Effectiveness of Conventional Physiotherapy Exercises Versus Kinesiotaping in Recreational Football Players with Plantar Fasciitis

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Abstract

Background: Plantar fasciitis is a disorder in which there is non-inflammatory structural breakdown of the plantar fascia. It is more common in sports that involve running and long- distance walking. Many of the literature suggest that there is 21.7 % of prevalence rate of plantar fasciitis in individuals who play sports, especially in football players who uses studs/cleats shoes. Attachment of the cleats place the foot in a dorsiflexed position throughout the stance phase of running which produces and increases pressure upon the calcaneus. This creates a pull from soft tissue attachments such as plantar fascia which further leads to disorders like plantar fasciitis which needs to be treated early and by more advanced techniques to prevent further overuse injuries.

Objective: To find the effect of conventional physiotherapy exercises versus kinesiotaping in football players with plantar fasciitis.

Material and Method: In this pre-post intervention study 40 football players having plantar fasciitis were included. They were randomly divided into 2 groups with 20 individuals each. Group A was treated with conventional exercises and Group B with kinesiotaping along with conventional exercises for two weeks. After pre-post assessment, data was analysed with help of appropriate statistical methods.

Results: According to the result, in Group A and Group B there is significant difference in pain and measures of foot function index with p value < 0.0001.

Conclusion: The results obtained by studying both the groups in this study suggests that in treatment of plantar fasciitis, Conventional Therapy along with Kinesiotaping is more effective than Conventional Therapy alone.

Keywords: *Plantar Fasciitis, Conventional physiotherapy exercises, Kinesiotaping, Pain assessment, Foot Function Index.*

Introduction

Heel pain or pain in the sole of the foot is the most common site of pain in general population.[1] It can occur due to tendinitis, disease of calcaneum, bursitis or inflammation of fat pad.[1] It also commonly occurs due to plantar fasciitis.

Plantar fascia is a dense, fibrous connective tissue structure originating from the medial tuberosity of the calcaneus.[1] There are 3 portions – medial, lateral and central bands of the fascia of which the central band is the largest portion. The fascia extends through the medial longitudinal arch into individual bundles and

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inserts into each proximal phalanx.[1]

Plantar fascia is an important static support for the longitudinal arch of the foot.[1] It acts as a shock absorber as it has an ability to elongate with increased loads.[1]

Plantar fasciitis is a disorder in which there is non-inflammatory structural breakdown of the plantar fascia. In this disorder, there is classic presentation of gradual, insidious onset of inferomedial heel pain at the insertion of the plantar fascia.[2] Typically, this pain is described as "burning", "aching" and occasionally, "lancinating".[2] Pain and stiffness are worse with rising in the morning or after prolonged ambulation. Pain and tenderness are sometimes extended into the medial arch.[2] Pain related to this condition may cause substantial disabilities and poor health-related quality of life.[2]

It occurs due to obesity, direct repetitive microtrauma with heel strike, excessive running, standing on hard surfaces for prolonged periods of time, high arches of the feet, presence of limb length discrepancy or flat feet.[3] It is more common in sports that involve running and long-distance walking. It is also common in non-athletic individuals who are overweight and obese.[3]

There is 21.7 % of prevalence rate of plantar fasciitis in individuals who play sports, especially in football players who uses studs/cleats shoes.[4]

Studs or cleats are protrusions on the sole or an external attachment to a shoe, that provide additional traction on a soft or slippery surface.[5] They can be conical or blade-like in shape and made of plastic, rubber or metal.[5]

There are three main types of football boots: round, hard ground and bladed. These cleats are often permanently attached to the shoe surface and sometimes they can be removed. The studs/cleats are mostly attached on the forefoot and heel surface of the sole leaving the midfoot area.

Attachments of these studs/cleats can create a negative effect on the sole of the foot. Attachment of the cleats place the foot in a dorsiflexed position throughout the stance phase of running which produces and increases pressure upon the calcaneus.[5] This creates a pull from soft tissue attachments such as Tendo-achillies and plantar fascia which further leads to disorders like plantar fasciitis.[5]

Considering that such a large number of professional football players are suffering from this condition it can be safe to assume that greater number of recreational players will be suffering from this condition as well. The fact that they do not have much knowledge about various types of shoes and how to wear them correctly will add to this problem. Plantar fasciitis has worse effects on the foot function, gait pattern, walking speed and even normal stance.[2] There are several ways to assess foot pain and foot function and Foot Function Index respectively.

In this study foot function was assessed by using Foot Function Index. It is a simple yet reliable test.[6] Test-retest reliability of the Foot Function Index total and subscale scores range from 0.87 to 0.69, while internal consistency ranged from 0.96 to 0.73.[6] It is reported that the FFI is a reliable instrument for use in foot orthopedic intervention trials.[6]

The Foot Function Index has been validated and determined to be a reliable instrument for patients with non-traumatic foot or ankle problems.[6]

Also, recreational players are more prone to get plantar fasciitis as they do not have that much access as professionals does for such facilities. Often players ignore such heel pain thinking it will subside with time but then it leads to various other problems related to foot.

As we know that there is a conventional therapy used widely and for a long time to treat plantar fasciitis. But now there is need for more advanced therapeutic techniques to treat plantar fasciitis which will help in reducing the recovery period and can give more better results than the conventional therapy. And the advanced therapeutic technique for treating plantar fasciitis is Kinesiotaping.

Kinesiology taping or kinesiotaping is a curative tool and has been showing great results when used in treating variety of conditions.[7] Taping has been used for a long time for the prevention and treatment of sporting injuries.[7] It is a Japanese technique used with the intention to alleviate pain and improve the healing in soft tissues.[7]

There are also other benefits of taping such as proprioceptive facilitation, reduced muscle fatigue, muscle facilitation, reduced delayed onset muscle soreness, pain inhibition, enhanced healing, such as reducing edema and improvement of lymphatic drainage

and blood flow.[7]

It can be applied in various shapes and sizes according to the needs of the condition.[7] The shape selection depends upon the size of the affected muscle and the results to be achieved. Here, for plantar fasciitis "I" or "Fan" strip method can be used in the treatment which has a supportive or inhibitory effect on the plantar fascia

Thus, recreational players need treatment and awareness of such therapeutic techniques for conditions which can lead to many disorders.

Methodology

The ethical clearance was taken from ethical committee of Krishna institute of medical sciences, Karad. There were 40 participants in the study. The study was taken place in the Physiotherapy department, Krishna Hospital. Treatment protocol was of 2 weeks. The subjects were assessed for foot function and foot pain at first. The type of study was experimental study. The study design was pre and post.

Procedure:

All the subjects were selected for the study according to the selection criteria. Demographic data and consent were taken from them. Included participants were divided in 2 groups by simple random sampling method. Pre and post assessment were taken before and after 2 weeks of the treatment respectively with the help of outcome measures.

Group A: In first week, Ultrasound therapy with pulsed mode and intensity of 0.8W/cm^2 for 7 minutes, for 5 days/week.

Contrast bath with hot water for 3 minutes and cold water for 1 minute for 5 times/session/day.

Active stretching of soleus and gastrocnemius muscles and plantar facia, 30 seconds hold for 5 times/day session.

In second week, Contrast bath with hot water for 3 minutes and cold water for 1 minute for 5 times/session/day. Active stretching of soleus and gastrocnemius muscles and plantar facia, 30 seconds hold each one, for 5 times/day session.

Strengthening exercises like toe curls with towel, 15 repetitions for 3 times.

Heel raise with towel, 15 repetitions for 3 times.

Marble pick-ups, 10 pick-ups for 2 times. All exercises were performed for 1 session/day.

Group B: In first week, Taping for 2 times/week. Patient position- prone lying. Fan method. Ultrasound therapy with pulsed mode and intensity of 0.8W/cm^2 for 7 minutes and for 5 days/week.

Contrast bath with hot water for 3 minutes and cold water for 1 minute for 5 times/session/day.

Active stretching of soleus and gastrocnemius muscles and plantar facia, 30 seconds hold for 5 times/day session.

In second week, Contrast bath with hot water for 3 minutes and cold water for 1 minute for 5 times/session/day. Active stretching of soleus and gastrocnemius muscles and plantar facia, 30 seconds hold each one, for 5 times/day session.

Strengthening exercises like toe curls with towel, 15 repetitions for 3 times. Heel raise with towel, 15 repetitions for 3 times. Marble pick-ups, 10 pick-ups for 2 times. All exercises were performed for 1 session/day.

Results

1. **Age wise distribution:**

Table no. 1: Age wise distribution in study.

Age Group	Group A				Group B				Total
	Players	Percentage	Mean SD	Total	Players	Percentage	Mean SD	Total	
18-24	18	90%	21.39±1.79	20	18	90%	21.39±1.79	20	40
25-30	02	10%	25.5±0.71		02	10%	25.5±0.71		
Total	20	100%	21.8±2.11		20	100%	21.8±2.11		

Interpretation: Above table represents age wise distribution of the study. Out of 40 subjects, 90% subjects were from the age group 18-24 and 10% subjects were from the age group 25-30, in both A and B groups.

2. **Pain score:**

Table no. 2: Mean Pain Score.

Pain Score(VAS)	Mean SD	
	Pre-Intervention	Post- Intervention
Group A	6.4±1.05	5.15±1.39
Group B	6.65±0.93	2.70±0.66

Interpretation: Above table represents mean pain score of pre and post intervention of subjects from both the groups.

Table no. 3: Paired and Unpaired 't' test results.

Pain Score	Paired t- test		Unpaired t- test	
	t- value	p- value	t- value	p- value
Group A	6.571	<0.0001 (ES)	7.139	<0.001 (VS)
Group B	23.269	<0.0001 (ES)		

Interpretation: Above table represents results of paired and unpaired 't' test of mean pain score of subjects from both the groups.

3. **Foot Function Index Score according to Subscales:**

Table no. 4: Mean scores of FFI.

FFI	Mean SD	
	Group A	Group B
FPS	16.80±1.70	14.20±1.20
FDS	28.20±1.36	25.45±1.28
ALS	5.10±0.31	5.00±0.00

Interpretation: Above table represents mean score of FFI according to its subscales of subjects from both the groups.

4. **Foot Function Index Score:**

Table no. 5: Mean scores of Foot Function Index.

FFI	Mean SD	
	Pre-Intervention	Post-Intervention
Group A	53.53±3.61	31.49±1.70
Group B	29.47±2.12	17.34±1.01

Interpretation: Above table represents mean of total score of FFI of subjects from both the groups.

Table no. 6: Paired and Unpaired 't' test results.

FFI	Paired t- test		Unpaired t- test	
	t- value	p- value	t- value	p- value
Group A	49.069	<0.0001 (ES)	27.430	<0.0001 (ES)
Group B	49.093	<0.0001 (ES)		

Interpretation: Above table represents results of paired and unpaired 't' test of mean score of total score of FFI of subjects from both the groups.

Discussion

A study reported that there is 21.7 % of prevalence rate of plantar fasciitis in individuals who play sports, especially in football players who uses studs/cleats shoes.

Thus recreational players need appropriate treatment and awareness of such therapeutic techniques like Kinesiotaping and proper strengthening exercises are necessary for preventing further complications.

In this study, 40 individuals who played football for recreation (all male) were taken. They were equally divided into two groups i.e. Group A and Group B. Individuals in the age group of 18-30 years were included in this study, out of which 18 (90%) individuals were in the (18-24) age group and 2 (10%) individuals were in the (25-30) age group, in both the groups. This age group consisted of those who played recreational football and did not have any training or experience in professional football.

In Group A, the subjects were given only conventional therapy for plantar fasciitis for two weeks and in Group B, the subjects were given conventional therapy along with Kinesiotaping. Pain score according to Visual Analogue Scale and Foot Function Index score of subjects of both the groups were taken before the treatment/intervention was given. The mean pain score measurements for Group A prior to the intervention was 6.4 and post intervention was 5.15 and for Group B, mean score pre-intervention was 6.65 and post-intervention was 2.70.

Statistical analysis of the pain score of pre and post intervention of both the groups was done to confirm that the difference between the pre and post measurements is significant. The comparison for pre and post pain scores was found to have a p-value of (<0.0001) which was very significant.

To analyze the impact of foot pathology on function in terms of pain, disability and activity restriction of foot was done by using the Foot Function Index(FFI). It is divided into 3 subscales viz; Foot Pain subscale(FPS), Foot Disability subscale(FDS) and Activity Limitation subscale(ALS) which consists of 23 items. Same as Pain score, measures of FFI were taken before and after the treatment. The mean score of FFI for Group A according to the FPS was 16.80, FDS was 28.20 and ALS was 5.10, and for Group B, FPS was 14.20, FDS was 25.20 and ALS was 5.00. Here, the scores of FDS was found to be more among the three subscales.

The mean scores of pre and post intervention of FFI for Group A were 53.53 and 31.49 and Group B were 29.47 and 17.34. Statistical analysis was done to compare the mean post intervention scores of Foot Function Index to confirm whether they were significant or not and it was found that the p-value for Group A was (<0.0001) which was extremely significant and for Group B the p-value was (<0.0001) which was extremely significant.

Analysis was done to compare the total scores of Foot Function Index post intervention of both the groups which were found to have a p-value of (<0.0001) which was extremely significant for both the groups.

Thus the results obtained by studying both the groups in this study suggests that in treatment of plantar fasciitis, Conventional Therapy along with Kinesiotaping is more effective than Conventional Therapy alone.

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Conclusion

On the basis of the result of the study it is concluded that in treatment of plantar fasciitis, Conventional Therapy along with Kinesiotaping is more effective than Conventional Therapy alone.

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Conflict of Interest: There were no conflicts of interest in my study.

Ethical Clearance: The Institutional Ethical Committee has hereby given permission to initiate the research project titled, "Effectiveness Of Conventional Physiotherapy Exercises Versus Kinesiotaping In Recreational Football Players With Plantar Fasciitis"

References

1. S. Brent Brotzman, Kevin E. Wilk. Clinical Orthopaedic Rehabilitation, Second edition, Foot and Ankle Injuries, Pg. no: 393-404.
2. Palomo-López P, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Rodríguez-Sanz D, Calvo-Lobo C, López-López D. Impact of plantar fasciitis on the quality of life of male and female patients according to the Foot Health Status Questionnaire. Journal of pain research. 2018;11:875.
3. Plantar Fasciitis: https://www.physio-pedia.com/Plantar_Fasciitis
4. Rome K, Howe T, Haslock I. Risk factors associated with the development of plantar heel pain in athletes. The foot. 2001 Sep 1;11(3):119-25.
5. Walter JH, Ng GK. The evaluation of cleated shoes with the adolescent athlete in soccer. The Foot. 2002 Sep 1;12(3):158-65.
6. Foot Function Index:
7. https://www.physiopedia.com/Foot_Function_Index_(FFI)#share
8. Kinesiology Taping: https://www.physio-pedia.com/Kinesiology_Taping#share
9. Cleland JA, Koppenhaver S: Netter's orthopaedic clinical examination-an evidence-based approach, ed 2, Philadelphia, 2011. David J. Magee. Orthopaedic Physical Assessment (sixth edition). Elsevier Saunders:2014
10. Garceau DD, et al: the association between diagnosis of plantar fasciitis and Windlass test results, Foot ankle Int 24:251-255, 2003. David J. Magee, Orthopaedic Physical Assessment (sixth edition). Elsevier Saunders:2014
11. Windlass test: https://www.physio-pedia.com/Windlass_test
12. Lim AT, How CH, Tan B. Management of plantar fasciitis in the outpatient setting. Singapore medical journal. 2016 Apr;57(4):168.
13. Rajalaxmi V, Mohankumar G, Ramanathan K. Effectiveness Of Plantar Fascia Stretching Vs Contrast Bath Combined With Ultrasound In Plantar Fasciitis.
14. Foot Function Index(FFI): https://www.physiopedia.com/Foot_Function_Index_(FFI)#share
15. Caratun R, Rutkowski NA, Finestone HM. Stubborn heel pain: Treatment of plantar fasciitis using high-load strength training. Canadian Family Physician. 2018 Jan;64(1):44.