A Study to Assess the Effectiveness of Ultrasound Therapy with Myofasial Release and Laser Therapy with Myofasial Release in **Acute Trapezitis**

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Abstract:

Background: Trapezitis is inflammation of trapezius muscle. The pain is present during rest and aggravates during activity. Passive range of motion may be painful and restricted due to pain and protective spasm in antagonist muscle group. The ratio of prevalence in males and females in India is 1:10 and 3-5% of the population is affected worldwide.

Materials and Methods: In this prospective comparative study,60 subjects with acute trapezitis were randomly divided into 2 groups i.e. group A and group B with 30 subjects in each group. Group A was given ultrasound therapy with MFR and group B was given laser therapy with MFR for 5 days continuously. All patients were evaluated with VAS, NDI and cervical range of motion on day 1 and day 5. The outcome measures used were VAS cervical lateral flexion and NDI.

Results: showed statistically significant improvement in range of motion, pain and functional disability following 5 days of treatment. Group A treated with ultrasound therapy and myofascial release showed better improvement in outcome measures compared to group B treated with laser therapy and myofascial release.

Conclusion: The present study concluded that ultrasound therapy with myofascial release is a better technique than laser therapy with myofascial release in patients with acute trapezitis.

Key Word: trapezitis, ultrasound therapy, myofascial release (MFR), Laser therapy; trapezius muscle spasm; visual analogue scale (VAS); neck disability index (NDI); cervical range of motion.

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I. Introduction

The trapezius muscle is the most superficial of the posterior muscles and belongs predominantly to the shoulder region. It has 3 fibers - upper, middle and lower. Neck pain is commonly seen in the individuals due to involvement of upper trapezius muscle during lateral flexion. Muscle spasm occurs and causes formation of muscle knots called trigger points. These knots form as the muscle gets overloaded due to spasm which keeps the muscle continuously in contracted position. Trapezius pain is the stress pain and is the most common musculoskeletal disorder and is caused by placing too much stress and strain over the trapezius muscle.

Inflammation of trapezius muscle is known as trapezitis. The upper trapezius muscle is designed as postural muscle and is highly susceptible to overuse. The pain is present during rest and aggravates during activity. Passive range of motion is restricted due to pain and in antagonist muscle group there is protective spasm.The prevalence ratio in India of male and female is 1:10 and 3-5% of the population is affected worldwide.

Trapezitis is mainly caused due to stress, tension, repetitive movements, forward head posture, sitting without back support, working with no arm support, prolonged head bending activity, using a thick pillow, tight pectoralis major muscle and severe neck spasm. Professionals working at desks and computers or individuals who drive for a long period of time are more prone for this condition as the upper trapezius muscle becomes painful and spasmodic. A feeling of stiffness and limitation of range of motion may be experienced by the person which is precipitated or aggravated by neck movements.

Muscle spasm is apersistent and involuntary muscle contraction. Pain arises in muscle spasm due to muscle ischemia, which leads to drop in Ph and the release of pain producing substances such as bradykinin, ATP and H+.

Tightness of the upper trapezius is associated with elevated shoulders or asymmetrical head positions as well as restricted head and neck range of motion.

Tightness of the middle trapezius alone is rare because the entire upper extremity pulls the scapula towards abduction.⁷ Tightness of the lower trapezius results in decreased elevation and downward rotation range of motion of the scapulothoracic joint and also a depressed and posteriorly tilted shoulder girdle.

Physiotherapy interventions for trapezitis include massage, stretching and different modalities like Interferential therapy, Transcutaneous electrical nerve stimulation, heat, cryotherapy, exercise therapy, positional release therapy and ultrasound therapy. Ultrasound therapy has proved to be more effective in relieving pain.Myofascial release therapy acts as a catalyst in the reduction of trapezius spasm. Laser therapy has also been used in the treatment of skeletal muscle disorders with a positive result.

Ultrasound therapy, one of the most important physical treatment modalities used for heating superficial and deep tissues has 3 techniques of application- Direct contact, Water bath and Water bag. It has proved to be more effective in relieving pain and has the ability to decrease short term local trigger point sensitivity. Frequency of 1MHz is used for a tissue up to 5cm deep and 3MHz for a tissue 1 to 2cm deep.

Low level laser therapy (LLLT), also known as cold laser therapy and high intensity laser therapy is also known as heat therapy.laser is a light amplification by the stimulated emission of radiation. laser therapy is used in tissue healing and pain control. LLLT reduces oedema and inflammation, induce analgesia and promote healing. Laser irradiation stimulates collagen production, alters DNA synthesis and improves the function of damaged neurological tissues, improves microcirculation and oxygen supply is increased in trigger point areas and also removes waste products.

Myofascial release (MFR) is an example of manual therapy that has become widely used. It is a soft tissue mobilization technique, defined as the facilitation of mechanical, neural and psychophysiological adaptive potential as interfaced via the myofascial system. The form of Myofascial release used in this study is a graded stretch to the soft tissue by the clinician that is guided entirely by feedback from the recipient's body to determine stretch direction, force and duration. The major benefits is reduction of pain associated with tissue restrictions.

II. Material and Methods

A comparative study was conducted on 60 subjects in KIMS Hospital, Bangalore. Inclusion criteria was both male and female subjects with the age group between 20 - 50 years with Acute unilateral Trapezitis. Exclusion criteria was Fibromyalgia syndrome with trapezitis, Systemic diseases with trapezitis, Cervical herniated disc with trapezitis, Recent Shoulder surgery, Pregnancy, Infections or skin lesions, Metallic implants or cardiac pacemakers, Periarthritis shoulder with trapezitis, TB shoulder with trapezitis and Cervical spondylosis with trapezitis. The intervention was explained to the subjects in the language understood by the subjects / family members. A written informed consent was also obtained.

Procedure methodology

Subjects referred were divided into two groups by asking them to pick up chits from a box which was written as Group A and Group B. Each group consisted of 30 patients. Group A and Group B were treated once daily for 5 consecutive days. Both groups were given myofascial release.

Group A: 30 subjects were treated with Ultrasound therapy followed by Myofascial release for 5 consecutive days. Parameters of Ultrasound therapy: Frequency: 3MHz, Mode: Continuous, Intensity: 1 W/Cm2, Duration: 5 minutes.

Position of the patient: Sitting on a chair with backrest and forearm supported.

The treatment was applied with circular movements on and around the pain area on the trapezius muscle.

Myofascial release therapy: Position of the patient – Sitting comfortably on a chair with back supported, elbows flexed, forearm placed on a pillow. Deep transverse friction is given 10 minutes followed by myofascial stretch of upper trapezius muscle 3 times, each holding for 90 seconds just until resistance (tissue barrier) was felt. Then myofascial release was given to the trapezius muscle using the right thumb with the left thumb reinforcing it from the top. Then myofascial release was given to the trapezius muscle by using ulnar border of both the palms, by positioning the subjects with opposite side flexion of cervical spine.

Group B: 30 subjects were treated with Low Level Laser Therapy (LLLT) followed by myofascial release for 5 consecutive days. Parameters of LLLT: Type: class 3A1, Probe size: point probe 1cm diameter, Wave length: 685 and 830 nm, Mode: Pulsed, Dose: 74J/Cm², Treatment time: 3 minutes, Position of the patient: Sitting on a chair with back rest.

Pain status, Range of motion and Disability index were measured by using Visual Analogue Scale, Inch tape and Neck Disability Index Questionnaire, respectively. The outcome measures like Pain status, Range of motion, Disability were taken on day 1 and day 5 after the treatment.

Statistical analysis

Data was analyzed using the statistical package SPSS19.0 (SPSS Inc., Chicago, IL) and level of significance was set at p<0.05. Descriptive statistics was performed to find out the mean and standard deviation of the respective groups. T test analysis was used within the groups to find out the statistical significance. Chi squared test was used.

III. Result

On comparison of the age of the study participants Group A showed a mean age of 27.66 and a standard deviation of 6.82. Group B showed amean age of 27.56 and a standard deviation of 8.17. Both the values were comparable as thestatistical test showed non significance using t test (p>0.05). On analyzing the frequency distribution of the age groups, Group A had 21 subjects (70%) in the age group of 21-30 years, 7 subjects (24%) in the age group of 31-40 years and 2 subjects (6%) in the group 41-50 years. Group B had 24 subjects (80%) in the age group of 21-30 years, 5 subjects (17%) in the age group of 31-40 years and 1 subject (6%) in the group 41-50 years. Analysis using chi square test showed no association between the age groups, hence these were comparable in nature (p>0.05). On analysis of the frequency distribution of gender groups in both the groups, Group A had 6 males (20%) and 24 females (80%) and group B had 7 males (24%) and 23 females (75%).

Analysis using chi square test showed no association between the gender in both the groups. Hence these were comparable in nature (p value 0.67).

On comparison of VAS between the groups, Group A showed a pre mean value of 6.48 and standard deviation of 1.43 and post mean value of 2.73 and standard deviation of 1.43. Group B showed a pre mean value of 6.43 and a standard deviation of 0.97 and post mean value of 4.26 and standard deviation of 1.01. The result showed that there is a significant difference in the VAS between the groups in reducing the pain (p<0.05). Within the group analysis showed that the two methods have showed significant improvements (p<0.05).

		Group A		Group B		P Value
		Mean	SD	Mean	SD	
	Pre	6.48	1.13	6.43	0.97	0.85
VAS						
	Post	2.73	1.43	4.26	1.01	0.0001*
	Diff	3.75	0.30	2.17	0.04	0.0001*
P value (within group)Paired t test	0.0001*			0.0001*		
% reduction	57.8%			33.7%		

On comparison of NDI (%) between group A and group B, Group A showed a pre mean value of 30.65 and a standard deviation of 8.05 and a post mean value of 12.31 and standard deviation of 5.28. Group B showed a pre mean value of 33.26 and a standard deviation of 8.27 and a post mean value of 22.47 and standard deviation of 7.57. The result showed that there is a significant difference present between the groups in reducing disability (p<0.05). Within group analysis showed the two methods have showed significant improvements (p<0.05).

		Group A		Group B		P value (Between
						group)
		Mean	SD	Mean	SD	
NDI(%)	Pre	30.65	8.05	33.26	8.27	0.22
	Post	12.31	5.28	22.47	7.57	0.0001*
	Diff	18.34	2.77	10.79	0.7	0.0001*
P value(within group)	0.0001*			0.0001*		
% reduction		59.8%		32.4	.%	

On comparison of cervical lateral flexion AROM between the groups, Group A showed a pre mean value of 5.67 and a standard deviation of 0.92 and a post mean value of 6.67 and standard deviation of 0.98. Group B showed a pre mean value of 5.31 and a standard deviation of 0.69 and a post mean value of 5.78 and standard deviation of 0.69. The result showed that there is a significant difference between the groups in improving the cervical lateral flexion AROM (p<0.05). Within group analysis showed the two methods have shown significant improvements (p<0.05).

On comparison of cervical lateral flexion PROM between the groups, Group A showed a pre mean value of 6.38 and a standard deviation of 1.05 and a post mean value of 7.31 and standard deviation of 1.01.

Group B showed a pre mean value of 6.75 and a standard deviation of 0.71 and a post mean value of 6.01 and standard deviation of 0.03. The result showed that there is a significant difference in improving the cervical lateral flexion PROM (p<0.05). Within group analysis showed the two methods have showed significant improvements (p<0.05).

IV. Discussion

The present study was conducted to analyze the effect of ultrasound therapy with myofascial release and laser therapy with myofascial release in acute trapezitis patients. Evidence from various literature demonstrates the importance of these modalities with myofascial release to reduce pain and also improve the cervical lateral flexion range of motion. The outcomes of the study were measured using Visual Analogue scale (VAS), Neck Disability Index and cervical lateral flexion range of motion.

The results of the present study were consistent with previous studies which showed that there was a specific importance of ultrasound therapy and laser therapy along with myofascial release in acute trapezitis patients. In the present study, the researcher had selected 60 subjects which were equally distributed into two groups within the age group of 20 -50 years with acute trapezitis, the mean age in group A was 27.66 and in group B was 27.56. The standard deviation of group A was 6.82 and group B was 8.17.

As per the frequency distribution of the age in group A, there were 21 subjects (70%) in the age group of 20 to 30 years, 7 subjects (24%) in the age group of 31 to 40 years and 2 subjects (6%) in the age group of 41 to 50 years. In group B, there were 24 subjects (80%) in the age group of 20 to 30 years, 5 subjects (17%) in the age group of 21 to 30 years and 1 subject (3%) in the age group of 41 to 50 years.

As per gender distribution analysis in group A, 20 percent of males, and 80 percent of females participated in the present study. In group B, 24 percent of malesand 76 percent of females participated in the study. Hence in the present study the number of female subjects is more than the male subjects.

Visual Analogue Scale (VAS) of group A showed statistically significant changes in terms of mean and standard deviation. The pre-test mean value was 6.48 and post-test value was 2.73 by the end of the treatment session on the 5th day. The standard deviation on day 1 was 1.13 and post-test value was 1.43 with the intervention of ultrasound therapy with myofascial release. Group B also showed significant differences in Visual Analogue scale in terms of mean and standard deviation compared to post –test values. Pre- test values of group B mean was 6.43 and standard deviation was 0.97, and the post- test values of group B mean was 4.26 and standard deviation was 1.01. Both methods have shown to be statistically significant in reducing pain in acute trapezitis. Further, the present study was supported by Victoria Misailidou from the department of Physical Therapy, Greece in the year 2012 concluded that VAS is a valid and reliable scale to measure the pain intensity.²⁰ Further, the researcher also supports the decrease in pain on the 5th day of treatment in both groups.

Neck Disability Index (NDI) of both groups showed statistically significant changes in mean and standard deviation compared to post-test values. In Group A, the pre-test mean value was 30.65 and standard deviation was 8.05 and the post- test mean value was 12.31 and standard deviation was 5.28 for the intervention of ultrasound therapy with myofascial release. The pre-test mean value for group B was 33.26 and standard deviation was 8.27 and the post -test mean value was 22.47 and standard deviation was 7.57. Within group analysis showed significant improvements in both groups (p<0.05). Victoria Misailidou from the department of Physical Therapy, Greece in the year 2012 concluded that NDI shows moderate to good validity to measure the functional performance of the subject. Further, the researcher also supports the improvement in functional performance of the subjects on the 5th day of treatment in both groups.

The active range of motion was measured using an inch tape. Both groups showed statistically significant changes in mean and standard deviation compared to the post-test values. The pre-test mean value of group A was 5.67 and standard deviation was 0.92 and post-test mean value was 6.67 and standard deviation was 0.98. The pre-test mean value for group B was 5.31 and standard deviation was 0.69 and the post -test mean value was 5.78 and standard deviation (SD) was 0.69. Within group analysis showed the two methods have showed significant improvements (p<0.05). Further the present study was supported by Priya Kannan from the University of Otago, New Zealand in 2012.

The passive range of motion was measured using an inch tape. Both groups showed statistically significant changes in mean and standard deviation. The pretest mean value of Group A was 6.38 and SD was 1.05 and post-test mean value was 7.31 and standard deviation was 1.01. The pretest mean value for group B was 6.75 and SD was 0.71 and the post -test mean value was 6.01 and standard deviation was 0.68. Within group analysis showed significant improvements in both groups (p<0.05). Victoria Misailidou from the department of Physical Therapy, Greece in the year 2012 concluded that interrater examination reliability for passive cervical range of motion has also been shown as slight to moderate. Further, the researcher also supports the slight improvement in the passive range of motion of subjects on the 5th day of treatment in both groups.

Further, the study is also supported by many literature reviews.Dr.Waingankar D et al. 2019, conducted a study to compare the effectiveness of myofascial release and passive stretching on 50 patients with unilateral

trapezitis and concluded that myofascial release was more effective than passive stretching for pain release in patients with unilateral trapezitis.

V. Conclusion

The present study concluded that ultrasound therapy with myofascial release is a better technique than laser therapy with myofascial release in patients with acute trapezitis.

Limitation of the study: the study was carried out on a small sample size, long term follow up wasn't carried out to assess whether subjects retained thegained improvement after 5 days of intervention, control group was not taken, Cervical flexion, extension and rotation range of motion were not evaluated in thestudy, duration of treatment was too short, Inadequate literature about the condition and only acute trapezitis cases were taken.

Suggestion and further recommendation:Further studies should be conducted in larger sample size. As the study was done only on acute trapezitis further studies are also suggested to detect the progress in patients, control group can be taken, similar studies could also be done to detect the Cervical rotation, flexion and extension range of motion. As the treatment session was done only for a Short duration, further study should be conducted with long term follow up sessions on trapezitis to know the effectiveness of the treatment and also on chronic trapezitis cases.

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