an overuse syndrome resulting in micro tears of the plantar fascia at its origin causing inflammation and form scar tissue with contraction. Some vague and non specific term incorrectly suggested that osseous spur (inferior calcaneal exostosis) is the cause of pain rather than an incidental radiograph finding. There is no correlation between pain and presence of exostosis and excision of a spur is not a part of usual surgery for plantar fasciitis. ^[3]

Patients with plantar fasciitis usually present pinpointed pain the first few steps in the morning which diminish after few steps. Pain is primarily felt on the anterior medial tubercle of calcaneous but may spread distally along the fascia. first step pain is felt after prolonged period of non weight bearing, such as getting out of bed or prolonged sitting which gradually worsen if not treated.^{3,37}

Successful treatment of plantar fasciitis usually requires a combination of treatment modalities, rather than administering only one treatment at a time, Although many authors agree that mechanical treatment should be considered a corner stone of any plan of treatment. Some debate remains regarding the most effective form of mechanical intervention. The aim of mechanical treatment modalities is to reduce the load and stress applied to inflamed plantar fascia during activity to tolerable level. These modalities include foot taping, foot orthosis, footwear, rest and night splints ^{14,24}

Plantar fasciitis is typically characterized by pain in the inferior heel region, which is aggravated by weight after long period of non-weight bearing and prolonged weight bearing.¹¹

Taping is the common conservative treatment for plantar fasciitis. Foot taping such as low dye taping may after the mechanical foot function, decreasing the stress on plantar fascia and may subsequently reduce the symptoms. But extensive literature is not available to prove efficacy of low dye taping ¹⁴

For purpose of study two different conservative treatment methods are compared for a period of 15days. First group treats with low dye taping with stretching of plantar fascia and

strengthening of intrinsic muscles and the second group with stretching of plantar fascia and strengthening of intrinsic muscles of foot.

Operational definitions

Low dye taping: It is a foot taping technique, which alters the mechanical function of foot, decreases stress on plantar fascia, and subsequently reduces the symptoms.³

Exercise

- a. Stretching exercise of the plantar fascia
- b. Strengthening exercises of the intrinsic muscles of the foot.

OBJECTIVE

To Compare The Effectiveness of Calcaneal taping versus Conventional Therapy in the treatment of plantar fasciitis.

NEED OF STUDY

Studies on this topic have shown that calcaneal taping and conventional physiotherapy may have beneficial effects in treatment of plantar fasciitis.

AIM OF THE STUDY

- 1- To study the effectiveness of calcaneal taping in treatment of plantar fasciitis.
- 2- To study the effectiveness of conventional therapy in treatment of plantar fasciitis.
- 3- To compare the effectiveness of calcaneal taping and conventional therapy in treatment of plantar fasciitis.

HYPOTHESIS

NULL HYPOTHESIS (H⁰)

Calcaneal taping will not be more effective than conventional therapy to reduce pain in subjects with plantar fasciitis.

ALTERNATE HYPOTHESIS (H¹)

Calcaneal taping will be more effective than conventional therapy to reduce pain in subjects with plantar fasciitis.

REVIEW OF LITERATURE

Karl B. Landorf, Joel A. Radford*, **Anne-Maree Keenan et al (2005)** conducted a study on the effectiveness of Low-Dye Taping for the Short-term Management of Plantar Fasciitis in 65 participants with plantar fasciitis. They were concluded that the low-Dye taping significantly reduces the pain associated with plantar fasciitis.

Beth Jamali, Martha Walker, Brian Hoke and John Echternach et al (2004) conducted a study on the Windlass taping is used to reduce pain in plantar fasciitis and thought to take stress off the plantar fascia. For study taken 20 patients with plantar fasciitis. Pretaping and posttaping measures included pain levels using a visual analog scale (VAS), resting-stance calcaneal position, tibial position, and navicular height. Fifteen also reported a VAS after wearing the tape for 24 h. They were concluded that Windlass taping decreased pain in patients with plantar fasciitis and caused small changes in resting-stance positions.

H R Osborne₁, G T Allison₁ et al (2006) conducted a study on treatment of plantar fasciitis by LowDye taping and iontophoresis: short term results of a double blinded, randomised, placebo controlled clinical trial of dexamethasone and acetic acid. They were concluded that Six treatments of acetic acid iontophoresis combined with taping gave greater relief from stiffness symptoms than, and equivalent relief from pain symptoms to, treatment with taping.

Kieran O'Sullivan, Norelee Kennedy, Emer O'Neill, Una Ni Mhainin et al (2008) conducted a study on the effect of low-dye taping on rearfoot motion and plantar pressure during the stance phase of gait. They were concluded that LD taping is associated with alterations in peak plantar pressure in the midfoot and forefoot that indicate reduced pronation with LD taping. However, LD taping appears to reduce both pronation and supination in the rearfoot, rather than simply reducing pronation, when assessed using 3D motion analysis.

Van de Water AT¹, Speksnijder CM. et al (2010) conducted a study on efficacy of taping for the treatment of plantar fasciosis: a systematic review of controlled trials. They were concluded that there is limited evidence that taping can reduce pain in the short term in patients with plantar fasciosis. The effect on disability is inconclusive.

Chien-Tsung Tsai, MD, Wen-Dien Chang & Jen-Pei Lee , MD et al (2010) conducted a study on effects of Short-term Treatment with Kinesiotaping for Plantar Fasciitis in 52 participants with plantar fasciitis. They were concluded that It was concluded that the additional treatment with continuous kinesiotaping for one week might alleviate the pain of plantar fasciitis better than a traditional physical therapy program only.

Van Lunen, Bonnie PhD*; **Cortes, Nelson PhD[†]**; **Andrus, Tracy MEd***; **Walker, Martha PhD et al (2011)** conducted a study on Immediate Effects of a Heel-Pain Orthosis and an Augmented Low-Dye Taping on Plantar Pressures and Pain in Subjects With Plantar Fasciitis. They were concluded that although the HPO and ALD produced statistically and clinically decreased VAS scores while walking and jogging, further research is needed beyond these preliminary findings to determine long-term outcomes related to pain relief.

Melinda Franettovich Andrew Chapman and Peter Blanch et al (2012) conducted a study on a Physiological and Psychological Basis for Anti-Pronation Taping anti-pronation taping is a treatment technique commonly used by clinicians in the management of lower extremity musculoskeletal pain and injury. They were concluded that psychological effects of the tape, but the article does prompt the need for further exploration into the possible role of placebo in the clinical effects of antipronation taping.

Emily N Schwartz, MD; John Su, MD et al (2014) conducted a study on One challenge in the treatment of plantar fasciitis is that very few high-quality studies exist comparing different treatment modalities to guide evidence-based management. They were concluded that plantar fascia-specific stretching had the best statistically significant long-term results (Figures 3-5). The figures show some of the most widely used and evidence-supported stretches that patients can do at home.

Larry E. Miller and Daniel L. Latt¹ et al (2015) conducted a study on Chronic Plantar Fasciitis is Mediated by Local Hemodynamics: Implications for Emerging Therapies. They were concluded that PF is a misunderstood condition with little consensus regarding optimal treatment practices. Chronic PF is not associated with inflammation, but instead with tissue degeneration. Classical treatments including stretching, shoe inserts, and anti-inflammatory medications are effective in 80% of cases.

N.C. Aishwarya*, K. Venkata Sai et al (2016) conducted a study on Immediate effect of calcaneal taping versus windlass taping on calcaneal angle in subjects with plantar fasciitis .They were concluded that study calcaneal taping provided better relief of symptoms with better biomechanical correction in short term. The calcaneal taping was much convenient and easy in terms of tape application and removal procedure when compared to windlass taping technique.

Banu ORDAHAN, Gözd TÜRKÖĞLU, Ali Yavuz KARAHAN, Halil Ekrem AKKURT et al (2017)) conducted a study on extracorporeal Shockwave Therapy Versus Kinesiology Taping in the Management of Plantar Fasciitis .They were concluded that In conclusion, both ESWT and KT treatments improved pain levels and function and quality of life in individuals with PF. Neither method is superior in treating PF. In the future, well-designed case-control studies evaluating the long-term effects of these treatments should be conducted.

Schuitema D, Greve C, Postema K, Dekker R, Hijmans JM et al (2018) conducted a study on effectiveness of Mechanical Treatment for Plantar Fasciitis . They were concluded that Mechanical treatment can be beneficial in relieving symptoms related to plantar fasciitis and Taping is an effective short-term treatment .

Phoomchai Engkananuwat, PT, BSc1, Rotsalai Kanlayanaphotporn, PT, PhD1, and Nithima Purepong, PT, PhD2 et al (2018) conducted a study on Effectiveness of the Simultaneous Stretching of the Achilles Tendon and Plantar Fascia in Individuals With Plantar Fasciitis. They were concluded that the simultaneous stretching of the Achilles tendon and plantar fascia for 4 weeks was a more effective intervention for plantar fasciitis.

Tony Lin-Wei Chen,^a Duo Wai-Chi Wong,^{a,b} Yinghu Peng,^a and Ming Zhang et al (2019) conducted a study on prediction on the plantar fascia strain offload upon Fascia taping and Low-Dye taping during running. They were concluded that different taping methods could affect loading on the plantar fascia in running through an approach of computational simulation.

Thong-On S¹, Bovonsunthonchai S¹, Vachalathiti R¹, Intiravoranont W², Suwannarat S², Smith R³ et al (2019) conducted a study on effects of Strengthening and Stretching Exercises on the Temporospacial Gait Parameters in Patients With Plantar Fasciitis. They were concluded that both strengthening and stretching exercise programs significantly reduced pain and improved gait in patients with PF.

METHODOLOGY

Methodology is the most important part of any research study, which enables the researcher to form a blue print for the study undertaken. The research methodology involves the systematic procedure by which the researcher starts from the time of initial identification of problem to its final conclusion.

The present study is aimed to find the effectiveness of the calcaneal taping and conventional therapy and find out the effect if both techniques on reduced the pain score in patient with plantar fasciitis.

The chapter present the methodology adopted by the researcher for the study. It including the research approach, the setting and population, sampling technique selection of tool, intervention procedure, data collection and plan for analysis approach, the setting, and population, sampling technique, selection of tool, intervention procedure, data collection and plan for analysis.

RESEARCH APPROACH

Research approach is the most significant part of any research, the appropriate choice of research approach depends upon the purpose of research study which is undertaken.

Experimental approach is chosen for conducting the present study, since most if researchers in the field of physical medicine demand at most labour of accuracy, a true experimental

design is thought to be a suitable one. Hence a pre-test and post- test design was chosen for conducting the present study.

POPULATION

A population is defined as the groups of people to who's research result are generalized. All the subjects are taken as the universal population of present study.

ACCESSIBLE POPULATION

Among these respondent who were approachable to the researcher from the accessible population from whom the sample was chosen. Population for the study were subject who came to OPD of Shri Mahant IndiresH Hospital, Patel Nagar dehradun.

RESEARCH SETTING

The study was conducted at the department of Physiotherapy at, Shri Mahant IndiresH Hospital, Shri Guru Ram Rai University, Patel Nagar Dehradun, Uttarakhand.

SAMPLE AND TYPE OF SAMPLING

Since it is an experimental study, comparative in nature, randomized sampling was adopted to select these subjects who were attending the physiotherapy department of Shri Mahant IndiresH Hospital, Shri Guru Ram Rai University, Patel Nagar Dehradun, Uttarakhand..

As an initial step, pain was measure for all subjects by using Visual Analogue Scale (VAS). After initial assessment 30 subjects were chosen meeting all the criteria. The subject were assigned to either the experimental (Group A) include 15 subject or control (Group B) include 15 subjects. Subjects in group A were treated with exercise (stretching exercise and strengthening exercise) and calcaneal taping. Subjects in group B were given conventional therapy (stretching exercise, Strengthening exercise).

INCLUSION CRITERIA

- Having pain from last 4 weeks.
- Pain reproduces by palpation of plantar fascia or its origin at medial calcaneal tubercle.
- Pain decreases after first standing but worsens with increased activities .
- Pain is first step in morning or after rest on heel.

EXCLUSION CRITERIA

- Having any inflammatory condition.
- Any neurological abnormality
- Having corticosteroid injection in past 3 months.
- Calcaneal stress fracture
- Previous surgery for plantar fasciitis.

Congenital deformity of foot and ankle.

VARIABLE OF STUDY

INDEPENDENT VARIABLE

VAS (Visual analogue scale)

VAS is a line scale with anchors at 0 and 10 (0 indicating no pain, 10 indicating the worst pain imaginable). The subject self rated their foot pain based on their first few steps in the morning , by placing a mark on the line representing their pain.

DEPENDENT VARIABLE

Pain

The Evaluation Tools

Dynaplast adhesive tape

Cotton

Saline Water

Scissor

DATA COLLECTION

The subjects in both groups participated were clearly explained about the procedure, purpose of study, and level of pain by using VAS. The experimental group A was treated with exercise (Stretching and Strengthening) and after Calcaneal taping. And group B was treated with exercise (Stretching and Strengthening) three times per day for 15 days. The pain scores was measure 1st day, 7th days, 15th days.

PROCEDURE

All thirty (30) subjects were selected from Shri Guru Ram Rai Institute of Medical and health Sciences, Shri Mahant IndiresH Hospital, Patel Nagar Dehradun, Uttarakhand. They were equally distributed in two groups. All participants had pain in heel and were taking Non

steroid anti inflammatory drugs (NSIADS) prescribed by physician. The patients were selected on the basis of the clinical assessments and were randomly allocated to experimental and control groups. All patients complained of maximum pain upon palpation of the origin of the planter fascia on the medial calcaneal tubercle, consistant with a diagnosis of plantar fasciitis.

Individual subjects signed informed consent prior to participation in the study. The parameters assessed were pain and functional outcome of the affected foot.

Pain was assessed by using visual analog scale (VAS). VAS is a line scale with anchors at 0 and 10 (0 indicating no pain, 10 indicating the worst pain imaginable). The subjects self rated their foot pain based on their first few steps in the morning, by placing a mark on the line representing their pain.

The pain scores of VAS of involved foot were recorded on initial day and treatment was started, which constituted the low dye taping and exercise program. Subjects were all tested and treated individually and had no contact with, or knowledge of the identity of any other individual in the study. Subjects in taping group were blinded to the type of treatment and were educated to the direct possible adverse reaction.

Subjects in both group were trained in exercise program, which include stretching of planter fascia and strengthening of intrinsic muscles of foot, depending upon their response. The only difference in both groups was the participants in taping group received low dying taping at their first appointment and those in control group did not.

Participants in the taping group were instructed into leave the tape on for three days. Participants were requested to note their pain and functional disability level after the base line appointment. Then subjects were returned to department for retaping. Tape used for taping procedure was dynaplast.

The criterion for progression was no aggravation of the sympton and no pain or discomfort reported while performing the exercises.

Exercise program was started with stretching exercise followed by strengthening exercise. They were asked to perform the stretching and strengthening exercise program three times per day. The exercises were:

Stretching exercises

They were instructed to perform this exercise while sitting and by first crossing the affected leg over the contra lateral leg. Then while using hand on the affected side, they placed the fingers across the base of the toes on the bottom of the foot (distal to metatarsophalangel

joints) and pulled the toes back towards the shin until they felt a stretch in the arch of the foot.

They were to confirm that the stretching was corrected by palpating the tension the plantar fascia with contra lateral hand while performing the stretching. Patients in both groups were instructed to hold each stretch for a count of ten and to repeat it ten times. In stretching program, first stretch was to be done before taking the first step in the morning.

Strengthening exercise

Strengthening program was focused on intrinsic muscle of the foot. Exercise used for this was towel curl. To do a towel curl, the patient was instructed sit with the foot flat on the end of the towel placed on a smooth surface. Keeping the heel on the floor, the towel is pulled towards the body of curling the towel with toes.

Patient in both groups were instructed to do the strengthening exercise program ten times in each sitting .

Calcaneal Taping

The patient was sitting or lying with leg extended and the foot at right angle of the leg. The foot is grasped gently. The cover roll stretch bandage was applied to a clean and dry skin surface then covered with dynaplast. The technique was applied with following steps.

1. Four piece of stretch bandage were taken in 5 cm in width.
2. First piece of stretch bandage was applied just distal to the lateral malleolus and pulling the calcaneus medially and was attached to the medial aspect of foot distal to medial malleolus.
3. Pieces second and third followed the same pattern with overlap approximately one third of tape width moving in distal direction.
4. Piece four went around the back of heel starting distill to lateral malleolus and wrapping around the posterior aspect of the calcaneus and anchoring distill to medial malleolus.
5. Pieces four also serves as an anchor for first three pieces.



Stretching of plantar Fascia



Strengthening exercise of intrinsic muscle of foot



Step – 1 Calcaneal Taping



Step -2 Calcaneal Taping



Step- 3 Calcaneal Taping



Step – 4 Calcaneal Taping

RESULTS

Group A – Experimental Group

Group B – Control Group

Total number of subjects include in the study – 30

Total number of Males - 15

Total number of females - 15

Table 1 : Mean and SD of Age for the subjects of Group A and Group B

Demographic data	Group A Mean ± SD	Group B Mean ± SD
Age	34.33 ± 7.75	35.66 ± 7.09

Table : 1 Describes mean and SD of Age for the Subjects included in Group A and Group B , the values were 34.33 ± 7.75 and 35.66 ± 7.09 respectively.

Table 2 : Mean and SD of VAS at 1st, 7th and 15th day for the subjects of Group A and Group B.

Variable	Group A Mean ± SD	Group B Mean ± SD
VAS 1 st Day	8.06 ± 0.70	7.86 ± 0.74
VAS 7 th Day	4.63 ± 0.70	5.73 ± 0.70
VAS 15 th Day	1.26 ± 0.88	2.73 ± 0.99

Table 2 describes the mean and SD of VAS at 1st, 7th and 15th day for the subjects of Group A and Group B. The value of VAS for Group A were 8.06 ± 0.70 , 4.63 ± 0.70 and 1.26 ± 0.88 where as the value of Group B were 7.86 ± 0.74 , 5.73 ± 0.70 and 2.73 ± 0.99 respectively.

Table 3: Comparison of mean values for VAS at 1st , 7th. and 15th day within Group A and Group B.

Comparison	GROUP A		GROUP B	
	t value	P value	t value	P value
VAS 1 st Vs 7 th Day	20.91	P < 0.05	9.90	P < 0.05
VAS 1 st Vs 15 th Day	38.95	P < 0.05	16.73	P < 0.05
VAS 7 th Vs 15 th Day	26.00	P < 0.05	13.16	P < 0.05

Table : 3 describes session wise comparison of VAS within Group A and Group B at 1st Vs 7th day, 1st Vs 15th day and 7th VS 15th day, the ‘t’ value for Group A were 20.91, 38.95 and 26.00 (P < 0.005) respectively and the ‘t’ value for Group B were 9.90, 16.73 and 13.16 (P < 0.05) respectively

Table:4 Comparison of Improvement for VAS (15th - 1st) day for group A and Group B.

Variable	Group A Mean diff. ± SD	Group B Mean diff. ± SD
VAS (15 th – 1 st) Day	6.80 ± 0.67	5.33 ± 1.23

Table: 4 describes about improvement of VAS (15th day – 1st day) for Group A and Group B, the values were 6.80 ± 0.67 and 5.33 ± 1.23 respectively.

Table:5 comparison of mean values for VAS at 1st, 7th and 15th day between Group A and Group B

Comparison	Group A Vs Group B	
	t value	P value
VAS 1 st Day	0.757	P > 0.05
VAS 7 th Day	-3.892	P < 0.05

VAS 15 th Day	-3.696	P < 0.05
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Table : 5 describes Comparison of VAS between Group A and Group B at 1st, 7th and 15th day, the ‘t’ values were 0.757 (P > 0.05), -3.892 (P < 0.05) and -3.696 (P < 0.05) respectively.

Table: 6 Comparison of mean diff. For VAS at (15th - 1st) day between Group A and Group B

Comparison	Group A Vs Group B	
	t value	P value
VAS (15 th - 1 st) Day	4.036	P > 0.05

Table : 6 describes comparison of VAS between Group A and Group B at (15th - 1st) day, the ‘t’ values was 4.036 (P> 0.05).

Discussion

In current study there was statistically significant improvement in experimental group as compared to control group, and our study consistent with that of karl B.Landorf who showed the effectiveness of low dye taping for short term management of plantar fasciitis ³.

In the current study both groups showed significant improvement in pain and functional outcome. The findings are comparable to the research of Joel A .Radford who showed that low dye taping decrease pain and improve functional outcome.⁶ The improvement in experimental group may be due to the correction of overpronation and underpronation of foot.^{3,6}. Treatment of palntar fasciitis by low dye taping is based on the windlass mechanism. Windlass mechanism describes plantar fascia abnormalities in terms of overpronation and underpronation to help formulate possible relationships between condition and treatment.⁹ Use of this approach may improve clinical outcomes because rehabilitation intervention does not merely treat physical symptoms but actively addresses the influences that result in the condition. ⁹

Karl B. Landorf, did the first study to demonstrate a clinically important and statistically significant difference between participants who received low dye taping and those who did not.³ In current study also there was a statistically significant difference between experimental and control group. Participants who received taping had more significant improvement in pain and functional outcome scores.

Joel A. Radford performed a participant- blinded randomized trial to assess the effectiveness of low dye taping, a commonly used short term treatment for plantar heel pain. He found that when used as short term treatment of plantar heel pain, low dye taping provides a small improvement in first step pain compared with a sham intervention after a one week period.⁶ Thus the finding of his study is in contrary to the results obtained in the present study.

In current study participants of both groups were trained for stretching exercise of plantar fascia and strengthening exercise for intrinsic muscles of foot. Only participants of experimental group received low dye taping for a period of fifteen days.

Both groups significantly improved but participants of experimental group showed more significant improvement than control group. They showed much better improvement in pain and functional outcome.

Stretching appears to be the easiest, most useful technique to evaluate the symptoms associated with plantar heel pain. Stretching of Achilles tendon and plantar fascia performed three to four times daily, has been shown to be effective in decreasing the pain at the plantar fascia. However although all elevate symptoms, stretching does not address the underlying pathology of poor foot biomechanics , and therefore may only provide temporary relief.¹⁴

Matthew R. Hyland examined the effect of a calcaneal and Achilles tendon taping technique utilising only 4piece of tape and not involving the medial arch, on the symptoms of planter heel pain. He found that calcaneal taping was shown to be more effective tool for the relief of planter heel pain than stretching , sham taping, or no taping. ¹⁴

Benedict F. Digiovanni concluded that a program of non weight bearing stretching exercise specific to the plantar fascia is superior to the standard program of weight bearing Achilles tendon stretching exercise for the treatment of symptoms of proximal plantar fasciitis.⁷ Following these findings in current study plantar fascia stretching program was used instead of Achilles tendon stretching program.

Stretching and strengthening programs are valuable because they can help correct functional risk factor.¹² Strengthening program focuses on intrinsic muscle of foot and includes towel curls.

The program of exercise therapy used in this study appears to offer considerable health gain. It aims to strengthen damaged tissues. Using slow, repetitive exercise movements for strengthening the soft tissues of the foot appears to have beneficial effects in treating heel pain. As the etiology of plantar fasciitis may be the repetitive micro trauma, slow strengthening exercises may allow tissue healing and may reduce the functional risk factor.

Overall our study indicate that low dye taping with stretching of plantar fascia and strengthening of intrinsic muscle was a useful technique for eliminating the pain and improving the functional activity. There was a significant improvement in both groups and improvement in all variables but overall improvement was much better in participants who received low dye taping. Therefore low dye taping is a useful intervention modality in the rehabilitation of patients with plantar fasciitis.

Relevance to clinical practice

The results of this study as determined by use of low dye taping along with stretching of plantar fascia and strengthening of intrinsic muscle of foot, led to a considerable increase in functional activity and decrease in the pain at a faster rate, as compared to stretching of plantar fascia and strengthening of intrinsic muscle of foot alone in patients with plantar fasciitis. Also no detrimental effects of low dye taping in terms of pain and functional outcome observed. Clinicians who advocate the use of low dye taping for plantar fasciitis must know the procedure of applying low dye taping and must know the principle of taping.

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