

Ischemic pressure vs. post-isometric relaxation for treatment of rhomboid latent myofascial trigger point: a systemic review

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Abstract. – OBJECTIVE: This systematic review was carried out to review ischemic pressure and post-isometric relaxation for treatment of rhomboid latent myofascial trigger point.

MATERIALS AND METHODS: This systematic review was organized using PRISMA and Cochrane standards. This meta-analysis compares ischemic pressure to post-isometric relaxation for rhomboid latent myofascial trigger point. Search terms included: myofascial pain, trigger point, ischemia pressure, post-isometric relaxation, and electric stimulation. We first searched MEDLINE (including ePub, Ahead of Print, InProgress, and Other Non-Indexed Citations) and then EMBASE and the Cochrane CENTRAL Register of Controlled Trials. Searches were conducted from the databases' inception through August 2022.

RESULT: The RCT review followed PRISMA criteria. PubMed, Embase, PSYCHInfo, and the Cochrane Library were searched from their origin without language constraints to locate all RCTs linked to ischemic pressure vs. post-isometric relaxation for therapy of rhomboid latent myofascial trigger point. 463 duplicates were removed. 140 of 174 citations were removed. Seven high-quality full-text papers out of 34 were included.

CONCLUSIONS: Conservative and noninvasive treatments can only raise pain tolerance. Compared to standard treatment, ischemia pressure and post-isometric relaxation reduced shoulder and neck pain and PPT discomfort. This study suggests that ischemia compression may be more effective than post-isometric relaxation for treating rhomboid latent myofascial trigger points (MTP). Future progress in the field will depend on multi-subject RCTs.

Key Words:

Ischemic pressure, Post-isometric relaxation, Myofascial, Trigger point, Rhomboid.

From 30% of patients reporting regional pain in general medicine clinics to as high as 85% and 93% in pain clinics, the incidence of this condition varies widely¹. According to the worldwide burden of disease study², the percentage of the population experiencing neck pain is the highest in Southeast Asia (at 11.8%), followed by Central Asia (9.8%), Central Europe (9.9%), East Asia (11.8%), Latin America (10.12%), and Western Europe (7.6%). Pakistan has a point prevalence of neck pain in 34.31 per 1,000 people, according to the global burden of disease in the Mediterranean region³.

This is a clinical mystery for which neither the root cause nor the most effective treatments are fully understood^{4,5}. A myofascial trigger point, also known as MTP or simply a trigger point, is a hyperirritable point or spot that is typically located within a taut band of skeletal muscle or in the muscle fascia. Compression of these trigger points causes the discomfort and impairment in movement that characterizes the disease⁶. Myofascial trigger points (MTrPs) may be involved in the development of and maintenance of these disorders, which have complex etiologies and multiple contributing factors⁷.

It is believed that myofascial trigger points (MTrPs) manifest as a result of postural imbalance, psychological stress, muscular overuse, injury, or overuse due to repetitive motions⁸⁻¹⁰. As a result, the muscle is thought to experience a "energy crisis", with lack of ATP. This propagates contracture and the resulting compressed capillary circulation can cause a hypoxic environment preventing efficient muscle relaxation. Central and peripheral sensitization mechanisms are speculated to play a role in the contracture's maintenance¹¹. Increased nociceptive input to the dorsal horn at the associated spinal segment is caused by the neurochemical and inflammatory

Introduction

Injuries to the neck and shoulders are among the most common and expensive in the world.

environment at the MTrP, which sensitizes afferent neurons. Neurons in the spinal cord become more sensitive to pain after receiving constant nociceptive input¹⁰.

A trigger point can be treated with ischemic pressure (IP), which entails applying gradually increasing, painless pressure over the area until a tissue resistance barrier is reached. In order to relieve tension and soreness, it is necessary to maintain contact until the tissue barrier releases, at which point the pressure is increased to break through to the next layer of tissue¹². In order to inhibit a muscle before stretching, the muscle energy technique post-isometric relaxation (PIR) is frequently used. In this method, the affected muscle is subjected to an isometric contraction, which triggers post-isometric relaxation as a result of the action of the Golgi tendon organs (autogenic inhibition)¹³. Myofascial pain can be alleviated through electrotherapeutic modalities like transcutaneous electrical nerve stimulation (TENS), percutaneous electrical nerve stimulation (PENS), and electroacupuncture¹⁴⁻¹⁶.

There is moderate evidence that ischemic compression is helpful for myofascial pain syndrome, according to a 2015 systematic review¹⁷ that included relevant randomized controlled trials (RCTs) until 2013 (MPS). Since there was insufficient information to conduct a quantitative synthesis at the time of this review, only qualitative synthesis was conducted. Another review¹⁸ found that manual therapy for temporomandibular disorder-related myofascial pain was more effective than sham treatment; however, this review did not include ischemic compression randomized controlled trials (RCTs).

Despite the fact that pain is the primary symptom of those with Myofascial Pain Syndrome (MPS), the meta-analysis did not evaluate or draw any conclusions about the impact of ischemic compression and post-isometric relaxation on MPS patients' levels of discomfort¹⁹. We conducted a systematic review to better understand the effects of ischemic compression and post-isometric relaxation on myofascial pain syndrome.

Materials and Methods

Both the PRISMA statement and the Cochrane Review Guidelines served as the basis for the organization of this systematic review^{20,21}. This systematic review includes randomized controlled trials (RCTs) comparing ischemic pressure to

post-isometric relaxation for the treatment of rhomboid latent myofascial trigger point. “Myofascial pain”, “trigger point”, “ischemic pressure”, “post-isometric relaxation”, and a “variety of electric stimulation techniques” were among the text words used in the search strategy. To conduct the systematic search, we first looked through Medline (including Medline ePub Ahead of Print, InProgress, and other non-indexed citations) and then translated those results for EMBASE and the Cochrane CENTRAL Register of Controlled Trials. From the databases' inceptions to August of 2022, searches were performed.

Search terms and evaluation methodology were both exhaustive. In conclusion, one author read the titles and abstracts of relevant articles and, if necessary, retrieved the full texts. All authors ultimately settled on the same set of requisite studies.

Statistical Analysis

For each potentially relevant trial, two clinicians read all the papers. Data on the number of patients, the country they were from, the age of diagnosis, the myofascial trigger point, the length of follow-up, the study design, the ischemic pressure, the post-isometric relaxation, and the overall bias were collected. Pre-made data extraction forms were used, and each data set was reviewed independently. This information has been added to the Cochrane Review Manager Database²². For this systematic review, a random effects model was used. p -value < 0.05 was considered statistically significant.

Results

The review of the randomized control trial followed the guidelines laid out in the Preferred Reporting Items for Systematic Review (PRISMA) statement (Figure 1). PubMed, Embase, PSYCHInfo, and the Cochrane Library were searched from their inception without language restrictions to identify all randomized controlled trials (RCTs) related to ischemic pressure vs. post-isometric relaxation for treatment of rhomboid latent myofascial trigger point. Terms such as “myofascial pain,” “trigger point,” “ischemic pressure,” “post-isometric relaxation,” and “various electric stimulation techniques” were used to find articles describing these concepts. We also conducted a manual search of the cited works of a select number of journals in order to identify ad-

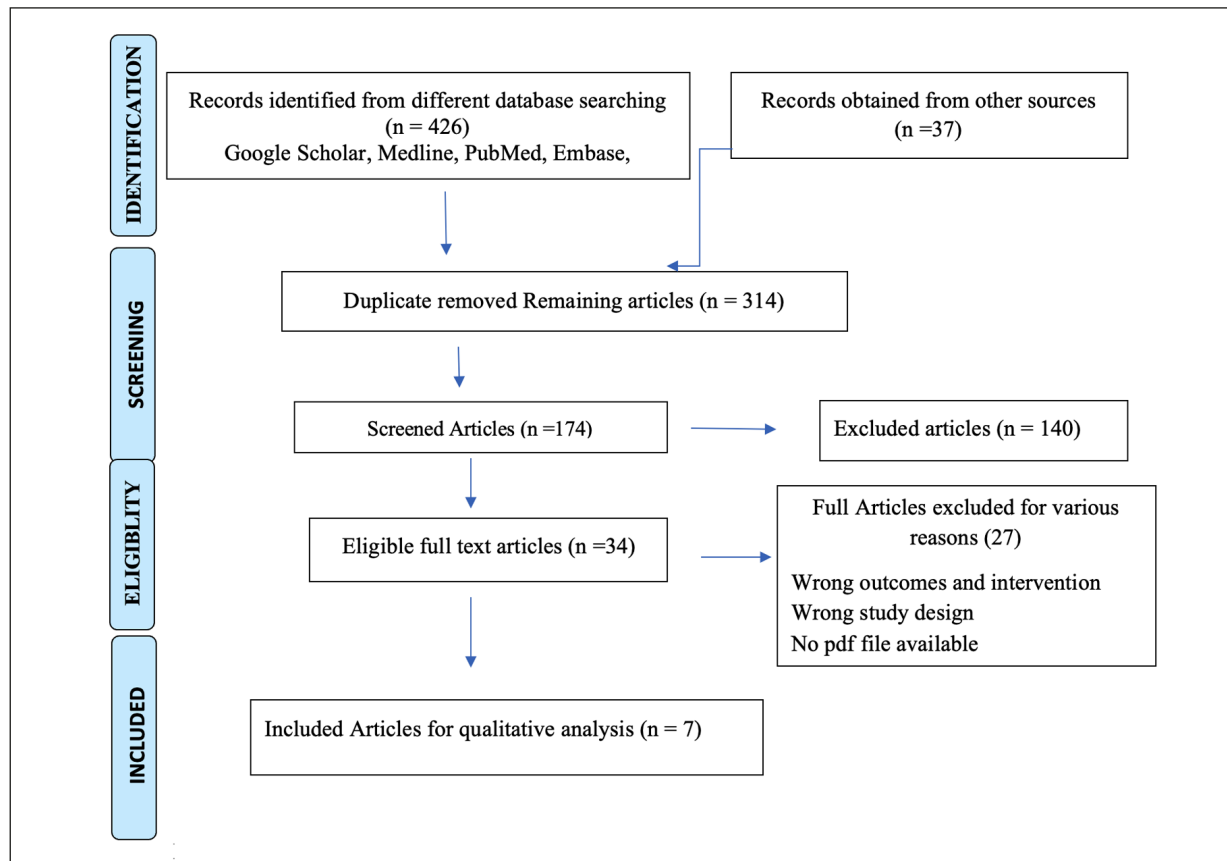


Figure 1. PRISMA flow chart used for the selection mechanism schedule of articles in this study.

ditional studies with potential relevance. A total of 463 references were culled because they were duplicates. The initial screening eliminated 140 out of the 174 citations. 34 full-text papers were screened for inclusion, and 7²³⁻²⁹ met the criteria; all 7 articles²³⁻²⁹ were of high quality (Figure 1). Both the duration of the treatments and the populations studied varied greatly across the trials. These data are summarized in Table I. Each study compared different groups based on past records, but none of them randomly assigned participants. Two of the seven studies were conducted in Saudi Arabia^{23,25}, while a single study each came from Spain²⁹, Turkey²⁴, Egypt²⁶, Pakistan²⁸, and Iran²⁷.

Combination therapy (MET plus ICT) improved neck discomfort and muscular tenderness in male patients with upper trapezius active MTrPs both immediately and in the near term (follow-up at 2 weeks)²³.

Each group's pressure pain threshold (PPT) increased significantly (p -value=0.01). The percentage change in PPT of masticatory and neck

muscles was greater in the MRP and LLLT groups than in the exercise group (p -value < 0.05)²⁴.

There were statistically significant differences between the three groups on posttest days 1, 5, and 12 (p -value =0.001). The neck disability index and bilateral side flexion improved with time for all three groups, although the improvements did not become statistically significant until the fifth posttest day (p -value = 0.015)²⁵.

After the experiment, there was a clear difference in all outcomes between the two groups (p -value < 0.05). In all measures except pain intensity, shoulder impairment, and left lower point PPT, there were no statistically significant differences between the groups²⁶.

Active cervical lateral flexion (p -value=0.001), pain intensity on VAS (p -value < 0.05), and upper trapezius muscle thickness (p -value= 0.01) improved immediately for patients with LTrPs in the upper trapezius muscle following MET and ART, respectively²⁷.

Table I. Summary of randomized controlled trials on Ischemic pressure vs. post-isometric relaxation for treatment of rhomboid latent myofascial trigger point.

S.N.	Author	No. of patients	Country	Published year	Study design	Diagnosis age (years)	Groups and controls	Characteristic of ischemic compression and post-isometric relaxation	Observation time point	Index
1	Alghadir et al ²³	60	Saudi Arabia	2020	Randomized controlled trail	19-38 years	Group A (20) did hot pack, stretching, ischemic compression, and muscle energy. Group B (n =20) did exercises without ischemic compression; Group C (n =20) did exercises without muscle energy therapy.	Gradually pressure to MTrP for 90 seconds	Pre and post treatment	Visual analogue scale (VAS), Pressure pain threshold (PPT)
2	Tanhan et al ²⁴	75	Turkey	2021	Randomized control trial study		Exercise, low-level laser, and manual pressure release groups each had 25 participants.	Three days a week for four weeks, press and release MTrP until no tension.	Pre and post treatment	BDI, SF-36, Northwick Park Neck Pain Questionnaire
3	Ahmed et al ²⁵	45	Saudi Arabia	2020	Pre-test – post-test experimental control	>20 years	Group C (n = 15) got the hot pack, active stretching, and isometric exercise intervention. Group A (n = 15) got the same intervention plus post-isometric relaxation. Group B (n = 15) got laser treatment.	treatment included applying hot packs (75°C for 20 minutes), active stretching, and isometric neck exercises, three times daily for 12 days.	Pre and post treatment	MTrP's sensitivity to pain pressure was measured using a "(WAGNER FORCE DIAL) FDK 20."
4	Fahmy et al ²⁶	45	Egypt	2020	Pilot study	20-35 years	An ischemic stroke was artificially induced in Group A. Group B received treatment following Lewit and Simons's post-isometric relaxation	Although infrared radiation (IRR), Ultrasonic therapy (UST), and burst transcutaneous electrical nerve stimulation are effective therapies, increasing pressure and going inside with the thumb over the trigger points until feeling a tissue resistance barrier is not (TENS)	Pre and post treatment	pressure pain threshold (PPT)
5	Sadria et al ²⁷	64	Iran	2017	Clinical trial study	18-50 years	Pressure and release group (n =32) and muscle energy group (n =32)	Applying thumb or finger pressure or tension on the MTrP is an example of an active release technique (ART)	Pre and post treatment	VAS, Cervical lateral flexion ROM, Upper Trapezius thickness.
6	Zainab et al ²⁸	60	Pakistan	2022	A single-blinded randomization	25-40 years	PIR (n=30) group and MFR (n=30) groups	Both groups engaged in isometric strengthening exercises, with PIR on the levator performed five times	Pre and post treatment	VAS, Neck Disability Index (NDI), PPT
7	Benito-de-Pedro et al ²⁹	34	Spain	2019		18-75 years	The control group (n = 17) received ischemic compression, and the dry needling	90 seconds of ischaemic compression to the MTrP	Pre and post treatment	PPT, Thermography

Discussion

Chronic pain and mobility restrictions are classic symptoms of musculoskeletal conditions known as MTrPs^{30,31}. Patient education, trigger factor reduction, pharmaceutical treatment, thermal modalities, electrotherapy, acupuncture, stretching, dry needling, laser, and therapeutic exercises are the mainstays of MTrPs pain management³². Muscle energy techniques (METs), myofascial release, strain-counter strain (SCS), proprioceptive neuromuscular facilitation, and ischemia compression are just few of the manual treatment methods suggested for these conditions³³. Based on the findings of a recent systematic review³⁴, manual therapies using ischemia compression may reduce range of motion in MPS patients when compared to placebo. This study aimed to evaluate the relative benefits of ischemic pressure and post-isometric relaxation in the management of rhomboid latent myofascial trigger point. When latent MTrPs in the rhomboid muscle were activated by ischemia pressure or post-isometric relaxation, there was a statistically significant change in the outcome measurements. Furthermore, the pre-to-post impact sizes were substantial across the board for the intervention groups. However, except for the lower and middle left trigger points, no statistically significant differences were detected between modalities in terms of outcome indicators.

While some studies^{31,34} have revealed no difference in the distribution of active and latent MTrPs, Fernández-De-Las-Peñas et al³⁵ have discovered that they are more prevalent in the upper trapezius muscle³⁵. There is no universally accepted definition of myofascial trigger point pain condition³⁶. The external validity of published findings is affected by the use of diverse definitions or the lack of clarity surrounding MTrPs terminology. The diagnostic criteria used to evaluate both overt and covert MTrPs in the included investigations were comparable (albeit not identical in all cases). As there is currently no gold standard for diagnosing MTrP, the diagnostic criteria for MTrP suffer from low criterion validity. Thus, the clinical criteria given by Simons et al³⁷ are not yet known to have the sensitivity and specificity they might have.

Post-isometric relaxation is characterized by a number of neurologic and biomechanical characteristics, including hypoalgesia, altered proprioception, changes in motor programming and control, and changes in tissue fluid (PIR).

During the PIR method, the afflicted muscles are isometrically contracted to stimulate the Golgi tendon organs, followed by a period of relaxation^{38,39}. By applying pressure on the antagonistic muscle group, the offending agonistic muscle can be inhibited in a reciprocal fashion³⁹. Trigger point pain relief was documented after PIR treatment in previous trials⁴⁰⁻⁴². At a 4-week follow-up, for instance, Chaitlow et al⁴⁰ found that PIR had significantly decreased trigger point discomfort.

Some prior studies⁴³⁻⁴⁷ have looked into the efficacy of treatments involving ischemia pressure and muscular energy in the therapy of latent MTrPs in the neck and shoulder areas. Ischemic pressure was seen across all these studies to elevate PPT levels beyond MTrPs. Simons et al³⁷ suggest that local pressure can equalize the length of sarcomeres in the MTrP and so alleviate pain. Tóth et al⁴⁸ have postulated that IP may cause reactive hyperemia in the MTrP region, which is either a spinal reflex mechanism or a technique of easing muscle spasm. Ischemic pressure has the potential to be employed as an extra technique of choice for the treatment of patients who have rhomboid latent myofascial trigger points, according to the findings of this study.

Conclusions

Conservative and noninvasive treatments like ischemic compression and post-isometric relaxation can only increase patients' tolerance to pain. When compared to standard care, our study noted therapy regimen consisting of ischemic pressure and post-isometric relaxation to be effective in reducing pain and disability associated with the shoulder, neck, and rhomboid latent myofascial trigger point. There is a scarcity of information. Future success will depend on larger, multi-subject randomized controlled trials.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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Availability of Data and Materials

The secondary data extracted from already published articles will be available with corresponding author.

Ethics Approval

Not applicable.

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