



International Journal of Medical and Exercise Science

(Multidisciplinary Peer Reviewed Journal)

ORIGINAL ARTICLE

EFFECTIVENESS OF STRETCHING AND MODIFIED FOOTWEAR ON REDUCING PAIN AND FUNCTIONAL ABILITY IN ATHLETES SUFFERING FROM SHIN SPLINT

Search engine:
www.ijmaes.org

Mr. Srinivas Mandom¹ and Dr.Jibi Paul²

Corresponding author: ¹Lecturer, Faculty of FSSKJ, UPSI, Tanju Malim, Perak, Malaysia, E-Mail: vasmpt@gmail.com

²Department of Physiotherapy, Faculty of Health Sciences, KPJ Healthcare University college, Nilai, Malaysia, E-Mail: jibipaul74@gmail.com

Abstract

Background: Shin pain is a common complaint among the athletes, particularly in distance runners. The term shin splint refers to the pain along the medial border of the tibia, which usually interfere in their athletic activity and increase their disability level. Major objective of this study was to find out the efficacy of early stretching and modified foot wear on reduction pain and effect on functional abilities among the athletes. **Methods:** Elite athletes from the sports department of the Mysore University of India were taken for the studies. The patients of both genders with age group between 24-32 suffer from shin pain were included for the study. The sustained stretching protocol and modified footwear were used for the experimental group and the cryotherapy and rest for the control group. A total of 30 subjects with the shin splint were participated in this study. All the subjects in this study were equally divided into experimental and control group and the treatment time fixed for four weeks. **Results:** Pre and Post treatment analysis found that there was significant difference in outcome of experimental group. The study accepted the alternative hypothesis and rejected the null hypothesis. The study was statistically significant with $P < 0.001$. Medically the study found early stretching intervention and modification of footwear were effective in reduction of pain and increase of functional ability. **Conclusion:** This study concluded that experimental group with intervention of early stretching and modified footwear was more effective on reducing pain and increasing functional ability among the athletes.

Key words: Athletes, shin splint, LEFS, cryotherapy, immobilization.

Received on 14th July 2015, Revised 29th July 2015, Accepted 14th August 2015

INTRODUCTION

Running in any form like sprinting, jogging around a park or training for a marathon, there is always a risk of injuries. One of the most common injuries among them is the Shin Splint (medial tibial stress syndrome).¹ The importance of a more accurate and specific diagnosis allows for more targeted treatment with improved outcomes and a higher rate of return to sports. The diagnosis should be limited to musculoskeletal inflammation excluding stress fractures or ischemic disorders².

Shin splint has a major impact on the performance of the runners; almost every runner will have at least one episode of shin splint in his/her life³. Worldwide estimation of prevalence of shin splint is 6% in males and 8% among females. Various population studies have reported shin splint a high as 80% in the athlete population and 60% in other sports but the average prevalence varies between 15% to 20%. Even with the advent of the ergonomically prevention programmes and advanced training technique, the number of athletes suffering from shin splint is continually rising^{4,5}

Aims and Objective

Objectives of the study were to find the effect of early stretching with the use of modified foot wear in reduction of pain and improve functional abilities among athletes with Shin Splint. The study has also evaluated the effect of cryotherapy with adequate rest in reducing pain and effect on functional abilities among the athletes. The study was aimed to compare the results obtained from both the groups and find the best method of treatment intervention.

Need of the study

Shin splint is one of the most common injuries among the athletes. The most common cause is the inflammation of the periosteum that is caused by the traction force on the periosteum from the muscles of the lower leg.^{6,7} The shin pain is the second only to the knee pain as the most common musculoskeletal disorder in the athlete's population; it is like the knee pain

that brings down the performance in athletes where they will not be able to push themselves during the end phase of the competition. As the pain increases restriction in range of motion and strength of the involved muscles decreases and increased disability level which make the athletes more worried about their performance. Proper rehabilitation can reduce the symptoms and improve the functional ability of athletes with shin splint.^{8,9,10,11}

MATERIALS AND METHODS

The population of the study will include both male and female athletes of Mysore University. The study setting was conducted in the departments of physiotherapy in the premises of Mysore University. The Samples were confirmed as having shin pain and recommended to the physiotherapy by physician. Simple random sampling method was used to select the samples. The sample size was 30 and divided equally into two groups, control group (group A) given cryotherapy and rest and the experimental group (group B) was given early stretching exercises with the use of shoe insoles and sports shoes as modified footwear.^{12,13,14,15,16}

Criteria Included were subjects with shin pain on any side of the leg (right or left), age group between 25-35 years, Both male and female athletes were taken, subjects with score of mild to severe discomfort in lower extremity functional scale, subjects with ability to understand visual analogue scale, athletes with the duration of pain less than two months.^{17,18} Subjects associated with traumatic conditions of leg, congenital deformities of leg, fracture of the bones of the lower leg, athletes with ankle sprain, infectious condition of the leg, peripheral vascular disease-acute and chronic, athletes who are allergic to ice were excluded from the study.

Data collected before and after the treatment by assessment of both the groups with visual analogue scale for pain and lower extremity functional scale for functional ability. Post assessment was taken after 4 weeks with the same tools for pain and lower extremity functional scale. Materials used for the study

were orthopedic assessment chart, couch, stop watch, ice towel and Chair.

RESULTS

The result was obtained after statistical analyze of the data using t' test. An interpretation was carried out in the later stage to make sure that the result can be implicated in a broader context. The decision criterion fixed by reject the null hypothesis if the p-value is less than 0.05; otherwise the study accepts the null hypothesis.

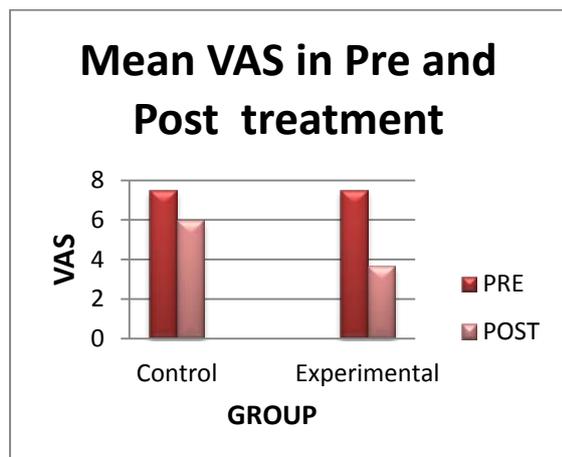
The study observed that there s no statistically

significant difference between control and experimental group with respect to the mean VAS in Pre treatment phase (P>0.05).

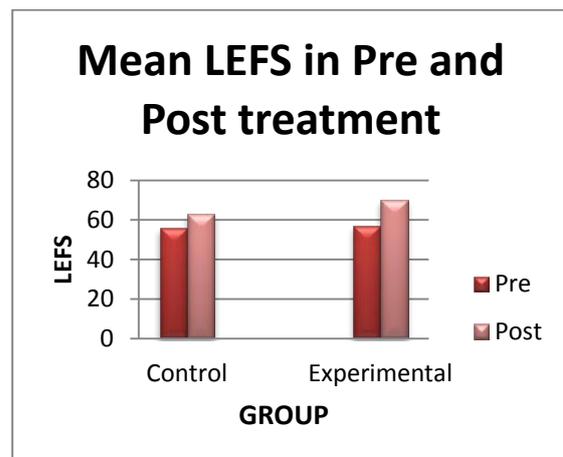
The mean VAS score is found to be equal between the two groups. Statistically significant difference is observed between control & experimental group with respect to mean VAS in Post treatment phase (P<0.001). Higher mean VAS is recorded in control group compared to experimental group and the difference between them is found to be statistically significant. (Graph 1)

Parameter	Group	Mean	Standard deviation	Mean difference	t- Value	P-Value
VAS – Pre	Control	7.53	0.74	0.000	0.000	1.000
	Experimental	7.53	0.64			
VAS – Post	Control	6.00	0.93	2.333	7.690	<0.001*
	Experimental	3.67	0.72			
LEFS – Pre	Control	56.00	2.88	-1.133	-1.218	0.233
	Experimental	57.13	2.17			
LEFS – Post	Control	62.93	2.34	-7.133	-7.885	<0.001*
	Experimental	70.07	2.60			

Table 1: Denotes the significant difference between pre and post test on VAS and LEFS among control and experimental group



Graph 1 Pre and Post VAS is recorded in control group and experimental group



Graph 2 Pre and Post LEFS is recorded in control group and experimental group

Statistically no significant difference was observed between control & experimental group with respect to LEFS in the pre treatment phase ($P>0.05$). Even though higher mean LEFS was recorded in experimental group compared to control group, the difference was not statistically significant. The difference in mean LEFS in post treatment phase between control & experimental group was found to be statistically significant ($P<0.001$). Higher mean LEFS was recorded in experimental group compared to the control group and the difference between them is statistically significant. (Table 1)

The difference in mean LEFS in post treatment phase between control & experimental group is found to be statistically significant. Higher mean LEFS is recorded in experimental group compared to control group and the difference between them is statistically significant. In control group, the study noticed that there is

significant difference in mean LEFS between Pre and Post treatment phase ($P<0.001$). There is an increase in mean LEFS from pre treatment phase to post treatment phase and the mean increase is found to be statistically significant (Graph 2).

Mean LEFS in control group is found to have increased from pre treatment phase to post treatment phase and the increase is found to be statistically significant ($P<0.001$). In experimental group. The study found there is a significant difference in mean VAS between Pre and Post treatment phase ($P<0.001$). The study also found there is a decrease in mean VAS from pre treatment phase to post treatment phase and the mean decrease is found to be statistically significant. Mean LEFS in experimental group is found to have increased from pre treatment phase to post treatment phase and the increase is found to be statistically significant with $P<0.001$. (Table 2)

Group	Parameter	Time interval	Mean	Standard deviation	Mean difference	t- Value	P-Value
Control	VAS	Pre	7.53	0.74	1.533	9.280	<0.001*
		Post	6.00	0.93			
	LEFS	Pre	56.00	2.88	-6.933	-7.776	<0.001*
		Post	62.93	2.34			
Experimental	VAS	Pre	7.53	0.64	3.867	15.120	<0.001*
		Post	3.67	0.72			
	LEFS	Pre	57.13	2.17	-12.933	-22.909	<0.001*
		Post	70.07	2.60			

Table 2 Denotes the significant difference between pre and post test by VAS and LEFS among control and experimental group

DISCUSSION

Shin splint is one of the major disabling pathology among the athletic population. This study was done to evaluate the effectiveness of early stretching along with modified foot wear in shin splints by taking a control group that underwent a conventional treatment protocol with Cryotherapy and rest. 30 athletes have actively taken part in the study among whom they were divided into control

and experimental groups randomly. Control group received Cryotherapy and rest for a period of 4 weeks. Experimental group underwent early stretching intervention that included both assisted and self stretches along with use of comfortable footwear. The pre and post treatment evaluation was based upon general physical examination, accurate history taking. Evaluation through Standardized scales such as VAS and LEFS was

also done and these scales played a key role in the process of assessing the athlete because, the statistical data used to compare the result was based on this scales.^{19,20}

The statistical data contains the Mean value, the Standard deviation, the T value and the P value derived by application of standard formulations for the two major parameters that is the VAS and the LEFS. Each of these parameters was subdivided into pre and post treatment phases. These two phases are applicable to both the control and the experimental groups. In this study it is seen and evidently proven by statistical outcomes that in the pre treatment phase, there was no significant difference between the experimental group and the control group.

There was no significant difference on the levels of pain and functional disability in pre test among the groups. However, it was seen and again evidently proven by both statistical outcome and direct scale values that in post treatment phase. There was a significant improvement in the scores of experimental group, in which the aim of the study was embedded. The study finally arrived at the alternative hypothesis and rejected the null hypothesis because; statistically P value was less than 0.05. Medically found the early stretching intervention and modified foot wear was effective in reduction of pain and increasing functional ability among the athletes.^{22,23}

There are many studies which proved the effect of stretching phase of rehabilitation on reduction of pain and improve functional abilities in patients with shin splint, Cole (1998), John J Regan (2000). Stretching in the early phase of shin splints is a therapeutic manoeuvre designed to relieve pain and increase the mobility of soft tissues and subsequently increase ROM (Beaulieu 1989). Use of several slow and gentle intermittent stretches with the muscles in lengthened position if the patient doesn't seem to tolerate the sustained stretch is helpful in reducing the pain in medial shin splints (Kannus P 1992). There was relative

strong evidence supporting the effectiveness of stretching exercises and isometric strengthening of the leg musculature for chronic or frequent shin pain (Sarig-Bhat H 2003).

CONCLUSION

On the basis of the data obtained the study clearly showed that there was clear reduction in the pain and disability level in the experimental group and control group, but when both the groups were compared experimental group showed better improvement than control group. The study concluded that, early stretching with the use of modified footwear indeed effective in reducing pain and improving functional ability in athletes with shin splints.

REFERENCES

1. H. Gerry, B. Davidson. A study of effectiveness of stretching Phys Med Rehabil Clinic N Amc Aug 14 2003 14 (3) 605-27.
2. Goldie I, Landquit A. Evaluation of effects of different forms of physiotherapy in shin pain, Scand J Rehabil Med 1970:117-121.
3. Frerrari R, Russel AS. Regional musculoskeletal condition : Neck pian, Dept od Rheumatic Diseses , University of Albert , Edmont , Canada 2003 Feb ;17(1) :57-70.
4. Cole A, Farell J, Stratton S. Functional rehabilitation of the shin in athletic injuries. Aspine publications 1998:27-48.
5. James RK. Shin splint a review of the commonly miss understood injury AMJ Med 2001 Jan 1:110(8): 652-6.
6. Barchgrevenk G. E, Kassa A, M.C Donagan et al. Acute treatment of shin injuries, A randomized trial of the treatment during first 14 days after a car accident Spine 1998 Jan 1:23(1): 25-31.
7. Neubauer E, Zablten-Hinguranage A, Schilten Woft M, Boucher M. Multimodal therapy in patients with chronic knee and shin pain, results of a comparative prospective study 2005 Sep 8 (2) 10-15.
8. Schnabil G. Randomized controlled outcome study of active stretching

- compared with passive stretching for shin pain. Dept of Trauma, Philipps University of Margurg, Germany 2003:289:2509-2516
9. Sarig- Bahat H. Evidence of exercises therapy in the knee rehabilitation, Dept of Phaycial therapy University of Haifa, Isreil, 203 Feb: 8(1):10-20.
 10. Crawford JR, Khanb R J, Varly G W. Early management outcome following shin splint A randomized controlled trail Jour of Spine Injuries 2004 Sep:35(9): 891-5.
 11. Swenson RS. Therapeutic modulates in the management of non specific shin pain, Dep't of Anatomy, Dartmouth Medical School, Hanover, USA Aug 19 2002 (3) 197-204.
 12. Riddle DL, Start Ford PW. Use of shoe insoles and sports shoes in a shin disorder, A Comparative study, Phys Ther 78:951 1998.
 13. Geune P. To assess the efficacy of the soft insoles in the early management of the shin- injury related pain, Acad Emerg Med 1996 Jan: 3(6): 568-73.
 14. Kebler B, Henery S, Previs J Eds. Functional rehabilitation of sports and musculoskeletal injuries, Gaithersburg: Aspen Publications: 1998; 127-48.
 15. Marchiori P. How effective is the Cryotherapy for the treatment of the cervical shin splint, Dept of Emerg Med 2005, May: 4(9) 532-33.
 16. Warelt G W. Effectiveness of ice in shin pain Dept of Sports Rhab: 1999 Dec: 16(9), 555-556.
 17. Youdas JW, Carey JR, Garett TR. Reliability of measurements of the shin pain, comparison of 3 methods Phy Therp 1991 Feb: 71(2); 98-104 Discussion 105-6.
 18. Riddle P, Garton S- The visual analog scale –A study of reliability and validity J manip Physio Ther 14:909, 1992.
 19. Thomson R, Lunsforo, Michal Davidson. Brenda R, The effectiveness of 4 early stretching in reducing shin pain, Dept of Trauma, 04, 1994 25:7 649-53.
 20. Jeffery Peter Larson – Immobilization- Gale Encyclopedia of Medicine 200:58:104-15.
 21. Lawn RA, Pappagallo M, Kuhlemeur KV. Shin pain a comparison of the 3 pillows and the cervical soft collar, Arch Phys Med Rehabil 1997:78; 193-198.
 22. Schneider W, Dvarak J. Functional treatment of diseases and injuries of the shin – Orthopedic Jour 1996 Nov; 25(6):778-82.
 23. Patric D Wall. Shin pain and its management, a new theory. Science 165:150:971-979.

Citation:

Mr. Srinivas Mandom, Dr.Jibi Paul, 2015, Effectiveness of stretching and modified footwear on reducing pain and functional ability in athletes suffering from shin splint, 2015; 1 (1), 16-21.