

IMMEDIATE EFFECT OF SOLEUS TRIGGER POINT PRESSURE RELEASE AND POST ISOMETRIC RELAXATION (MET) ON RESTRICTED ACTIVE ANKLE JOINT DORSIFLEXION AMONG COLLEGE FEMALES

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ABSTRACT

Background and purpose: To determine the immediate effect of soleus trigger point pressure release and post isometric relaxation(MET) on restricted active ankle joint dorsiflexion among college females.

Materials and Methods: A sample of 45 college females within the age group of 20-25 years with unilateral restriction in active ankle dorsiflexion $> 10^\circ$ and atleast one identifiable muscle trigger point within the soleus muscle were randomly divided into three groups.

Results: There was significant differences between pre and post intervention ROM for group A (MD=5.310, t value=13.301 at p=0.0001) and group B (MD=5.890, t value=19.552 at p=0.0001) but nonsignificant in group C (MD= -0.088, t value=1.070 at p=0.302). Maximum improvement was seen in Group B. Decreased range was seen in Group C. Clinical relevance of study, This treatment protocol is easy to apply and has good result in short period of time and reduces the risk and further consequences of restricted ankle dorsiflexion.

Conclusion: Post isometric relaxation was more effective in increasing ankle dorsiflexion range in case of soleus trigger points.

KEY WORDS: Manipulation, Muscle, Trigger Point.

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INTRODUCTION

MTrPs defined as discrete foci, often palpable as a nodule, within taut band of skeletal muscle that are tender on palpation and produced local and referred pain and may create additional complaints by reducing joint range of motion and producing autonomic disturbance [1,2].

In previous days the methods of managing trigger points were: transcutaneous electrical nerve stimulation (TENS), Ultrasound therapy, Laser, acupuncture, massage, spray and stretch, non-inflammable coolant spray, botulinum toxin injection, local anesthetics and dry needling. In the present study the Trigger Point Pressure

Release and Post-isometric Relaxation (MET) are techniques used to treat the trigger points [3,4]. Although researchers have mapped out TrPs in the body and knowledge about their structure, pathologies and interventions are expanding, there has been relatively little research on appropriate interventions for TrPs in the soleus muscle [5,6]. In addition, such treatment modalities as ischaemic TrPs compression and passive stretching while commonly used in the treatment of TrPs have not been subject to rigorous empirical investigation, although studies using impressionistic data have been published [7-9]. The new trigger point pressure release replaces the previous term and concept of ischaemic compression. Instead of ischemic compression, Simon et al 1999 recommends the application of TrPs pressure release.

Travells and Simons recommend applying gentle digital pressure to TrPs. It is an indirect technique that uses the barrier-release concept, in which the finger "follows" the releasing tissue [10]. Applying a press and stretch technique is believed to restore abnormally contracted sarcomeres in the contraction knot to their normal resting length [11]. Javier Montanez, 2009 found the effectiveness of trigger point pressure therapy on myofascial trigger point in upper trapezius.

T.J.Ruddy and Fred Mitchell developed latest technique MET in 1961. MET are of two types, reciprocal inhibition and post-isometric relaxation account for the neuromuscular inhibition that occurs during application of these techniques. Post-isometric relaxation states that after a muscle is contracted, it is automatically in a relaxed state for a brief latent, period. The patient is asked to contract the involved muscle 10% to 25% of maximum after which the tight muscle is relaxed then stretched. This method can be reinforced by controlled respiration and directed eye movement by Chang Zern Hong, 2006. Reciprocal inhibition stated that when one muscle is contracted, antagonist is automatically inhibited [12]. MET have been recommended as a mean of managing TrPs for achieving tonus release in a muscle before stretching.

C.F de Las Pen'as et al in year 2005 undertook a systematic review and concluded that manual therapies (ischemic compression, spray and stretch, strain & counter strain, MET, TrPs, transverse friction massage) have specific efficacy [13]. So we are planned to determine the immediate effect of soleus trigger point pressure release and post isometric relaxation (MET) on restricted active ankle joint dorsiflexion among college females.

MATERIALS AND METHODS

An experimental study was done at Guru Jambheshwar University of Science and Technology. Samples of 45 college females were recruited from department of physiotherapy within the age group of 20-25 years. Subjects with unilateral restriction in active ankle dorsiflexion $>10^{\circ}$ and at least one identifiable muscle trigger point within the soleus muscle were included in the study. Subjects were excluded if they had diagnosis of fibromyalgia syndrome, talipes equinus varus deformity, anterior ankle impingement, planter heel pain, previous ankle fracture or surgery within last 12 months and any neurological or poor general health. All the subjects gave their informed consent. Dependent Variables was ankle range of motion (dorsiflexion) And Independent variable was trigger point pressure release, post isometric relaxation technique.

Subjects were randomly divided into three groups, In Group A the subjects were treated with Trigger Point Pressure Release only, Group B treated with Post-Isometric Relaxation and Group C subjects treated with sham treatment (subjects were positioned prone with knee extended bilaterally for 5 minutes) and allocated 15 participants to each group. Active ankle dorsiflexion range of motion (ROM) was measured with 360° plastic universal goniometer before and after the treatment session as the outcome measure in each group²². All participants were positioned prone with their knee flexed to 90° for examination and location of TrPs. Identification of soleus MTrPs based on [10,14].

1. A palpable taut band in muscle.
2. A hypersensitive tender spot/nodule with in a taut band.

3. Recognition of current pain complaint by pressure on the tender nodule.
4. Painful limit to full stretch range of motion.

Trigger Point Pressure Release: Patients were positioned prone with knee extended bilaterally for 5 minutes. The researcher would slowly apply pressure on trigger point site with thumb and maintained pressure until release in muscle tension was felt. The process was applied only once for 60 seconds for each participant [11].

Post Isometric Relaxation Technique (MET): It is applied in supine position with knee flexed over a rolled towel or cushion when soleus is being treated. The therapist right hand was placed with fingers on the dorsum of foot. The left hand cradled the achillis tendon just above the heel. The area was treated with foot dorsiflexed to the restriction barrier. The patients were asked to effort towards planter flexion against unyielding resistance. The therapist's and patient's effort were matched. Initial effort involves approximately 30% of patient's strength, an increase to no more than 40% on subsequent contractions and hold for 7-10 seconds, rest for 5 second before next stretch. The process was applied 3 times for each of the participant [12].

Statistical Analysis: Data analysis was performed with the software package SAS version. Mean and standard deviation of the variable were calculated. Pre intervention active ankle dorsiflexion for all groups was compared with the help of one way ANOVA. Paired t test was performed for all the three groups to analyze the intra group difference in ROM before and after treatment protocol. Comparison of effect of treatment between the groups for dorsiflexion ROM was done using one way ANOVA. The significance level was kept at 95% ($p \leq 0.05$).

RESULTS

All 45 subjects successfully completed the study. Mean age of the subjects 22.5 years. There was

Table 1: Statistical analysis of pre treatment dorsiflexion ROM between all groups.

	Sum of Squares	Df	Mean Square	F-Value	P-Value
Between groups	5.603	2	2.801	3.1	0.055
Within groups	37.927	42	0.903		
Total	43.531	44			

no significant difference ($F=3.10$) found between pre intervention ankle ROM of all the three groups as shown in Table 1.

Paired t test was performed for all the three groups to analyze the intra group difference in ROM before and after treatment session. There was significant differences between pre and post intervention ROM for group A ($MD=5.310$, t value= 13.301 at $p=0.0001$) and group B ($MD=5.890$, t value= 19.552 at $p=0.0001$) but nonsignificant in group C ($MD= -0.088$, t value= 1.070 at $p=0.302$).

Table 2: Mean and paired t-test Pre-Post treatment dor-siflexion ROM group A.

Group A	N	mean	Std. deviation	Df	t-Value	P-Value
Pre treatment	15	8.514	1.06	42	13.301	0.0001
Post treatment	15	13.825	1.741	42		

Table 3: Mean and paired t-test Pre-Post treatment dorsiflexion ROM group B.

Group A	N	mean	Std. deviation	Df	t-Value	P-Value
Pre treatment	15	9.158	0.677	42	19.552	0.0001
Post treatment	15	15.048	1.496	42		

Table 4: Mean and paired t-test Pre-Post treatment DF-ROM group C.

Group A	N	mean	Std. deviation	Df	t-Value	P-Value
Pre treatment	15	8.337	1.061	42	1.07	0.302
Post treatment	15	8.248	0.99	42		

At the end of the study by comparing the difference value of pre-post intervention ankle dorsiflexion between all the two treatments and one control group, a statistically significant difference (126.90) was found as shown in Table 5.

Table 5: Statistical analysis of Pre-Post treatment DF-ROM using ANOVA.

	Sum of Squares	Df	Mean Square	F-Value	P-Value
Between groups	326.164	2	163.082	126.9	0.0001
Within groups	53.973	42	1.285		
Total	308.137	44			

The results of this study shows maximum improvement was seen in Group B than Group A. Decreased range was seen in Group C. In the end result showed that all hypotheses was strongly accepted by data.

Table 6: Shows comparison between improvement all groups.

Group	Mean Difference	P-Value
Group A	5.31	0.0001
Group B	5.89	0.0001
Group C	-0.088	0.302

DISCUSSION

Most studies have been done for the treatment of myofascial trigger points by using wide variety of physiotherapy methods. Separately there are evidences present which supports the effectiveness of Post-Isometric Relaxation (MET) and Trigger Point Pressure Release for the treatment of trigger points but no study has been done earlier to compare their effects in college females. Sabby et al and Nagrale et al conducted studies on upper trapezius MTrP with the help of MET and Strain Counter Strain and concluded that following a improved range of motion, reduced pain in patient, supported finding of this study¹⁵. Mehdikhani et al 2012, Chang Zern Hong, 2006 concluded that MET changes in pressure sensitivity in latent trigger point in upper trapezius muscle [16]. Cleofas Rodriguez Blanco, 2006 evaluated the effectiveness of post-isometric relaxation in active mouth opening following a single treatment of latent trigger myofascial trigger point in masseter muscle [17].

The findings of present study confirm the positive effects of Trigger Point Pressure Release and Post-Isometric Relaxation (MET) on restricted active ankle joint dorsiflexion and significantly improved the range of motion in ankle joint. Results showing improvement occurs more in post-isometric relaxation group as compared to trigger point pressure release group.

The superiority of MET on trigger point could possibly due to it involves the whole muscle for the lengthening of contracted sarcomere as compared to pressure release which work

directly on trigger point only. Simons et al 1999 claimed that stretching of a muscle with MTrPs might be useful since the stretching can reduce the contraction knot as well as increasing circulation to the area; this theory explains the mechanism of Post Isometric Relaxation. The clinical implication of increased ankle ROM after the treatment protocol would include cost effectiveness and patient satisfaction. The inadequate rehabilitation of dorsiflexion ROM may lead to long term pain and ankle instability, so early benefits gain from the pressure release and Post-Isometric Relaxation (MET) further ads to their clinical relevance. The limitation of the study includes short sample size and immediate effect is seen.

Clinical Relevance of Study: Post Isometric Relaxation (MET) was more effective in increasing ankle dorsiflexion range in case of soleus trigger points. This treatment protocol is easy to apply and has good result in short period of time and reduces the risk and further consequences of restricted ankle dorsiflexion.

Future Scope of Study: A biplane goniometer can be used as it is diagnosed specially to measure ankle joint dorsiflexion, prevent pronation and maintains subtler joint in neutral position and long term effectiveness of Post Isometric Relaxation (MET) and Trigger Point Pressure Release can be addressed.

CONCLUSION

Trigger Point Pressure Release and Post Isometric Relaxation (MET) both improved ankle dorsiflexion. However, post isometric relaxation was more effective in increasing ankle dorsiflexion range in case of soleus trigger points.

Conflicts of interest: None

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