



To find the effectiveness of positional release technique on pain, range of motion and functional activities in subjects with subacute trapezitis

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INTRODUCTION

NECK PAIN

It is a pain in the neck most commonly with the structures of cervical spine. Neck pain (NP) is one of the most prevalent pathologies 14.6% of all musculoskeletal health problems in community.¹ It is estimated that 50% of all adults experience some kind of neck pain at some point each year.²

The economic burden associated with the management of NP is second only to low-back pain in annual workers compensation costs in the United States³. Although the etiology of insidious mechanical NP is under debate, it is clear that NP is multifactorial in nature, with both physical and psychosocial contributors^{4,5}

In 2016, among the 154 conditions, low back and neck pain had the highest health care spending in the United States with an estimated \$134.5 billion.⁶ In 2012, neck pain was responsible for job absences among 25.5 million Americans, who missed an average of 11.4 days of work.⁷ In 2017, the global age-standardised prevalence and incidence rate of neck pain were 3551.1 and 806.6 per 100,000, respectively⁸

The exact pathology of mechanical neck pain is not clearly understood. Different authors often assume that mechanical neck pain is associated with muscular, joint and neural impairment⁹

TRAPEZITIS

The upper trapezius muscle is designated as postural muscle and it is highly susceptible to overuse. Any position which places trapezius in a shortened state for a period of time without rest may shorten the fibers and lead to dysfunction and restricted motions of neck.¹⁰ **Myofascial trigger points (MTrPs)** are hyperirritable spots located in a taut band of a skeletal muscles, when compressed, overloaded or

stretched generate pain in typical referred patterns. Trigger points form in the muscle fibres, close to the motor end plate (neuromuscular junction).

Excess acetylcholine is released at the synapse, usually associated with overuse or strain, leading to release of calcium. Resulting ischemia creates an O₂ deficit and energy crisis.

ETIOLOGY

Neck pain is localised to the cervical spine or may radiate down the arm (radiculopathy) all age groups are at risk of developing neck pain.¹¹ People who sit in one location staring at computer screens for long periods at a time may be at an increased risk about 10% of the population has an episode of neck pain each year.¹² Neck pain may occur slightly more frequently in women than men. About 10% instances of neck pain are associated with systemic illness, such as polymyalgia etc. Neck pain may be triggered by a specific event such as a sports injury or motor vehicle accident. More common and less dramatic causes include reaching or pulling and awkward resting or sleeping positions. Even poor sitting postures over time can lead to neck discomfort.

Long term neck problems are more likely to happen when pain develops gradually or discomfort is recurrent over a period of time. Chronic neck pain is often triggered by prior injuries, especially if the original injury was severe or the injury was not given enough time to heal. A frequent complaint is that neck pain has developed for no apparent reason. The events preceding pain or discomfort will provide clues behind the original cause if the exact incident is not evident.

Mechanical disorders that cause neck pain

- Muscle strains usually related to prolonged physical activity such as sitting at computer terminals for extended periods of time. Acute strain also may occur after sleeping in an awkward position.
- Osteoarthritis resulting from narrowing of intervertebral discs of the spine. The neighbouring vertebral spurs grow in response to the increasing pressure.
- The bony growth can be localised pain in the neck or arm related to nerve compression.
- Herniated intervertebral disc causes arm pain more frequently than neck pain. The pinching of a nerve in the neck causes severe arm pain. Disc herniations may cause loss of function of the nerve that may include a loss of reflex, muscle strength.^{13,14}
- Whiplash is a sudden fast forward and backward injury to the soft tissues of the neck most commonly caused by rear-impact car accidents. Pain and stiffness associated with these accidents generally develop 24-48 hrs after the injury.

DIAGNOSIS OF NECK PAIN

- Diagnosis of neck pain can be done by medical history and physical examination.^{13,14}
- In individuals who do not respond to starting therapy may undergo specialised radiographic tests, such as plain x rays, magnetic resonance imaging or computerised tomography to screen for additional problems of soft tissues, herniated disease, spinal stenosis, tumors or nerve injuries.

POSITIONAL RELEASE TECHNIQUE

Positional release technique (PRT) is a type of manual therapy that may be used effectively in treating chronic and sub-acute muscle spasm, pain and disability that is often associated with it. Positional Release Techniques are based on the work of **Dr. Lawrence H. Jones (1950)**¹⁵ whose work resulted in the publication of his work strain and counter strain in 1964. Model positional release therapy makes use of updated positions and accessory equipment while preserving the original purpose and strategy of strain and counter strain.¹⁶

Protective muscle spasm occurs as a direct result of injury and as a secondary manifestation of inflammation. Often as a result of changes in neuro muscular pattern associated with guarding poor posture, favouring and injured area with bracing & immobilization. Often, especially in the case of chronic spasm, the level of spasm is in appropriate for the level of injury. This may result in disability, pain and poor biomechanics well after the injury has healed. Chronic spasm often results in changes in normal fascia, neuromuscular and the connective tissue relationships. This hypertonicity, prolongs inflammation, causes ischemia, reduces lymphatic drainage and the concentration of metabolites (waste products in the tissue).

PRT acts on the muscle spindle mechanism and its associated reflex mechanism to promote a more normal fringe of the muscle spindle and a more normal level of tension in the muscle which result in a more normal relationship with the various soft tissue surrounding the area. This techniques work to reduce the hyperactivity of the myotactic reflex to reduce the over-whelming afferent nerve impulses within which that may lead to an overflow of neurotransmitters into the associated dermatome, resulting in referred pain. This phenomenon is known as “facilitated segment.” PRT sets the stage for normal process to overcome more efficiently. Reduction in localised spasm increases range of motion, decreases pain and allows more circulation and improves lymphatic drainage and increases the potential for normal biomechanics. PRT strongly complements traditional therapy regimen by allowing them to be more effective.

Indication

- Patient with a history of recent or past trauma
- Patients upon evaluation, demonstrates limited ROM, muscle hypertonicity, fascia tension or joint hypomobility.

Contraindication

Positional release therapy should not be used directly in the area of

- Open wounds
- Hematoma
- Hypersensitive skin
- Systemic/local infection
- Healing fractures

Except in case of significant systemic infection using PRT in areas surrounding the affected tissue is not contraindicated. Caution should be used when working on the neck to avoid vertebral artery compression

PROCEDURE

- Evaluate the patient needs
- Position the patient comfortably: most often lying down. Palpate the affected areas that may be affected because of referred pain.
- Palpate the selected tender point – instruct the patient to relax the area. Passively move the body part to release at the tender point.
- Stop motion when pain exceeds and the patient should only feel the pressure.
- Release the pressure – but maintain light contact over the tender point to monitor response.
- Maintain the position for 90 sec, hold longer if patient is feeling a therapeutic pulse, tissue tension changes/ movement.
- Encourage the patient to relax- slowly return to neutral position. Recheck the tender point – expect 70% improvement in pain level and reduced tension.

NEED OF THE STUDY

- Trapezitis is one of the most common non traumatic musculoskeletal problem during covid19 pandemic.

- During this period many people have suffered from trapezitis, causing disturbance to their work life.
- Only few studies were done on PRT on subacute trapezitis subjects.
- So, Need of the study is to focus on PRT on pain, cervical range of motion and functional activities in subjects with subacute trapezitis.

AIM OF THE STUDY

- To find out effect of positional release technique on pain, range of motion and functional activities in subjects with subacute trapezitis.

OBJECTIVE OF THE STUDY

- To study the effect of PRT on pain using VAS in subjects with subacute trapezitis.
- To study the effect of PRT on range of motion using inch tape in subjects with subacute trapezitis.
- To study effect of PRT on functional activities using NDI in subjects with subacute trapezitis.

MATERIALS AND METHOD

DESIGN OF THE STUDY: Experimental study

TYPE OF SAMPLING: random sampling

STUDY SETTING : College of Physiotherapy OPD , SVIMS

NUMBER OF SUBJECTS : 30 subjects between the age group 18 to 30 years of both male and female genders

- 15 subjects were treated with positional release technique, trapezius stretching and ultrasound
- 15 subjects were treated with trapezius stretching and ultrasound

STUDY DURATION: 2 Weeks

SELECTION CRITERIA

INCLUSION CRITERIA:

- Age between 18-30 years
- Both male and female
- Trapezius spasm with subacute duration
- Unilateral muscle spasm

EXCLUSION CRITERIA :

- Fracture of cervical spine
- Neck pain with radiation to upper extremity
- Malignancy
- Infection

Inflammatory disorder

Osteoporosis

Diagnosed with cervical disc prolapse

Cervical canal stenosis

Spondylolisthesis

Torticollis

Scoliosis

OUTCOME MEASURES:

Inch tape

Visual analogue scale

Neck disability index

METHODOLOGY:

Subjects who met inclusion criteria were randomly divided into group A and group B. pre and post therapeutic outcome measures (pain through VAS, ROM through inch tape and Neck disability index) were recorded.

GROUP A (Experimental Group): Pre therapeutically VAS, ROM, NDI are measured 15 patients with trapezius spasm were treated with positional release technique (for 90 seconds for 2-3times/week), trapezius stretching (5 stretches for 15second) and ultrasound therapy with intensity of 1.5 watt/ cm² for 5 sessions a week for 2 weeks.

Post therapeutically VAS, ROM, NDI are measured.

GROUP B (Control Group): 15 patients with trapezius spasm were treated with trapezius stretching (5 stretches for 15second) and ultrasound therapy with intensity of 1.5 watt/cm² for 5 sessions a week for 2 weeks.

STATISTICAL ANALYSIS AND RESULTS

Statistical analysis have been carried out to analyze the significant impact of the treatments issued to the subjects of both experimental and control groups of 30 subjects. First 15 subjects were taken under experimental group and next 15 subjects were taken into control group.

All 30 subjects completed entire protocol by 2 weeks of intervention and the outcome measures are VAS, NDI, ROM.

Table-1 : Analysis of mean difference and standard deviation values of VAS of experimental and control groups.

	Group	N	Mean	SD	Z-Value	p-value	Remarks
VAS	1	15	4.33	1.047	-4.479	0.000	Significant
	2	15	1.47	0.990			

RESULTS:

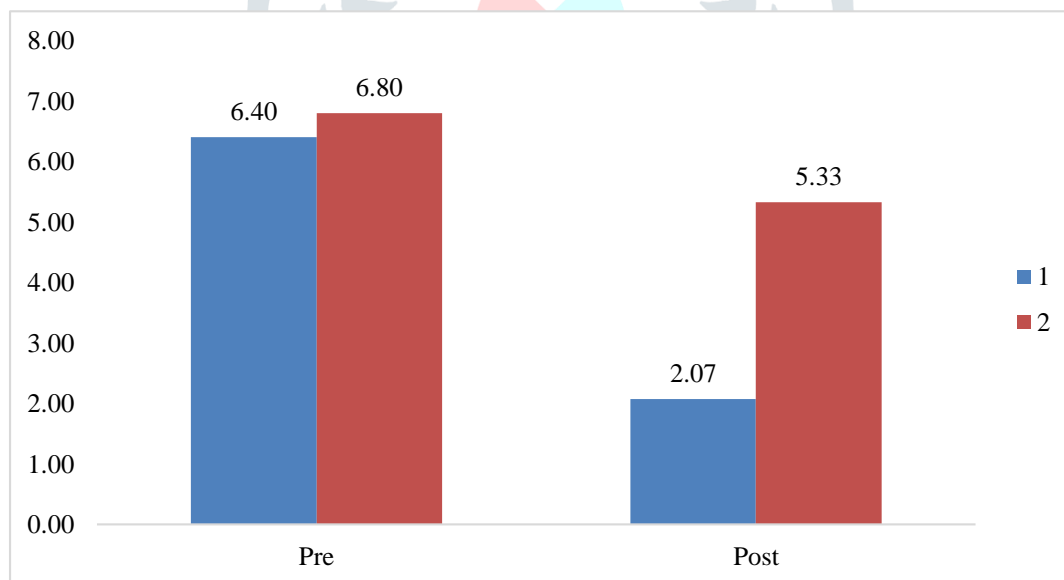
Pre and post means values of VAS of experimental and control groups are 4.33 and 1.47 which shows reduction in post values.

INFERENCE:

It was observed that there was a statistical significance ($p < 0.05$) existing between the observation of mean for experimental and control groups with respect to VAS.

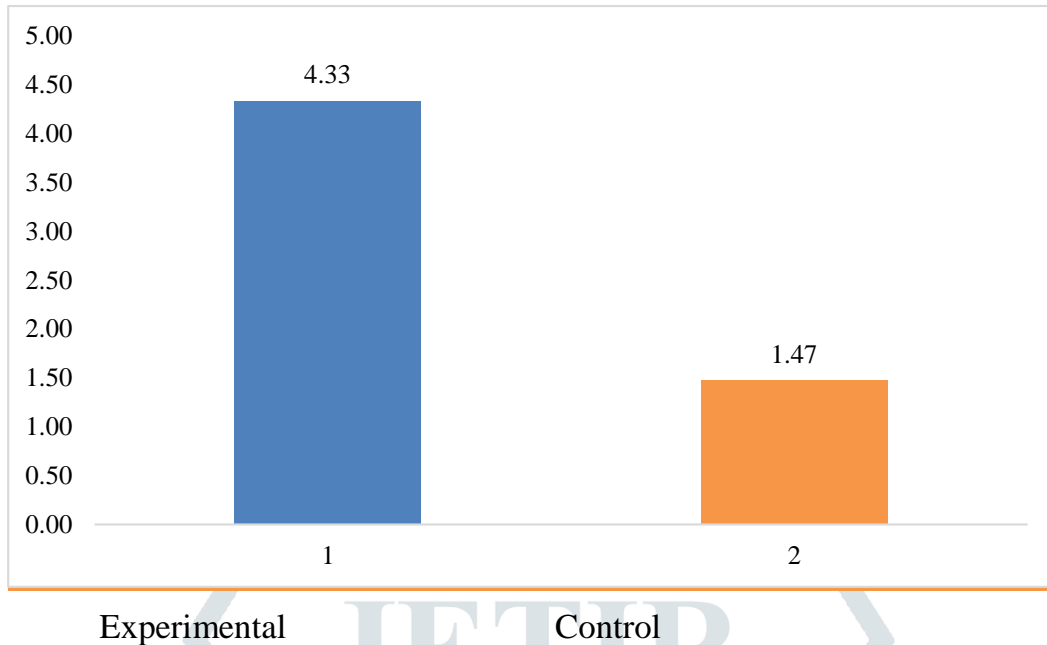
This similar type of interpretation can be observed in the following graph.

Graph – 1: Graphical representation of pre and post values of VAS Of experimental group



There was a significant difference between pre and post intervention of positional release technique in subjects with subacute trapezitis.

Graph - 2 : Graphical presentation of mean difference values of VAS in experimental and control group



There was a significant difference between pre and post intervention of positional release technique in subjects with subacute trapezitis.

Table-2: Analysis of mean and standard deviation of NDI of experimental and control groups.

	Group	N	Mean	SD	Z-Value	p-value	Remarks
NDI	1	15	18.40	6.642	-4.087	0.000	Significant
	2	15	5.53	2.615			

RESULTS:

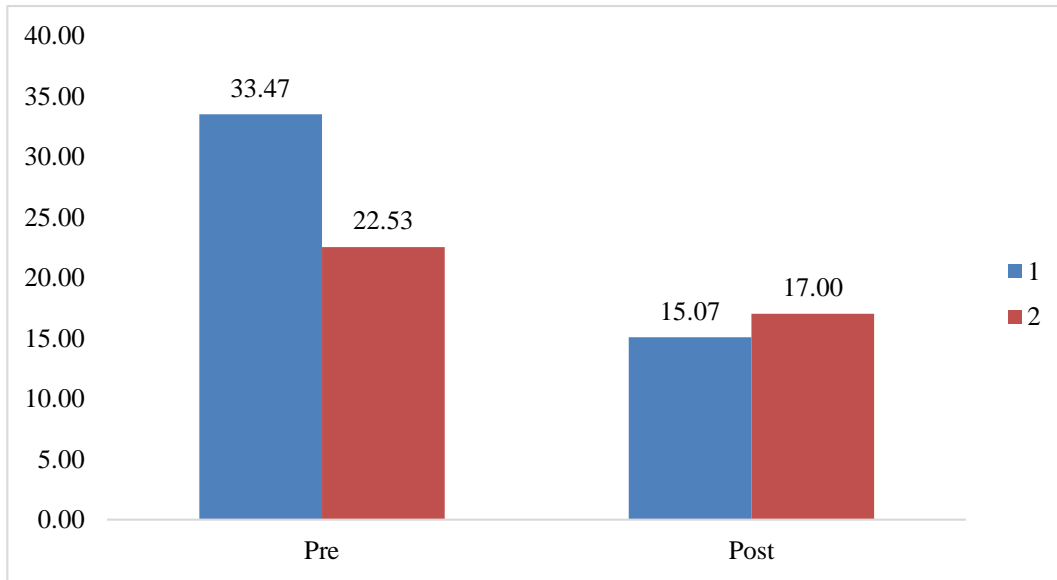
Mean values of NDI in experimental group were 18.40 and 5.53 in control group which shows significant reduction in the values.

INFERENCE:

It was observed that there was a statistical significance ($p < 0.05$) existing between the observation of mean for experimental and control groups with respect to NDI.

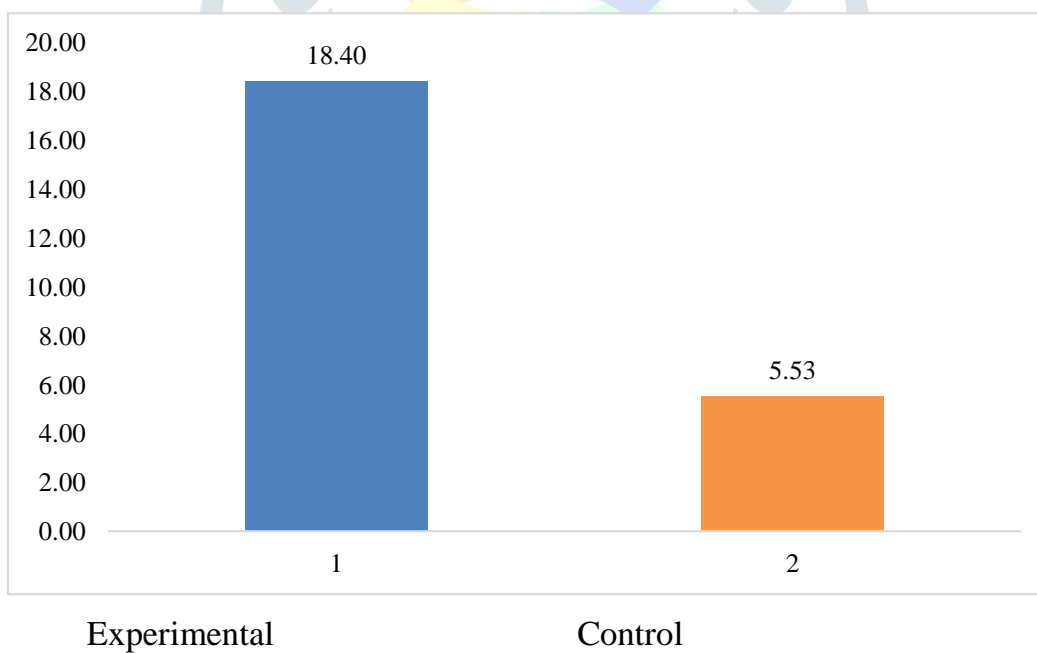
This similar type of interpretation can be observed in the following graph

Graph-3 : Graphical representation of pre and post values of NDI Of experimental and control group



There was a significant difference between pre and post intervention of positional release technique in subjects with subacute trapezitis.

Graph-4 : Graphical representation of mean difference values of NDI Of experimental and control group



There was a significant difference between pre and post intervention of positional release technique in subjects with subacute trapezitis.

Table-3 : Analysis of mean and standard deviation of ROM of experimental and control groups.

	Group	N	Mean	SD	Z-Value	p-value	Remarks
Cervical Flexion	1	15	2.33	0.976	-1.375	0.169	Not Significant
	2	15	2.07	0.458			
Cervical Extension	1	15	4.87	0.834	-4.671	0.000	Significant
	2	15	1.93	0.799			
Side Flexion Right	1	15	3.53	0.516	-4.355	0.000	Significant
	2	15	1.60	0.828			
Side Flexion Left	1	15	3.73	0.961	-4.663	0.000	Significant
	2	15	1.40	0.507			

RESULTS:

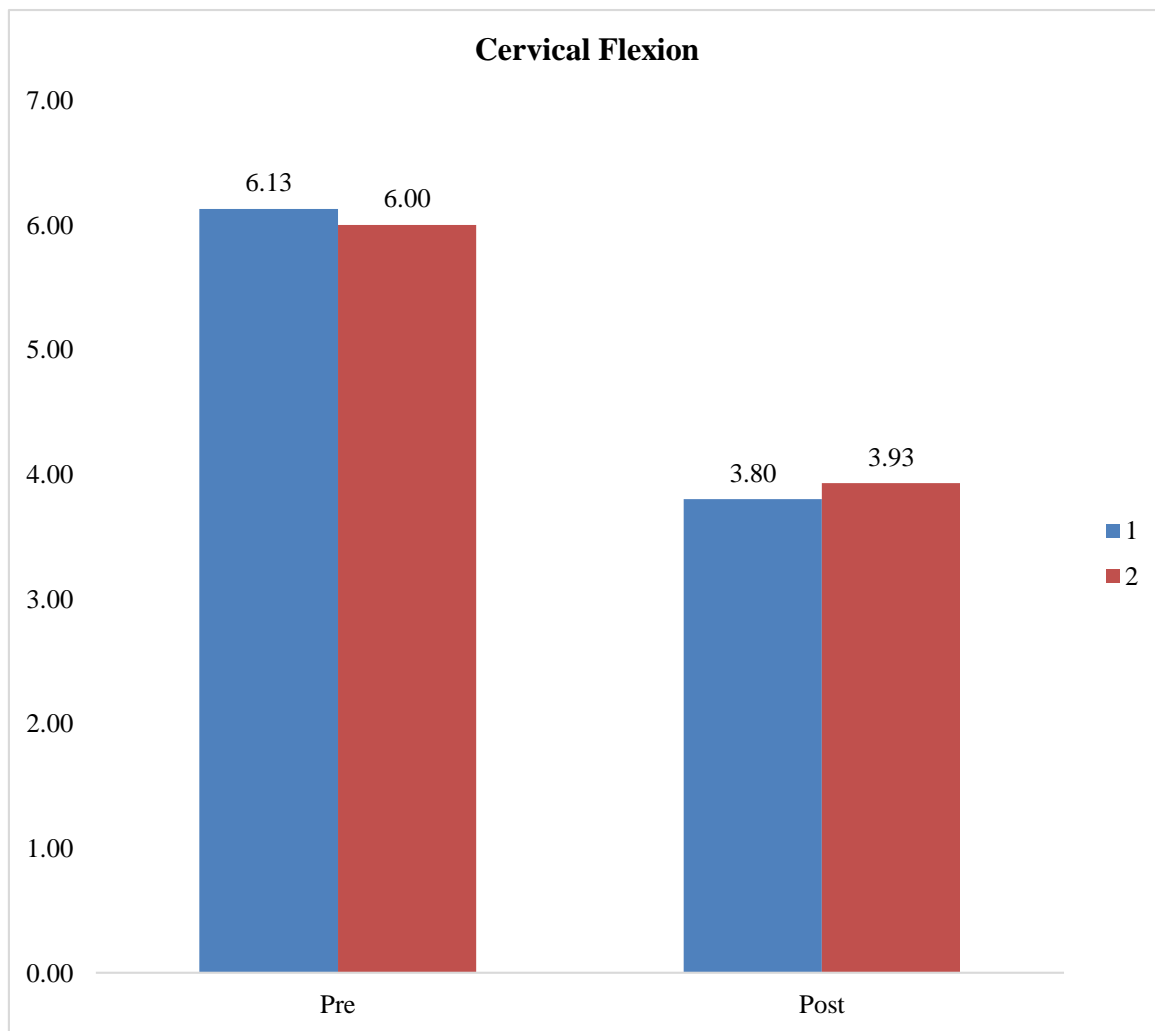
Mean values of ROM in experimental group were 18.40 and 5.53 in control group which shows significant reduction in the values.

INFERENCE:

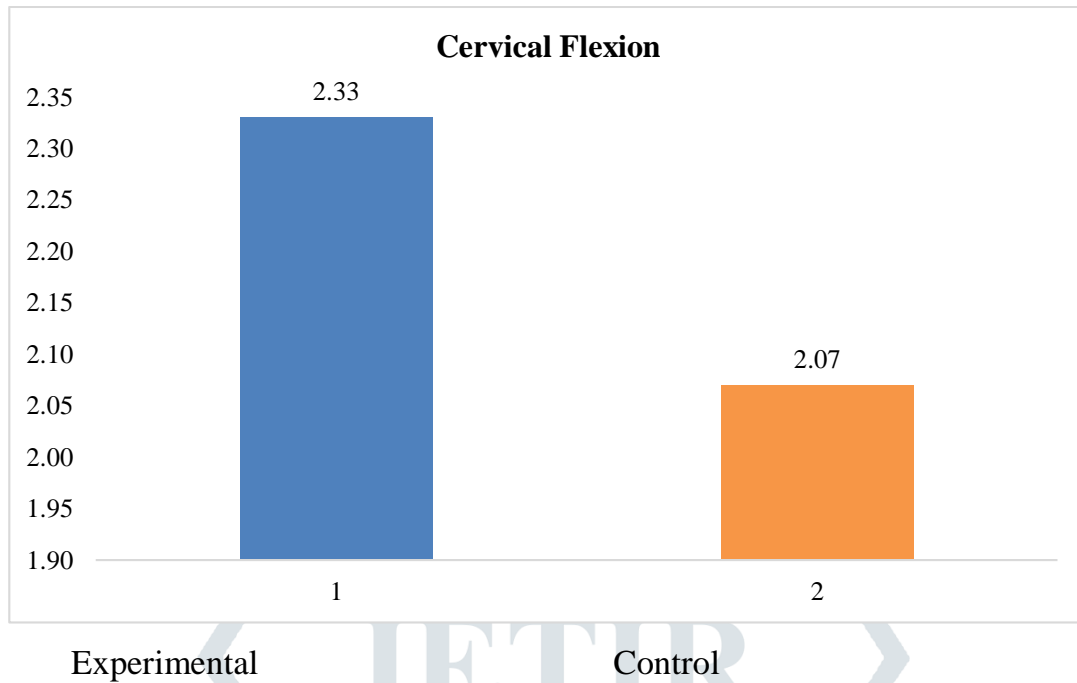
It was observed that there was a statistical significance ($p < 0.05$) existing between the observation of mean for experimental and control groups with respect to ROM.

This similar type of interpretation can be observed in the following graph.

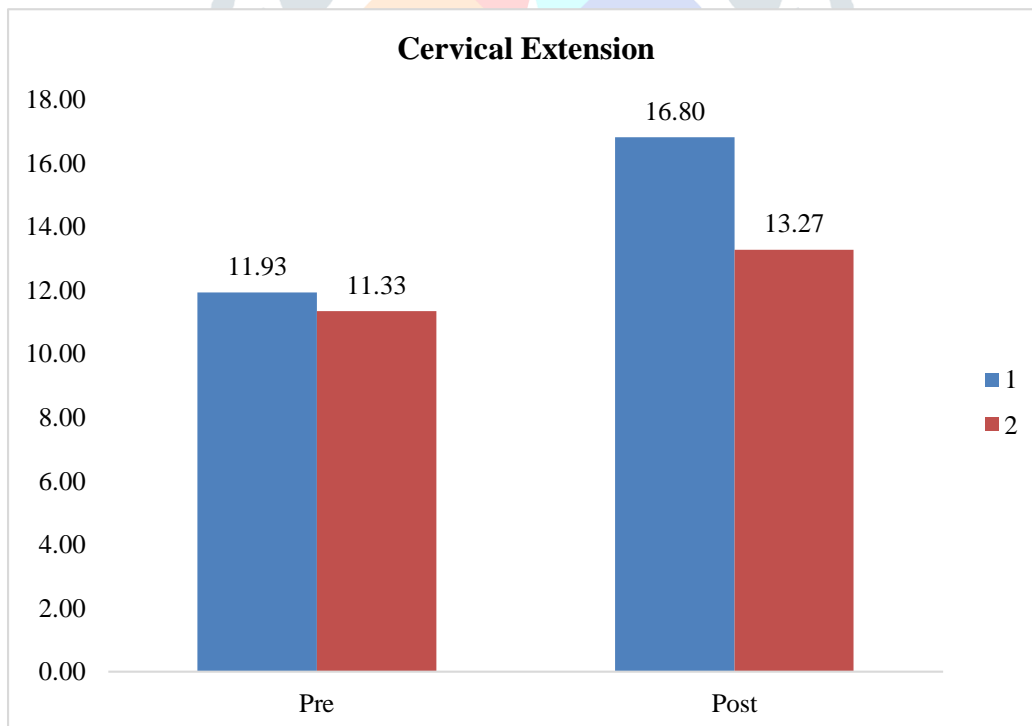
Graph-5 : Graphical representation of pre and post values of ROM of cervical flexion of experimental and control group



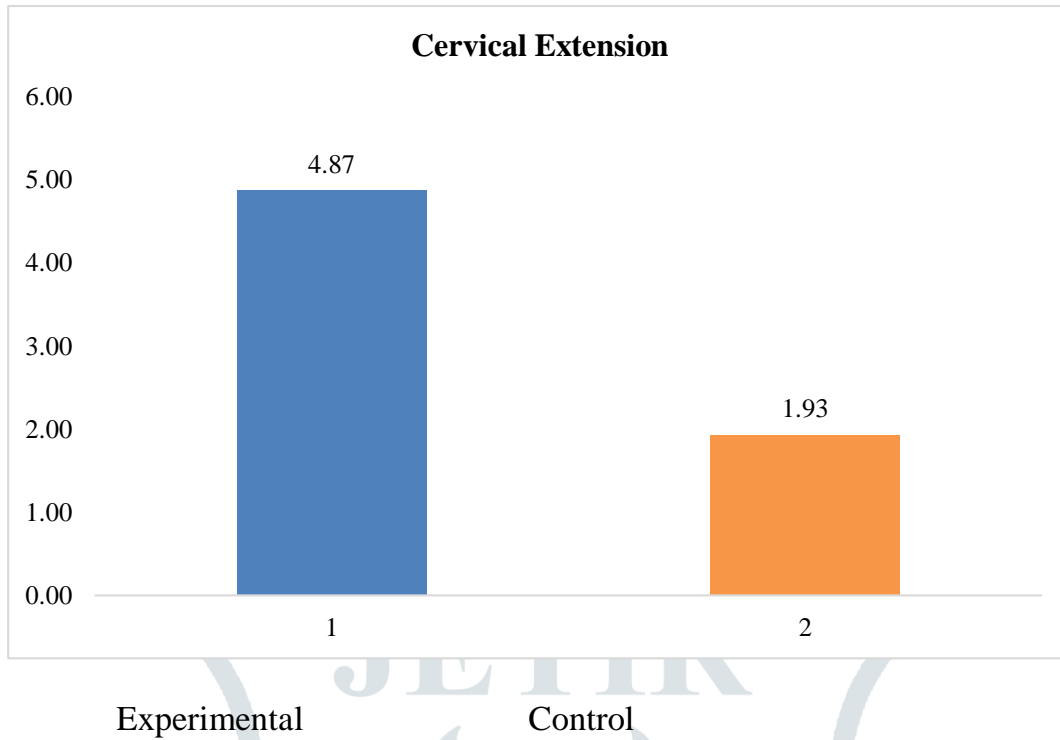
Graph-6 : Graphical representation of mean difference values of ROM of Cervical Flexion of experimental and control group



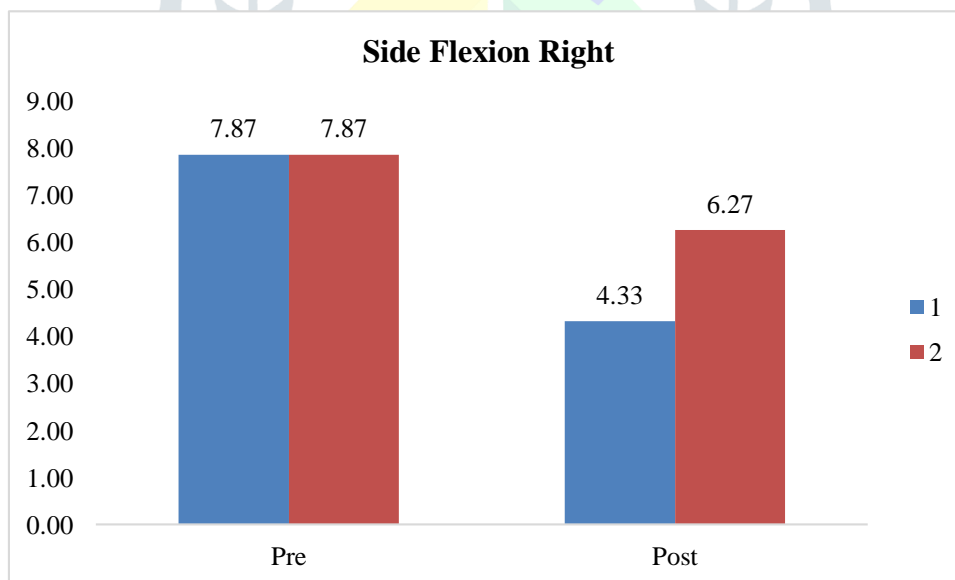
Graph-7 : Graphical representation of pre and post values of ROM of cervical extension of experimental and control group



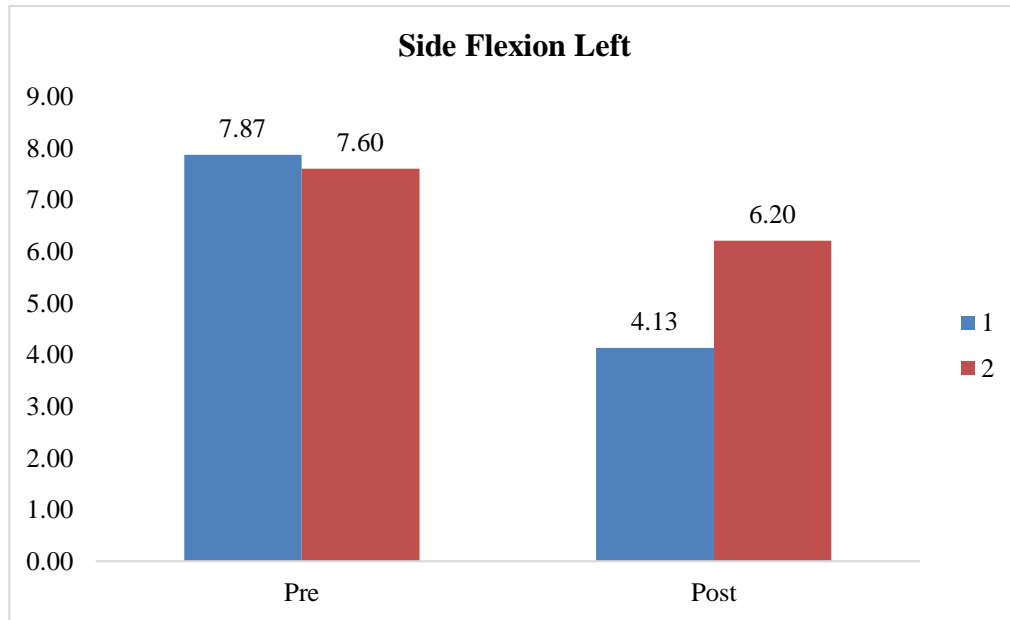
Graph-8 : Graphical representation of mean difference values of ROM of experimental and control group



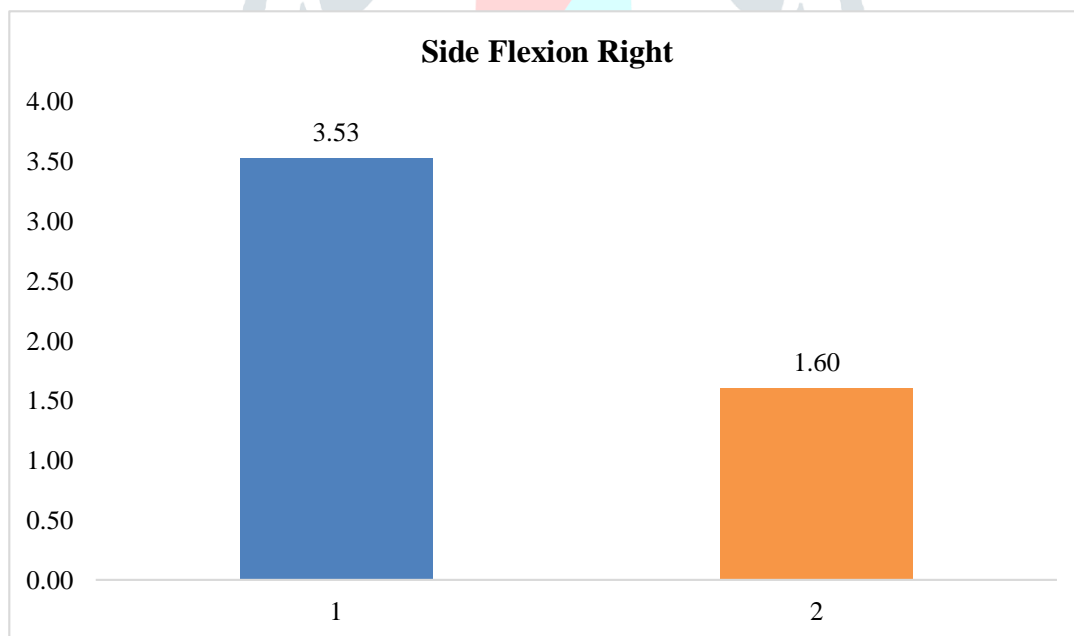
Graph-9 : Graphical representation of pre and post values of ROM of cervical side flexion to right of experimental and control group



Graph - 10 : Graphical representation of pre and post values of ROM of Cervical Side Flexion to Left of experimental and control group



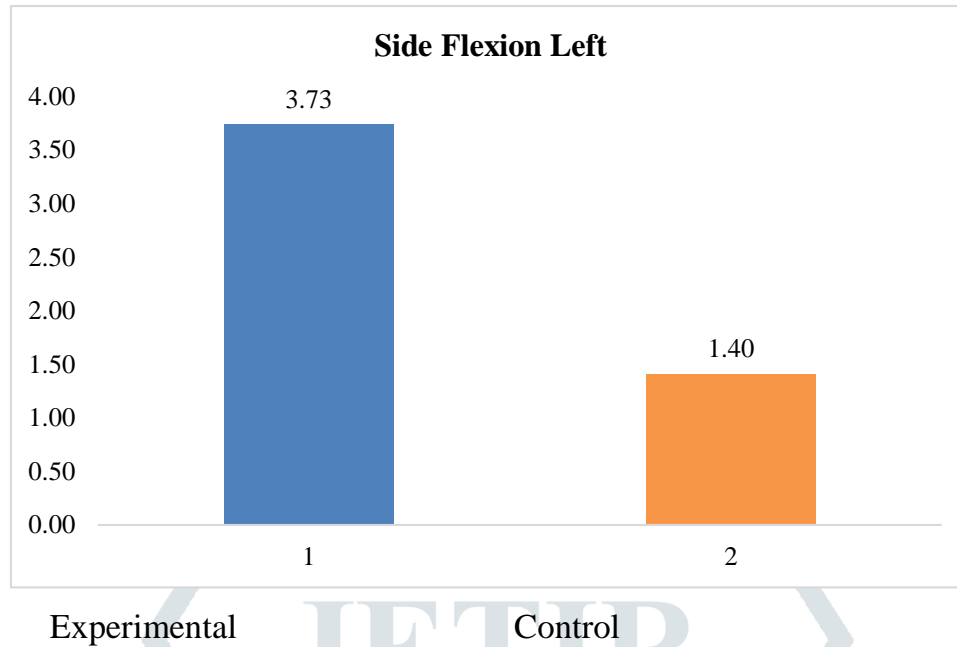
Graph-11 : Graphical representation of mean difference values of ROM cervical side flexion to right of experimental and control group



Experimental

Control

Graph-12 : Graphical representation of mean difference values of ROM cervical side flexion to left of experimental and control group



DISCUSSION

It is found that two weeks of PRT with passive stretching have shown statistically significant greater effect in improving pain, functional disability and cervical active rotation and lateral flexion ROM than the control group treated with trapezius stretching for subjects with subacute trapezititis.

In study group, the improvement in pain, cervical Range of motion and functional disability could be an effect of positional release technique and trapezius stretch. Positional release technique aims at removing restrictive barriers of movement in the body. This is accomplished by decreasing protective muscle spasm, facial tension, joint hypomobility, pain, and swelling and increasing circulation and strength. As a result the patient begins to move more easily, with less pain and discomfort^{15,16,17}

Positional release technique acts on the muscle spindle mechanism and its associated reflex mechanism (which controls spasm) to promote a more normal firing of the spindle and a more normal level of tension in the muscle, which results in a more normal relationship within the various soft tissue surrounding the area. These techniques work to reduce the hyperactivity of the myotatic reflex arc and to reduce the overwhelming afferent nerve impulses within the arc that may lead to an overflow of neurotransmitters into the associated dermatome, resulting in referred pain. This phenomenon is known as a “facilitated segment”. PRT ‘sets the stage’ for normal process to occur more efficiently. Reduction in localized spasm increase range of motion, decreases pain, allows normal circulation and improves

lymph drainage and increases the potential for more normal biomechanics. PRT strongly complements traditional therapy regimens by allowing them to be more effective.^{15.16.17}

Kumaresan et al., stated in their study that both positional release therapy and the conventional treatment method showed significant difference in the intensity of pain within the groups and between the groups on the 7th day of treatment

Jagatheesan Alagesan et al studied conventional treatment with PRT or conventional treatment with taping is equally effective and produced significant pain relief in tender point of unilateral upper trapezius muscle as like the conventional treatment by moist heat and shoulder girdle exercises

The improvements in the both group could be due to the effect of passive stretching. The concept behind the stretching of trapezitis is that the affected muscle is set in the lengthened position in order to activate autogenic inhibition reflex and to improve the viscoelastic property of the muscle and surrounding tissue. Cunha ACV et al found that conventional stretching and muscle chain stretching in association with manual therapy were equally effective in reducing pain and improving the range of motion and quality of life

Based on the statistical analysis, the alternate hypothesis stating that positional release technique has a significant effect on pain, range of motion in subjects with subacute trapezitis is more significant in subjects with subacute trapezitis. So alternate hypothesis can be accepted and null hypothesis can be rejected.

CONCLUSION

It is concluded that Positional release technique significantly found more effective along with trapezius stretching in improving pain, functional disability and cervical range of motion than trapezius stretching alone for subjects with subacute trapezitis.

LIMITATIONS OF THE STUDY

- Large sample size can be taken.

IMPLICATIONS OF FUTURE RESEARCH

- Further studies can be focused on evaluating on other age groups.
- Large and well-designed prospective studies would add more information to the literature.

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REFERENCES

1. Audette I, Dumas J.-P., Côté J.N et al Validity and between-day reliability of the Cervical Range of Motion (CROM) Device. *J. Orthop. Sports Phys. Ther.* 2010.
2. Rodríguez-Sanz J., Carrasco A., Cabanillas-Barea S et al Validity and reliability of two smartphone applications to measure the lower and upper cervical spine range of motion in subjects with chronic cervical pain. *J. Back Musculoskelet. Rehabil.* 2019.
3. J. Selhub, P. F. Jacques, I. H. Rosenberg et al., “Serum total homocysteine concentrations in the third National Health and Nutrition Examination Survey (1991–1994): population reference ranges and contribution of vitamin status to high serum concentrations,” *Medicine*, vol. 131, no. 5, pp. 331–339, 1999.
4. R. J. Gatchel, J. P. Garofalo, E. Ellis, and C. Holt, “Major psychological disorders in acute and chronic TMD: an initial examination,” *Journal of the American Dental Association*, vol. 127, no. 9, pp. 1365–1374, 1996.
5. F. J. Keefe, M. E. Rumble, C. D. Scipio, L. A. Giordano, and L. M. Perri, “Psychological aspects of persistent pain: current state of the science,” *The Journal of Pain*, vol. 5, no. 4, pp. 195–211, 2004.
6. Dieleman JL, Cao J, Chapin A, Chen C, Li Z, Liu A, et al. US health care spending by payer and health condition, 1996-2016. *JAMA*. 2020;323(9):863–84.
7. Lezin N, Watkins-Castillo S. The impact of musculoskeletal disorders on Americans-opportunities for action. *Burden Musculoskelet Dis US Prev Soc Econ Cost*. 2016;3.
8. Safiri S, Kolahi A-A, Hoy D, Buchbinder R, Mansournia MA, Bettampadi D, et al. Global, regional, and national burden of neck pain in the general population, 1990–2017: systematic analysis of the Global Burden of Disease Study 2017. *BMJ*. 2020;368.
9. Gupta S, Jaiswal P, Chhabra, D. A comparative study between postisometric relaxation and isometric exercises in non-specific neck pain. *Journal of Exercise Science and Physiotherapy*. 2008; 4(2):88-94.
10. Rand S. Therapeutic modalities in the management of nonspecific neck pain. *Physical Medicine and Rehabilitation Clinics of North America journal*. 2003; 14:605–627.
11. Ruud Groeneweg, Hans Kropman, Huco Leopold, Luite van Assen, Jan Mulder, Maurits W van Tulder and Rob AB Oostendorp Citation:*BMC Musculoskeletal Disorders* 2010 11:14.
12. Workplace-Based Interventions for Neck Pain in Office Workers: Systematic Review and Meta-Analysis 2018 Gisela Sjøgaard.

13. Slavin RE (1986) Best evidence synthesis: an alternative to meta-analytic and traditional reviews. *Educational Researcher* 15:5–11.
14. Slavin RE (1995) Best evidence synthesis: an intelligent alternative to metaanalysis. *J of Clin Epidem* 48:9–18.
15. Kerry j. D' Ambrogio, George b. Roth. *Positional Release Therapy*. 1st ed; 1997.
16. Lawrence H. Jones, DO. *Jones Strain Counter Strain*. 2nd ed; 1995.
17. Janet D Travell, David G Simons. *Myofascial Pain and Dysfunction: The Trigger point Manual*. Volumes 1 (Upper Body). 2nd ed; 1983

