

ORIGINAL RESEARCH

The effect of active release therapy on cervical range of motion addressing upper trapezius spasm in patients with non-specific neck pain: A randomised control trial

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ABSTRACT

The aim is to investigate the effectiveness of pre- and post-application of, the Active Release Technique, on cervical range of motion addressing upper trapezius spasms for patients suffering from non-specific neck pain. Materials and Methods: The study was done over a sample size of 15 patients which included both male and female patients among the age group of 20 – 50 years suffering from non-specific neck pain. A simple Random sample was used for selecting the sample population. The duration of the study was 12 weeks. Cervical ROM was used as an outcome measure. Results: Paired and unpaired sample t-tests were used to compare the outcome differences. Improvement was significant with cervical ROM ($p<0.004$). In conclusion, the active release technique is thereby effective in improving the cervical range of motion in patients having non-specific neck pain.

Key words:Active Release Technique, Cervical ROM, Upper Trapezius Spasm, Non-specific neck pain.

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Introduction

Neck pain is one of the most common and painful musculoskeletal conditions. Point prevalence ranges from 6% to 22% and up to 38% of the elderly population, while lifetime prevalence ranges from 14,2% to 71%. For majority of the neck disorders there is an absence of an identifiable underlying disease or abnormal anatomical structure. Consequently, they are classified as 'non-specific' neck pain. ⁽¹⁾Neck pain is a common symptom associated with the upper trapezius muscle spasm. ^(2,3) According to Noor *et al.*, trapezius pain is a typical example of stress-related pain and the most common musculoskeletal pain experienced. The trapezius muscle, a large and broad superficial muscle with a trapezoidal shape, originates from the occipital bone and extends to the lower thoracic vertebrae, inserting into the spine of the scapula. ⁽⁴⁾ The upper fibers of the

trapezius muscle play a crucial role in maintaining proper head posture in space. Repetitive activities can lead to muscle shortening, restricted range of motion, and subsequent spasms or tightness. ⁽⁵⁾

This study aims to compare the effectiveness of pre- and post-application of Active Release Therapy (ART) on cervical range of motion addressing upper trapezius spasm for patients suffering from non-specific neck pain. Active Release Technique (ART), developed by Dr. P. Michael Leahy, focuses on treating soft tissue injuries and musculoskeletal disorders. Active Release Therapy (ART) is a method of treating soft tissues, such as; fascia, tendons, and nerves. ART is the most widely accepted treatment protocol/ consideration when it comes to repetitive injuries/ strains; acute injury, and functional fixation damage due to abnormal posture maintained over the long term. ⁽⁶⁾ Cumulative trauma disorders, also called

repetitive stress; or overuse syndromes are a source of major problems among the workforce population. A major problem with these cumulative trauma disorders is accumulation of adhesions. Adhesions develop between joints and stick or attach to muscles, ligaments, tendons, nerves, and blood vessels, resulting in restricted motion, pain, numbness, tingling in case nervous system is involved. As the already tensed soft tissue structures rub against each other, eventually an injury occurs/ happens which further heals itself with protective inflammation and scar tissue formation. Conditions such as tendonitis Trapezitis carpal tunnel syndrome have one thing in common that is these usually develop with overuse of muscles. And these specifics can be caused in three different ways:

- Acute injuries (pulls, tears, collisions)
- Accumulation of small tears from over-use (micro-trauma)
- Lack of oxygen (hypoxia) ⁽⁷⁾

Active Release Therapy is used for the recovery of soft tissue function which involves realigning the collagen of scar tissue. Once these adhesions are softened using ART, the effect on soft tissue will tend to re-establish optimal texture, resilience, and proper function unwinding fascia which allows the muscles, ligaments, tendons, and nerves to move freely in their spaces. ⁽⁷⁾ ART involves applying deep, tolerable pressure with the fingertips on myofascial trigger points in shortened muscles due to pain and muscle spasms, while the patient actively moves the muscle in a lengthening position. This pressure helps break the adhesions in the muscle. ART is used to treat various musculoskeletal conditions, restore soft tissues, release entrapped nerves and vasculature, and improve tissue texture, resilience, and function. ⁽⁸⁾

Procedure and Methodology

Study Design: Randomised Control Trial.

Location of The Study: Out-Patient Department of Physiotherapy, Pacific Medical College and Hospital

Study Population: Non-Specific Neck Pain Patients

Duration of Study: 12 Weeks.

Sampling Technique: Simple Random Sampling

Sample Size: 15

Procedure

Informed consent was taken and patient were included in the study with inclusion criteria. After the approval of the Institutional Ethics Committee (IEC), patients between the age group of 20-50 years having non-specific neck pain were selected for the study based on the inclusion and exclusion criteria. For application of ART, patient was made to sit on a stool with hands supported on the thighs. Therapist stood behind the patient stabilising the shoulder with one hand. Neck was taken in extension and contact was made using thumb with the trapezius muscle over the tender area and deep tension stretch was applied. Patient was then asked to flex and turn the neck. This was repeated for 3-5 times over a period of 12 weeks with patients engaging in the intervention for 30 minutes per day, five days per week. At the end of 12th week, patients were re-evaluated and compared to determine their active range of motion (ROM) in the cervical region using a goniometer.

Statistical Analysis and Results

The paired statistical comparisons of distribution of categorical variables were tested using paired and unpaired t-test. All results are shown in tabular as well as graphical format to visualize the statistically significant difference more clearly.

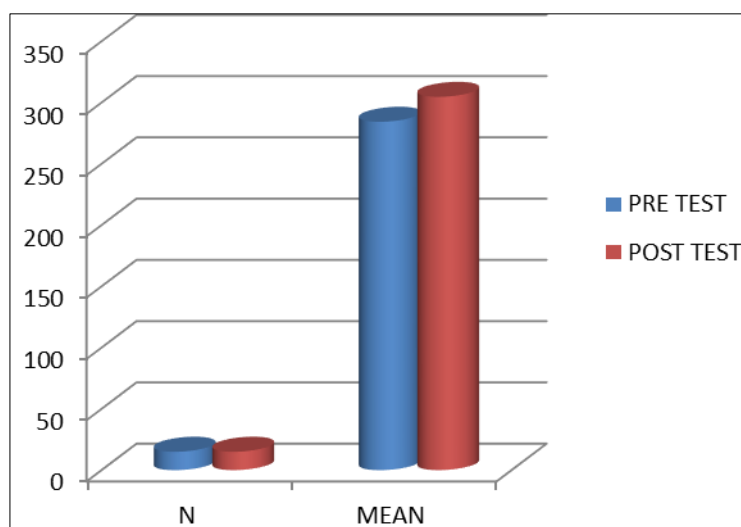
Table 1 Cervical ROM pre and post intervention

Sr. No.	Flexion (0-50)		Extension (0-85)		Rotation Rt. (0-40)		Rotation Lt. (0-40)		Side Flexion Rt. (0-90)		Side Flexion Lt. (0-90)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	25	33	50	55	20	24	33	36	68	71	67	71
2	28	36	56	61	23	27	32	35	64	67	61	65
3	35	43	70	75	25	29	30	33	66	69	64	68
4	42	50	75	80	27	31	28	31	65	68	74	78
5	38	46	74	79	29	33	26	29	54	57	72	76
6	36	44	68	73	33	37	24	27	50	53	68	72
7	32	40	64	69	32	36	29	32	56	59	64	68
8	33	41	66	71	30	34	31	34	70	73	66	70
9	35	43	65	70	28	32	33	36	69	72	65	69
10	25	33	54	59	26	30	37	40	74	77	54	58
11	29	37	58	63	24	28	20	23	58	61	50	54
12	31	39	61	66	29	33	23	26	61	64	56	60
13	33	41	64	69	31	35	25	28	64	67	70	74
14	38	46	74	79	33	37	27	30	74	77	75	79
15	42	50	72	77	37	41	29	32	65	68	74	78

AVERAGE	33.47	41.47	64.73	69.73	28.47	32.47	28.47	31.47	63.87	66.87	65.33	69.33
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Table 2: Mean and + SD, for (ART) pre-post analysis.

Cervical Range of Motion Tests	Number of participants (N)	MEAN	Standard Deviation (SD)	Standard Error of the Mean (SEM)	P-value	T-value
Pre -Test	15	284.33	22.95	5.92	0.004	3.05
Post Test	15	304.66	35.63	9.20		

**Graph: 1** Depicting effectiveness of ART post treatment.

Results: The p-value of 0.004 indicates the statistical significance of active release therapy in improvement of cervical range of motion.

Discussion

The purpose of this study was to compare the effectiveness pre and post treatment of active release therapy in patients with upper trapezius spasm suffering from non-specific neck pain. In this study, cervical range of motion measure was taken in order to specify the evaluated results after the treatment active release therapy.

Following a twelve-week treatment period, ART demonstrated significant improvements in range of motion (ROM). The Active Release Technique showed was found to be effective in treating upper trapezius spasm occurring as a result of non-specific neck pain. These findings emphasize the importance of considering different therapeutic approaches for individuals with non-specific neck pain and suggest that incorporating the Active Release Technique may lead to enhanced pain management and functional outcomes. There have been many supporting studies concluding the effectiveness of Active Release Technique on various conditions such as frozen shoulder, plantar fasciitis, trigger thumb, upper crossed syndrome, hamstring tightness and trapezius pain.⁽⁹⁾

The possible mechanism for this effectiveness may be that ART by virtue of mechanical stimulation cause a reactive hyperaemia and produces analgesic effect. Mechanical stimulation through digital pressure

invokes the physiological response to cutaneous as well as muscular mechanoreceptors. This may alter the nociception and pain. With manual contact, mechanoreceptors may induce inhibitory effect on central nervous system which may result in decrease in H reflex. Patient also actively does the movement which increase the circulation and thus, reduction in pain and spasm may reduce the symptoms.^[15]

A study by Harneet K M1, Khatri SMetal. (2012) showed that Active Release Technique might have additional treatment effects compared with ultrasound, muscle stretching and strengthening exercises for management of lateral epicondylalgia over the short term. Differences between groups were found for the primary and outcome measurement ($p < 0.05$) after 2 weeks of intervention, indicating Active Release Technique was more effective than the other interventions.⁽¹⁰⁾

In a study by James, involving 20 young men with no injury of the lower extremity, hamstring flexibility increased immediately after ART was applied. Similarly, in the present study, ROM significantly increased after ART was applied on the neck for 12 weeks. This finding indicates that scar tissue, which can limit the mobility of soft tissue, can be removed by ART, and thus relieve limitations of movement.⁽¹¹⁾ In a study done to compare the effectiveness of Positional Release technique and Active Release technique on Hamstring Tightness, the group treated with Active release technique showed significant improvement in Popliteal angle ($p < 0.01$) and sit and reach flexibility test ($p < 0.01$) as compared to

Positional Release Technique. Result also showed a significant difference within the groups post-intervention. Hence Active Release Technique can be used as an effective physiotherapeutic intervention in reducing hamstrings tightness.⁽¹²⁾

According to a study conducted by Andrew Robb, Jason Paczkowski; a pilot study published on May 6 2010, on Immediate effect on pain thresholds using active release technique on adductor strains: The mean pre-intervention and 2 min post-intervention PPT values were 4.2 ± 0.83 and 5.3 ± 0.99 significantly different ($p < 0.001$). The application of ART was successful to treat groin strains may be of benefit in increasing pain thresholds amongst ice-hockey players.⁽¹³⁾

ART is a method for treating soft tissues such as tendon, nerve, and myofascial and is performed for repetitive strain injury, acute injury, and damage to functional fixation due to abnormal long-term posture. In addition, ART eliminates the adhesion of scar tissue and soft tissue causing discomfort, spasm, muscle fatigue, tingling and other symptoms.⁽¹⁴⁾

In the current study, it was observed that active release technique (ART) yielded favourable result when compared pre and post treatment for cervical ROM in non-specific neck pain. Apart from its impact on mechanoreceptors, one possible explanation for this could be attributed to the direct targeting of muscles by ART and the active involvement of the patient in movement. By directly addressing the muscles, ART effectively breaks down scar tissue adhesions and relieves muscle spasms through the process of muscle shortening and lengthening. Consequently, this leads to a prompt and enduring alleviation of pain, enhanced mobility, and improved neck function.

With a significant and valid result having post treatment cervical ROM as ($p < 0.004$) this study thus states the effectiveness of ART. Following is a supporting study-

Published by Author(s): Mishra, Daxa; Prakash, R. Harihara; Mehta, Jigar; DHADUK, ANKITA: on the topic Comparative Study of Active Release Technique and Myofascial Release Technique in Treatment of Patients with Upper Trapezius Spasm concludes that although both techniques are effective in the alleviation of symptoms and associated disability in upper trapezius muscle spasm, ART gave better results as compared to MFR.⁽¹⁵⁾

Conclusion

Active Release Techniques is a soft tissue method that focuses on relieving soft tissue tension through the removal of entrapment developed in tissues as a result of overload due to repetitive function. These disorders may lead to muscular insufficiency, numbness, aching, tingling, and burning sensations.

In this study, we are concluding through the data which we analyzed and the nature of the technique which was administered. Hence, ART was found

effective in improving the cervical range of motion simultaneously relieving upper trapezius spasms in patients with non-specific neck pain.

Scope & Limitation

- Small sample size
- Short duration of study
- Limited age group of subjects were included.

Recommendation

- Large number of samples
- Duration of study for long period
- Different stages of the selected condition.
- Age group could be extended

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