

Effects of Active Release Technique Versus Deep Transverse Friction Massage on Pressure Pain Threshold and Muscle Activity Among Young Adults with Upper Trapezius Myalgia

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(Received: 21 January 2023; Revised: 20 February 2023; Accepted: 05 March 2023; Published: 22 March 2023)

(Published by Research Trend)

ABSTRACT: The upper trapezius is one of the postural muscles which is highly susceptible to overuse. An awkward position of neck and shoulder in turns reduces the activities of upper trapezius. This study aims to examine the effectiveness of positional release technique and deep transverse friction massage in young adults who are all having upper trapezius myalgia. Pre-test and Post-test experimental study. The study was done on 50 patients of both male and female between the age group of 16 to 32 years with upper trapezius myalgia. Pre and post-test were taken for pain using digital algometer and muscle activity by EMG signals. The analysis was done using paired and unpaired t test to compare the outcome measures of the two group and there is a significant reduction in the pain at pressure pain threshold and a significant increase in the muscle activity in both the group ($p < 0.0001$). However group B is more effective in improving muscle activity and reducing pain when compared to group A. From this study the results indicate that both the treatments are effective in upper trapezius myalgia patients to reduce pain and improve muscle activity. However, in Group B who received Active release technique showed better improvement in reducing pain and improving muscle activity than Group A who received deep transverse friction massage.

Keywords: Upper trapezius, Active release technique, deep transverse friction massage, digital algometer, muscle activity, pain, EMG signals.

INTRODUCTION

Upper trapezius myalgia is the most common musculoskeletal disorder in young adults who work with an awkward position of the neck and shoulder for a prolonged period of time. During day-to-day activities, the upper trapezius gets strained due to poor posture (forward, rounded shoulder, and kyphosis).

In the general population, upper trapezius strain is a classic stress pain mainly occurring in the neck and shoulder; therefore, the prevalence of trapezititis is between 40% and 55%. Excessive stress in the upper trapezius leads to the formation of sore knots (trigger points) (Aras *et al.*, 2019).

Overuse of the upper trapezius affects the function of neck rotation, extension, and lateral flexion. Shortening of the trapezius results in reduced cervical range of motion, causing pain (Aras *et al.*, 2020).

Several studies show significant improvement in the effectiveness of various therapeutic techniques for myalgia, such as dry needling, IFT, and deep transverse friction massage (De Meulemeester *et al.*, 2022). Deep

transverse friction massage is a form of deep tissue massage or tissue manipulation intended to break down muscle adhesions (De Meulemeester *et al.*, 2017). It helps increase flexibility, decrease pain, and specifically improve the range of motion (ROM) (De Meulemeester *et al.*, 2017). Active release technique involves muscle activity while improving circulation, decreasing pain, and increasing muscle function (De Meulemeester *et al.*, 2019).

The technique actively moves the injury site from a shortened to a lengthened position through progressive manual pressure applied for about 90 seconds (Goudy and McLean 2006).

Deep transverse friction massage and active release technique are convenient therapies to treat upper trapezius myalgia (Joshi *et al.*, 2022).

Both techniques significantly improve muscle function and reduce pain in individuals with upper trapezius myalgia. The upper trapezius is one of the postural muscles highly susceptible to overuse. An awkward neck and shoulder position further reduces the activity of the upper trapezius (Prasan *et al.*, 2023).

This study aims to examine the effectiveness of deep transverse friction massage and active release technique in young adults with upper trapezius myalgia.

Statement of the Study. Effects of Active Release Technique versus Deep Transverse Friction Massage on Pressure Pain Threshold and Muscle Activity among Young Adults with Upper Trapezius Myalgia.

Aim and need of the Study. The aim of the study is to the Effects of Active Release Technique Versus Deep Transverse Friction Massage on Pressure Pain Threshold and Muscle Activity Among Young Adults with Upper Trapezius Myalgia.

MATERIAL AND METHODS

Research Design. The study is experimental in nature. Thirty subjects were selected based on selection criteria were randomly allotted into two groups namely on

1. Experimental group A
2. Experimental group B

Subjects from both groups were assessed for pain and muscle activity using algometer and EMG prior to treatment and this was recorded as the pre-test value.

After pre-test assessment Experimental group, A was given Deep transverse friction massage and Experimental group B was given Active release technique for a period of 4 weeks. The treatment was given fifteen minutes per day for both groups.

Similar assessment was done after intervention and was recorded as post-test value.

Criteria of Selection

Inclusion criteria:

- Age group between 16 to 32 years
- Onset of pain not > 4weeks
- Decreased neck ROM
- Unilateral involvement of upper trapezius myalgia.
- Presence of a palpable taut band in upper trapezius

Exclusion Criteria

- Fracture or any shoulder pathology
- Skin disease
- Surgery in the neck or upper back or shoulder
- History of trauma
- Radiculopathy

Population

All the subjects who satisfied the above criteria were taken as the population of the study.

Sample. Selected 50 samples on the basis of inclusion and exclusion criteria were randomly divided equally by lottery method into two experimental groups A and B. Both groups were allocated 25 samples each.

Variables

Independent Variable

- Deep transverse friction massage
- Active release technique

Dependent Variable

- Pressure pain threshold
- Upper trapezius muscle activity

Tools

- Algometer

- EMG

Validity and Reliability of the Tools Used. The Algometer and EMG is a valid and reliable tool to measure the Pressure pain threshold, Upper trapezius muscle activity

Setting

The study was conducted at Department of Physiotherapy, Aarupadai Veedu Medical College and Hospital, Puducherry.

Methodology & Procedure. A total of 50 samples were taken from the AVMC&H campus. Digital algometer and Electromyography had taken for all 50 patients, each group consist of 25 patients and the pre-test score values were documented. Prior to the study, the objectives and the guidelines were explained to all the participants and written informed consent form was signed by the participants, then the samples were divided randomly into two groups-Group A and Group B.

Group A was treated with Deep transverse friction massage and Group B was treated with Active release technique. Both the groups were treated for 4 consecutive days and on 5th day the scores of pains, and muscle activity were recorded as post intervention scorings for statistical analysis.

Deep transverse friction massage: Patient was lying in the proneposition; head flexed laterally towards the shoulder and shoulder was abducted to approximately 90degree. In that position, maintain a deep manual pressure with thumb finger on the trigger point, In during treatment every second 2-3 movements performed. First treatment time is 5 minutes then 2 minutes rest then doing up to 12 minutes

Active release technique: The patient was positioned in sitting up straight, with feet flat and shoulders back, grab on to the bottom of chair with right hand. Selected tender point (TP) was palpated and pressure over the tender point (TP) was applied by therapist thump and then slowly tilt the head sideways bringing the shortened position to lengthened position. The placing of contact near the lesion and causing the patient to move in a manner that produces a longitudinal sliding motion of muscles beneath the contact point.

Data Analysis. Data analysis was done with SPSS software package, the analysis was using paired "t" test and unpaired "t" test.

The pre and post treatment comparison for Digital algometer (Group A: $p=0.00$), (Group B: $p=0.005$) and EMG signals (Group A: $p=0.0000$), (Group B: $p=0.0006$). Both groups showed highly significant differences ($p<0.05$). The mean difference and SD for pressure threshold and electromyography between two groups are tabulated.

The values show statistically significant changes in mean difference for pain pressure threshold and muscle activity for Group B when compared to Group A.

Table 1: Shows a Mean, SD, "p" value for Deep transverse friction massage in upper trapezius myalgia.

	TEST	MEAN	SD	'P'
Pain Pressure Threshold	Pre-test	9.75	4.031	0.005
	Post-test	4.48	2.61	
EMG	Pre-test	5.63	0.86	0.006
	Post-test	8.79	2.41	

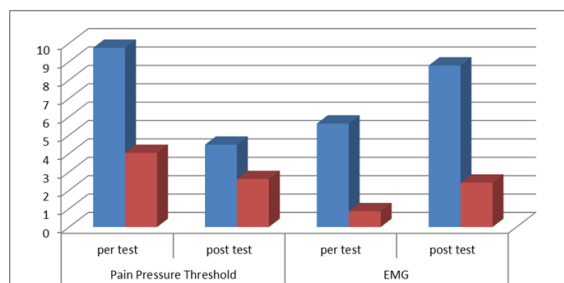


Fig. 1. Shows a pre and post-test value for Deep transverse friction massage in upper trapezius myalgia.

RESULTS AND DISCUSSION

Group A who received Deep transverse friction massage showed significant improvement in all the outcome measures *i.e.*, PPT, Muscle activity, Group B who received Active release technique showed significant improvement in all outcome measures *i.e.*, PPT, Muscle activity, The improvement gained by Group B was significantly better than the other groups with regard to all the outcome measures *i.e.*, PPT, Muscle activity. The within-group analysis of the study demonstrates significant improvements in four key areas: Pressure Pain Threshold (PPT), muscle activity (EMG readings). The findings suggest that the interventions implemented across all groups were effective in promoting positive outcomes. This discussion will elaborate on each of these areas, analyzing the implications of the results and considering potential factors that contributed to the observed changes.

Limitation of the study.

Recommendation of the study

- Large sample size can be used.
- Long duration studies are recommended.
- Regular and long term follow up is recommended

CONCLUSIONS

The study findings suggest that both Deep transverse friction massage and Active release technique are effective interventions for improving physiological and functional outcomes, including pain tolerance, muscle activity. However, Active release technique demonstrated a greater overall impact across most measured variables compared to Deep transverse friction massage. The significant improvements in Pressure Pain Threshold observed in the PRT group indicate that this intervention is particularly effective in enhancing pain tolerance, likely due to its focus on muscle relaxation and the release of tension. The greater increases in muscle activity and strength in the

Table 2: Shows a Mean, SD, "p" value for Active release technique in upper trapezius myalgia.

	TEST	MEAN	SD	'P'
Pain Pressure Threshold	Pre-test	9.25	2.57	0.005
	Post-test	3.85	0.98	
EMG	Pre-test	5.51	1.45	0.006
	Post-test	9.15	1.41	

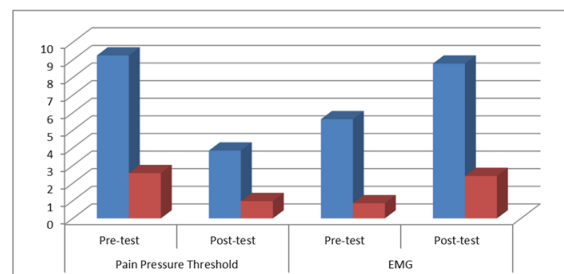


Fig. 2. Shows a pre and post-test value for Active release technique in upper trapezius myalgia

Active release technique group suggest that it may also be more effective in promoting neuromuscular efficiency and muscle strength, possibly due to its emphasis on passive muscle release, which can enhance motor unit recruitment and muscle function. The improvements in posture observed in both Active release technique and Deep transverse friction massage groups further underscore the benefits of these therapies in enhancing postural alignment and stability. However, the greater gains in the Active release technique group suggest that this intervention may be more effective in addressing postural imbalances and improving overall body mechanics.

FUTURE SCOPE

Future research in the treatment of upper trapezius myalgia could focus on several key areas to enhance the understanding and effectiveness of interventions. Long-term efficacy studies are needed to determine whether improvements in pain and muscle activity are sustained over time and to examine the recurrence of symptoms post-treatment. Additionally, comparing positional release technique and deep transverse friction massage with other therapeutic modalities, such as stretching, strengthening programs, or alternative manual therapies, could help identify the most effective treatments. Expanding the sample size and including more diverse populations in future studies would allow for broader generalization of findings. Investigating the mechanisms behind the effects of these treatments on pain and muscle activity could offer valuable insights into their physiological impact. Furthermore, exploring the combined effects of these manual therapies with other interventions like postural correction or ergonomic training could provide a more comprehensive treatment approach. Advanced electromyographic (EMG) analyses could also be utilized to explore how these therapies impact different muscle fibers. Lastly, incorporating psychosocial factors, such as stress and anxiety, into future studies

would help determine their role in treatment outcomes, potentially leading to more personalized and effective therapies. Overall, these future directions could refine treatment strategies and contribute to evidence-based clinical guidelines for managing upper trapezius myalgia.

Acknowledgement. The authors are thankful to Vinayaka Mission's College of Physiotherapy, Vinayaka Mission's Research Foundation (DU), Salem, Tamil Nadu, India.

Conflict of Interest. None.

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How to cite this article: Balu S., Mohanraj G. and Mohanraj K. (2023). Effects of Active Release Technique Versus Deep Transverse Friction Massage on Pressure Pain Threshold and Muscle Activity Among Young Adults with Upper Trapezius Myalgia. *Biological Forum – An International Journal*, 15(3): 955-958.