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A Comparative Study To Evaluate The Safety Of Stretching Along With Ultrasonic Versus Releasing Manual Pressure From Myofascial Trigger Points With Cold Therapy For Acute Achilles Tendinitis In Young Athletes

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Abstract

Background And Objective: Since athletes must utilize precise footwork skills during competition, Achilles tendinitis is a prevalent issue among them. The Achilles tendon is significant in outdoor sports because of its dual interaction with the two primary plantar flexors, the Gastrocnemius as well as the Soleus muscles.This syndrome is particularly common in runners who have abruptly increased their run length or intensity, as well as in athletes who play sports like basketball, tennis, soccer, etc. It also produces a great deal of physical as well as mental stress.
Methods: Using a convenient sampling method, samples that met the inclusion criteria for theresearch subjects were randomized to fit into one of two groups : experimental therapy (Releasing manual pressure from myofascial trigger points with cold therapy) or conventional therapy (ultra therapy with stretching) for a comparative analysis that included 100 subjects aged 18 to 23.
Results: The current study's findings demonstrate that, among patients with Achilles tendinitis, there is a substantial change in pain as well as foot function after Releasing manual pressure from myofascial trigger points therapy combined with cold therapy as well as ultrasonic therapy combined with stretching.
Conclusion: This study's findings indicate that manual pressure release therapy using myofascial trigger points in conjunction with cold therapy and ultrasonic therapy paired with stretching considerably reduces pain and improves foot function in people with Achilles tendonitis.

INTRODUCTION

Sportsmen frequently experience Achilles tendonitis because they must use their feet to execute complex game techniques. The Achilles tendon is significant in outdoor sports because of its dual interaction with the two primary plantar flexors, the Gastrocnemius and the Soleus muscles. Plantar flexor strength would most

likely decline with any Achilles tendon injury. This impacts general gait metrics, such as walking, running, as well as jumping, as well as the plantar flexion of athletes. The mechanics of running, walking, as well as

jumping on the field are among the things that might cause Achilles tendon irritation. In addition, the kind of boot worn, the surface of the field, as well as the soccer player's foot as well as ankle biomechanics all play a part in the Achilles Tendon inflammation.

Rookie athletes are likely to experience Achilles tendinitis the most. Right-footed athletes or those who are normally prone to this problem must adjust their stride pattern to accommodate for a hindfoot stress that may be varus or valgus. Athletes get injured because they don't properly warm up their bodies or execute their skills with good mechanics. The player becomes immobile as a result of the factors' repetitive strain on the tendon, which allows an acute inflammation to develop there. Poorly fitting soccer boots would rub against the tendon as well as the heel's shape. Right-heeled boots may not allow the midfoot as well as forefoot enough range of motion, which could lead to variations in foot biomechanics. When a soccer player has Achilles tendinitis, they usually feel discomfort all the way down the tendon. This region is sensitive, especially when aggressive plantar flexion is being performed. Muscle tension in the plantaris, gastrocnemius, as well as soleus may be the outcome of this condition.

The strongest tendon in the body, the Achilles tendon (sometimes called the calcaneal tendon) joins the calf muscles to the heel bone. It is essential for locomotion and propulsion when walking, running, jumping, climbing stairs, and standing on tiptoes because it permits movement of the foot and ankle:

Plantar flexion: The foot bends downward as a result of the Achilles tendon transmitting force through it when the calf muscles contract. Toeing off the foot when walking or running requires this motion. Heel lift: When the calf muscles contract, the Achilles tendon also elevates the heel. Pointing the foot: When running, walking, or jumping, it's helpful to be able to point the foot downward thanks to the Achilles tendon.

The Achilles tendon's function The Achilles tendon's primary job is to transfer force from the calf muscles to the foot and heel. This enables the foot to flex (plantar flexion), meaning that the forefoot is forcefully drawn downward. Toe off of the foot during walking and sprinting requires this motion. The Achilles tendon also plays a role in the foot's supination, or twisting onto its outer border. High stresses must be withstood by the Achilles tendon, particularly while jumping and landing. For instance, when you run, the Achilles tendon is subjected to a force that is eight times your own body weight.1.

Particularly for runners, the tendon at the heel is a notorious weak point. Achillodynia, often known as Achilles tendon pain syndrome, is a common condition among athletes. Intriguingly, Achilles was a Greek mythological hero. Though he was thought to be unbreakable, he did have one weak point—his heel. Achilles lost his life there during the Trojan War after being struck by an arrow. Because of this mythology, the human Achilles tendon bears the same name as the Achilles heel, which has come to represent a weak point.

METHODOLOGY

STUDY DESIGN:

This study used a randomized controlled trial to evaluate the effectiveness of two treatment protocols for Achilles Tendinitis in young athletes.participants wererendomly assigned to either Group Group A,receiving ThepeuticUltrasonic with stretching or Group B Manul pressure Release from Myofascial Trigger Points with Cold Therapy (cryotherapy)

STUDY SETTING:

The athletes at JLN Stadium were selected and brought to theclinic in sector-50 the subject of the study.

Study Duration

The study spanned one year January to December encompassing participant recruitment, intervention administration, and follow-up assessments. And follow-up assessments. Each participant underwent six weeks treatment period with evaluations at baseline, mid-point (Three weeks) and post-treatment (six- week) one year time was chosen to allow sufficient time for intervention effects to manifest and to provide a thorough evaluation of short-term outcomes including data analysis and interpretation.

Study Participants

Inclusion criteria for athletes were athletes aged 18-23 with clinical diagnosis of Achilles tendinitispersistent Heel pain for last 1 week the ability to follow the study protocol, and willingness to provide written Informed consent. Exclusion criteria indicated a history of heel pain other medical conditions affecting ankle functions, and patient in another clinical trial or physical therapy program during the study period With the

aid of a practical sampling technique, the subjects were chosen. Participants in the 18–23 age range who had acute Achilles tendinitis were chosen as study subjects. GROUP 1 received conventional therapy, as well as GROUP 2 received experimental therapy. The samples were split equally between the two Categories. Ten samples are available for each GROUP.

Study Sampling
connivance sampling method from athletes visiting the department of Physiotherapy with diagnosis of acute Achilles tendinitis

Study samples size
A power analysis determined that 60 participants were necessary to detect significant differences between the two treatment groups with 80% power and a 0.05 significance level. Therefore, 30 participants were randomly assigned to each intervention group. This sample size was selected to ensure robust statistical analysis and reliable results, accounting for potential dropouts

Study procedure
Participants were randomly assigned to either Group A or Group B upon enrollment. Group A- Ultrasonic Therapy with Stretching Participants were positioned prone for ultrasonic therapy targeting the Achilles tendon using a high-frequency sound wave device. Following ultrasonic therapy, participants engaged in stretching exercises to enhance flexibility and reduce tendon tension d, while Group B receive c from Myofascial Trigger Points with Cold Therapy (Cryotherapy) Manual pressure was applied to myofascial trigger points associated with the Achilles tendon and calf muscles to release tension and promote muscle relaxation.- Cold therapy (cryotherapy) was then applied to the Achilles tendon area using ice packs or cold compresses to reduce Both groups attended three weekly sessions for six weeks, conducted by licensed physiotherapists. Group A's interventions focused on ultrasonic therapy and stretching, whereas Group B's interventions included Manual Pressure Release and cold therapy, with both groups following structured regimens.

Study data collection:
Data were collected at baseline, mid-point (three weeks), and post-treatment (six weeks) using the Visual Numerical Rating Scale form for pain intensity, Index of foot function, functional status. Visual Numerical Rating Scale ratings ranged from 0 (no pain) to 10 (worst pain imaginable), ROM was measured in degrees of ankle

Study Data analysis :
Data analysis was performed using SPSS version 25.0. Descriptive statistics summarized participant demographics and baseline characteristics. Independent t-tests compared mean differences between groups at each time point, while paired t-tests assessed changes within groups. considering the interaction effects of time and treatment group. A significance level of $p < 0.05$ was considered statistically significant.

RESULT AND ANALYSIS

SUBJECT SELECTION:
Participants in the 18–23 age range who had acute Achilles tendinitis were chosen as study subjects. GROUP 1 received conventional therapy, as well as GROUP 2 received experimental therapy. The samples were split equally between the two Categories.15 samples in a each GROUP.

GROUP 1 -
Participants in this group received the following interventions:
- Ultrasonic Therapy with Stretching:
- Participants were positioned prone for ultrasonic therapy targeting the Achilles tendon using a high-frequency sound wave device.
- Following ultrasonic therapy, participants engaged in stretching exercises to enhance flexibility and reduce tendon tension.

GROUP 2 –
Participants in this group received the following interventions:
- Manual Pressure Release from Myofascial Trigger Points with Cold Therapy (Cryotherapy):**
- Manual pressure was applied to myofascial trigger points associated with the Achilles tendon and calf muscles to release tension and promote muscle relaxation.
- Cold therapy (cryotherapy) was then applied to the Achilles tendon area using ice packs or cold compresses to reduce

MEASURING INSTRUMENTS:

VARIABLE	TOOL
Pain	Numerical Rating Scale form
Foot function	Index of foot function

INDEX OF FOOT FUNCTION:
This questionnaire was created to provide the therapist with information regarding the ways in which the patient's ability to manage in daily life has been impacted by foot discomfort. All of the questions were asked of the patients. A score was assigned to each item on a scale of 0 (no pain or difficulty) to 10 (worst pain imaginable or so bad that help was required) that best reflected the patient's foot during the previous week.

NUMERICAL RATING SCALE FORM:
A 10-cm horizontal line with two labelled end points makes up the numerical rating scale. There are labels for no discomfort on one end as well as extreme agony on the other. The participants were instructed to mark the 10-centimeter line at a location that matched the intensity of their pain.

GROUP 1
STRETCHING as well as ULTRASONIC THERAPY: Based on convenience, a sample of fifty participants was chosen from the study population.
STEP 1: A goniometry as well as a numerical pain rating scale were used, respectively, to quantify range of motion as well as pain prior to the analysis.
STEP 2: The patient was put in a comfortable prone lying position with a pillow supporting the anterior part of the ankle. The patient received eight minutes of ultrasonic therapy at 1.8 watts per square centimetre in pulsed mode at a frequency of 1-1.5 MHz
STEP 3: Range of motion as well as discomfort were measured before to the analysis.
STEP 4: Stretching for the aforementioned muscles as well as fascia was taught, as well as three stretches with a 20-second hold as well as a 20-second recovery period were made. These stretches were to be performed three times, twice a day.
STEP 5: Range of motion as well as discomfort were measured after the analysis.
STEP 6: The ultrasonic modality treatment included stretching, as well as it lasted for more than two weeks.
GROUP 2

MANUAL PRESSURE RELEASE BY MYOFASCIAL TRIGGER POINT:Based on convenience, a sample of fifty participants was chosen from the population for the research.
STEP 1: Using a numerical pain rating scale as well as goniometry, respectively, a BEFORE-analysis measurement of pain as well as range of motion was obtained.
STEP 2: Cold therapy will be used with manual trigger release technique in GROUP 2. The patient was placed on a couch with their afflicted side leg stretched as well as positioned comfortably based on their muscle.
While the patient stands or sits on the damaged side of their leg, the therapist will apply pressure with his thumb or elbow to the pertinent muscles, such as the Soleus, Gastrocnemius, and Plantaris. TIMING: 20 MinsSix minutes for each muscle, counterclockwise.
STEP 3: Range of motion as well as discomfort were measured before to the analysis.
STEP 4: The patient was placed in a comfortable sleeping posture with the foot raised with the use of a pillow to support the affected area. A numerical pain rating scale was used to quantify the pain, as well as goniometry was used to measure the range of motion. The first step of treatment was applying pressure with an ice pack to the posterior ankle joint to cause numbness. It can take anywhere from 10 to 20 minutes for the first numbness to appear after applying cold therapy.

STEP 5: Range of motion as well as discomfort were measured after the analysis.
STEP 6: Releasing manual pressure from myofascial trigger points as well as Cold therapy were used as treatments for more than two weeks.
DATA ANALYSIS &OUTCOMES

INFORMATION ANALYSIS
The methodical presentation of the data analysis as well as interpretation are the main topics of this chapter.
The Paired 't' analysis
Unpaired 't' analysis

CHART-1
AMONG GROUP 1, THE MEAN, STANDARD DEVIATION, MEAN DIFFERENCE, as well as PAIRED "T" VALUATION BETWEEN THE BEFORE as well as AFTER ANALYSIS PAIN SCORES

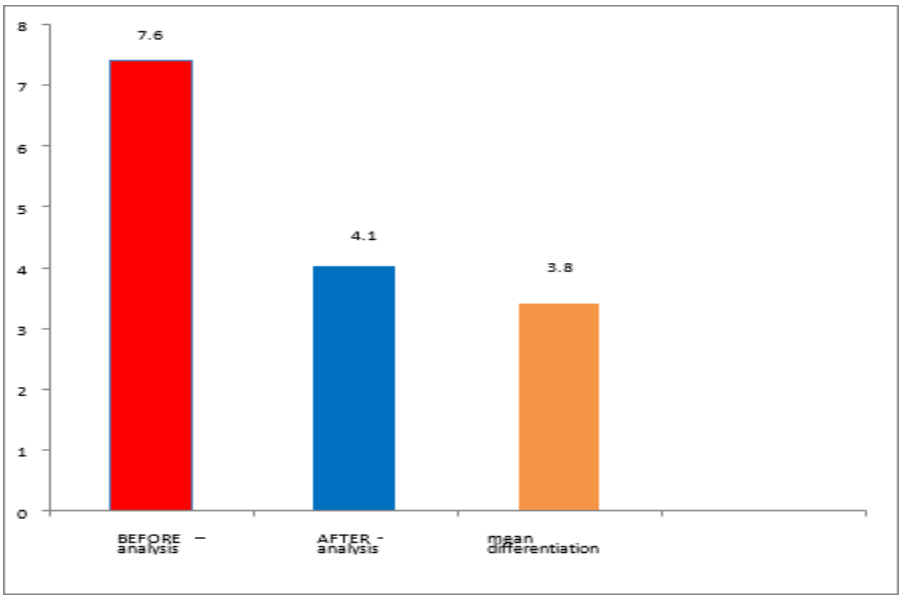
Measurements	Mean	Mean diff.	The Standard deviation	The paired "t" valuation
BEFORE-analysis	7.6	5.00	4.951	8.5
AFTER-analysis	4.1	3.8	2.1722	7.8*

Statistical significance level of 0.005 The paired "t" valuation for pain in GROUP A is 8.8, as well as at the 0.005 level of significance, the "t" CHART valuation is 3. 250.Given that the computed "t" valuation exceeds the "t" CHART valuation, the data indicates a noteworthy variation in pain after ultrasonic therapy for patients with Achilles tendinitis.

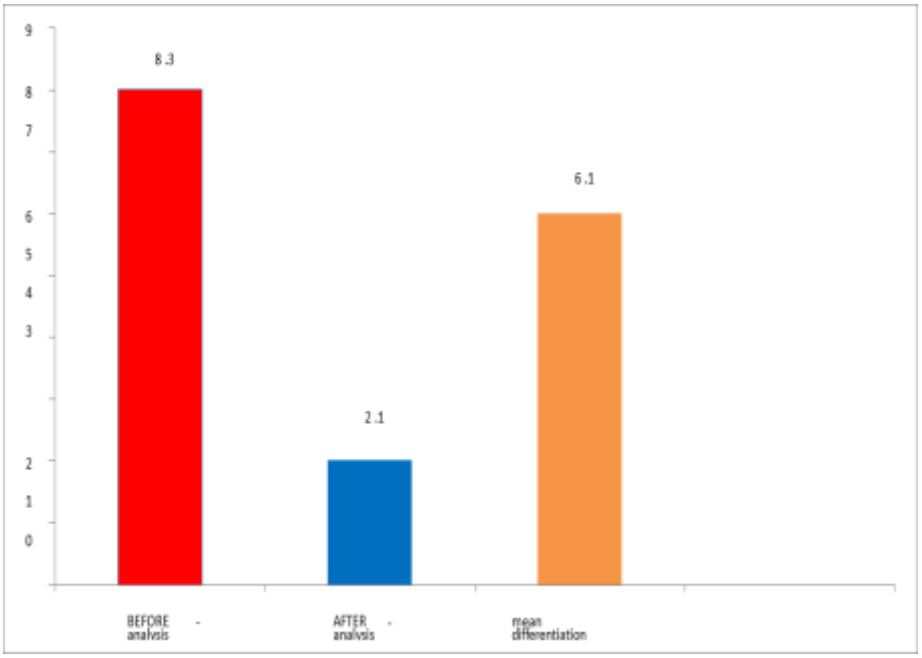
THE MEAN VALUATION, MEAN DIFFERENCE, STANDARD DEVIATION as well as PAIRED 'T' VALUATION BETWEEN BEFORE as well as AFTER ANALYSIS SCORES OF PAINS AMONG GROUP 2

Measurements	Mean	Mean diff.	The Standard deviation	The Paired "t" valuation
BEFORE-analysis	8.3	6.1	3.798	3.76*
AFTER-analysis	2.1	1.5	1.2	1.5

Statistical significance level of 0.005



The paired "t" valuation for pain in GROUP B is 4.86, as well as at the 0.005 level, the "t" CHART valuation is 3.250.The above valuation indicates that there is a substantial difference in pain after Releasing manual pressure from myofascial trigger points in Achilles tendinitis individuals since the calculated "t" valuation is greater than the "t" CHART valuation.



AMONG GROUP 1, THE MEAN, STANDARD DEVIATION, MEAN DIFFERENCE, as well as UNPAIRED "T" VALUATION BETWEEN THE BEFORE- as well as AFTER-ANALYSIS PAIN SCORES

S.no	Categories.	Improvement Seen		TheStandard deviation	Unpaired 't' Analysis
		Mean	Mean Difference		
1	GROUP 1	3.7	2.8	6	5.2*
2	GROUP 2	6.4	5.6	6.7	5.8

*Statistical significance level of 0.005

Since the calculated "t" valuation is greater than the "t" CHART valuation, the calculated unpaired "t" valuation in Categories 1 as well as 2 (for pain) is 5.4 as well as the "t" CHART valuation is 2.87 at the 0.005 level. This indicates that there is a significant difference in pain between ultrasonics well as Releasing manual pressure from myofscial trigger points among subjects with Achilles tendinitis.

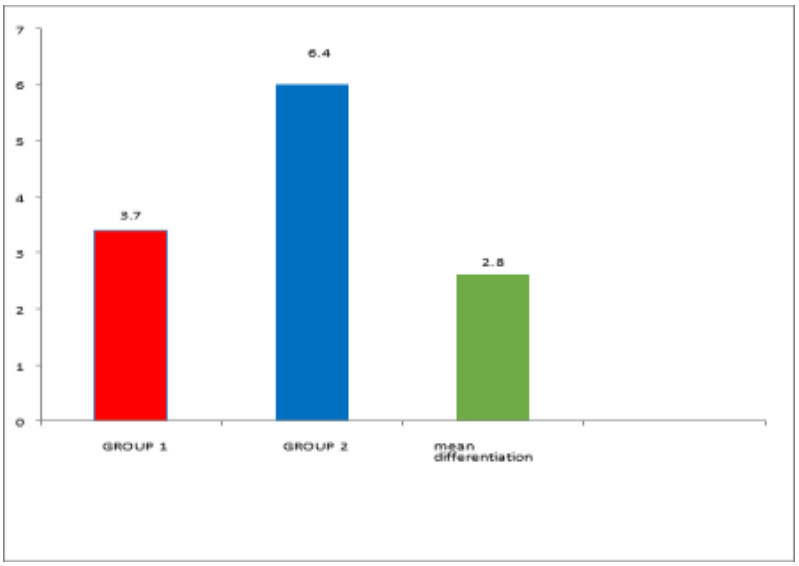
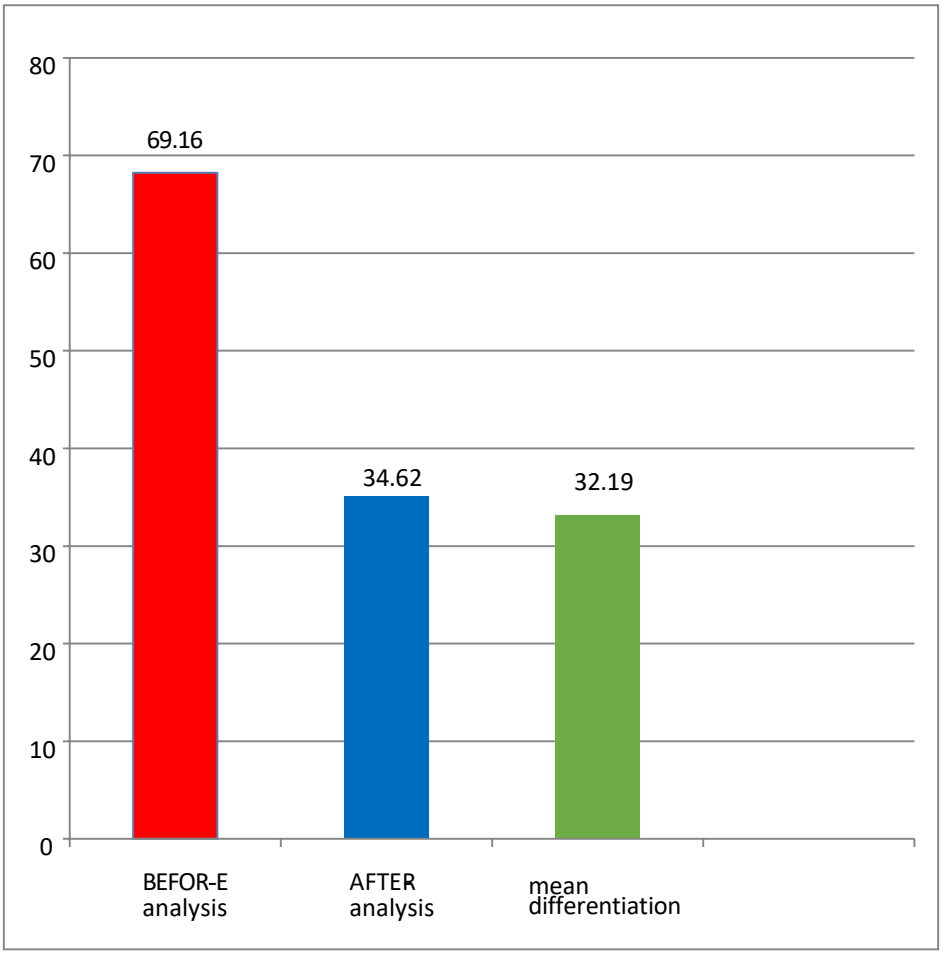


CHART- 4
AMONG GROUP 1, THE MEAN, STANDARD DEVIATION, MEAN DIFFERENCE, as well as PAIRED "T" VALUATION BETWEEN THE BEFORE- as well as AFTER-ANALYSIS SCORES FOR FOOT FUNCTION ABILITY

Measurements	Mean	Mean diff.	TheStandard deviation	Paired “t” valuation
BEFORE-analysis	69.16	44.5	46.9	10.1
AFTER-analysis	34.62	32.19	32.15	2.165*

*Statistical significance level of 0.005

The unpaired "t" valuation in GROUP A for the FFI calculation is 3.163, as well as the "t" CHART valuation is 2.87 at the 0.005 level. Following ultrasonic therapy for Achilles tendinitis patients, there is a considerable difference in foot function, as indicated by the calculated "t" valuation being greater than the "t" CHART valuation above.



BEFORE AND AFTER-ANALYSIS MEAN VALUATIONS OF FFI GRPHICALLY REBEFORESENTE AMONG GROUP 1

CHART- 5 AMONG GROUP 2, THE MEAN, STANDARD DEVIATION, MEAN DIFFERENCE, as well as

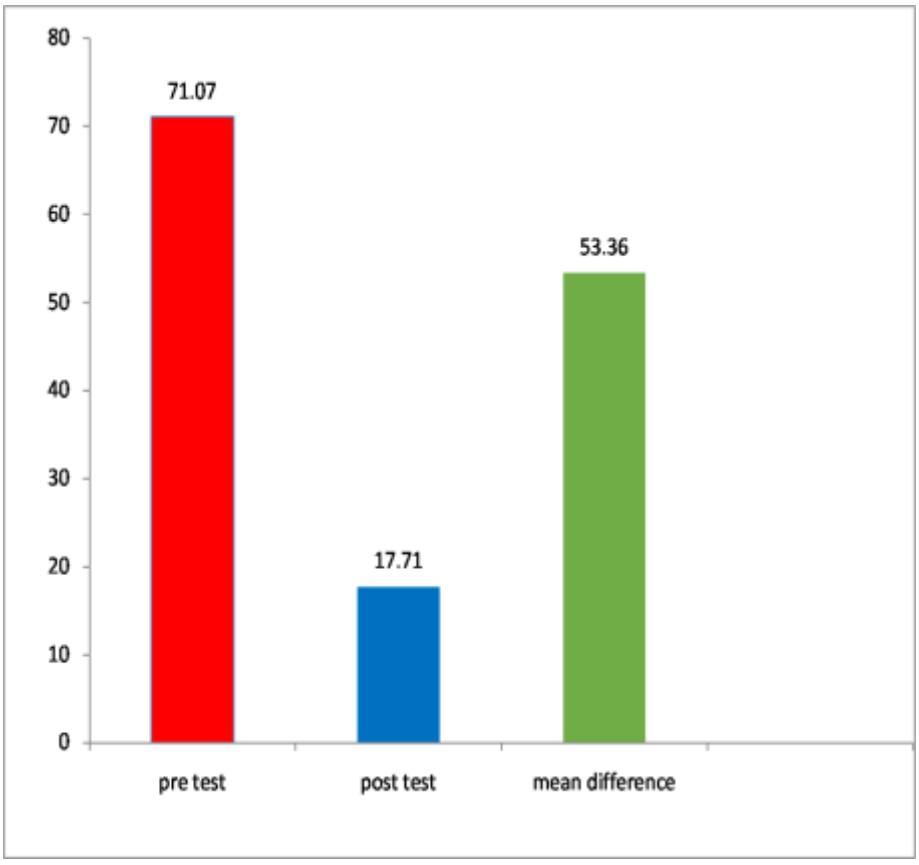
PAIRED "T" VALUATION BETWEEN THE BEFORE- as well as AFTER-ANALYSIS SCORES OF FOOT FUNCTIONAL ABILITY

Measurements	Mean	Mean diff.	The Standard deviation	Paired “t” valuation
BEFORE- analysis	71.06	53.35	53.62	55.2
AFTER- analysis	17.7	18.5	23.2	3.13

*Statistical significance level of 0.005

The paired "t" CHART valuations in GROUP 2 for the FFI calculation are 3.14 as well as 2.87 at the 0.005 level.

The fact that the computed "t" valuation exceeds the "t" CHART valuation above indicates that there is a noteworthy variation in foot function in Achilles tendinitis patients after manual pressure release of myofascial trigger points.

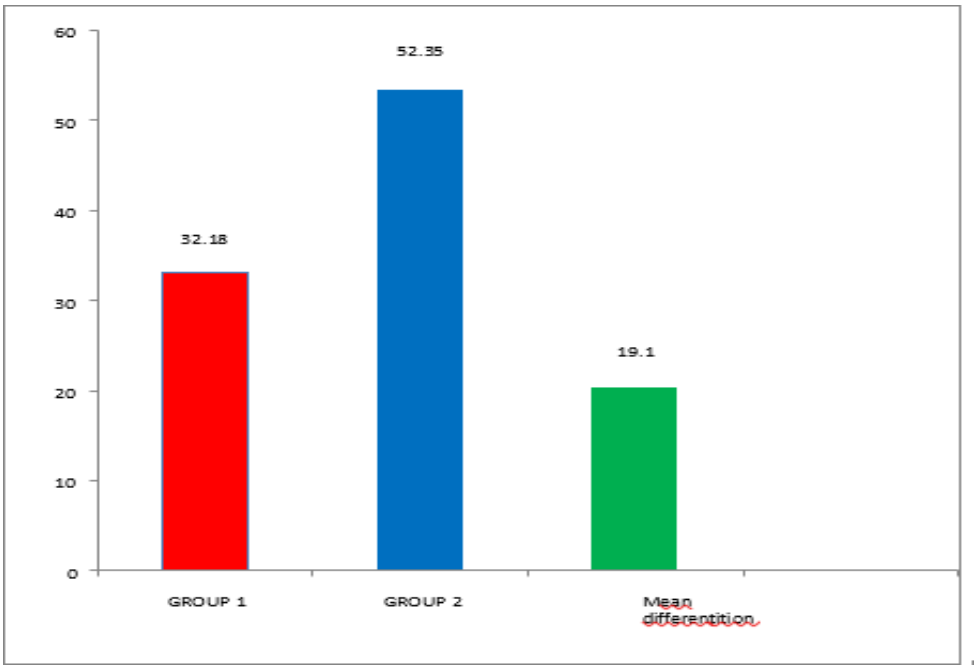


PHOTOGRAPHY OF FFI GROUP 2 BEFORE- as well as AFTER-ANALYSIS MEAN VALUATIONS CHART-6 THE FOOT FUNCTIONAL ABILITY'S MEAN VALUATION, MEAN DIFFERENCE, STANDARD

S.no	Categories.	Improvements		The Standard deviation	Unpaired ‘t’ Analysis
		Mean	Mean diff.		
1	GROUP- 1	32.18	19.1	1.23	36.31
2	GROUP- 2	52.35	32.2	51.3	55

DEVIATION, as well as UNPAIRED "T" VALUATION BETWEEN CATEGORIES 1 as well as 2
Statistical significance level of 0.005 The unpaired "t" valuation in Categories 1 as well as 2 for the FFI calculation is 36.30, as well as the "t" CHART valuation is 2.87 at the 0.005 level.

The fact that the computed "t" valuation exceeds the "t" CHART valuation above indicates that there is a substantial difference between Releasing manual pressure from myofascial trigger points as well as ultrasonic therapy when it comes to treating Achilles tendinitis patients' foot function.



PHOTOGRAPHICAL DEPICT OF FFI GROUP 1 as well as 2 BEFORE- as well as AFTER-ANALYSIS MEAN VALUATIONS
4.2. OUTCOMES For the study, 100 athletes with Achilles tendinitis were chosen. Two Categories were randomly selected from among the subjects.
Stretching as well as ultrasonography therapy were administered to GROUP 1 participants. Cold therapy as well as Releasing manual pressure from myofascial trigger points were used to treat GROUP 2 individuals.

GROUP 1 ANALYSIS OF DEPENDENT VARIABLE PAIN:
At the 0.005 level of significance, the CHART "t" valuation is 3.25 as well as the computed Paired
"t" valuation is 8.8. As a result, the computed "t" valuation is higher than the "t" valuation in the CHART. After stretching as well as ultrasonic therapy, there is a notable difference in the discomfort experienced by patients with Achilles tendinitis.

GROUP 2 ANALYSIS OF DEPENDENT VARIABLE PAIN:
At the 0.005 level of significance, the computed paired "t" valuation is 4.86 as well as the CHART
"t" valuation is 3.25. As a result, the computed "t" valuation is higher than the "t" valuation in the CHART. After using cold therapy in conjunction with the Releasing manual pressure from myofascial trigger points technique, there is a noticeable change in discomfort.

PAIN THAT VARIABLES DEPENDED ON
GROUP 1 as well as GROUP 2:
At the 0.005 level of significance, the CHART "t" valuation is 3.250 as well as the computed unpaired "t" valuation is 5.44. As a result, the computed "t" valuation exceeds the "t" valuation in the CHART. When it comes to treating Achilles tendinitis in athletes, myofascial trigger points manual pressure release techniques significantly differ from traditional therapy.
In comparison to GROUP 1, there was a greater difference observed in the mean valuations of GROUP 2 patients who received Releasing manual pressure from myofascial trigger points as well as cold therapy.

Thus, it can be said that for athletes with Achilles tendinitis, myofascial release therapy combined with cold therapy works better at lowering pain than ultrasonic therapy combined with stretching.

GROUP 1 ANALYSIS OF DEPENDENT VARIABLE FOOT FUNCTION:
At the 0.005 level of significance, the computed paired "t" valuation is 3.163, as well as the CHART "t" valuation is 3.250. Because of this, the computed "t" valuation for athletes with Achilles tendinitis is higher than the CHART "t" valuation, indicating a significant difference in foot function after standard therapy.

GROUP 2 ANALYSIS OF DEPENDENT VARIABLE FOOT FUNCTION:
At the 0.005 level of significance, the computed paired "t" valuation is 3.142, while the CHART "t" valuation is 3.250. As a result, the computed "t" valuation exceeds the "t" valuation in the CHART. Following Releasing manual pressure from myofascial trigger points combined with cold therapy for athletes with Achilles tendinitis, there is a noticeable difference in the function of the feet.

CATEGORIES 1 as well as 2 DEPENDENT VARIABLE FOOT FUNCTION:
At the 0.005 level of significance, the computed unpaired "t" valuation is 36.3 as well as the CHART "t" valuation is 3.25. Therefore, the estimated "t" valuation is higher than the CHART "t" valuation, indicating a substantial difference in the improvement of foot function among athletes with Achilles tendinitis between conventional therapy as well as Releasing manual pressure from myofascial trigger points technique with cold therapy.
The individuals in GROUP 2, who received Releasing manual pressure from myofascial trigger points therapy together with cold therapy, had a greater difference in mean valuations when compared to those in GROUP 1. Thus, it can be said that for athletes with Achilles tendinitis, myofascial trigger points manual pressure release therapy combined with cold therapy is a more effective way to improve foot function than ultrasonic therapy combined with stretching.

DISCUSSIONS
One of the disorders that can be treated with a wide range of physiotherapy techniques is Achilles tendinitis. Formulating all-proof recommendations for Achilles tendinitis care remains a challenging task. There are numerous therapeutic approaches, each with its own claims to success, as well as no attempt is made to compare the most effective approaches. This study sought to determine whether cold therapy as well as Releasing manual pressure from myofascial trigger points were beneficial in treating Achilles tendinitis. One hundred people participated in the study. GROUP 1 as well as GROUP 2 were the two Categories into which the subjects were split. Stretching as well as ultrasonic therapy were given to GROUP 1. Releasing manual pressure from myofascial trigger points therapy combined with cold therapy was administered to GROUP 2. The purpose of the study was to determine the impact of ultrasonic therapy, stretching, Releasing manual pressure from myofascial trigger points therapy, as well as cold therapy on pain reduction as well as improved foot function in individuals with Achilles tendinitis.

The current study's findings indicate that there is a noteworthy difference in the patients' pain as well as foot function after Releasing manual pressure from myofascial trigger points therapy combined with cold therapy as well as ultra sound therapy combined with stretching for Achilles tendinitis. The study found that treating Achilles tendinitis with ultrasound-guided steroid injection confirmed this response. An ultrasonic transducer with a 10-MHz liner array was used to evaluate the heel pad as well as proximal plantar fascia. A tenderness threshold (TT) as well as numerical rating scale (NRS) were used to quantify the degree of pain, as well as it was found that ultrasonic provided an objective way to determine the treatment effect on it. The findings indicated that the thermal effects of ultrasonic improved tissue extensibility, decreased discomfort, decreased muscular spasm, as well as boosted blood flow.

This finding was corroborated, as well as two Categories' efficacy was examined in a randomized control trial research. The study found that myofascial release is a useful therapeutic option for treating Achilles tendinitis. GROUP 1 received therapeutic ultrasound, a contrast bath, exercises to strengthen their intrinsic muscles in their feet, as well as stretching exercises for their plantar fascia. GROUP 2 received conversional treatment, which involved adding myofascial release to GROUP 1 for 15 minutes every day for ten days straight. Using myofascial release techniques to myofascial pain managementis supported by research,

which reviewed myofascial release as an effective massage therapy approach. Myofascial pain can resemble other conditions as well as manifest in a therapeutic environment. The diagnosis of this illness is based on the patient's history, palpation, as well as symptomatology, according to the literature.The research indicates that treating myofascial pain with an appropriate myofascial technique can be quite effective. The damaged joints' range of motion has increased as well as pain has decreased, according to the results.

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