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A STUDY TO ANALYZE THE EFFECTIVENESS OF STRETCHING VS CRYOTHERAPY COMBINED WITH ULTRASOUND IN PATIENT WITH HEEL PAIN

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ABSTRACT

Aim Of The Study: To study the effectiveness of stretching with ultrasound in patient with heel pain and To study the effectiveness of cryotherapy with ultrasound in patient with heel pain. To evaluate the effectiveness of stretching vs cryotherapy combined with ultrasound in patient with heel pain. **Background Of The Study:** Heel pain are caused when a band of tissue in the foot known as the plantar fascia thickened and sudden damage that over month or year can cause micro tear to develop inside the tissue resulting in pain. **Methodology:** This study was an experimental study with Comparative pre-post test type. 30 subjects were randomly allocated into two groups Group A received ultrasound and stretching and Group B received ultrasound with cryotherapy. This study was carried out in Physiotherapy department of A.C.S medical college and hospital and duration of the study was 4 weeks. **Result:** On comparing both the groups A and B,group A (stretching with ultrasound therapy) showed marked improvement in functional activities and reduced pain in patients with heel pain than group B (cryotherapy with ultrasound therapy). **Conclusion:** The present study concluded that 4weeks duration of exercise program combining stretching with ultrasound was more effective than cryotherapy with ultrasound in reducing heel pain.

KEYWORD: Ultrasound, stretching (foot pull), cryotherapy, Heel Pain, VAS FFI.

INTRODUCTION

Heel pain is a very common foot disease. The diagnosis is mostly based on clinical examination. Normally the location of pain and absence of associated symptoms indicating a systematic disease strongly suggests the diagnosis and several therapies including rest, physical therapy, stretching and changing foot wear, supports orthotics night splints, anti-inflammatory agents and surgery. Almost all patients responds to conservative non-surgical therapy. Plantar heel pain is one of the most commonly occurring foot compliant. It is one of the most common causes of pain in inferior heel and is very frequent in some running sports. Pain is caused due to degeneration and irritation of the plantar fascia. Pain gets severe during walking and doing daily activities. It affects up to 10% of total general Population and accounts for 11% to 15%of all foot pain symptomatology. In most cases only one heel is affected although estimate suggests that around one third of people have pain in both the heel. About one in 10 people aged over 30 years report Plantar heel pain. Plantar heel pain causes soreness and tenderness of the sole of the Foot which sometimes extend into the medial arch. Plantar fascia is a thickened connective tissue which support the arch on the bottom of the foot. It runs from the Tuberosity of the calcaneum (heel bone) forward to the head of the metatarsal bone. Calcaneum is the largest bone in the foot The human heel is designed to provide a rigid support for the weight of the body. When we are walking or running it absorb the impact of the foot when it hits the ground, and spring as forward into our next Stride. Expert says that the stress placed on foot when walking may be 1.25 times of body weight, and 2.75 times when running consequently. The heel is vulnerable to Damage and ultimately pain in the majority of cases, heel pain has a mechanical Cases. It may also be caused by arthritis, infection, an autoimmune problem trauma. A Neurological problem or some other systemic condition. Plantar fascia is made up of predominately longitudinally oriented collagen fibers. There are three structural components: the medial components, the central components, the lateral Components. The central components are the largest and the most prominent. Several risks Factor such as obesity, occupations that requires/prolonged foot biomechanics. Anatomical and structural abnormalities, foot biomechanics, (eg.pesplanus, pescavus).

Reduced ankle dorsiflexion and age are all closely related to the onset of these diseases. The vertical force in the foot at foot Stake may reach 2-3 times an individuals body weight. The plantar fascia and Longitudinal arch are also part of the foot shock absorption mechanisms During Heel-off phase gait tension increases on the plantar fascia, which acts as a storage Of potential energy, toes-off plantar fascia

passively contract it convert potential energy in to kinetic energy as the etiology of plantar heel pain in unclear diagnosis is usually based on clinical sign including plantar heel pain on weight bearing after a period of non-weight bearing pain. Initial activity with further use as the day progresses and pain on palpation. Excessive stretch of the plantar fascia can result in chronic degeneration of the plantar fascia fibers. The loading of degeneration leads to heel pain. Further possible treating options is the use of therapeutic ultrasound, Such therapy extent's an analgesics and anti-inflammatory effect and is one of the most advised physiotherapeutic treatment for the heel pain. Ultrasound stimulate the repair of soft tissue injuries and to relive pain. Stretching is frequently utilised as a conservative treatment for plantar heel pain stretching is form of physical exercise in which a specific muscle (or) tendon Is Flexed (or) stretched in order to improve the muscle`s felt elasticity and achieve comfortable muscle tone. This will help to increased muscle control, flexibility and range of motions. The application of cold for various therapeutic purposes is called as Cryotherapy Cryotherapy is generally considered to be a basic components of most injury management startegies. This cryotherapy is used to prevent swelling and to minimize the pain.

Visual analogue scale (VAS) scores pain on a scale of 1 to 10 and have been effective in helping clinician`s measure pain.

Foot function index is a self-report, foot specific instrument measuring pain and disability and has been widely used to measure foot health for over twenty years.

METHODOLOGY: This study was an experimental study with Comparative pre-post test type. 30 subjects were randomly allocated into two groups Group A received ultrasound with stretching and Group B received ultrasound with cryotherapy. This study was carried out in Physiotherapy department of A.C.S medical college and hospital and duration of the study was 4 weeks. INCLUSION CRITERIA: The study included both male and female participants between age 30-50 having heel pain more than a week. EXCLUSION CRITERIA: Participants with impaired circulation of lower extremities, sciatica, calcaneal fracture, metal implants around ankle, tumour, dermatitis, anaesthesia area.

Visual analogue scale (vas) pain intensity-foot function index. Pre-test will be measured based on initiation of 1st treatment session and post-test Will be measured at the end of the session. Visual analogue scale (VAS) scores pain on a scale of 1 to 10 and have been effective in helping clinician`s measure pain. Foot function index is a self-report, foot specific instrument measuring pain and disability and has been widely used to measure foot health for over twenty years. A total of 30 subjects with heel pain Group A- 15 patients both male and female treated with stretching with ultrasound. Before the treatment procedure the treatment techniques are explained to the patients. Base line measurement was taken with visual analogue scale and foot function index. Patient treated with Ultrasound therapy, duration of the treatment is for 8 mins, Position of the patient is prone lying with pillow supported under the ankle and frequency of ultrasound should be 1 MHZ as it penetrates deeply, continuous mode is used Intensity be 1.5w/cm2. The subjects are treated with heel stretching exercises. They are: Ball /bottle rolling, Towel stretch, foot pulls. ***Ball/bottle stretching*:** The Patient sits with foot resting on ball/bottle and asks them to roll the ball/bottle to stretching the soft tissue under the heel. Patient do this stretching for 8 mins and repeat this for 3 times. ***Towel stretch:*** Patient sit with comfortable position fold towel lengthwise to make an exercise Strap and place the towel under the arches of feet and gently pull the toes towards you to stretch the soft tissues. Ask the patient to do this stretch for 15 sacks and repeat 3 times. ***Foot pulls***: Patient sit with one leg crossed over the other and grasp all the toes pull them towards you to stretch the soft tissues. Hold this stretch for 10 sacks and repeat 3 Times.

Group B-15 Patients both male and female treated with cryotherapy with ultrasound. Before the treatment procedure the treatment techniques are explained to the patients. Base line measurement was taken with visual analogue scale and foot function index. Patients in prone lying with pillow supported under the leg. Cryotherapy is given to the patient for 10 minutes. It helps to reduce pain, prevent swelling and decreases the stiffness.

DATA ANALYSIS

The collected data were tabulated and analysed using both descriptive and inferential statistics. All the parameters were assessed using Statistical Package for Social Science (SPSS) version 24. Paired t-test was adopted to find statistical difference within the groups & Independent t-test (Student t-Test) was adopted to find statistical difference between the groups.

Table 1: Comparison of Vas Between Group – A And Group - B In Pre And Post Test.

Significance	Do	t – TEST	#GROUP - B		#GROUP - A		#VAS
			S.D	MEAN	S.D	MEAN	
.825*	28	.224	.798	8.06	.833	8.13	Pre Test
.000***	28	-3.46	.915	6.46	1.08	5.20	Post Test

#GROUP A – VAS in stretching, # GROUP B – VAS in cry therapy

(*- P > 0.05)

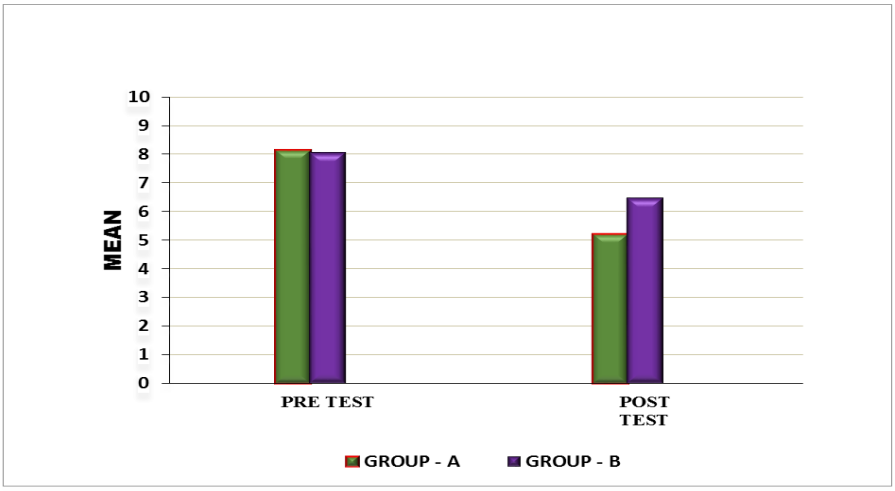
(*- P ≤ 0.001)**

The above table reveals the Mean, Standard Deviation (S.D), Student t-test, degree of freedom(do) and p-value of the VAS between (Group A) & (Group B) in pre-test and post-test weeks.

This table shows that there is no significant difference in pre-test values of the VAS between Group a & Group B (*****P > 0.05).

This table shows that statistically highly significant difference in post-test values of the VAS **between** Group A& Group B **(***- P ≤ 0.001)** (Graph –I)

Both the Groups shows significant decrease in the post test Means but (Group-A) which has the Lower mean value is more effective than (Group-B)



Graph I: Comparison of Vas Between Group – A And Group - B In Pre & Post Test

Table-2: Comparison of Ffi Between Group – A And Group - B In Pre And Post Test.

SIGNIFICANCE	do	t - TEST	#GROUP - B		#GROUP - A		
			S.D	MEAN	S.D	MEAN	
.767*	28	-.299	12.04	113.50	9.84	112.33	Pre Test
.000***	28	-2.49	11.40	101.40	9.79	91.73	Post Test

#GROUP A – FFI in stretching, # GROUP B – FFI in cry therapy

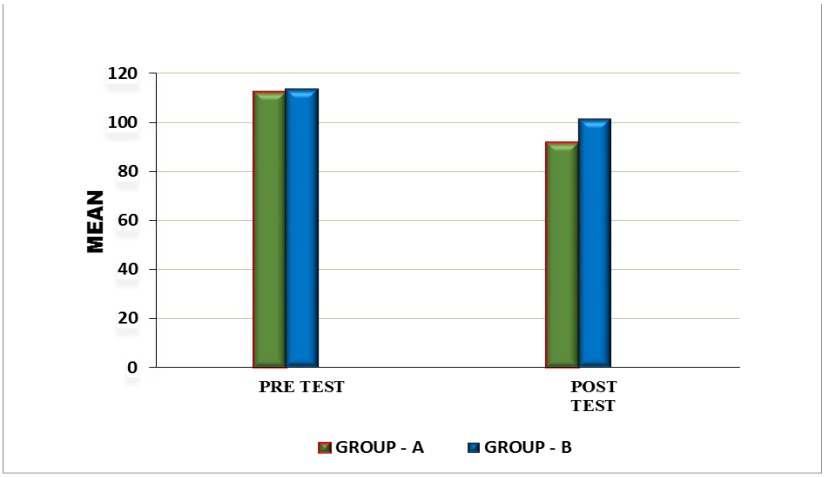
FFI-FOOT FUNCTION INDEX
(*- P > 0.05)
(*- P ≤ 0.001)**

The above table reveals the Mean, Standard Deviation (S.D), Student t-test, degree of freedom(do) and p-value of the FFI between (Group A) & (Group B) in pre-test and post-test weeks.

This table shows that there is no significant difference in pre-test values of the FFI between Group a & Group B (*****P > 0.05).

This table shows that statistically significant difference in post-test values of the FFI between Group A& Group B **(***- P ≤ 0.001)** (Graph –II)

Both the Groups shows significant decrease in the post test Means but (Group-A) which has the Lower mean value is more effective than (Group-B)



Graph – Ii: Comparison of Ffi Between Group – A And Group - B In Pre & Post Test.

Table 3: Comparisonof Vas With In Group – A& Group – B Between Pre & Post Test Values.

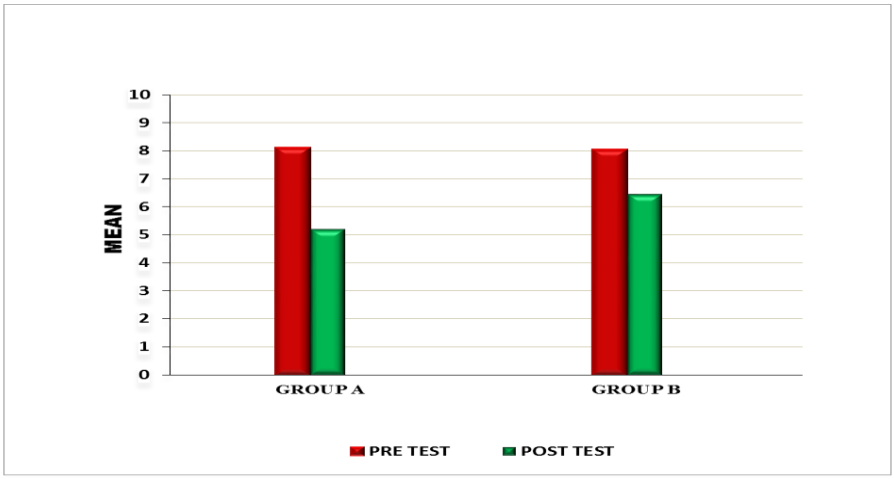
Significance	t - Test	Post Test		Pre Test		#VAS
		Mean	Mean	S.D	S.D	
.000***	19.13	5.20	8.13	.833	1.08	**GROUP- A**
.000***	6.80	6.46	8.06	.798	.915	**GROUP-B**

#VAS - VISUAL ANALOGUE SCALE

(*- P ≤ 0.001)**

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value of the VASbetween pre-test and post-test within Group – A &Group – B

In VAS, there is a statistically highly significant difference between the pre-test and post-test values within GROUP A and GROUP B (***- P ≤ 0.001). (Graph-III)



GRAPH – III: Comparison of Vas With In Group – A& Group – B Between Pre and Post Test Value

Table – 4: Comparison Of Ffi With In Group – A& Group – B Between Pre & Post Test Values.

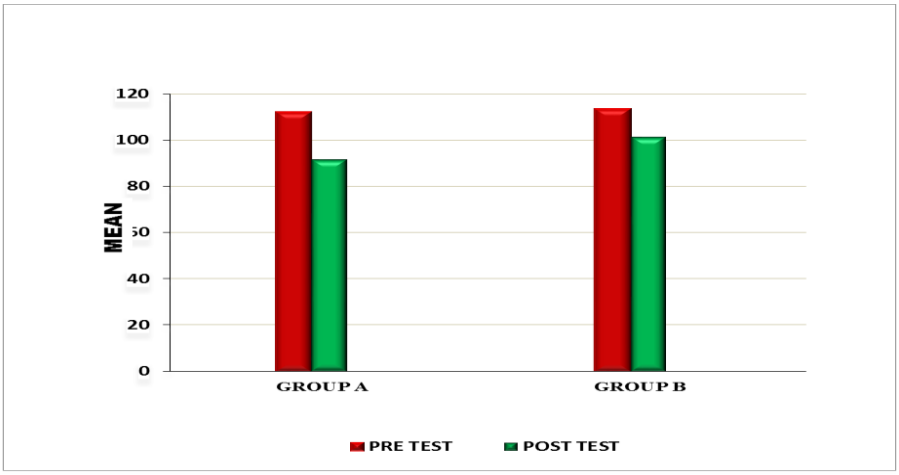
SIGNIFICANCE	t - TEST	POST TEST		PRE TEST		#FFI
		S.D	MEAN	S.D	MEAN	
.000***	48.68	9.79	91.73	9.84	112.33	**GROUP- A**
.000***	28.62	11.40	101.40	12.04	113.53	**GROUP-B**

#FFI - FOOT FUNCTION INDEX

(*- P ≤ 0.001)**

The above table reveals the Mean, Standard Deviation (S.D), t-value and p-value of the FFI between pre-test and post-test within Group – A &Group – B

In the FFI, there is a statistically highly significant difference between the pre-test and post-test values within Group A and Group B (***- P ≤ 0.001). (Graph-IV)



GRAPH – IV: Comparison of Ffi With In Group – A& Group – B Between Pre And Post Test Values

RESULT

On comparing the post test mean value of GROUP A (5.20) and GROUP B (6.46) on VAS GROUP A (5.20) shows significant reduction in post-test mean value than GROUP B (6.46) with p>0.00.

On comparing the post test mean value of GROUP A (91.73) and GROUP B(101.40) on FFI GROUP A (91.73) shows significant reduction in post-test mean value than GROUP B (101.40) with p>0.00.

Between Group analyses using independent "t" test p> 0.05 showed significant difference between group A and B. Hence null hypothesis is rejected.

DISCUSSION

The study was conducted to compare the effectiveness of Stretching vs Cryotherapy with a common treatment of ultrasound therapy to both the groups In the treatment of heel pain for 4 weeks in terms of pain on VAS and FFI, it was noticed that there was improvement in the above parameters in the both the groups.

It is evident from the study that the mean value of visual analogue scale between group (A) pre-test mean value (8.13) and post-test mean value (5.20) showed a significant difference. Similarly the mean value of foot function index between group (A) pre- test mean value (112.33) and post-test mean value (91.73) showed a significant difference.

This study also reveals that the mean value of visual analogue scale and Foot Function Index between group (B) pre-test mean value(8.06) and post-test mean value (6.46) showed a significance difference. Similarly the mean vale of foot function index between group (B) pre-test mean value (113.53) and post-test mean value (101.40) showed a significant difference.

Similarly the mean value of Foot Function Index between group (A) pre-test mean value (112.33) and group (B) pre-test mean value (113.53) does not show any significant difference. At the end of treatment session group (A) post-test mean value (91.73) shows a marked difference than group (B) post-test mean value (101.40).

The mean value of visual analogue scale and between Group (A) pre-test (8.13) and Group B pre-test (8.06) does not show any significant difference. Whereas the mean value of visual analogue scale post-test Group A (5.20) shows significant difference than Group B post-test mean value (6.46).

In this study Group A was given stretching with ultrasound therapy and Group B was given cryotherapy with ultrasound therapy. The result shows that stretching with ultrasound therapy is more effective than cryotherapy with ultrasound therapy.

Hence our data supported alternate hypothesis ie., there is a significant difference in stretching with ultrasound therapy is more effective for treating heel pain.

CONCLUSION

The study conducted for 4 weeks treatment programme performed on subject with heel pain demonstrated that both Stretching combined with Ultrasound therapy were effective in reducing pain intensity and improving daily activities. Further it was observed that Stretching combined with ultrasound therapy was more effective in improving ADL activities and equally effective in reducing pain intensity compared to cryotherapy with ultrasound therapy. Hence finding of their study suggests that plantar fascia stretching exercise added to conventional physiotherapy in the treatment of heel pain is more beneficial.

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