



To Compare the Efficacy of Deep Transverse Friction Massage and Ultrasound in Patients with Upper Trapezius Trigger Points

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ABSTRACT

Background and Objective:

Myofascial trigger point is a common problem worldwide. Myofascial trigger points of upper trapezius muscle leads to neck pain and decreased cervical range of motion that profoundly influence all aspects of daily life.

The purpose of the study was to compare the efficacy of deep transverse friction massage (DTFM) and ultrasound in relieving pain, improving cervical ROM (lateral flexion both sides) and ADL's in patients suffering with upper trapezius trigger points.

Materials and Methods:

The study was performed among 20 patients of both genders, aged 18-50 years. Subjects were selected on the basis of inclusion criteria and randomly divided into two groups by convenience sampling and allocating alternate patient group A and group B, 10 in each group. Group A was treated with DTFM (5 minutes), Group B was treated with ultrasound (5 minutes), and both the groups along with treatment receive moist pack (15 minutes), passive trapezius stretching, TENS (15 minutes) and cervical isometric exercise (home protocol). Baseline assessments were taken on the 1st day and reassessment was done on 5th and 10th day of treatment session using NPRS, NDI and cervical ROM and data was analyzed.

Results:

Both the groups showed significant differences in all variables. DTFM and ultrasound both were effective

in resolving pain and improving cervical ROM which further lead to improvement in ADL's. But on comparing the mean of both the groups: Group A showed better results than Group B.

Conclusion:

This study concluded that DTFM and ultrasound both are effective in treatment of myofascial trigger points of upper trapezius muscle but clinically DTFM shows better results.

Keywords: *Myofascial trigger points, DTFM, ultrasound*

Introduction

Trigger points are discrete, focal, hyperirritable spots located in a taut band of skeletal muscle.¹ Patients having trigger points report regional, persistent pain that results in decreased ROM. The muscles used to maintain body posture are affected². The trapezius is broad, flat, superficial muscle of the posterior aspect of the neck and trunk.³ Upper fibers of trapezius act with levator scapulae and elevate the scapula.⁴

Researchers believe that the sedentary lifestyle has enhanced the pain.⁵ Motionless body postures and tiresome movements of the shoulder, arm, hand lead to development of musculoskeletal disorders.^{6,7} Occupational/recreational activities that produce repetitive stress on specific muscle/muscle group commonly cause chronic stress in muscle fibers, leading to trigger points.⁸

Richard L. Gajdosik reported that clinicians should adopt standardized methods of testing, and goniometric results as ROM measurements.⁹ M. J. H. McCarthy evaluated the NDI by comparison with the Short Form 36 Health Survey Questionnaire.¹⁰ C.H.Z Hong determined the immediate effectiveness of physical medicine modalities, superficial heat, ultrasound, deep pressure soft tissue massage.¹¹ Massage has been considered as treatment of choice for numerous conditions.^{12,13} Applying massage for 5-minutes after strenuous exercise is beneficial.¹⁴ Indirect evidence exists signifying that massage may be beneficial on factors related to an individual's psychological state. These investigations verified improvements in mood status^{15, 16} and perception of recovery.¹⁷

The comparison of two manual treatments for myofascial trigger points in upper trapezius muscle (Ischemic Compression and DTFM).¹⁸ The statically significant improvement in both decreased visual analogue scale readings and increase in pain pressure thresholds of trigger points tenderness. The results were similar and found that two techniques equally effective in reducing trigger points tenderness.¹⁸

Methodology

In study, subjects were selected on the basis of inclusion criteria- age 18-50 (males/females) with upper trapezius trigger points and neck stiffness.

Interpretation

Table 1: Comparison of scores of (a) NPRS in Group A (b) NDI in Group A (c) Lateral Flexion of neck (Right) in Group A (d) Lateral flexion of neck (Left) in Group A

(a)				(b)			
NPRS	Mean ± SD	F-test	P value	NDI	Mean ± SD	F-test	P value
Day 1	6.50±0.707			Day 1	50.60±9.276		
Day 5	3.50±1.354	162.74	3.555 (S)	Day 5	29.30±6.147	205.77	3.555 (S)
Day 10	1.40±0.699			Day 10	14.10±0.699		
(c)				(d)			
Lateral Bending of Neck (Right)	Mean ± SD	F-test	P value	Lateral Bending of Neck (Left)	Mean ± SD	F-test	P value
Day 1	20.10±4.149			Day 1	26.10±4.748		
Day 5	23.70±4.423	512.36	3.555 (S)	Day 5	29.00±5.142	150.76	3.555 (S)
Day 10	31.20±4.492			Day 10	33.50±5.359		

Subjects were excluded with exclusion criteria- Inflammatory changes, neurological disorders, pregnant women, infections and tumors. Written consent was obtained after explaining the procedure to the patients.

Sampling method was convenience sampling. Sample design was two groups namely, group A and group B (10 in each group). Group A was treated with DTFM(5 minutes), Group B was treated with ultrasound (5 minutes). Both the groups receive moist pack (15 minutes), passive trapezius stretching, TENS (15 minutes) and cervical isometric exercise (home protocol). Total 10 sessions of treatment were given within period of 2 weeks.

Baseline assessments were taken on the first day. Exercises were demonstrated and home protocol was explained to the patients. Patients had followed protocol for 10 days. Reassessments were taken on the 5th day and 10th day.

Statistical analysis

Unpaired t-test was used to compare the scores of baseline assessments between the two groups to find out whether the two groups were comparable or not. The groups have p>0.05 are comparable. Repeated ANNOVA was used to determine the significance of difference within group analysis.

Table 2: Comparison of scores of (a) NPRS in Group B (b) NDI in Group B (c) Lateral Flexion of neck (Right) in Group B (d) Lateral flexion of neck (Left) in Group B

(a)				(b)			
NPRS	Mean ± SD	F-test	P value	NDI	Mean ± SD	F-test	P value
Day 1	6.50±0.850			Day 1	50.30±12.202		
Day 5	4.10±0.994	297.82	3.555 (S)	Day 5	35.00±10.541	113.21	3.555 (S)
Day 10	2.10±0.738			Day 10	19.70±8.616		
(c)				(d)			
Lateral Bending of Neck (Right)	Mean ± SD	F-test	P value	Lateral Bending of Neck (Left)	Mean ± SD	F-test	P value
Day 1	19.20±4.29			Day 1	22.40±5.892		
Day 5	21.80±4.756	512.36	3.555 (S)	Day 5	24.90±6.691	109.00	3.555 (S)
Day 10	25.50±4.301			Day 10	28.40±5.854		

Table 3: Comparison of scores of (a) NPRS between Group A and Group B (b) NDI between Group A and Group B (c) Lateral flexion of neck (Right) between Group A and Group B (d) Lateral flexion of neck (Left) between Group A and Group B

(a)					(b)				
NPRS	Group A Mean ± SD	Group B Mean ± SD	P value	t-test	NDI	Group A Mean ± SD	Group B Mean ± SD	P value	t-test
Day 1	6.50±0.70 7	6.50±0.85 0	1.000	0.000 (NS)	Day 1	50.60±9.27 6	50.30±12.2 02	0.951 3	0.062 (NS)
Day 5	3.50±1.35 4	4.10±0.99 4	0.273 5	1.129 (NS)	Day 5	29.30±6.14 7	35.40±10.5 41	0.156 9	1.477 (NS)
Day 10	1.40±0.69 9	2.10±0.73 8	0.043 0	2.178 (S)	Day 10	14.10±0.69 9	19.70±8.61 6	0.102 7	1.719 (S)
(c)					(d)				
Lateral Bending of Neck (Right)	Group A Mean ± SD	Group B Mean ± SD	P value	t-test	Lateral Bending of Neck (Left)	Group A Mean ± SD	Group B Mean ± SD	P value	t-test
Day 1	20.10±4.1 49	19.20±4. 29	0.639 2	0.477 (NS)	Day 1	26.10±4. 748	22.40±5.89 2	0.139 4	1.546 (NS)
Day 5	23.70±4.4 23	21.80±4. 756	0.369 2	0.925 (NS)	Day 5	29.00±5. 142	24.90±6.69 1	0.141 8	1.536 (NS)
Day 10	31.20±4.4 92	25.50±4. 301	0.009 6	2.898 (NS)	Day 10	33.50±5. 359	28.40±5.85 4	0.057 2	2.032 (NS)

Results

All participants completed the program without any adverse effects and found the improvement in cervical range of motion, resolve pain and neck stiffness. Comparison of scores for each component of NPRS, NDI and lateral flexion of neck both sides on the 1st, 5th and 10th day for both the groups was done using unpaired t-test with assuming no normality and for $p > 0.05$.

➤ Comparison within group A

Table 1 (a), (b), (c) and (d) shows comparison of NPRS, NDI, lateral flexion of neck (right) and lateral flexion of neck (left) respectively and result for the variable was significant.

➤ Comparison with in group B

Table 2 (a), (b), (c) and (d) shows comparison of NPRS, NDI, lateral flexion of neck (right) and lateral flexion of neck (left) respectively and result for the variable was significant.

➤ Comparison between the group A and group B

Table 3 (a) shows the comparison of NPRS between group A and group B. On comparing Mean \pm SD of 1st, 5th and no significant difference observed, while on 10th day significant difference found.

Table 3 (b) shows the comparison of NDI between group A and group B. On comparing Mean \pm SD of 1st, 5th day but no significant difference found, while on 10th day significant difference found.

Table 3 (c) shows the comparison of Lateral Flexion of neck (Right) between group A and group B. On comparing Mean \pm SD of 1st, 5th, but no significant difference found while on 10th day, significant difference found.

Table 3 (d) shows the comparison of Lateral Flexion of neck (Left) between group A and group B. On comparing Mean \pm SD of 1st, 5th but no significant difference found while on 10th day, significant difference found.

Thus the findings of present study support the H₁ and H₂ of hypothesis. There is significant difference in variables after both the interventions but deep transverse friction massage shows more improvement in patients with upper trapezius trigger points.

Discussions

The study focused on determining the effectiveness of both deep transverse friction massage and ultrasound when treating the patients with upper trapezius trigger points. The data analysis revealed that there were significant improvements in cervical ROM (lateral flexion both sides) statistically. Similar results were shown in a study conducted by Sharma et al 2010 when two different trigger point techniques were used in combination with the ultrasound and massage.¹⁹ Significant differences were observed in the NPRS score ($p < 0.05$) and NDI in both the groups. The group receiving ultrasound showed improvement in the pre and post score of the treatment. Hence ultrasound treatment with deep pressure works on the painful tissues and resolves pain that further increases the ROM. Researchers found that at the depth of 5 cm, ultrasound followed by ice treatment yielded little or no thermal benefits.²⁰ The objective was to warm muscle, tendons and other tissues to improve blood circulation or blood movement and to accelerate the healing process.²¹ A study on human muscle by Draper et al has shown that, treatment more than 10 minutes of 1-MHz constant ultrasound at intensity of 1.5 W/cm² with 80 cm², the temperature in the gastrocnemius muscle at a depth of 3 cm was amplified by 5°C.²² The treatment was given for 5–7min for deep friction massage, for 10 days and ultrasound was given with an intensity of 1.5 watt/cm², with 40-50cm² for 10 days. The post score on the 10th day showed significant improvements in pain intensity along with the lateral flexion of neck to both sides. But when they both were compared, deep friction massage showed significant improvement over ultrasound.

Initially, deep friction massage was actually claimed to be too strenuous to administer²³ but later on, a Cochrane review conducted on randomized control trails and clinical controlled trails claimed deep transverse friction massage (DTFM) to be one of the essential physiotherapy interventions for the management of tendinitis and soreness.²⁴ Mayer et al in the study showed a relief in pain up to 50% with deep friction massage among 31 male sprinters with one-sided untreated achilles tendinopathy.²⁵ According to the World Federation for ultrasound in Medicine and Biology²⁶ ultrasound on another days for a lapse of either 1 or 3 weeks enhanced arteriole blood movement, this dose was selected because same intensity was used by Dyson et al for the management

of people with varicose ulcers hence revealing the clinical significance.²⁷ Multiple studies has shown the effectiveness of massage therapy in reducing pain²⁸ and increasing ROM²⁹.

Researchers claim that treatment sessions are directly dependent on the phase and site of the lesion.³⁰ It was found that massage therapy decreased pain and works effectively more in patients with uncomplicated upper trapezius spasm after 10 treatment sessions. The improvement in pain and function is due to the time spending by therapist, treatment in peaceful and relaxing environment, enhancing body functions awareness.³¹ Several therapies and modalities have been tested with contradicting results and till now no single treatment strategy is accepted.³²

Conclusions

This study concluded that Deep Transverse Friction Massage and Ultrasound both are effective in treatment of myofascial trigger points of upper trapezius muscle but clinically Deep Transverse Friction Massage shows better results.

Limitations of the study

- The sample size for the study was too small.
- Duration of the study was not adequate to study the long term effects of the treatment
- External factors affecting the progression cannot be calculated.
- The study was limited to 10 sessions only and there was no follow up after that.

Ethical Clearance

No ethical clearance required.

Source of funding

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Conflicts of Interest

Authors declare that there is no conflict of interest.

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