

Effects Of Calcaneum Taping Versus Stretching Exercise In Short Term Effect In Plantar Fascitis Among Homemakers

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ABSTRACT

Background: The current economic situation creates unique problems for healthcare professionals, particularly in underdeveloped countries. Due to lifestyle and survival challenges, both urban and rural communities are unable to devote adequate time to follow-up. This difficulty is significantly more apparent in the field of physiotherapy, as many of the treatments require follow-up. The cost of follow-up care experienced by patients includes incidental expenditures such as lost pay, travel, and productivity, among others. The distance travelled for follow-up physiotherapy is also a considerable concern, particularly for patients who live in rural areas. As a result, many patients may choose to discontinue treatment. Management of plantar fasciitis (PF) needs numerous sessions of intervention and so falls into the problems.

AIM: The aim of the study was to see the effect of Calcaneumtaping and stretching exercise in short term effect of plantar fasciitis among home makers.

Method: A total of 20 homemakers were selected for the study from various home in Puducherry. Whose age range between 30-60 years. They were participated according to the selection criteria. They were allocated into two groups using odd and even method. Group A (n=10) experimental group. Group B (n=10) control group (Conventional exercise). The training was given 3 days a week for 4weeks. After 4 weeks of training

Result: The findings indicated that p value of stretching in foot function index is less than 0.0009 which shows 99.9% of significance and the taping p value is less than 0.001 which shows 98% of significance. Hence stretching is more effective in reducing the pain in plantar fasciitis patients and improve the foot function index after taping.

Conclusion: This study concluded that there was significant improvement in stretching exercise than the calcaneal taping

Keywords: Calcaneumtaping, Stretching exercise, home makers, plantar fasciitis

1. INTRODUCTION

Calcaneumtaping system is a remedial taping procedure that reduces pain and promote lymphatic drainage. This lifting effect creates complications in the skin adding interstitial space and reducing inflammation in affected areas. The tape-recording is stretched up to 130- 150% of its original length. Mulligan's calcaneal taping focuses on correcting defective biomechanics of the hind foot (1). The height of the medial longitudinal arch increases with calcaneal taping, which can correct calcaneal eversion and bring it nearly to neutral. As a result, the plantar fascia may witness lower tensile pressure, which lessens inflammation and prevents plantar fasciitis. Plantar fasciitis is one of the most common cause of heel pain. This sedentary response is classified as overuse pattern. This causes micro tears in the plantar fascia at its origin. Waugh suggests that sedentary diseases. Epicondylitis may be ascertained to as habitual Pain runs. Cases with plantar fasciitis generally appears with localized pain in the calcaneal excrescence during their original way in the morning.

Plantar fasciitis is allowed to have multiple causes. Factors similar as increased bottom weight bearing conditioning, poor memoir mechanics and delayed mending are likely factors. The individualities who have the symptoms are prone to develop plantar fasciitis. The plantar fascia connects the medium tuberosity of the calcaneus to the plantar plates of the metatarsophalangeal joints, located near the base of the proximal toe. Phalanges and flexor tendon pods. The plantar fascia operates like a bowstring. ⁽²⁾ The purpose is to strengthen the bottom's longitudinal bow and help absorb dynamic shocks. The plantar fascia serves a vital part in Foot support and stiffness play a pivotal part during gait cycles. During cargo, the plantar fascia allows for inflexibility in the midfoot. Conforms to the ground and absorbs shock. During pre-swing phase, the metatarsophalangeal joints are extended, the plantar fascia becomes tense. The height of the longitudinal bow increases, leading to supination of the bottom and bettered propulsion. Poor biomechanics in these ages can be get bottom pathology and plantar heel pain.

Taping techniques target the root cause of poor foot biomechanics. Arch taping is applied. Normally resilient fascia becomes stiffened and prone to re-injury, thus setting up a vicious cycle of persistent pain. There are various etiological factors resulting in plantar fasciitis: they are classified as biomechanical, environmental and anatomical. Biomechanical factors are abnormal joint mechanics, tight posterior musculature and resultant decreased range of motion. Individuals with poor foot biomechanics that stresses plantar fascia are commonly diagnosed with plantar fasciitis. ⁽³⁾ Excessive pronation is a commonly cited risk factor for developing plantar heel pain. Excessive pronation is caused by plantar flexion and adduction of the talus during weight bearing, causing the calcaneus to evert. Individuals most prone to plantar heel pain are middle-aged women, obese individuals, athletes and male runners. Men and women with poor gait mechanics that include excessive pronation. No research has been conducted on the acute effects of taping the calcaneus and Achillestendon during weight bearing to manage their position and alignment.

Previously, strapping and taping procedures focused on supporting the arch (midfoot) rather than managing the calcaneus (rear foot region). This study aimed to investigate the impact of a calcaneal and Achillestendon taping technique (using only 4 pieces of tape) on plantar heel pain symptoms, based on the biomechanical premise that decreased longitudinal arch height is caused by eversion of the calcaneus and plantar flexion/adduction of the talus. ⁽⁴⁾ Stretching exercise will show a greater decrease in pain, utilizing a visual analogue scale (VAS), and an increase in functional activity, as measured by a patient-specific functional scale (PSFS), compared to Calcaneal taping

2. METHODOLOGY

This is a Quasi-experimental study performed to reduces the pain in plantar fasciitis patient by using Calcaneal taping and stretching exercise. The study included a total of 20 samples. The participant in the study were taken in MGMCRI hospital. A total of 20 participant who fulfilled the selection criteria were included in the study. Participant were divided into 2 groups by random allocation using odd or even method and then asked to sign the consent form. Training protocol were explained to the participants. Group A received calcaneum taping and Group B received stretching exercise along with footwear modification (MCR Wear). The females were at the age between 30-45. Both the groups had 10 participants each. **INCLUSION & EXCLUSION CRITERIA:** The age between 40-60 years females were included in the study with plantar fasciitis. The participants must have a pain in the morning and the VAS scale must be 3-7. THE exclusion criteria include the participants who are contraindicated to taping and are not included if there is any vascular disease example DVT.

3. DATA COLLECTION PROCEDURE

The participants of Group A were given Calcaneal taping for 3 days per week. The participants in Group B were asked to do stretching exercise along with footwear modification (MCR FOOTWEAR). **Intervention** - Calcaneal taping is applied with the patient positioned in long sitting on the couch for all subjects in Group-A. Cover-Roll stretch bandage was applied to a pre-cleaned & dry skin surface and then covered with Leuko-tape. Once the Cover-Roll is applied, 3-4 pieces of Leuko-tape was applied. The 1st strip of tape was inserted distal to the medial malleolus, which has a pulling effect in the medial side of the calcaneum and it has been fixed in the medial side of the foot. The 2nd and 3rd strip of tape is applied in a same pattern and it is overlapped by about one-third of the tape width distally. The 4th strip of tape is fixed on the back of the heel, starting from lateral malleolus around the posterior part of calcaneum and finally anchoring the medial malleolus. The 4th strip is used the anchor the 1st strip. Stretching exercise- In day 1 the participants perform toe flexor stretch, towel pull and ball roll. The next day participants plantar flexor stretch and foam roll exercise. Later the exercises are continue from day 1 & 2 with maximum repetition.

OUTCOME MEASURE:

- Visual analogue scale (VAS)
- Plantar fasciitis pain/ disability scale
- Foot Function Index (FFI)

VISUAL ANALOGUE SCALE (VAS):

The Visual Analogue Scale (VAS) is a scale used to measure the intensity of the pain. The [Visual Analog Scale](#) (VAS) is a 10 cm line with anchor statements on the left (no pain) and on the right (extreme pain).

FOOT FUNCTION INDEX:

A Foot Function Index (FFI) is used to measure the impact of foot pathology on function in terms of pain, disability and activity restriction. FFI has good test- retest reliability and internal consistency of 0.87 and 0.96 respectively⁴.

STATISTICAL ANALYSIS:

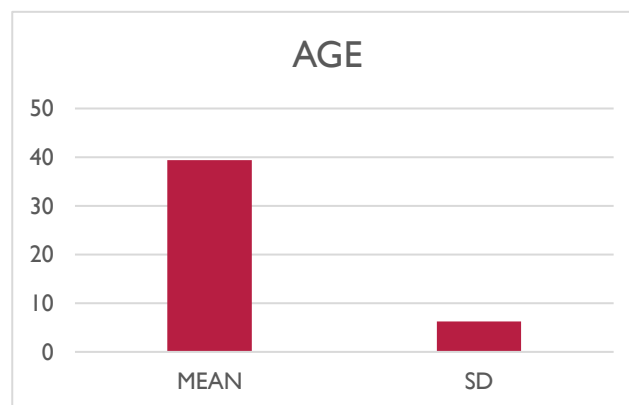
The data analysis shows the outcome of paired t test and unpaired t test for two groups where paired test measures variables within the group and unpaired t test measure the variables between the groups.

Demographic data:

The survey received the response from 20 participants. They ranged in age from 30-50 years old, and their age weren't distributed evenly all the respondents were females.

Table 1:

N	MEAN	SD
20	39.4	6.24



Graph 1: Distribution of age

4. RESULT

The findings indicated that p value of stretching exercise is less than 0.0004 which shows 98.9% of significance and the taping p value is less than 0.003 which shows 95% of significance. Hence stretching is more effective in reducing the pain in plantar fasciitis patients and improve the foot function index after taping.

DATA ANALYSIS OF PAIRED T TEST SCORE OF FOOT FUNCTIONAL INDEX

FOR GROUP A AND GROUP B

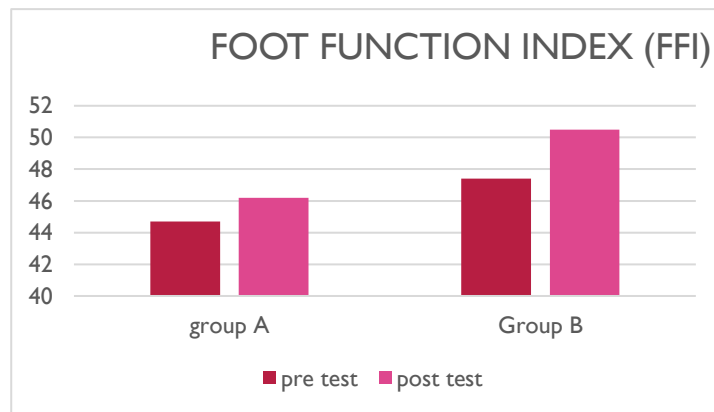
This table represents the comparative mean value, mean difference, standard deviation and unpaired t test score between Group A and Group B on Foot Function Index. The p value is 0.0004 for Group A.

TABLE-2

GROUP A&B	MEAN	SD	P value	t-value
PRE-TEST	44.76	10.65	0.38	0.8822
POST-TEST	47.49		0.0004	

PRE-TEST	46.2	10.04	0.056	1.2461
POST-TEST	50.5		0.0003	

Table 2: Analysis of Foot Function index for Group A & B. This table represents the comparative mean value, mean difference, standard deviation and paired t test score between Group A and Group B on Foot Function Index. The p value is 0.0004 for Group A and 0.0003 in Group B.



Graph2: Graphical analysis of Foot Function Index for group A&B

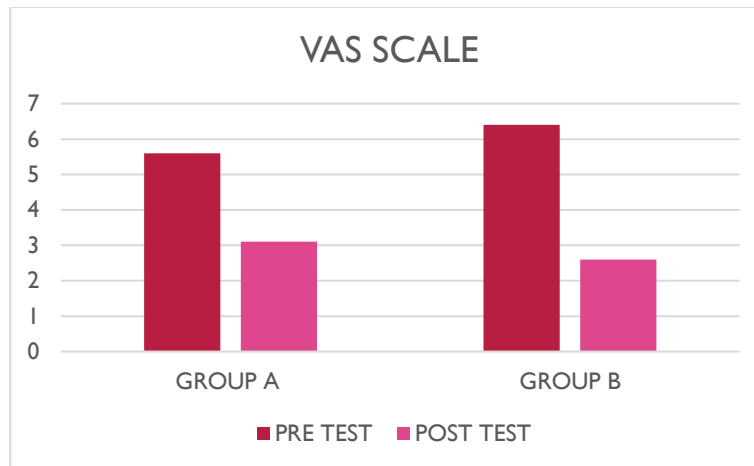
DATA ANALYSIS OF PRE AND POST TEST SCORE OF VISUAL ANALOGUE SCALE FOR GROUP A AND GROUP B

This analysis deals with the interpretation of data collection from 10 participants with plantar fasciitis. Pre-test versus post - test values of visual analogue scale for group A who received

Table-3

GROUP A&B	MEAN	SD	P-value	T-value
PRE-TEST-A	5.6	1.70	0.088	1.961
POST-TEST-A	3.0		0.06	
PRE-TEST-B	6.4	1.23	0.067	2.341
POST-TEST-B	3.65		0.0005	

Table3: Analysis of VAS in Group A&B. This analysis deals with the interpretation of data collection from 10 participants with plantar fasciitis. Pre-test versus post -test values of visual analogue scale for group A who received calcaneum taping. The mean value and standard deviation were 2.06&1.70. the p value 0.06 in Group A and 0.0005 in Group B.



Graph3: Graphical representation of VAS in Group A&B

5. DISCUSSION

Plantar Fasciitis is the one of the most common cause for heel pain. It's caused due to heavy weight bearing and repetitious overuse. In this study is used to find the effect of calcaneal taping with stretching exercise among home labels with plantar fasciitis. Pain intensity is measured on VAS and FFI which shows a significant pain reduction in Group B than in Group A. The Calcaneal taping group had a significant effect in reducing the pain in both bottom function indicator and Visual analogue scale (VAS).⁽⁸⁾ The bottom function indicator has a significant change in managing the pain in the stretching group and the visual analogue scale (VAS) dropped. The mean of both the groups in pre and post intervention showed the difference in managing the pain. According to the result of this study, prior to training, 10 participants experienced moderate to severe pain, scoring a total of 7-8 (VAS) Scale. At the end of the intervention phase, the number were decreased to 8. There was a improvement in the foot function index for the participants who undergo stretching. Both the groups showed a changes with 8 participants score was 3-5 and 12 participants with 5-6 score. In the short term, stretching exercise appears to give better pain relief for plantar fasciitis cases than calcaenum taping. Taping provides instant support and reduces strain, which can contribute to faster symptom relief. still, stretching exercises may give both short & long- term advantages by correcting underpinning inflexibility enterprises and precluding rush.

Calcaneal taping involves applying tape to support the heel and arch, aiming to reduce strain on the plantar fascia. A randomized controlled trial demonstrated that calcaneal taping significantly alleviated plantar heel pain compared to stretching exercises, sham taping, or no treatment. Participants reported notable pain reduction after one week of taping. Stretching exercises, particularly those targeting the plantar fascia and Achilles tendon, are commonly recommended to enhance flexibility and reduce tension. While these exercises have shown benefits, their short-term effectiveness may be less pronounced compared to taping. The same study indicated that stretching exercises were less effective in immediate pain relief than calcaneal taping.⁽¹⁰⁾ For homemakers, the choice between taping and stretching may depend on factors such as daily activities, time constraints, and the ability to perform self-care routines. Calcaneal taping can provide immediate support and pain relief, which might be beneficial during periods of increased activity. However, it requires proper application techniques, possibly necessitating guidance from a healthcare professional. Stretching exercises, on the other hand, can be performed independently and incorporated into daily routines. While they may offer slower onset of pain relief, they contribute to long-term flexibility and strength, potentially preventing future episodes of plantar fasciitis. In conclusion, calcaneal taping is superior to stretching exercises for treating plantar fasciitis discomfort right down. A combined approach, with taping for temporary comfort and stretching for short & long- term conservation, may give a further thorough treatment strategy. quick and effective.⁽⁹⁾

H.R Osborne (2006) studied taping supports the longitudinal arch of the foot. It reduces the peak plantar pressure of normal toe. Kumar R et al (2017) concluded that self-stretching can help in correcting the functional risk factors (tightness of Achilles tendon and fibrotic changes of plantar fascia) seen in chronic plantar fasciitis subjects. Similarly, stretching of the plantar fascia may lead to increase elasticity of the plantar fascia thereby restoring the windlass mechanism so that the tissue tension is reduced. Laxmi Yadav et al (2019) has concluded that This study demonstrated that calcaneal taping along with supervised exercise & moist heat pack has an efficacy in improving pain & function. But while comparing it with supervised exercise & moist heat pack alone insignificant result have been found. Thus, it can be concluded that there were no added benefits of rigid calcaneal taping in plantar fasciitis than supervised exercises and moist heat pack applied together

6. CONCLUSION

On the basis of the outcome measure both stretching exercise and calcaneal taping has a significant effect in reducing the pain thereby improving the foot function in subject who are suffering from plantar fasciitis. While comparing both the intervention it is said that stretching exercise show a better difference than the calcaneal taping technique.

Conflict of interest:

The author declared that there was no conflict of interest.

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Author contribution:

All authors contributed equally.

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