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EFFECTIVENESS OF THE POST ISOMETRIC RELAXATION (MET) AND POSITIONAL RELEASE THERAPY FOR GASTROSOLEUS MUSCLE ON TRIGGER POINT RELEASE AND RESTRICTED ACTIVE ANKLE JOINT DORSIFLEXION AMONG COLLEGE FEMALES – EXPERIMENTAL STUDY

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ABSTRACT

Background: Gastrosoleus trigger point is pain full and movement restriction leading to functional disability**.** Several studies have studied the efficacy of Muscle energy technique (MET) and Post isometric Relaxation technique; however, they were inconclusive of evidence. Hence the present study was to compare the effectiveness of Post isometric Relaxation and Positional Release Therapy Technique on improvement of ROM and Decrease NPRS.

Aim: To determine the effect of Post isometric Relaxation Technique (MET) and Positional Release Therapy Technique in relief pain and improving ROM.

Methodology: 46 individuals with Gastrosoleus trigger point and Restricted ROM Participated in this study and were randomly allocated to groups (Group A and B, n=23 each). Group A was administrated with Post isometric Relaxation technique, Group B was administrated with Post isometric Relaxation technique for Immediate effect**.**

Result and Conclusion: The present study concluded that both Post isometric Relaxation Technique (MET) and Positional Release Therapy are shown to have effect on decreasing pain and increasing ROM. The Post isometric Relaxation Technique was found clinically more effective in decreasing pain score than Positional Release Therapy Technique in subjects with Gastrosoleus trigger point and Restricted ROM. However there is no significant difference found in improving ROM between both groups Post isometric Relaxation and Positional Release Therapy

Key words: Post isometric Relaxation (MET), Positional Release Therapy, Gastrosoleus Trigger Point

INTRODUCTION

The gastrocnemius and soleus are strong plantar flexors at the ankle joint. Gastrosoleus trigger point is pain full and movement restriction leading to functional disability**.** Musculoskeletal discomfort affects the majority of people at some point in their lives. According to the available evidence and clinical knowledge, MTrPs are responsible for a significant portion of the discomfort. [1,2]

Trigger point are typically located by palpation. Simons described criteria for identification of taut band - a tender spot on the taut band, referred pain or altered sensation at least 2 cm beyond the spot, elicited by needle penetration or pressure held for 10 seconds; and restricted ROM in the joint, the muscle crosses. [3]

Myofascial or overuse injuries cause TrPs to form in muscles.[4] who compete in sports like athletics, rugby union, cricket, and football are predisposed to overworking the muscle and developing TrPs. Within the affected muscle, the TrPs cause a persistent shortening.[5,6] causes a disturbance in the muscle's normal function, putting the person at risk of injury[6,7] Active and latent TrP are the two types of TrP. Physical properties distinguish all types of TrP.[8,9]

MET:An isometric contraction is one that a muscle, or a muscle group, or a limb, or a part of the body, is forced to contract or move in a specific direction, and the practitioner/effort therapist's is balanced, so that no movement is required.[10]

PRT:Positional Release Therapy (PRT), also known as strain-counter strain, is a painless method of bodywork that aims to resolve dysfunctions. Unlike most other soft tissue methods, which use force to stretch restricted fibers, it requires the force off the tissue to loosen it.

Gastrosoleus trigger point is pain full and movement restriction leading to functional disability**.** Several studies have studied the efficacy of Muscle energy technique (MET) and Post isometric Relaxation technique; however, they were inconclusive of evidence. Hence the present study was to compare the effectiveness of Post isometric Relaxation and Positional Release Therapy Technique on improvement of ROM and Decrease NPRS.

Aims and Objectives: The aim of the study was to compare the long term effect on Trigger point pain and restricted dorsiflexion ROM with immediately treatment involving positional release therapy and post isometric relaxation technique (MET).

METHODOLOGY

Study Design: Experimental pre-test – post-test study design

Sample Size: Sample size is calculated on G* power software on the basis of mean dorsiflexion range of motion of the ankle previously reported study[11] from a similar population of patients with gastro-soleus trigger point effect size 0.498 and significance level of 0.05 and 0.95 power was selected. These criteria led to an estimated sample size of 23 participants in each group and to take into account a probable no drop out, the sample size is enhanced to 23 in each group so total 46 patients were included in this study.

Sampling Method: Convenient sampling

Inclusion Criteria

- The age group of 20-30 years.
- College female student.
- The ones having atleast one hypersensitive tender nodule within a palpable taut band in the gastrosoleus muscle.
- Participate having ankle dorsiflexion range of motion less than 20 degrees.
- Pain intensity of more than 4 on NPRS.
- Non athletes.
- Willingness to participate.

Exclusion Criteria

- Fibromyalgia syndrome.
- Congenital deformity of the foot and ankle.
- Anterior ankle impingement.
- Planter heel pain.
- Previous ankle fracture or surgery within last 12 months.
- Any neurological or poor general health.
- Deep vein thrombosis.

Procedure

The purpose of this study was described to all of participants who signed informed consent. The study procedure was conducted through assessing patients, beginning recording, treatment and final recording. Forty six participants to be a part of this study based on the inclusion and exclusion criteria. Subjects were allocated into two groups, group A (Post isometric Relaxation Technique (MET) and group B (Positional Release therapy) by using randomization procedure as follows.First subject was allocated group A, Second visiting subject group B once they fulfilled the inclusion and exclusion criteria. The same sequence of the procedure was followed throughout for consecutive subjects.

Description of groups were as follows:

Group A (Post isometric Relaxation Technique group): Therapist were administered MET technique passively.

Group B (Positional Release therapy group): Therapist were administered positional release therapy technique passively.

All the patients completed demographic details and physical examination performed by the researcher.

Group A: Post isometric Relaxation Technique (MET):

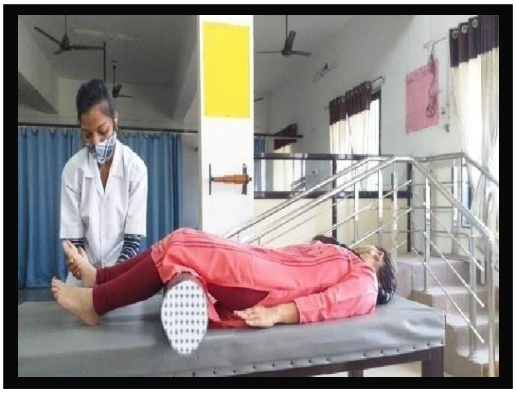


Figure 4. Post isometric Relaxation Technique (MET)

When treating the soleus, it was done in a supine position with the knee flexed over a Bolster. The therapist right hand was held with fingertips on the dorsum of foot. The achillis tendon was cradled in the left hand just above the heel. With the foot dorsiflexed to the restriction barrier, the region was treated. The patients were instructed to push against unyielding resistance in order to achieve planter flexion. Both the therapist's and the patient's efforts were equal. The initial effort should be about 30% of the patient's strength, with subsequent contractions increasing to no more than 40% of the patient's strength. Hold for 7-10 seconds, then rest for 5 seconds before stretching again. This Method was repeated three times for each participant.

GROUP B: Positional Release Therapy

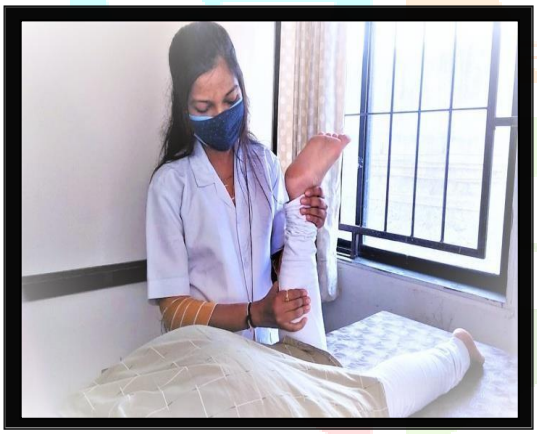
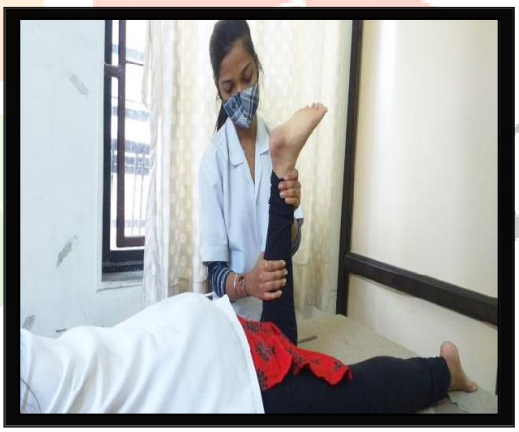

Figure 2 Positional Release Therapy for Gastrocnemius

For gastrocnemius: Subject was in prone lying position with the knee flexed to 90 degree and the ankle plantar flexed. Therapist applied a deep manual pressure over the palpated trigger point and maintained it for 90 seconds. This Method was repeated 3 times


Figure 3. Positional Release Therapy for Soleus

For soleus: Subject was in prone lying position with the knee extended and the ankle plantarflexed. The therapist applied a deep manual pressure over the palpated trigger point and maintained it for 90 seconds. This method was repeated 3 times.

Ankle Dorsiflexion Measurement:

Figure 4: Active Ankle Dorsiflexion ROM was the Outcome measure for this Study.

Immediate post assessment for both the groups was done by measuring the ankle dorsiflexion range of motion using half circle goniometer and pain intensity using NPRS scores and ROM values were noted. The data was collected and statistically analyzed.

RESULTS AND DISCUSSION

The normality of the data was checked. Since the outcome measures were measured within-group pre-test and post-test values. Descriptive statistics including mean and standard deviation were analyzed and Between-group differences at the follow-up period were compared. Statistical significance was set at $p<0.05$ for all statistical analyses and the confidence interval was set at 95 %. All the data analysis was done in IBM SPSS version 2

Demographic Data

Variable	Post Isometric Relaxation (MET) Group	Positional Release Technique Group
Subject	23	23
Age	21.043±1.267	21.956±1.680

Table 1 shows the demographic data of both groups including a number of patients and age.

Table 2: Normality of Data

Outcome	Kolmogorov-Smirnov[a]			Shapiro-Wilk Test		
	Statistic	Difference	Significant	Statistic	Difference	Significant
Pre ROM R.T	0.394	23	0.000	0.664	23	0.000
Pre NPRS R.T	0.320	23	0.000	0.828	23	0.001
Pre ROM L.T	0.248	23	0.001	0.798	23	0.000
Pre NPRS L.T	0.429	23	0.000	0.686	23	0.000

Table- 2 shows a test of Normality of 46 subjects from both the Post isometric Relaxation Technique (MET) group and Positional Release Therapy group which were included in the present study. In this Kolmogorov-Smirnov[a] and Shapiro-Wilk test are used and according to that data were not normally distributed so Non-parametric test were used for further analysis**.**

Table 3: Wilcoxon Signed Rank test for within group comparison of ROM and NPRS in Group A (n=23)

Variables	Level	Mean± SD	Z Value	P Value
ROM R.T	PRE	14.39±2.148	-4.345	0.000
	POST	18.87±2.581		
ROM L.T	PRE	14.00±2.023	-4.239	0.000
	POST	18.39±2.388		
NPRS R.T	PRE	6.30±0.703	-1.414	0.00
	POST	6.22±0.795		
NPRS R.T	PRE	5.78±0.736	-2.333	0.020
	POST	5.48±0.846		

Table 4: Wilcoxon Signed Rank test for within group comparison of ROM and NPRS in Group B (n=23)

Variables	Level	Mean± SD	Z Value	P Value
ROM RT	PRE	13.13±2.262	-4.348	0.000
	POST	18.26±2.649		
ROM LT	PRE	12.96±2.402	-4.472	0.000
	POST	17.91±2.466		
NPRS RT	PRE	6.00±0.739	-4.246	0.000
	POST	2.87±1.140		
NPRS LT	PRE	5.74±0.810	-4.232	0.000
	POST	2.61±1.616		

Table 5: Non parametric (independent sample t-test) for between group comparison of ROM and NPRS in Group A (n=23) and Group B (n=23)

Variables	Mean± SD		Z Value	P Value
	MET	PRT		
t ROM R.T	18.87±2.581	18.26±2.649	0.955	0.337
t ROM L.T	18.39±2.388	17.91±2.466	0.384	0.703
t NPRS R.T	6.22±0.795	2.87±1.140	5.755	0.000
t NPRS L.T	5.48±0.846	2.61±1.616	5.195	0.000

Discussion

The purpose of the study was to compare the effect of Post Isometric Relaxation Technique (MET) and Positional Release Therapy in the treatment of Gastrosoleus Trigger Point and Restricted Dorsiflexion ROM. In this study 46 patients were randomly allocated to any one of the two treatment groups such that were 23 subjects in each treatment group. Group A received MET and group B received Positional Release Therapy. ROM and NPRS were measured both before and after immediately of treatment.

For group A ROM and NPRS pre and post-treatment values were measured using Wilcoxon signed-rank test, which showed extremely statistically significant changes giving a p-value <0.000. Thus stating the Post isometric Relaxation that Technique has beneficial effects on improving ROM and reducing pain.

Similarly, for group B ROM and NPRS pre and post-treatment values were measured using Wilcoxon signed-rank test, which showed extremely statistically significant changes giving a p-value < 0.000. Thus stating the Positional Release Technique that Treatment has beneficial effects on improving ROM and reducing pain.

When compared between groups (group A and group B), post treatment values were measured using Man Whitney U Test, P-value for ROM score was 0.005, which is considered to be statistically significant and the p-value for NPRS was 0.000, which is considered to be extremely statistically significant.

The baseline value of NPRS for both the groups was significant, therefore pre-post NPRS differences of both the groups (group A and group B) were been taken and an average score was obtained, using this average score further analysis using Man Whitney U Test was performed, according to this test p-value for NPRS was 0.505 which is considered to be not statistically significant. Hence the present study concluded that there was no difference in post values.

Similar studies from the evidence databases showed that the results are in line with the present study for ROM and NPRS. The results of the study are discussed in and also compared with the previous studies. The possible explanations for the results are also discussed below according to supporting literature.

Most research has been conducted for the therapy of myofascial trigger points by a wide variety of physiotherapy approaches. Separately there is evidence present that supports the effectiveness of Post-Isometric Relaxation (MET) and Positional Release Therapy for the treatment of trigger points and Restricted ROM but no study has been done earlier to compare their effects in college females.

The study attempted to find out the effectiveness of Post isometric Technique and Positional Release Technique on Trigger point of Gastrosoleus and Restricted Dorsiflexion ROM. In the present study, it was found that there is a statistically significant improvement in ROM and NPRS within Post isometric Technique and Positional Release Technique. Between the groups, the analysis found that there is a statistically significant difference between Post isometric Relaxation group and the Positional Release Therapy group in the improvement of NPRS.

Nirali M Jain et a[l(12)]Conducted a study on Efficacy of Active Release Technique and Positional Release Therapy for Gastrosoleus Trigger point Release in Recreational Runners with 30 subjects and concluded that Immediate that Positional Release Therapy is a better intervention for the release of trigger points as it shows a greater increase in ankle dorsiflexion range of motion and a significant reduction in pain. The Present study also shows the decrease pain and improving ROM.

Brinda shah et al[(13)] conducted a study on Efficacy of Positional Release Technique in Gastrosoleus Muscle Cramps with 30 subjects and concluded that the Positional release therapy is a significant difference in decreasing pain, increase in ROM of dorsiflexion, and increase in the strength Of Gastrosoleus muscle. The Present study supports this literature as the present study also shows the decrease in pain and improving ROM by Positional Release Therapy.

The present study was in favor of the study conducted by Jack Clarke [(14)] et al which included 40 participants (24 male and 16 female) were randomly divided into 2 groups, Intervention introduced to the subjects were three treatment protocols over 10 days on their dominant leg and concluded that regular 10 days exercise as a helpful means in this reduce NPRS. On the other hand, exercise can be done in every place that does not need any cost. When the present study was compared with this study it also concluded that both energy techniques MET and ischemic compression effectively Latent trigger points Gastrocnemius following acute and mid-term treatment. But Post isometric Relaxation Technique is more effective compare to ischemic compression for a latent trigger point in the Gastrocnemius. (I.e. 30% of patient's strength, an increase to no more 40% subsequent contraction and hold for 7 to 10 second, Rest for 5 second before the next stretch and it's applied 3 times for participants.) Help in reducing pain, while no significant difference in both groups pre-post Rom, while Post isometric Relaxation Technique group showed more statistically significant Reduce NPRS.

K Lewit et al[(15)] conduct a study on Effect of Myofascial pain: relief by post isometric relaxation with 244 participants and concluded that post isometric relaxation was the increased tension of the affected muscle and the resulting pain and dysfunction are both relieved by restoring the full stretch length of the muscle. When both groups compare post isometric relaxation technique and positional release technique is effective to reduce pain.

The mechanism behind Post isometric Relaxation Technique (MET) effective for Pain and Restricted Dorsiflexion ROM is still unclear mechanism. The results of this study demonstrate that Trigger Point Pressure Release (TPPR) and Post-Isometric Relaxation (MET) have a beneficial effect on the restricted active ankle joint dorsiflexion and considerably enhance ankle joint ROM. Results indicate improvement occurs higher in post-isometric relaxation groups when compared to the trigger point pressure release group.

The advantage of MET on trigger points may also be related to the fact that it uses the entire muscle to stretch the tightened sarcomere, as relates to pressure release, which only performs on the trigger point. According to Simons et al. (1999), stretching a muscle using MTrPs can lower the contraction knot while also restoring circulation to the area; this idea explains the mechanism of Post Isometric Relaxation. Energy efficiency and patient satisfaction would be two clinical indications of improved ankle ROM with the therapy strategy. Excessive dorsiflexion ROM therapy can result in long-term pain and ankle instability; therefore the pressure release and Post-Isometric Relaxation (MET) have clinical benefit. The study's barriers include a small number of participants and an instant effect. In addition, another study reported that Post isometric Relaxation increase ROM and decrease NPRS in Gastrosoleus muscle.

Following trigger point release, Positional Release Therapy demonstrates a larger increase in ankle dorsiflexion range of motion. Positional release treatment is a technique for increasing muscle flexibility by placing the muscle in a reduced shape, as compared to a long or stretched one, to increase muscle relaxation. The therapy's neurophysiological basis is based on the concept that afferent neuron changes affect somatic joint dysfunction. Excessive gamma gain can promote hyperactivity of the myotatic reflex arc, resulting in restricted mobility. The gamma gain reduces when the patient's muscle is placed in the position of ease for a brief period of time, allowing the hyperactive reflex arc to restore to its normal level and range of motion to increase.[16]

However, in spite of both groups (Post isometric Relaxation Technique and Positional Release Therapy) showing Decrease NPRS and Increase ROM these results support Post isometric Relaxation Technique as a more positive manager of Gastrosoleus muscle pain Decrease.

According to present study there may be no significant difference in the post value of ROM score between Post isometric Relaxation and Positional Release Therapy group but Post isometric Relaxation shows significant improvement in the reducing the NPRS score compare to Positional Release Technique.

Limitations

It is a short duration study in which follow up was not done, therefore long term effects were not known. Randomized controlled trial is needed to find long term effects of both therapeutic Treatments. There is lack of control group

Conclusion

The present study concluded that both Post isometric Relaxation Technique and Positional Release technique are shown to have effect on improving ROM and Decrease NPRS score. The Post isometric Relaxation technique was found clinically more effective in Decrease NPRS score than Positional Release Therapy Technique subjects with Gastrosoleus trigger point pain and restricted dorsiflexion ROM. However there is no significant difference found in improving ROM between both the groups Post isometric Relaxation Therapy and Positional Release Therapy group.

Future Recommendation: The long term benefits of this treatment protocol could be established. Further study can be carried out to find the effect of Post isometric Relaxation Technique and Positional Release Therapy technique comparing with control group. Further study can be done measuring effect of these techniques on other outcome measures.

Ethical Clearance: Taken from institutional advisory board.

Conflict of interest: None

Source of funding: Self

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