IMMEDIATEEFFECTOFMYOFASCIALRELEASEAND STRETCHING IN CHRONIC PLANTAR FASCIITIS

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ABSTRACT

Background: Oneofthemostcommonfootdisordersisplantarfasciitis,whichischaracterized byheelandarchdiscomfortthatisfrequentlymadeworsebythefirststepoftheday.Thefoot is an important connection between thehuman bodyand the groundbecauseit is essential for sustainingpostureandmobility.Forplantarfasciitis,anumberofphysiotherapytherapieshave beenwidelyrecommended,includingsiliconeheelcups,myofascialrelease,positionalrelease therapy, orthotic devices (night splints), rest, and taping. Cryotherapy, phonophoresis, laser therapy, microwave diathermy, iontophoresis, and contrast baths are other electrotherapy methods that have been used. Comparing the efficacy of myofascial release and ultrasound therapy vs stretching and ultrasound therapy in patients with chronic plantar fasciitis was the main goal of this study.

Methods: Thirty patients with chronic plantar fasciitis, ages 20 to 40, were enrolled in this comparative study, which used a pre- and post-experimental design. Every participant stated that their heel pain has persisted for longer than six months and is especially obvious when they take their first step in the morning. Patients with calcaneal fractures, tumours, metal implants around the ankle, dermatitis, impaired circulation in the lower extremities, sciatica- related pain, other neurological disorders, arthritis, or infective foot conditions were not allowed to participate in the study, which employed a random sampling technique. Group A had five minutes of continuous therapeutic ultrasound at a frequencyof 1 MHz and an output of1 W/cm². This was followed bythreerepetitions of90-second holds ofmyofascial release. Group B underwent the identical ultrasonography procedure and then performed stretches using **OutcomeMeasures**Pre-andpost-treatmentmeasurementsofankledorsiflexionrangeof motion (ROM) and pain intensity were made using the Visual Analog Scale (VAS).

Results: Both paired and unpaired t-tests were used in the statistical analysis. Both groups demonstrated significant improvements in ankle dorsiflexion ROM and pain reduction. However,comparedtoGroupB(stretching),GroupA(myofascialrelease)showedstatistically larger improvements in ankle dorsiflexion and pain.

Conclusion: Theresultsindicatethat,incomparisontostretchingexercises,myofascialrelease combined with ultrasound therapy is more beneficial in increasing ankle dorsiflexion and lowering discomfort in patients suffering from persistent plantar fasciitis.

INTRODUCTION-

Themostprevalentfootconditionisplantarfasciitis,whichaffectstheplantarfascia,an important component of the foot's biomechanics. The foot is a unique anatomical feature that plays a vital role in connecting the bodyto the earth [1]. As a truss, the plantar fascia supports thefoot'smediallongitudinalarch(MLA),aidsinmobility,andmakesiteasierforthebodyto absorb shock when bearing weight [2]. Maintaining the longitudinal arch and acting as a dynamic shock absorber for the foot and lower limb as a whole are two of its primary roles during walking and running [3].

Plantarfasciitishastraditionallybeentreatedwithavarietyofphysiotherapytechniques,such asmyofascialrelease,positionalreleasetherapy,siliconeheelcups,orthoticdevicesincluding night splints, rest, and taping. This condition has also been treated using electrotherapy methodslikeiontophoresis,lasertherapy,microwavediathermy,phonophoresis,cryotherapy, and contrast baths [4].

Onepopularphysiotherapymethod fortreating chronicdiseases is myofascial release(MFR). The foundation of this method is the idea that physical stress causes fascia, the connective tissue that runs throughout the body, to restructure and thicken. By implementing MFR, the fascia's ground substance's viscosity is changed to a more fluid state, relieving excessive pressure on pain-sensitive tissues and reestablishing their normal alignment. Therefore, MFR might be a crucial strategy in treating plantar fasciitis [5].
The goal of stretching programs is to reduce the strain on the plantar fascia, which can become taut for internal reasons or as a result of Achilles tendon tension. A tight Achilles tendon can limit ankle dorsiflexion, resulting in excessive foot pronation and inappropriate stretching of the plantar fascia. Both structures have a shared insertion on the calcaneus [6,7]. Another technique to manage pain is ultrasound therapy, which modifies the underlying medicalconditionandaffectshowpainisperceivedortransmitted.Thiscanbeaccomplished by either increasing soft tissue extensibility as a result of the tissue temperature rise or by stimulating cutaneous thermal sensors [8].

With an emphasis on comparing the effectiveness of myofascial release and stretching in terms of pain reduction and range of motion improvements, the current study intends to examinetheefficacyofbothtechniquesinconjunctionwithultrasoundtherapyforchronic plantar fasciitis.

MATERIALSANDMETHODOLOGY

Basedonpresetinclusionandexclusioncriteria,participantswhoreportedwithplantarfasciitis at Krishna College of Physiotherapy, Karad, were evaluated for eligibility. Informed permission was acquired after eligibilitywas confirmed. Subsequently, a standardized history was obtained, encompassing demographic information such as age, gender, height, weight, occupation,andthetypeofsymptomsexperienced.Abasicweighingscalewasusedtorecord bodyweightinkilograms,andameasuringtapewasusedtorecordheightinmeters.TheVisual Analogue Scale (VAS) was used to assess baseline pain and record information on the side affected and the length of the symptoms. A universal goniometer was used to measure range of motion (ROM). Each subject received treatment for 15 to 20 minutes.

InclusionandExclusion Criteria:

Malesandfemalesbetweentheagesof20and40whohadbeensufferingfromplantarfasciitis formorethansixmonths,experiencedheeldiscomfortthatwasrestrictedtotheplantaraspect, and complained of pain when they took their first morning step were eligible participants. Participants with diseases such as infections, malignancies, calcaneal fractures, and metal implants close to the ankle that are contraindicated for therapeutic ultrasonography were excluded. People with conditions that preclude myofascial release, such as dermatitis, circulation problems in the lower extremities, arthritis, or pain that was referred from sciatica or other neurological conditions, were also not included.

Method:

A 10 cm horizontal Visual Analogue Scale (VAS) was used to measure pain intensity. Participants were asked to mark their level of discomfort on a line that went from 0 (no pain) to 10 (severe pain). We used a universal goniometer to measure ROM. In order to conduct dorsiflexionattheanklejoint,participantswererequestedtoliesupinewiththeirkneesflexed to 30 degrees. The goniometer was used to assess both active and passive dorsiflexion range of motion.

After the preliminaryassessment, participants were randomized to either of the two treatment groups:

Group A: Participants received therapeutic ultrasound in continuous mode at 1 W/cm² and 1 MHz frequency for 5 minutes, followed by the myofascial release technique, applied for 90 seconds with 3 repetitions. Group B: Participants received therapeutic ultrasound under the same parameters as Group A, followed by a stretching regimen, with each stretch held for 30 secondsandrepeated5times.Post-treatment,painlevelswereagainmeasuredusingtheVAS, andbothactiveandpassivedorsiflexionROMoftheanklewerereassessedusingtheuniversal goniometer. Pre- and post-treatment data were collected for statistical analysis.

STATISTICALANALYSIS:

BothpairedandunpairedStudent's't'testswereusedinthestatisticalstudy.Withineachgroup, the effectiveness of the myofascial release and stretchingapproaches was evaluated using the paired 't' test before and after treatment, and the effectiveness of the two techniques was compared using the unpaired 't' test.

The age range of the participants was 20–40 years old. Group A's mean age was 29.8 years ± 6.8, whereas Group B's was 29 ± 6.3. The unpaired 't' test revealed that the age difference between the two groups was not statistically significant (t = 0.3043, p = 0.7631). In order to determinetheindividuals'BMI,theirweightandheightwerealsonoted.GroupAhadamean BMIof23.5kg/m²±2.3,andGroupBhadameanBMIof24.03kg/m²±0.7.Thetwogroups' BMIs did not differ significantly, according to the unpaired 't' test (t = 0.5399, p = 0.5935).

Using the visual analogue scale (VAS) to measure pain, Group A's mean score before to therapy was 7.6 cm ± 1.50, while Group B's mean score was 7 cm ± 1.41. Prior to therapy, there was no statistically significant difference between the groups, according to the unpaired 't' test (p = 0.2696). Nevertheless, following therapy, the mean VAS score for Group A decreased to 1.26 cm ± 0.9, but the mean VAS score for Group B was 3.2 cm ± 2.04, with a statistically significant difference (p = 0.0025).

Beforetreatment,GroupA'smeanactiverangeofmotion(ROM)was9°±2.23,whileGroup B's was 7.9° ± 1.83. Before therapy, there was no statistically significant difference between the two groups, according to the unpaired 't' test (p = 0.1639). With a highly significant difference(p<0.0001),GroupA'smeanactiverangeofmotionimprovedto15.6°±1.84after treatment, while Group B's mean active range of motion climbed to 12.26° ± 2.21.

Thepre-treatmentmeanforpassiverangeofmotionwas11.6°±2.38forGroupAand10.4° ± 1.59 for Group B. There was no statistically significant difference between the groups (p = 0.1164).Followingtherapy,therewasastatisticallysignificantdifference betweenthe groups (p < 0.0001), with Group A's mean passive range of motion improving to 18.6° ± 1.29 and Group B's improving to 14.86° ± 1.59.

DISCUSSION

Withbothgroupsundergoingtherapeuticultrasonography,thecurrentstudysoughttoexamine the efficacy of stretching and myofascial release (MFR) in the treatment of persistent plantar fasciitis. The study participants ranged in age from 20 to 40 years, while subcalcaneal discomfort has been documented in people from 8 to 80 years of age [9]. Group A's average BMI was 23.5 kg/m² ± 2.3, while Group B's was 24.03 kg/m² ± 0.7. Both of these BMIs lie within the 18.5–24.9-10- range that the World Health Organization (WHO) recommends [10]

The Visual Analogue Scale (VAS) was used to measure pain alleviation, and the mean and standard deviation of the values before and after the intervention were computed. Group B's VASscoresdecreasedfrom7±1.4to3.2±2.04,whereasGroupA'sdecreasedfrom7.6± 1.50 beforethe intervention to 1.26 ± 0.96 after. There was no discernible difference between the two groups, as indicated by the p-value of 0.2696 for the pre-intervention VAS values. Nevertheless,asubstantialdifferencewasnotedaftertheintervention(p=0.0025).This

implies that Group A, who received myofascial release, saw a higher decrease in pain than Group B, which received stretching therapy.

Inthisstudy,theuseoftherapeuticultrasoundhelpedbothgroupsexperiencelessdiscomfort. These results are in line with those of Hana Hronkova et al., who discovered that ultrasound treatment dramatically decreased pain in plantar fasciitis patient [11]. Therapeutic ultrasonography is thought to promote cellular functions including phagocytosis[12,13], hasteningthenaturalresolutionofinflammation.Theultrasounddosageusedinthisstudywas based on earlier research by Hronkova et al., which found that most participants had pain alleviation after receiving ultrasound therapy for five minutes at an intensity of 1W/cm².

GroupB'smeanactiverangeofmotion(ROM)increasedfrom7.9°±1.83to12.2°±2.21, while Group A's mean active ROM increased from 9° ± 2.23 pre-intervention to 15.6° ± 1.84 post-intervention.ActiveROMbeforetheinterventionhadap-valueof0.1639,meaningthere was no significant difference between the groups; however, a significant difference was discovered after the intervention (p< 0.0001). Both groups' passive range of motion also improved; Group A's increased from 11.6° ± 2.38 to 18.6° ± 1.29, while Group B's increased from 10.4° ± 1.59 to 14.8° ± 1.59. Additionally, the passive ROM post-intervention p-value was statisticallysignificant (p < 0.0001). The findings of Rather Aijaz Y. et al., who noted an increase in ankle dorsiflexion range of motion after the combination of ultrasound and prolonged stretching [14].

Static stretching, which is frequently used to increase range of motion and lower the risk of injury, increases flexibilityover time bystretching muscle tissue over its natural length [15]. It has been demonstrated that stretching, especially of the plantar fascia and Achilles tendon, efficiently relieves plantar heel discomfort. This is consistent with earlier studies by Suman Kuharetal.,whichdiscoveredthatmyofascialreleasewasasuccessfultherapeuticstrategyfor lowering pain and enhancing function in individuals with plantar fasciitis [16].

Soft tissue manipulation is the main goal of myofascial release (MFR), which relieves fascial limitations brought on bystress, injury, or bad posture. MFR seeks to extend the fascia, boost the body's natural healing processes, and promote circulation by gently applying continuous pressure[17]. Targeting limited fascia, the direct MFR technique promotes the remodeling of fascia in response to physical stress by elongating or mobilizing sticky tissue (18). This technique is supposed to strengthen the viscosity of the ground substance within the fascia, relieving pressure on pain-sensitive structures and restoring alignment. [18]

Additionally, MFR has been demonstrated to promote collagen production and fibroblast proliferation, which may complement the healing process by substituting more functional tissuefordeterioratedtissue[19,20].DirectMFRhasbeenfoundtobeaverysuccessfultreatment for plantar fasciitis, especially for patients who need to recover quickly, according to Shirat Ling's 1999 study. According to the results of the current study, myofascial release was more effectivethan stretchingaloneat reducingdiscomfortand improvingankle dorsiflexionrange of motion.

Thisstudyconcludesthatalthoughstretchingandmyofascialreleasearebothusefulinhelping individualswithplantarfasciitisreducepainandincreaserangeofmotion,myofascialrelease hasbetterresultsintermsofbothpainreductionandROMimprovement.Therefore,MFRcan

beregardedasabettertherapeuticchoiceforthemanagementofpersistentplantarfasciitis.

CONCLUSION

The findings show that when paired with therapeutic ultrasound, myofascial release is much more effective in delivering immediate pain relief and enhancing ankle dorsiflexion range of motion than stretching with ultrasound. Based on these data, it is possible to infer that myofascial release treatment combined with therapeutic ultrasonography is extremely useful forchronicplantar fasciitisintermsof both rapidpainrelief andincreasedankle dorsiflexion.

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