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EXAMINE THE EFFICACY OF LONGWAVE DIATHERMY IN CONJUNCTION WITH MYOFASCIAL RELEASE VERSUS ULTRASOUND THERAPY PAIRED WITH MYOFASCIAL RELEASE IN ALLEVIATING PAIN AND ENHANCING FUNCTION AMONG INDIVIDUALS SUFFERING FROM PLANTAR FASCIITIS

(Physiotherapy intervention for Plantar fasciitis)

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Abstract: INTRODUCTION: Plantar fascia is a ligament that supports the arch of the foot. Plantar fasciitis causes heel pain, particularly while taking the first steps in the morning or after rest. Overuse, weight gain, tight calf muscles, and poor footwear are all contributing factors. METHODOLOGY: Forty people who had plantar fasciitis were divided into two groups. Group A received LDT, followed by MFR, three times each week for four weeks. Group B received US, followed by MFR on the same timetable. Pain and function were assessed before and after therapy with the Visual Analog Scale (VAS) and Foot Function Index (FFI). RESULT: Both groups reported considerable pain reduction (VAS) and better function (FFI) following treatment. Group A (LDT + MFR) experienced a higher reduction in pain and improved function compared to Group B (US + MFR).

Index Terms **– Plantar fasciitis, Long wave diathermy, myofascial release, Foot function index.**

I. INTRODUCTION

The Plantar fascia is the thick tissue on the bottom of foot. It connects the heel bone to the toes and creates the arch of the foot. When this tissue becomes swollen or inflamed it is called plantar fasciitis.

The plantar fasciitis also known as plantar fasciitis or Jogger's heel is a disorder that results in pain in the heel and bottom of the foot. The pain is usually most severe with the first step of the day or following a period of rest. The cause of plantar fasciitis is not entirely clear. Risk factors include overuse such as from long period of standing an increase in exercise and obesity.

It is also linked to a lifestyle with little exercise and inward curling of the foot. Many believe the ailment should be called plantar fasciitis instead of fasciitis since it is a problem of the ligaments' insertion site on the bone that is characterized by micro rips, collage disintegration, and scarring. Inflammation is not as important in this condition. Reactive arthritis, heel pad syndrome, anklyosing spondylitis, and osteoarthritis are among the numerous conditions that present with comparable symptoms. At any given time, between 4% and 7% of people have heel pain; around 80% of these cases are caused by plantar fasciitis, which affects 10% of people at some point in their lives. When plantar fasciitis arises, the pain is usually intense and usually (unilateral 70% of case).

Understanding plantar fascia biomechanics is crucial for understanding its development. Key factors include excessive weight-bearing, repetitive micro trauma, tight calf muscles, and inadequate footwear. Special considerations for plantar fasciitis include athletes, occupations, age, obesity, and foot deformities. Diagnosis is based on a thorough history and physical examination, with imaging modalities like X-rays or ultrasound. Common symptoms include heel pain, stiffness, and stiffness. Management strategies include rest, ice therapy, NSAIDs, physical therapy, orthotics, night splints, shockwave therapy, and corticosteroid injections.

The exercise treatment strategy has tremendous health benefits. It aims to strengthen damaged tissues. Heel discomfort can be effectively managed by engaging in moderate, frequent exercise to strengthen the soft tissues. Slow strengthening exercises may enhance tissue repair by stretching the soleus, gastrocnemius, and Achilles, resulting in lower adaptive risk factors for plantar fasciitis, which may be caused by repetitive microtrauma.

After extended periods of rest, exerting weight on the heel exacerbates heel discomfort. Plantar fasciitis commonly manifests as a clicking or snapping sound, severe localized edema, and excruciating pain in the foot. Though rare, symptoms can include tingling, numbness, swelling, or discomfort that radiates. Plantar fasciitis can be caused by a number of risk factors, such as flat feet, high arches in the foot, excessive running, and prolonged standing on hard surfaces. With the employment of a treatment head and a specific independent long wave diathermy cream that is applied as a coupling media, long wave diathermy is a type of machine that can be used to treat patients.

Treatment options vary, with a growing interest in non-invasive therapies like longwave diathermy, ultrasound therapy, and myofascial release. This study aims to compare the effectiveness of longwave diathermy combined with myofascial release (LDT+MFR) and ultrasound therapy combined with myofascial release (US+MFR) in managing pain and improving function in patients with plantar fasciitis.

Ultrasound therapy uses sound waves to deliver deep heat and micro-vibrations to targeted tissues, potentially benefiting plantar fasciitis by increasing blood flow, reducing pain, and improving flexibility. It is non-invasive, painless, safe, and can be used in conjunction with other treatments like stretching and strengthening exercises.

Longwave diathermy is a non-invasive treatment for plantar fasciitis, a common cause of heel pain. It uses low-frequency electromagnetic waves to deliver deep heat therapy to targeted tissues, promoting improved blood flow, pain relief, and muscle relaxation. While it offers potential benefits like reduced pain, improved function, and faster healing, it is not a guaranteed cure and should be combined with other therapies.

Myofascial release includes Softening, lengthening, broadening and separating the fascia. Myofascial Release (MFR) is a non-invasive treatment that focuses on releasing tension and restrictions in the fascia, a web-like connective tissue that surrounds muscles and other structures. MFR helps plantar fasciitis by reducing tightness and inflammation, improving flexibility and range of motion, and promoting healing. Techniques for MFR include foam rolling, massage, trigger point therapy, and stretching. Benefits include being non-invasive, self-care, and combining MFR with other treatments like physical therapy or orthotics. MFR is a safe and drug-free approach to pain management.

METHODOLOGY:

This study investigated the effectiveness of longwave diathermy and ultrasound therapy combined with myofascial release for treating plantar fasciitis. It employed an experimental design, conducted within an outpatient department setting. The study lasted four weeks, with participants attending twelve treatment sessions.

40 participants diagnosed with Subacute plantar fasciitis were randomly sampled and divided into two groups: Group A and Group B. Group A received longwave diathermy followed by myofascial release techniques, while Group B received ultrasound therapy followed by similar myofascial release techniques. This design allowed researchers to compare the effectiveness of these two combined treatments on pain and function in patients with plantar fasciitis.

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STUDY DESIGN - Experimental Study design

STUDY SETTING – Out patient department

STUDY DURATION – 4 weeks (12 sessions)

SAMPLE SIZE - 40

SAMPLING TECHNIQUE - Random Sampling Technique

40 Subacute plantar fasciitis patients divided in to 2 groups -Group A &Group B

GROUP A-longwave diathermy with myofascial release.

GROUP B-Ultrasound therapy with myofascial release.

SAMPLING CRITERIA

INCLUSION CRITERIA

- Clinically diagnosed subacute plantar fasciitis.
- Age group 30-60 years
- Male and female
- Mechanical origin.

EXCLUSION CRITERIA

- Calcaneal spur.
- Calcaneal periostisis.
- Valgus deformity and other causes of heel pain.
- Metal implants in foot.
- Fat pad syndrome.
- Diseases such Rheumatoid arthritis, ankylosing spondylitis, Reiter syndrome.
- Plantar Fascia Rupture.

MATERIALS USED

- Pillows
- Couch
- Data collection sheet
- Pen
- Stop watch
- Consent form

PROCEDURE:

Patients' formal written informed permission was obtained, and they would be told about the nature of the study. Plantar fasciitis pain and functional status will be measured in both groups prior to and following the trial using the Foot Functions Index (FFI) questionnaire for function and the Visual Analog Scale (VAS) for pain.

This experimental study employed a random sampling technique to recruit 40 participants diagnosed with subacute plantar fasciitis. Participants were then divided into two groups (Group A and Group B) for a comparative analysis of treatment effectiveness. The intervention for both groups consisted of a combination of myofascial release techniques and a specific therapeutic modality delivered for ten minutes each day, three days per week, for a total of four weeks. Group A received longwave diathermy, while Group B received ultrasound therapy. Following these treatments, both groups participated in a series of slow strengthening exercises designed to promote tissue healing. These exercises specifically targeted the soleus, gastrocnemius, and Achilles muscles, aiming to improve strength and flexibility in the lower leg complex and potentially enhance overall treatment outcomes. This structured approach allowed researchers to not only compare the effectiveness of longwave diathermy versus ultrasound therapy but also assess the potential benefits of incorporating strengthening exercises into the rehabilitation program for plantar fasciitis patients.

The patients will have additional testing at the conclusion of the fourth week to compare function and pain. It will be examined how the scores from the pre- and post-treatment sessions differed from one another. Every participant was instructed to use MCR footwear, and at-home workouts were also provided.

The pre test and post test score were measured prior and after the treatment session to evaluate the effectiveness.

DATA ANALYSIS:

To examine the data and evaluate the hypothesis, the following statistical tool was used. The VAS and FFI were used to calculate the scores. Using paired tests, every dependent variable in groups A and B was examined.

TABLE:-1. COMPARISON OF PRE TEST AND POST TEST VALUES OF VAS AND FFI IN GROUP A

VARIABLES	PRE TEST		POST TEST	
	MEAN	SD	MEAN	SD
VAS	4.27	0.827	2.38	0.463
FFI	0.32	0.73	0.18	0.28

TABLE:- 2. COMPARISION OF PRE TEST AND POST TEST VALUES OF VAS AND FFI IN GROUP B

VARIABLES	PRE TEST		POST TEST	
	MEAN	SD	MEAN	SD
VAS	4.23	0.72	3.39	0.45
FFI	0.36	0.87	0.27	0.76

The "T" value of 4.109 which in statistically significant with ($P<0.05$) 0.001.

RESULT

When we examined the post-test mean values on the VAS scale, group A's mean value was lower than group B's, and there was a statistically significant difference ($p < 0.05$). A statistically significant difference was seen between Groups A and B when comparing the means of their post-test scores on the FFI Scale, with a "P" value of less than 0.001 ($P<0.05$).

DISCUSSION

The purpose of the study was to evaluate the benefits of myofascial release and ultrasound against long wave diathermy on plantar fasciitis. Thirty people were used in the investigation, divided into two groups of fifteen each. Group B received myofascial release and ultrasound therapy, whereas Group A received longwave diathermy and myofascial release treatment. Group A consisted of fifteen subjects. The alignment of plantar fascia plays an essential role in the maintenance of the arch during locomotion. Inefficient foot function results in impaired foot motion at different gait cycle phases.

Excessive stress causes irritation in both the plantar fascia and the calcaneal tubercle. Excessive pronation may cause tibialis posterior weakness and plantar fascia lengthening. Because of the imbalance during the propelling phase of ambulation, elongation prevents the foot's windlass mechanism from being used to its full capacity. This function can be improved by strengthening the tibialis posterior and intrinsic muscles.

Plantar fasciitis in the pes cavus is a condition where the foot fails to transfer equal stress. Poor foot posture causes an excessive amount of stress on the muscles and joints of the lower limbs, which can lead to anatomical alterations throughout the body. Excessive tension might lead to long-term physical problems. Over pronation refers to a misplaced foot. As a result of the instability and soreness, more load is transmitted to the knees, which have less joint space. This posture promotes to pelvic misalignment. Core strength is required to align the pelvis and spine, allowing for proper femoral rotation. A lack of core muscular power suggests that maintaining the right pelvic position for pain-free movement over time becomes difficult. Both feet bear the body's weight, and plantar fasciitis affects the lower back by affecting posture or gait. Over pronation, or excessive inward foot rolling toward the arches during walking, causes internal rotation of the entire lower limb as well as pelvic tilt.

This disorder is primarily degenerative in nature. Aside from degenerative alterations, histological observations include granulation tissue, micro-tears, collagen disorganization, and a noticeable absence of conventional inflammation. Calcifications, intra-substance rips, thickness, and heterogeneity of the plantar fascia are frequently discovered during an ultrasound examination. These abnormalities, which are frequently found on ultrasonography, indicate a non-inflammatory disease with malfunctioning vasculature. In one investigation, magnetic resonance imaging revealed chronic fasciitis in eight cases and an ancient rupture of the plantar fascia. Microtears form as a result of the repeated tension of standing erect and bearing weight, which causes the ailment. Constant stretching of the plantar fascia causes chronic fascial deterioration, eventually leading to pain while sleeping or at rest.

Longwave Diathermy: The deeper tissue penetration of LDT may have increased blood flow and promoted healing throughout the plantar fascia. Ultrasound Therapy: The micromechanical effects of US could have aided in reducing inflammation and pain within the plantar fascia tissue. Myofascial Release: MFR techniques likely addressed fascial restrictions and tightness in the plantar fascia and surrounding muscles, contributing to improved flexibility and function.

Results were measured using the foot function index (FFI), which was used to quantify function disability and pain intensity before and after therapy for a period of four weeks. Using a paired t test, the vas score was compared between groups, and after four weeks of treatment, the "p" value was significant. comparison of the "p" value for the FFI of groups A and B.

The study has a limited sample size. A larger sample size could have produced different findings. The study was completed in about four weeks. Long-term research may produce diverse results. There was no control group. One of the study's inherent strengths is that all measurements were taken, even if it is acknowledged that human error could pose a risk to the accuracy of the results. The study's outcome measures are subjective rather than objective.

CONCLUSION:

This randomized trail study was carried out to investigate the effectiveness of myofascial release combined with long wave diathermy and ultrasound in reducing pain and improving functional impairment in patients with plantar fasciitis. In this study, the combination of myofascial release, longwave diathermy, and ultrasound led to a significant increase in functional activity and pain reduction in patients with plantar fasciitis than the other group.

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