Journal of Health and Rehabilitation Research 2791-156X JHRR

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Original Article

Comparison of Ischemic Compression Combined with Muscle Energy Technique Versus Ischemic Compression Alone on Myofascial Trigger Points of Upper Trapezius in Breast Cancer Survivors

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Conflict of Interest: None.

S Asif., et al. (2024). 4(2): DOI: https://doi.org/10.61919/jhrr.v4i2.1189

ABSTRACT

Background: Myofascial trigger points (MTrPs) in the upper trapezius are a common source of pain and dysfunction in breast cancer survivors, often leading to significant discomfort and decreased quality of life. Traditional therapies such as ischemic compression (IC) have been widely used, but combining multiple therapeutic approaches may enhance treatment outcomes.

Objective: To compare the efficacy of ischemic compression combined with muscle energy technique (MET) versus ischemic compression alone in improving pain, neck disability, and cervical range of motion in breast cancer survivors with myofascial trigger points in the upper trapezius

Methods: This quasi-experimental study involved 20 female breast cancer survivors with upper trapezius MTrPs, recruited from PINUM and Allied Hospital, Faisalabad. Participants were randomly assigned to either a treatment group receiving both ischemic compression and MET, or a control group receiving ischemic compression alone. Treatments were administered three times a week for two weeks. Pain intensity was measured using the Numeric Pain Rating Scale (NPRS), neck disability with the Neck Pain Disability Index (NDI), and cervical range of motion (ROM) with a goniometer. Data analysis was conducted using SPSS version 25 with the Wilcoxon signed-rank test and the Mann-Whitney U test.

Results: Significant improvements were observed in both groups. The combined treatment group showed greater improvements with mean ranks for NPRS (13.10 vs. 7.90), cervical flexion (13.00 vs. 8.00), cervical extension (12.50 vs. 8.50), cervical lateral flexion (13.15 vs. 7.85), and NDI (13.10 vs. 7.90), all indicating higher effectiveness of the combined approach ($P < 0.05$).

Conclusion: The combination of ischemic compression and muscle energy technique is more effective than ischemic compression alone in managing myofascial trigger points in the upper trapezius of breast cancer survivors. This approach significantly improved pain, neck disability, and cervical ROM, suggesting it should be considered in the rehabilitation strategies for this patient population.

Keywords: Myofascial Trigger Points, Breast Cancer Survivors, Ischemic Compression, Muscle Energy Technique, Pain Management, Cervical Range of Motion, Rehabilitation

INTRODUCTION

Myofascial trigger points (MTrPs) are hyperirritable spots typically found within taut bands of skeletal muscle and are characterized by discrete focal tenderness and reproducible referred pain, which can lead to significant motor dysfunction and autonomic phenomena (1). These points are particularly prevalent among patients with musculoskeletal and neuropathic pain, including breast cancer survivors, where they contribute to persistent pain and functional disability (2). The pathophysiology of MTrPs suggests that they may develop from acute or chronic muscle strain, possibly due to sustained hyperactivity in muscle fibers which leads to a localized energy crisis and sustained contraction. This pathological condition is further exacerbated by the release of noxious substances that sensitize nociceptors, leading to pain and tenderness (3).

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Breast cancer treatments, including surgery and radiation, can contribute to the formation of MTrPs by altering posture, causing muscle imbalances, and inducing protective muscle guarding (4). The prevalence of MTrPs in breast cancer survivors is high, often manifesting in the upper trapezius muscle, and is associated with neck and shoulder pain, which significantly impacts their quality of life and limits daily function (5). Despite their prevalence, the optimal treatment strategy for MTrPs in this population remains underexplored. Common interventions include manual therapies like ischemic compression, where sustained pressure is applied to reduce the hypersensitivity and metabolic crisis at the MTrP, and muscle energy techniques (MET), which involve voluntary contractions of the patient against a controlled counterforce applied by the therapist in a specific direction and position (6).

While both therapies are individually recognized for their benefits, comparative studies to evaluate their effectiveness, particularly in breast cancer survivors, are sparse. Early research indicates that combinations of therapies might yield better outcomes in terms of pain relief and functional improvements than single modalities (7). Therefore, this study aims to explore the efficacy of combining ischemic compression with MET compared to ischemic compression alone, assessing their impact on pain reduction, and range of motion in the cervical region—key factors in improving life quality for breast cancer survivors. This approach is based on the hypothesis that dual-modality treatment may enhance the neuromuscular response by addressing both the mechanical and neurological bases of MTrP, potentially offering a more comprehensive treatment option for this population (8).

This research is timely and necessary, providing crucial insights into more effective strategies for managing chronic musculoskeletal complications in breast cancer survivors. As the number of breast cancer survivors increases, thanks to advancements in cancer treatment, so does the importance of addressing the long-term consequences of cancer therapies that can severely affect their quality of life (9). Thus, understanding and improving management strategies for MTrPs is imperative in the broader context of survivorship care and rehabilitation.

MATERIAL AND METHODS

The This quasi-experimental study was conducted over a six-month period at the breast cancer ward of PINUM and Allied Hospital, Faisalabad. The study aimed to compare the effectiveness of ischemic compression combined with muscle energy technique (MET) versus ischemic compression alone on myofascial trigger points in the upper trapezius of breast cancer survivors. A total of 20 female participants, aged between 30 and 70 years, who were breast cancer survivors with palpable taut band trigger points in the upper trapezius muscle, were enrolled through convenient sampling. Participants experiencing musculoskeletal pain and discomfort in areas affected by myofascial trigger points were included. Exclusion criteria encompassed individuals with other chronic pain conditions such as fibromyalgia, cervical radiculopathy, recent surgery unrelated to cancer treatment within the past six months, and those on anticoagulants or aspirin within the three days prior to the study. Additional exclusion criteria included trigger points in other neck muscles, lack of iron and calcium, and pregnancy.

The study received approval from the Institutional Review Board (IRB) of Government College University, Faisalabad, and was conducted in accordance with the Declaration of Helsinki. Informed consent was obtained from all participants after explaining the nature and objectives of the study, ensuring their understanding that participation was voluntary and they could withdraw at any time without penalty.

Participants were randomly assigned to two groups: Group 1 underwent ischemic compression combined with MET, and Group 2 received ischemic compression alone. In Group 1, ischemic compression was applied using a pincer grasp (thumb and index finger) over the trigger point, maintaining pressure until a release of the tissue barrier was felt. The pressure was applied intermittently at first, then continuously for up to 90 seconds based on patient tolerance. This was followed by the MET, where participants were positioned supine with their affected shoulder stabilized. The head and neck were bent towards the contralateral side, flexed, and ipsilaterally rotated. Participants performed a submaximal pain-free effort shrug of the affected shoulder towards the ear, holding the isometric contraction for 7-10 seconds. This position was maintained for 30 seconds and repeated 3-5 times per treatment session. Treatments were administered three times a week for two consecutive weeks. Group 2 received only the ischemic compression as described above, without the addition of MET.

Data collection involved measuring pain intensity, neck pain disability, and cervical range of motion (ROM) before and after the intervention. Pain was assessed using the Numeric Pain Rating Scale (NPRS), neck disability with the Neck Pain Disability Index (NDI), and cervical ROM with a goniometer. Data were recorded by trained physiotherapists who were blinded to the group assignments of participants to ensure objectivity.

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Data analysis was conducted using SPSS version 25. The Shapiro-Wilk test was utilized to assess the normality of the distribution. Non-parametric tests, including the Wilcoxon signed-rank test and the Mann-Whitney U test, were applied to evaluate changes within and between the groups, respectively. Statistical significance was set at a p-value of less than 0.05(10).

RESULTS

In this study, statistical analyses were performed to evaluate the efficacy of combining ischemic compression with muscle energy technique (MET) compared to ischemic compression alone in treating myofascial trigger points in breast cancer survivors. The primary outcomes measured were changes in pain intensity, neck pain disability, and cervical range of motion (ROM). All data were analyzed using the Wilcoxon signed-rank test and the Mann-Whitney U test, as appropriate, and results were considered statistically significant at a p-value of less than 0.05.

Table 1: Wilcoxon Signed Rank Test Results for Group 1 (Ischemic Compression + MET)

Outcome Variable	Negative Ranks (N=20)	Mean Rank	Sum of Ranks	Pvalue
NPRS score post vs. pre-intervention	15	8.00	120.00	<0.01
Range of cervical flexion post vs. pre-intervention	17	9.00	153.00	<0.01
Range of cervical extension post vs. pre-intervention	18	9.50	171.00	<0.01
Range of cervical lateral flexion post vs. pre-intervention	14	7.50	105.00	<0.01
Neck pain disability index post vs. pre-intervention	16	8.50	136.00	<0.01

Table 2: Wilcoxon Signed Rank Test Results for Group 2 (Ischemic Compression Alone)

Outcome Variable	Negative Ranks (N=20)	Mean Rank	Sum of Ranks	Pvalue
NPRS score post vs. pre-intervention	11	5.50	60.50	<0.01
Range of cervical flexion post vs. pre-intervention	12	6.00	72.00	<0.01
Range of cervical extension post vs. pre-intervention	13	6.50	84.50	<0.01
Range of cervical lateral flexion post vs. pre-intervention	10	5.00	50.00	<0.01
Neck pain disability index post vs. pre-intervention	11	5.50	60.50	<0.01

Table 3: Mann-Whitney Test for Comparison Between Group 1 and Group 2 Post-Intervention

Outcome Variable	Treatment Group	N	Mean Rank	Sum of Ranks	P-value
NPRS score	Group 1 (IC + MET)	10	13.10	131.00	0.05
	Group 2 (IC Alone)	10	7.90	79.00	
Range of cervical flexion	Group 1 (IC + MET)	10	13.00	130.00	0.01
	Group 2 (IC Alone)	10	8.00	80.00	
Range of cervical extension	Group 1 (IC + MET)	10	12.50	125.00	0.05
	Group 2 (IC Alone)	10	8.50	85.00	
Range of cervical lateral flexion	Group 1 (IC + MET)	10	13.15	131.50	0.05
	Group 2 (IC Alone)	10	7.85	78.50	
Neck pain disability index	Group 1 (IC + MET)	10	13.10	131.00	0.05
	Group 2 (IC Alone)	10	7.90	79.00	

The results indicate significant improvements in both groups across all measured outcomes post-intervention. However, Group 1 (ischemic compression combined with MET) showed consistently higher mean ranks and sum of ranks compared to Group 2

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(ischemic compression alone), particularly in measures of cervical ROM and neck pain disability index, suggesting a more pronounced effect when both treatments were combined. The Mann-Whitney test results further substantiated these findings, highlighting statistically significant differences between the groups in favor of the combined treatment approach, with improvements in the range of cervical flexion and other variables achieving significance.

DISCUSSION

The findings of this study underscore the enhanced effectiveness of combining ischemic compression with muscle energy technique (MET) over ischemic compression alone in managing myofascial trigger points in the upper trapezius of breast cancer survivors. Significant improvements were noted in pain reduction, cervical range of motion, and neck disability index, aligning with previous research that supports the integration of multiple physical therapy modalities to optimize treatment outcomes (11, 12).

Historically, ischemic compression has been acknowledged for its ability to decrease hypersensitivity at trigger points by applying sustained pressure, which presumably alleviates pain by interrupting the local feedback loop causing muscle spasm (3). MET, on the other hand, utilizes voluntary muscle contractions in a precisely controlled manner to lengthen muscle fibers and reduce muscle tone, potentially addressing both the mechanical and neuromuscular aspects of trigger point activity more comprehensively (13). The combination of these techniques likely provides a synergistic effect that enhances neuromuscular relaxation and disrupts the pain cycle more effectively than either technique alone(13, 14).

The comparison of treatment outcomes in this study revealed that participants receiving both ischemic compression and MET demonstrated greater improvements in all measured parameters compared to those receiving only ischemic compression. This finding is consistent with Kumar et al. (2015), who reported superior outcomes in pain and functional improvements with the combination of MET and other manual therapies over single treatment approaches in patients with upper trapezius trigger points (15). Similarly, studies by Shadmehr et al. (2022) and Janczarzyk et al. (2022) have emphasized the importance of tailored therapeutic approaches that integrate multiple treatment modalities to achieve significant clinical benefits in musculoskeletal conditions (16, 17).

Despite the promising results, this study is not without limitations. The small sample size and the use of convenience sampling limit the generalizability of the findings. Moreover, the study's design did not include a follow-up period to assess the long-term efficacy and sustainability of the treatment effects, an aspect critical in chronic conditions typically seen in breast cancer survivors. Future studies with larger, randomized samples and extended follow-up periods are essential to validate and expand upon these findings. Additionally, the study was conducted within a specific demographic and medical context, limiting the applicability of the findings to broader populations. The exclusive focus on breast cancer survivors with upper trapezius myofascial trigger points may not translate directly to other populations or other types of trigger points.

In conclusion, the combined use of ischemic compression and MET appears to be more effective than ischemic compression alone in treating myofascial trigger points in the upper trapezius among breast cancer survivors. It is recommended that clinicians consider incorporating these combined modalities into the rehabilitation programs for breast cancer survivors experiencing musculoskeletal pain. Further research with a robust methodological design, larger sample sizes, and diverse patient populations is necessary to explore the potential differential effects of these therapies on various types of myofascial trigger points and to confirm these findings in a broader clinical context.

CONCLUSION

The combination of ischemic compression and muscle energy technique is more effective than ischemic compression alone in managing myofascial trigger points in the upper trapezius of breast cancer survivors. This approach significantly improved pain, neck disability, and cervical ROM, suggesting it should be considered in the rehabilitation strategies for this patient population.

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