

Effect of Heel Pad Combined with Ultrasound and Stretching Exercises in the Treatment of Plantar Fasciitis

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ABSTRACT

The purpose of this study was to investigate the effect of using rubber heel pad during weight bearing activities in conjunction with ultrasound therapy and stretching exercises on pain and functional disability associated with plantar fasciitis. Forty subjects suffering from plantar fasciitis, were randomly assigned to either group one (G1) who received ultrasound therapy and stretching exercises or group two (G2) who received ultrasound therapy and the same exercises program as group one. In addition patients in G2 were instructed to use rubber heel pad throughout their weight bearing activities. Subjects in both groups were evaluated pre and post experimentally for pain and functional disability. Both groups received twelve sessions (one session every other day for four weeks). Group one showed significant differences concerning both pain and functional disability, in comparing pre and post experimental evaluations. Group two, showed significant improvement in pain and functional disability, in comparing pre and post experimental evaluations. Comparison between results achieved in both groups showed significant differences in pain and functional disability improvements in favor of group two. Therefore, it was concluded that using rubber heel pad conjointly with physical therapy in the form of ultrasound therapy and stretching exercises is helpful in enhancing improvement of pain and functional performance in patients complaining from plantar fasciitis.

INTRODUCTION

Heel pain is a common problem encountered in clinical practice, sometimes representing a very debilitating condition and can be a real challenge to treat³.

Plantar fasciitis has been reported to be the most common cause of heel pain, in which pain can occur along the whole course of the plantar fascia or more commonly be limited to the inferior medial aspect of calcaneus².

Davies et al., (1999)⁵ also pointed out that plantar fasciitis is the most common cause of inferomedial heel pain and has been recognized for almost 200 years.

Kwong et al., (1988)¹⁰ defined plantar fasciitis as an inflammation of the plantar fascia and perifascial structures. Chandler and Kibler, (1993)⁴ defined plantar fasciitis as a repetitive microtrauma overload injury of the attachment of the plantar fascia at the inferior aspect of calcaneus.

A main line of treatment has been suggested to involve anti-inflammatory drugs, heel cups to off load the calcaneus. Corticosteroid injection and surgical release have also been suggested in resisting conditions¹.

Gill and Kiebzak, (1996)⁷ reported different forms of conservative treatments of plantar fasciitis including aspirin, non steroidal

anti-inflammatory drugs and injection of steroids.

Schepesis et al. (1991)¹³ pointed out that heel cups can be efficient to relief symptom in cases of plantar fasciitis.

Tisdell et al., (1999)¹⁴ reported that as a part of the initial conservative strategies in treatment of plantar fasciitis using shoe inserts, in the form of heel pads or heel cups, usually afford more comfort for patients.

Several therapeutic modalities have been reported in treatment of plantar fasciitis within physical therapy field. This includes ultrasound therapy, ice cube massage and passive stretching of the plantar fascia⁴.

Gudeman et al., (1997)⁸ demonstrated the success of short term relief of pain in cases of plantar fasciitis using dexamethasone iontophoresis.

Relief of heel pain might be enhanced using combined effects of short term anti-inflammatory modalities, stretching exercises of the plantar fascia to restore normal fascial extensibility and heel pads to off load the calcaneus. The purpose of this study was to investigate the effect of using heel pad for off loading heel during the period of physical therapy treatment using ultrasound therapy and stretching exercises.

MATERIALS AND METHODS

Forty patients (29 females and 11 males), age ranged from 40 to 60 years (average 49 years) participated in this study. All were diagnosed as cases of unilateral plantar fasciitis by referring physician. The treatment sessions were carried out in the outpatient physical therapy clinic in Kasr Elani hospital. All participants have an initial explanation of the purpose of the study. Treatment procedures were explained and

demonstrated for each participant. Consent forms were obtained from participants.

Patients were randomly assigned into one of the study groups, namely, group one (20 patients) who received ultrasound therapy and stretching of the plantar fascia. Group two received ultrasound therapy and stretching of plantar fascia using same procedures as group one. In addition, patients in this group were instructed to use rubber heel pad, throughout the weight bearing activities. Patients were instructed to remove heel pad only during bed time.

Evaluation procedures

Each patient included in the study was scheduled to perform pre experimental assessment before starting his/her treatment sessions. After the last session each patient was scheduled for post experimental assessment. Pain assessment was performed using visual analog scale. Foot disability assessment was performed using foot disability questionnaire⁶. It consists of 19 items, preceded by the phrase, 'because of my foot pain'. They cover activities of daily living and recreational activities that involve standing, walking, and running. Patient was asked to make one of three available selections, never occur, occurs sometimes, and occurs all the time.

Treatment Procedures

Each patient in both groups received 12 sessions of physical therapy (one session every other day for 4 weeks). Patients of group one were treated by ultrasound adjusted to 1MHz frequency, 1.5 W/cm² intensity, using pulsed mode (1:2) for a period of 8 minutes¹⁵. Stretching exercise for the plantar aspect of the foot and Achilles tendon was applied, with sequential 20 seconds on/off rate for a period of 3 minutes⁹. Patients of group two received

treatment using the same parameters as group one. In addition, they were instructed to use rubber heel pad through out weight bearing activities.

RESULTS

In group one paired t-test showed significant difference in pain and functional

disability between the pre-experimental and the post-experimental evaluations. In group two paired t-test also showed significant difference between pre experimental and post experimental evaluations for the two measured parameters pain and functional disability (Table 1)(Figs. 1&2).

Table (1): Paired T-test in both groups.

Parameters	Groups	Pre experimental		Post experimental		T-test	
		Mean	S.D.	Mean	S.D.	Value	Sig.
Pain	Group1	8.11	.87	5.31	.91	14.43	.000
	Group 2	7.81	.86	2.91	.99	19.87	.000
Functional disability	Group1	47.13	3.33	36.61	5.09	10.39	.000
	Group2	47.81	3.97	26.81	6.33	10.74	.000

$P < .05$

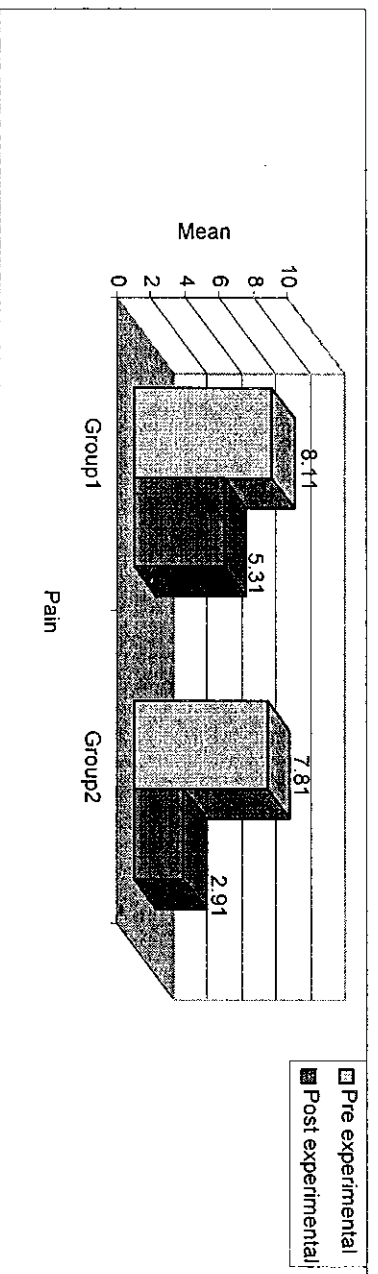


Fig. (1) : Comparison between pretest and post test mean values for pain in each group.

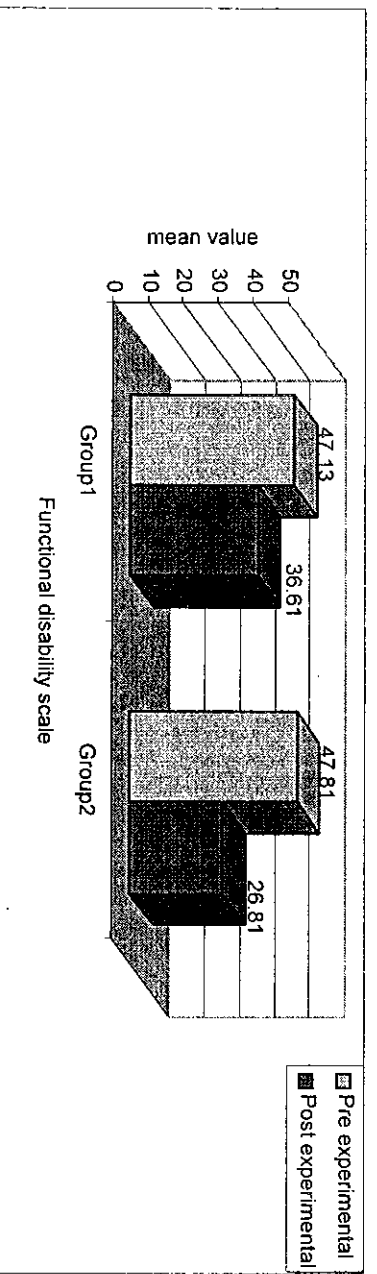


Fig. (2) : Comparison between pre test and post test mean values for functional scale in each group.

In order to compare the results achieved in group one (control group) and group two (experimental group), independent t-test has been performed. No significant differences have been found between both groups at pre experimental evaluation concerning pain and functional disabilities, justifying that any

differences in post experimental evaluation between both groups can be attributed to differences in experimented treatment. At post experimental evaluation significant differences were detected concerning pain and functional disability in favor of group two (Table2) (Figs. 3&4).

Table (2): Independent T-test (Pre experimental and post experimental).

Parameters	Time of evaluation	Group 1		Group 2		T-test	
		Mean	S.D.	Mean	S.D.	Value	Sig.
Pain	Pre	8.11	.87	7.81	.86	.95	.35
	Post	5.31	.91	2.91	.99	7.03	.00
Functional disability	Pre	47.13	3.33	47.81	3.97	-.54	.58
	Post	36.61	5.09	26.81	6.33	4.63	.00

P<.05

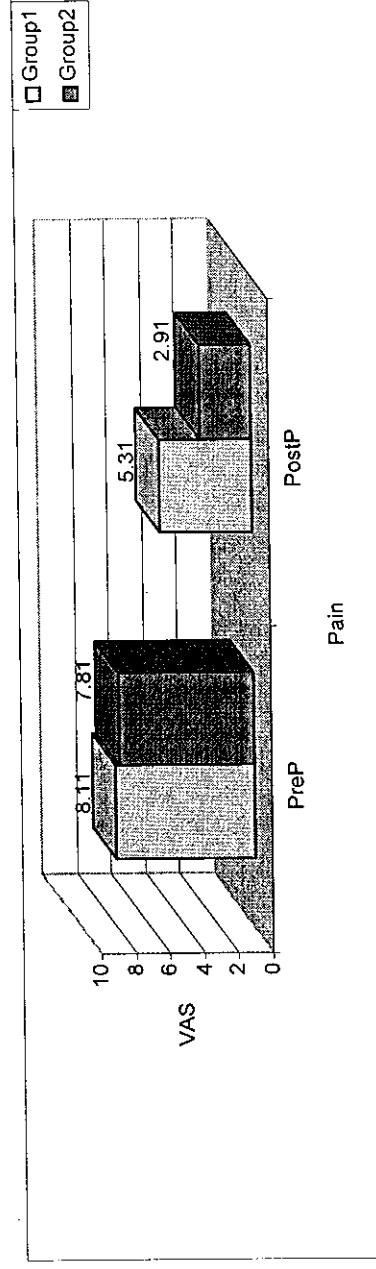


Fig. (3): Comparison between pre test and post test mean values for pain in both groups.

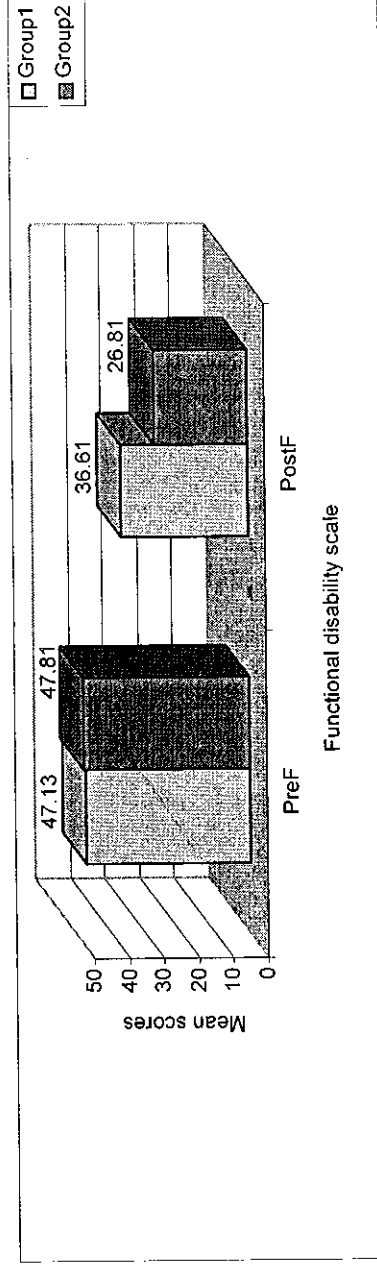


Fig. (4): Comparison between pretest and post test mean values for functional scale in both groups.

DISCUSSION

Results of this study revealed that using heel pad during activities of daily living in conjunction with physical therapy sessions was more effective in decreasing pain and improving function.

The results conforms with results achieved by Pfeffer et al., (1999)¹¹ who examined the effect of different forms of shoe inserts in alleviating pain in cases of plantar fasciitis. The authors concluded that prefabricated shoe insert used in conjunction with exercises was effective in improving the condition and reduction of pain.

The result of the Current study is also relevant to the effects of using shoe inserts reported by Ryan, (1995)¹² who reported that orthotic shoe inserts are effective in pain relief specially when plantar fasciitis is resulting from a mechanical deficit as in pes planus, cavus foot and hyperpronation.

Schepisis et al., (1991)¹³ supported the use of different forms of shoe inserts as a part of the conservative treatment of plantar fasciitis, emphasising that using firm rubber cup inserts gives cushioning of the inflamed area. These suggestions confirm the results obtained in the current study and justify the use of rubber cushion in conjunction with physical therapy.

Tisdell et al., (1999)¹⁴ recommended the use of a supportive shoe as a part of the conservative treatment of plantar fasciitis, through using pliable heel pads or heel cups into these shoes. The previous recommendation further supports the results obtained in the current study that ensures the increased comfort achieved in pain and improved function obtained with physical therapy when rubber shoe inserts were used contemporary.

CONCLUSION

The results of this study suggested that using rubber heel cup in conjunction with physical therapy management of plantar fasciitis was efficient in reducing pain and functional disability in cases of plantar fasciitis. However, further studies are needed to study the long term effect of using rubber heel cup, or any supportive shoe on this condition.

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الملخص العربي

تأثير مخدة الكعب بمعالجة الموجات الصوتية وتمارين الإطالة في علاج التهاب صفاق الأخمص

أجريت هذه التجربة لبيان أثر استخدام مخدة الكعب أثناء أداء الأنشطة التي تتطلب التحميل على القدم متزامنة مع جلسات العلاج الطبيعي المكونة من الموجات فوق الصوتية و تمارين الإطالة وذلك لعلاج المرضى المصابين بالتهاب الأنسجة الرخوة لأسفل القدم. وقد شارك في الدراسة أربعين مريض تم تقسيمهم عشوائياً إلى مجموعتين تضمنت كل منهما عشرين مريض. تلقى المرضى في المجموعتين التثني عشر (يوم بعد يوم لمدة ثلاثة أسابيع) جلسة علاجية متماثلة تكونت من الموجات فوق الصوتية و تمارين الإطالة. وأعطيت التعليمات لمرضى المجموعة الثانية فقط باستخدام مخدة الكعب أثناء أداء الأنشطة التي تتطلب التحميل. تم تقييم الألم و كفاءة الأداء الوظيفي قبل الدراسة و بعدها. وقد أوضحت النتائج تحسن الألم و ارتفاع مستوى الأداء الوظيفي بعد الدراسة في المجموعتين. ولكن معدلات التحسن في المجموعة الثانية فاقت معدلات المجموعة الأولى بفارق ذي دلالة إحصائية. ومن النتائج خلاص الباحث إلى أفضلية استخدام مخدة الكعب أثناء أداء الأنشطة التي تتطلب التحميل على القدم متزامنة مع جلسات العلاج الطبيعي المكونة من الموجات فوق الصوتية و تمارين الإطالة وذلك لعلاج المرضى المصابين بالتهاب الأنسجة الرخوة لأسفل القدم.