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Analysis of Benefits of Manual Therapy Techniques and Laser Therapy for Trapezitis in College Students

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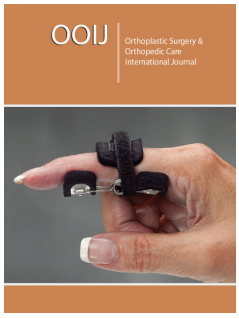

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Abstract

Objective: Trapezitis is an inflammatory condition affecting the Trapezius muscle, leading to pain that worsens with movement and may persist at rest. It is a common musculoskeletal disorder associated with poor posture and repetitive neck movements. This study compared the effects of manual therapy techniques-Positional Release Technique (PRT) and Muscle Energy Technique (MET)-in combination with Low-Level Laser Therapy (LLLT) for the management of trapezitis in college students.

Materials and methods: A single-blinded randomized experimental study was conducted on forty participants aged 18-25 diagnosed with trapezitis. Participants were randomly divided into two groups: Group A (PRT+LLLT) and Group B (MET+LLLT), both treated for four weeks. Outcome measures included the Visual Analogue Scale (VAS) and Neck Disability Index (NDI).

Results: Both groups demonstrated significant improvement post-treatment ($p \leq 0.05$). However, Group B (MET+LLLT) showed superior results with greater reductions in pain and disability compared to Group A.

Conclusion: The combination of MET and low-level laser therapy was more effective than PRT with laser therapy in reducing pain and improving cervical range of motion in trapezitis among college students.

Keywords: Trapezitis; Muscle energy technique; Positional release technique; Low-level laser therapy; Neck disability index; Visual analogue scale; Sirtuin 1; Muscle regeneration

Introduction

Present even at rest, trapezitis is explained as inflammatory processes of the trapezius muscle creating stress pain, also classified as neck stiffness or tightness encircling the neck or shoulder; it is worse by movement [1]. One should start with Usually; patients express discomfort that hinders their everyday living's activities. Three to five days is pain's duration [2]. Trapezitis generally results from forward head position, repeated motions, poor back support while sitting, working devoid of arm support, extended forward bending activity [3]. Pain and shielding spasm in the opponent groups of muscle may cause a limited and unpleasant passive range of motion. Those who drive for more extended periods of time or those who work at computers are more likely to have this disorder. Women in middle age have the greatest frequency; they are more impacted than men [4]. The scapula is raised, depressed, rotated and retracted using Trapezius muscle [5]. Large superficial back muscles with trapezoidal form are the Trapezius muscles. From the outside protuberance of the anterior bone to the shorter thoracic spine vertebra and subsequently laterally to the spinal column of the scapula. The Trapezius consists of the higher the middle; and lower sets of fibers [6]. It causes extreme neck spasm by inflammatory pain. It starts at the rear of the head and runs from C7 to T2 vertebral bodies on the spine. Its attachments are to the spine of the shoulder border, the acromion process, and the outside portion of the collarbone. Along with from the accessory nerve, it obtains nerve signals from the C1 via C4 cervical nerve roots. The prevalent issue in the general population is neck discomfort, which has frequency between 10% and 15% [7]. Studies with average point prevalence of 13% (range 5.9%-38.7%) and average lifetime

incidence of 50% (range 14.2%-71.0%) show very diverse rates of neck discomfort [8]. Bad ergonomic practices such extended limited work posture with constant head and neck along with spine flexion might point to a risk factor [9]. The lifetime frequency of mechanical neck discomfort in the general global population is between 30 and 50% [10]. Once the trapezitis is identified, there are many treatment choices available including pharmacological ones include non-steroidal anti-inflammatory in character and pain-modulating ones. Treatments include stretching, myofascial release techniques, posture and MET approaches in electrotherapy [11,12]. Aiming for maladaptive changes in trapezitis patients, present studies concentrate on reducing pain, improving the range and decreasing functional impairment a treatment choice offers [13]. One hand method applied to a positional release represents a technique which restored a certain muscle to its original resting tone. While muscle in the skeletal system is kept in a shortened state for an extended length of time. It brings adaptive shortening and finally results in spasm.

This technique inserts extremely concentrated muscle and lengthens fibres approaching the place of initiation. This position lessens the quantity of offensive impulses that reach the brain, therefore preventing the muscle spasms' activation. By use of this path, the patient's muscle releases and adopts a normal resting tone. The technique slowly and passively brings the person affected to a readily position of neutrality with no firing of the skeletal muscle spindle, thereby producing the expected result [14]. The Positional Release Technique (PRT) is a soft Tissue technique also known as Stress Counter Strain (SCS), which includes recovering Muscle tone and enhancing circulation in a light manual treatment for Muscle soreness and spasm. This method first identifies the active TPs then applies pressure till a Nociceptive reaction arises. The region is then positioned so that the stress in the afflicted muscle is lowered, therefore lowering the TP's discomfort. The stressed tissues are perceived as most relaxed, and a local drop of tone occurs when the point of ease/pain decrease is reached [15].

Muscle Energy Methods (MET) include the insertion of an isometric stretch to the target muscle. Using the Golgi tendon organs, post isometric relaxation is produced under autogenic inhibition [16]. MET may help to lower pain, extending tight muscle groups and fascia, lower muscular tonus, increase local circulatory system, strengthen weak muscles and mobilise joint limitations [17]. This method aims to cure Hypomobile joint (stiffness) and provide the joints appropriate biomechanical and physiological function. In a muscle, MET lets one attain a tonus release sooner than stretching. The stressed tissues become most relaxed after they attain either comfortable or painlessness, which reduces the local tone. Besides in mobility of restricted joints, and relief of highly concentrated and spastic muscles, MET is used in neuromuscular reconfiguration. Patients whose problems are exacerbated by certain posture or body position will find this appropriate approach [18]. The area is then set up so that the Trapezius suffers less damage by lowering the amount of pressure in the affected muscle. Originally labelled as muscle energy methods, precisely targeted and regulated tender tissue osteopathic (first) manipulation procedures combine. Laser therapy reduces pain and inflammation as well as stimulates tissue healing. Often known as cold-frequency laser therapy, low intensity laser treatment reduces oedema and inflammation, generates analgesia and advances recovery. Laser irradiation removes waste products, stimulates collagen production, alters DNA synthesis, heals injured neurological tissues and enhances circulation of blood and oxygen supply in trigger point sites. Ten items comprise NDI: Pain intensity, personal cleanliness, lifting, sleeping, driving, leisure, headaches, focus, learning and employment. The overall score is 0 (no activity restrictions) to 5 (severe activity limits) with six different answers in each of the 10 questions [19].

Materials and Methods

Choosing of topics Subharti Medical College and Hospital's Out-Patient Unit for Physiotherapy has been where this work has been done. Using a basic random approach, the research conception was experimental and randomising of the people. With regard to inclusion and exclusion criteria, the research had forty people overall from the age range of 18 to 25 years (Appendix 1).

Appendix 1.

Parameters for Qualification	Parameters for Disqualification
- Subjects within the ages of 18 and 25	- Alzheimer's lesion featuring cervical spine, Fibromyalgia Disorder with trapezitis, Systemic illness with trapezitis,
- Trapezitis diagnosis verified by a physician	-Cervical disc herniation with trapezitis, New the upper arm procedure, An infection or breakouts of the skin.
- Those with informed permission and eager to take part in the research	- inflammation of shoulders with trapezitis, - TB shoulder alongside trapezitis,
	- spondylosis of the cervical spine with trapezitis.

a. Procedure: Following a comprehensive protocol explanation to every participant, they received a permission form authorised by the ethics committee. Subjects were then split into two groups of twenty each. In addition to positional release method, Group A with twenty individuals will receive laser treatment.

Group B consisting of twenty will be treated using Muscle energy approach in addition to laser treatment. There were four weeks for the intervention. Using outcome criteria, all forty participants in both groups underwent pre- and post-intervention assessments.

b. Intervention:

i. Laser treatment combined with a positional release technique: Regarding Group A: Method of positional release: The subject rests lying down with therapist position on the affected

side; sore spots are found along the Trapezius's top fibres. To build pressure, the muscle is squeezed between one's index and middle fingers. Laterally flexed towards the side of the sensitive point, the subject's head is then grasped by the therapist and abduction of the shoulder to about 90° one adds a little flexion or extension to get perfect tuning. Following an involuntary come back of the body component to an anatomical neutral posture continuous for five minutes, the perfect position of comfort attained is sustained for ninety seconds. The patient is seated with the healthcare professional standing on the side of the affected side; laser treatment will be administered to the patient for four minutes. Safety measures are performed to lower the possibility of laser light eye exposure. With an intensity of 10 Hz, dosage of 7j/cm2, area covered 1cm2, laser treatment will be given in a sore region for four days/week four consecutive weeks.

ii. Muscle energy approach combined with laser treatment: Group B: Muscle energy method: The participant is supine laying head flexed, turned towards the other side, then outwardly flexed out from the stretch. With one hand stabilising an individual's head, the therapist lays another hand on their shoulder. The participant is supposed to raise their shoulder closer to the ear while the therapist provides an equal amount of resistance and holds it for ten seconds. Ask the sufferer to relax then. The healthcare professional then advances to the next resistance barrier. Five times will this process be done. The patient is seated with the healthcare professional standing on the side of the afflicted side; laser treatment will be administered to the patient for four minutes. Safety measures are performed to lower the possibility of laser light eye exposure. With an intensity of 10 Hz, dosage of 7j/cm2, area covered 1 cm2, laser treatment is administered in a sore region four days per week for a period of four consecutive weeks. Visual Analogue Scale (VAS) and Neck Disability Index (NDI) are the final results of measures used in the research. The Institutional Ethical Board granted the ethical approval in March 2023 (B-24 / PHYSIO / IRB / 2022-2023). Data pertaining to the research individuals were exclusively used for that intended use. Study subjects completed informed consent papers before treatment.

Result and Discussion

Inferential as well as descriptive statistics were used in the tabulation and analysis of the gathered data. With a confidence interval of 95% defined for every analysis and a significance threshold of p value below 0.05, all of the variables were evaluated using the universal statistical software. The Shapiro-Wilk test was a tool that helped one to establish the normality of the data. Shapiro Wilk test shows in this study that the findings had a distribution that was normal on the variables that were dependent Visual Analogue Scale (significance 0.381) as well as the upper cervical area Disability Ordering (significance 0.414) at P>0.05. Parametric testing was applied thus. The statistical variance among the groups was found by means of an unpaired t-test (Student t-test); paired t-test was employed to ascertain the statistical difference within the groups (Table 1).

Table 1: Visual analogues scale score comparison between groups prior to and after test.

Test	A Group		B group		t-Test	df	SIG
	Average mean	S.D	Average mean	S.D			
Before Test	5.65	1.08	5.60	.882	.159	38	.874*
After Test	2.95	.887	1.75	.716	4.70	38	.001**

Although the B Group-Muscle Energy Method with Laser Therapy indicates 1.75±.716, which has the lower mean value, Table 1 explains the comparison of Pretest and Post test within Group A and the B group in Visual Analogue Scale & Neck Disability Index (NDI) Score indicates significant difference in the mean values at P≤0.05. The null assumption is therefore disproved.

Table 2 explains the comparison of the Mean Values of Group A & Group B on Neck Disability Index (NDI) Score, When comparing the mean after test results for both Group A and the second group on the cervical spine Neck Disability Index (NDI) Score indicates a significant decrease in the two groups yet (referred to as Group B, on the other- Muscle Energy Method with Laser Therapy) indicates 27.95±3.79 which has the lesser average value and is more efficient than (Group A, which used Positional Release A method with Laser Therapy) at P≤0.05, 42.25±3.89. The null assumption is thereby disproved.

Table 2: Comparison of neck disability index score between groups in before and after test.

Test	A Group		B Group		t-Test	df	SIG
	Average mean	S.D	Average mean	S.D			
Before Test	56.10	4.82	56.35	3.31	-.191	38	.849*
After Test	42.25	3.89	27.95	3.79	11.81	38	.003**

Table 3 explains the Comparison of Visual Analogue Scale Score within Group-A and GROUP-B In Pre and Post Test, the mean values at P<0.05 demonstrate significant variation between Before test and after test within the first group and the second group upon Visual Analogue Scale as well as the cervical region Neck Disability Index (NDI).

Table 3: Comparison of visual analogue scale score within groups before pre and after test.

Groups	Before Test		After Test		t-Test	SIG
	Average mean	S.D	Average mean	S.D		
A Group	5.65	1.08	2.95	.887	21.13	.000**
B Group	5.60	.882	1.75	.716	29.32	.000**

Table 4 reveals the comparison of Neck Disability Index Score Within Group-A and GROUP-B In Pre and Post Test. There is a statistically significant difference between the pretest and post-test values within Group A and Group B at P≤0.05

Table 4: Comparison of neck disability index score within group-a and group-b in pre and post-test.

Groups	Before test		After test		t-Test	SIG
	Average mean	S.D	Average mean	S.D		
A GROUP	56.10	4.82	42.25	3.89	21.85	.000**
B GROUP	56.35	3.31	27.95	3.79	24.12	.000**

Discussion

Trapezius is functionally significant for daily tasks. As the Trapezius muscle works in various directions, the amount of stress or looseness dictates the neck flexibility. Faulty ergonomics which are maintained for extended periods of time leading to muscular imbalance causes Trapezitis [20]. Physiological process in METS include variations in Visco-elasticity, modifications to muscle extensibility, and stretch tolerance variation. First changing the skeletal muscle spindle and then hindering muscular contractions by activating the Golgi tendon organ helps METS mostly reduce the muscle spasms or tightness of the muscles. Post isometric relaxation is this phenomena [21]. Eliminating limiting restrictions of mobility in the body is the advantage of PRT (position release treatment) method of MET (muscle energy technique). Reducing preventive muscle tightness, fascial trigger place, joint, low mobility, discomfort, swelling and strengthening of circulation and strength help to achieve this [22].

Thomas E et al. [23] in the study named the efficacy of muscle energy techniques in symptomatic and asymptomatic subjects: proves the effect of muscle energy technique as useful as pain relievers and to hasten the repair of damaged tissues is laser treatment. Faster wound healing, less muscular tension, greater flexibility of the neck region, pain and inflammation relief all depend on laser treatment's circulation of blood to the afflicted region. Therapeutic worth of Laser's ability to cause subsequent tissue regeneration, soft tissue repair, and stimulation of protein synthesis. The group that had laser treatment had significantly lower NDI results. Laser treatment's beneficial effects also help to relieve pain by means of neural blockage of the sympathetic nervous system along with triggering neuromuscular contractions therefore reducing muscle spasms. Within hours to days, local oedema decreases and inflammation is reduced [23].

Published by V N Ravish et al. [5], to assess the efficacy of myofascial release method vs positional release technique with laser in patients with unilateral trapezitis. At the end he found that the two groups had greatly enhanced range of motion, functional mobility, and pain reduction. When the two groups' subjects are compared, nevertheless, MRT with LASER shows greater improvements than PRT with LASER [5]. Effectiveness on Chronic Trapezitis of Myofacial Technique and Muscle Energy Technique Aneri Jhaveri et al. [12]. She has determined that for participants with chronic trapezitis, Muscle Energy Technique proved to have much more additional impact than Myofascial Release Method in alleviating pain, cervical impairment and cervical motions [12]. Effect of combining therapies on muscle tenderness and neck pain in male patients with activated myofascial trigger points of upper Trapezius published by Ahmad H Alghadir et al. [24] it suggests that MET with ICT reduces neck discomfort and muscular soreness in males with the s active MTrP more effectively than MET alone [24].

In patients with persistent upper trapezitis, research comparing the benefits of Muscle Energy method and positional release method on pain and neck ROM Published by Saloni Thaker et al. [25] it finds that Muscle Energy Technique (MET) is a good choice for treating persistent upper trapezitis [25]. Management of shoulder rotator cuff muscles injury: comparison of laser and ultrasound therapy Published by Shahiduz Zafaret et al. [26] that both ultrasonic therapy and laser treatment is helpful modalities for improving the degrees of shoulder movements and decreasing the SPADI disability ratings among the patients with grade 1 and 2 rotator cuff injuries. In these criteria, LASER improves them more than ultrasonic treatment [26]. Effect on pain and quality of life in individuals with mechanically discomfort in the neck with static stretching and muscle energy approach. Published by Apoorva Phadke et al. [27] found that Muscle energy method improved pain and functional impairment in individuals with mechanical neck pain more than stretching technique [27].

The Statistical research revealed that both groups A and B had improved Visual Analogue Scale (VAS) and the cervical region Neck Disability Index (NDI). When both the Groups are evaluated at the end of 4 weeks, participants in Group B who had Laser treatment with Muscle energy method exhibited greater Improvement in VAS & NDI than those in Group A who underwent Laser therapy with Positional release technique. Pre-intervention mean of Visual Analogue Scale (VAS) in Group A was 5.65 after treatment of the participants with Positional Release Technique (PRT) combined

with Laser therapy; the mean value of Visual Analogue Scale (VAS) improved to 2.95 at the end of four weeks. Pre-intervention mean of Neck Disability Index (NDI) towards afflicted Side was 56.10 and improved to 42.25 at the end of four weeks. Which, inside the group, had statistical relevance? Pre-intervention mean of Visual Analogue Scale (VAS) in Group B was 5.60; after treating the participants with Muscle Energy Method (MET) together with Laser treatment, the mean value of Visual Analogue Scale (VAS) changed to 1.75 at the end of four weeks. Neck Disability Index (NDI) towards afflicted Side had a pre-intervention mean of 56.35 and changed to 27.95 at the end of four weeks. This displayed statistical relevance inside the group.

Although Muscle energy method (Group B) indicates 1.75, a lower mean value than positional release method 2.95, the post-test means values of Group A and Group B on VAS in terms of pain intensity demonstrate a substantial reduction. Although muscle energy technique (Group B) shows 27.95 degrees, a mean value more successful than positional release technique (Group A), the post-test means values of Group A and Group B on the Neck Disability Scale (NDI) afflicted side indicate a notable rise. displays 42.25.

Conclusion

Statistically speaking, both the groups show fairly distinct post-test results. Group B shown a significant improvement in cervical range of motion and pain relief in individuals with trapezitis. Hence the present study illustrates that Muscle energy approach along with laser therapy is more effective treating trapezitis lowering discomfort and enhancing cervical range of motion than the laser treatment in conjunction with positional release method.

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