



Randomized Controlled Study of IASTM vs. SHAM Treatment in Alleviating Symptoms Associated with Upper Trapezius Myofascial Trigger Points

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Abstract

Instrument-assisted soft tissue mobilization (IASTM) is widely used and compared with other therapeutic interventions. However, limited evidence exists comparing IASTM with sham treatment in the Philippines, which hinders the ability to determine observed therapeutic outcomes attributable to the specific physiological effects of IASTM or to placebo-related responses. To address this gap, this study investigates the effects of IASTM vs sham treatment in alleviating the symptoms of upper trapezius myofascial trigger points among staff and office workers. A single-blinded randomized controlled study was conducted among office workers and staff with upper trapezius MTrPs. Twenty participants were randomly assigned to IASTM or sham treatment groups. Interventions were done in standardized sessions by a licensed Physical Therapist, where pain intensity and neck disability were measured using the Visual Analog Scale (VAS) and Neck Disability Index (NDI) before and after all treatment sessions. Results showed that the IASTM group demonstrated greater reduction in both OM, with NDI decreasing from 11.80 to 0.60 and VAS from 5.40 to 0.80, compared to the sham group with an NDI of 11.40 to 7.80 and VAS of 5.20 to 3.10. Within-group analysis revealed significant pre-post improvements in both groups ($p < 0.001$). However, post-treatment comparisons showed significantly greater improvements in the IASTM group ($p < 0.001$) in the reduction of neck disability and pain intensity. Further research with a larger sample group is recommended to strengthen evidence on its clinical effectiveness.

Keywords: Instrument-Assisted Soft Tissue Mobilization; Upper Trapezius; Myofascial Trigger Points; Sham Treatment; Placebo-Effect; Neck Disability; Pain Intensity

Introduction

In some countries, the third most common musculoskeletal disorder is the myofascial trigger points (MTrPs) in the shoulder, while the fourth most prevalent condition in terms of years lived with disabilities is neck pain. About 30% to 85% of patients with musculoskeletal pain suffer from myofascial trigger points, which causes shoulder and neck pain and can significantly affect work-related activities and ADLs in individuals. In a study of Elagamawy, M. (2023), MTrPs of the upper trapezius muscle were the most prevalent in its population, with a percentage of 93.75%. The most prevalent active MTrPs were located in the right (82.1%) and left (79%) nearly horizontal fibers of the upper trapezius muscle. MTrP in the upper trapezius presents with complaints of neck pain, headache, muscle stiffness, restricted ROM of the cervical joint, and insomnia from the patient. It is frequently caused by poor posture, acute trauma, muscle stress, and psychological stress [26]. Myofascial trigger point (MTrP) is defined as "pain associated with inflammation or irritation of muscle or of the fascia surrounding the muscle." It comes from the surrounding fascia and the muscle itself, wherein a hypersensitive spot, a palpable nodule within a taut band, was felt. It resulted in referred pain of different patterns or localized pain in a limited area. According to estimates, 85% of the general population has dealt with it at some point in their lifetime, which causes a prevalent problem (Bodine, 2023). MTrPs are associated with musculoskeletal problems such as muscle spasm, restricted range of motion (ROM), and decreased fiber extensibility and autonomic symptoms that affect the patient's physical abilities. An intervention to reduce MTrP pain can be clinically useful [15]. Traditional treatments have been a success in treating myofascial pain or trigger points, such as pharmacological management, exercise, postural correction, transcutaneous electrical nerve stimulation, myofascial release therapy, acupuncture, superficial and deep heating modalities. Among these, injections into TrPs and the spray-and-stretch technique are the most

commonly used (Urits et al., 2020). Instrument-Assisted Soft Tissue Mobilization (IASTM) is a manual therapy technique that uses specially designed rigid tools to locate and treat soft tissue disorders, which uses a variety of direct compressive stroke techniques to manipulate the skin, muscles, myofascial tissues, and tendons. It developed from the Chinese practice of Gua Sha but differs in purpose and application (Ikeda et al., 2016) IASTM is based on the cross-friction massage theory, as it applies controlled compressive and shearing strokes to muscles, fascia, and tendons using stainless steel instrument which allows deeper and more precise treatment than manual methods [32]. According to Cheatham (2019), there are several scientific theories regarding the effects of IASTM, most notably mechanical and neurophysiological. The mechanical theory suggests that pressure and shearing from the instrument may release and break down scar tissues, adhesions, and fascial restrictions and aid in tissue healing. IASTM works through nerve stimulation by stretching the skin, activating touch and pain receptors housed within. These triggers localized inflammation, increasing fibroblast activity and production of fibronectin protein. This ultimately aids the synthesis and realignment of collagen, a key component of soft tissue, potentially promoting healing (Davidson et al., 1997; Gehlsen et al., 1999; Hammer, 2008). The growing interest in this technique as a treatment approach for myofascial pain syndrome can be attributed to its remarkable effects on muscle tissues and surrounding fascia. The growing interest in this technique as a treatment approach for myofascial pain syndrome can partly be attributed to its remarkable effects on muscle tissues and surrounding fascia. There has been no study reporting the comparison of IASTM and sham treatment, specifically in the Philippines. The purpose of this study is to compare the effects of IASTM and Sham Treatment in alleviating the symptoms associated with MTrPs. In the present study, it is hypothesized that the therapeutic effects of IASTM could lead to a further decrease in VAS and NDI outcome measure score.

Methods

The study utilized a single-blinded, randomized controlled, experimental study that measured the effectiveness of an IASTM compared to Sham Treatment in alleviating the symptoms of upper trapezius MTrPS among staff and office workers. The research was conducted at the Villamor Air Base Golf Course in Pasay City. A physical therapist assessed the inclusion and exclusion criteria. Only participants who meet the eligibility criteria will be included in the study. The sample was divided into two groups: Experimental group (n=10), which received an IASTM intervention, while the Control group (n=10) received a SHAM treatment. The allocation was guided by a random allocation software. Each participant chose one envelope, which indicated the treatment the patients would receive. Participants remained blinded until post-assessments were completed, minimizing potential bias. Data were collected over two sessions per week for a total of 6 sessions, consisting of three different types of strokes: 1 minute sweeping, 1 minute strumming, and 1 minute brushing at the upper trapezius MTRPs, alternating for 5-10 minutes on every participant; the study was evaluated using the Neck Disability Index as the primary instrument that evaluates functional limitations in patients. To assess pain intensity, the Visual Analog Scale was evaluated. This tool is commonly used in a diverse population, which offers a simple and reliable way to measure the intensity of various symptoms such as pain.

Results and Discussion

This chapter presents the analysis, interpretation, and discussion of the data gathered to determine the effects of instrument-assisted soft tissue mobilization (IASTM) in alleviating symptoms associated with upper trapezius myofascial trigger points among office workers in Pasay City. The variables measured were Neck Disability Index (NDI) and Visual Analog Scale (VAS) before and after intervention under both IASTM and sham treatment conditions (Table 1).

Table 1 presents the NDI scores of participants before and after undergoing IASTM treatment. The results show that before treatment, participants had a mean NDI score of 11.80 with a standard deviation of 3.645, indicating moderate levels of neck disability associated with upper trapezius myofascial trigger points. After the application of IASTM, the mean score dramatically decreased to 0.60 with a standard deviation of 0.843.

Table 2 presents the VAS scores of participants before and after IASTM treatment. The mean pain score prior to treatment was 5.40 with a standard deviation of 1.713, indicating moderate pain intensity. After treatment, the mean pain score decreased to 0.80 with a standard deviation of 0.789.

Table 3 shows the NDI scores of participants before and after the sham treatment. The mean score before the intervention was 11.40 with a standard deviation of 5.016. After the sham treatment, the mean score decreased to 7.80 with a standard deviation of 3.327.

Table 4 presents the VAS scores of participants before and after the sham treatment. The mean pain score before the intervention was 5.20 with a standard deviation of 1.398. After the sham treatment, the mean pain score decreased to 3.10 with a standard deviation of 1.197.

Table 5 presents the paired sample t-test results comparing the pre- and post-treatment scores for participants who underwent IASTM treatment. The results indicate statistically significant differences between the pre- and post-treatment scores for both NDI and VAS ($p < 0.001$). This means that the IASTM intervention significantly reduced both neck disability and pain levels among participants.

Table 1: NDI Scores of Participants Before and After IASTM Treatment.

Treatment	Time	Mean	SD
IASTM	Before	11.80	3.645
	After	0.60	0.843

Table 2: VAS Scores of Participants Before and After IASTM Treatment.

Treatment	Time	Mean	SD
IASTM	Before	5.40	1.713
	After	0.80	0.789

Table 3: NDI Scores of Participants Before and After Sham Treatment.

Treatment	Time	Mean	SD
Sham	Before	11.40	5.016
	After	7.80	3.327

Table 4: VAS Scores of Participants Before and After Sham Treatment.

Treatment	Time	Mean	SD
Sham	Before	5.20	1.398
	After	3.10	1.197

Table 5: Paired Sample t-Test for NDI and VAS Before and After IASTM Treatment.

Variable	t	df	p-value	Before	After	Mean Difference	Interpretation
NDI	9.798	9	<0.001	11.80	0.60	11.20	Significant
VAS	10.173	9	<0.001	5.40	0.80	4.60	Significant

Table 6: Paired Sample t-Test for NDI and VAS Before and After Sham Treatment.

Variable	t	df	p-value	Before	After	Mean Difference	Interpretation
NDI	5.014	9	<0.001	11.40	7.80	3.60	Significant
VAS	11.699	9	<0.001	5.20	3.10	2.10	Significant

Table 7: Independent Samples t-Test Comparing IASTM and Sham Treatment Groups After Intervention.

Variable	Statistic (t)	df	p-value	Mean Difference	SE Difference	Interpretation
NDI Before	0.204	16.434	0.841	0.400	1.961	Not Significant
NDI After	-6.634	10.152	<0.001	-7.200	1.085	Significant
VAS Before	0.286	17.308	0.778	0.200	0.699	Not Significant
VAS After	-5.073	15.575	<0.001	-2.300	0.453	Significant

Table 6 shows the paired sample t-test results comparing the pre- and post-treatment scores for participants who received the sham intervention. The results reveal statistically significant differences between the pre- and post-treatment scores for both NDI and VAS ($p < 0.001$). However, the magnitude of improvement was smaller compared to the IASTM group.

Table 7 presents the independent samples t-test comparing the scores of participants in the IASTM and sham treatment groups before and after intervention using NDI and VAS measures. Before treatment, the NDI scores between the two groups showed a t-value of 0.204 with a p-value of 0.841, while the VAS scores showed a t-value of 0.286 with a p-value of 0.778. These results indicate that there were no statistically significant differences between the two groups prior to treatment. After treatment, however, the NDI scores yielded a t-value of -6.634 with a p-value of less than 0.001, while the VAS scores yielded a t-value of -5.073 with a p-value of less than 0.001, indicating statistically significant differences between the IASTM and sham groups after intervention.

Conclusions and Recommendations

The study concluded that IASTM is an effective intervention for reducing symptoms associated with upper trapezius myofascial trigger points among office workers. Participants who received IASTM experienced substantial reductions in both neck disability and pain intensity, demonstrating significant improvements in functional ability and symptom relief after treatment. The significant reduction in NDI scores suggests that IASTM effectively improved neck-related functional performance, allowing participants to perform daily activities with less limitation. The significant decrease in VAS scores indicates that IASTM successfully alleviated pain associated with myofascial trigger point irritation in the upper trapezius muscle. Although sham treatment also resulted in statistically significant improvements, the degree of change was considerably smaller than that observed in the IASTM group. This suggests that while placebo effects or therapeutic attention may influence symptom perception, the physiological effects produced by IASTM contribute more strongly to recovery. These results indicate that participants who received IASTM experienced significantly greater reductions in

neck disability and pain intensity compared with those who received sham treatment. The improvements observed in the SHAM group were attributed to the neurophysiological effects of low-threshold mechanical stimulation, which were thought to be the factor for the benefits shown in the Sham group. C-tactile (CT) afferents were activated despite the sham intervention using very little pressure. When the tool was gently moved, these unmyelinated fibers reacted through the transmission of signals to the insular cortex instead of the primary somatosensory brain. Rather than through the "bottom-up" mechanical breakdown of tissue adhesions, this process probably influenced the participants' autonomic nervous system, resulting in a decrease in sensory perception of pain and muscle guarding by conducting a "top-down" neurological mechanism (Löken et al., 2009). The findings demonstrate that although both interventions produced improvement, IASTM yielded greater beneficial therapeutic effect for alleviating symptoms associated with upper trapezius myofascial trigger points compared to SHAM group. The IASTM group had a clear advantage, indicating that the benefits of applying mechanical stress through clinical equipment went beyond simple tactile stimulation. These findings demonstrated the principle of the mechanism of mechanotransduction, where the mechanical exertion applied by the licensed practitioner induced cellular physiological responses that facilitated better tissue regeneration. Furthermore, the results indicated that the "placebo effect" and "light touch effect" were essential elements of the therapeutic interaction in the practice of physical therapy rather than just conflating factors to be disregarded. It was suggested that future studies identify the mechanical thresholds needed to generate modifications that greatly outweigh the neurological advantages of light-touch sham treatments. Therefore, the results of the study can be incorporated into local PT practice in the Philippines by supporting the use of IASTM as an evidence-based, cost-effective, and non-invasive intervention for managing myofascial trigger point symptoms in terms of pain reduction and functional ability. It is recommended to PT to incorporate IASTM into rehabilitation for upper trapezius trigger points, particularly those with occupational neck pain related to prolonged desk work. And can be integrated with stretching, posture correction, and strengthening exercises to optimize treatment outcomes. Early intervention, ergonomic adjustments, stretching breaks, and preventive rehabilitation strategies are recommended as prevention. Healthcare facilities should provide training and standardized protocols to improve consistency in treatment delivery and patient outcomes. Future studies may include larger sample sizes, longer treatment duration, and follow-up assessments to determine the long-term effects of IASTM. Furthermore, the study recommended adjuncting IASTM with a multimodal exercise protocol to enhance the longevity of the treatment effects. It is suggested that IASTM effectively reduced immediate tissue stiffness by stimulating mechanoreceptors and increasing local blood flow, these mechanical gains were often transient (Kim et al., 2017). To "lock in" these structural improvements, IASTM was immediately followed by eccentric loading and proprioceptive training. Eccentric exercises facilitated functional collagen remodeling by applying controlled tension to the newly mobilized fibers, while neuromuscular re-education ensured the brain recognized and utilized the increased ROM (Bostan & Kaya, 2023; Ikeda et al., 2024). This combined approach transitioned the intervention from a passive, short-term relief mechanism to an active, long-term physiological adaptation (Tang et al., 2025).

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