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# Effect of positional release technique and scapular stabilisation exercises on unilateral upper trapezius spasm in undergraduate students at the end 4 weeks: Randomised controlled trail

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**Abstract**
**Background:** Neck pain is a very common problem among across every age group and it originates due to multiple factors. Excess physical loading or strain can cause microtrauma in the tissues. The principle muscle to carry load and maintain postural stability in the scapulocervical and scapulothoracic region is the trapezius. Muscle imbalance around the cervical spine caused due to excessive loading on upper trapezius and continuous bad posture causes neck pain. Students studying for long hours continuously experience neck pain and they have shown high prevalence as much as 48-78%.
**Objectives:** To study the effectiveness of positional release technique and scapular stabilisation exercises on unilateral upper trapezius spasm in undergraduate students at the end of 4 weeks.
**Methods:** Various undergraduate colleges were visited in and around the city. The subjects (total n=60) were selected according to the inclusion and exclusion criteria and randomly allotted to Group A (total n=30) and Group B (total n=30). The outcome measures Visual Analogue Scale and Neck Disability Index scores were taken before the treatment began and after 4weeks in both the groups. Group A were given Positional Release Technique Group B were given Positional Release Technique along with Scapular Stabilisation Exercises.
**Results:** Statistical analysis showed the effect of positional release technique and scapular stabilisation exercises on unilateral trapezius spasm at end of 4 weeks showing p value<0.0001 which was highly effective using paired t test. The Post comparison of both the control group and experimental group showed p value <0.05 which is effective using unpaired t test.
**Conclusion:** The study shows that positional technique and scapular stabilisation exercises are effective in relieving unilateral trapezius spasm in undergraduate students at the end of 4 weeks.

**Keywords:** trapezius, spasm, undergraduate students, positional release technique, scapular stabilisation exercises, VAS, NDI

## Introduction

Neck pain is the common problem in general population. The cervical spine is the most intricate region of the spine and so are the muscles of this region. The principle muscle to carry the load is the trapezius [1]. Neck Pain arises from anywhere like superiorly by superior nuchal line, inferior by tip of first thoracic spinous process, and laterally by the lateral border of neck is one of the most common cause in dysfunction of cervical spine. Although the cause of neck pain is exactly unknown but some of the risk factors associated with neck pain included age, excessive work, carrying of heavy loads, poor posture, mental depression and strain. Another cause of neck pain are varied most causes are believed to be due to sprain or strain in the muscles and soft tissues of the neck [3]. Undergraduate students have been reported to have a high prevalence of neck and upper extremity pains.

The prevalence of neck pain has been reported as 48- 78% [4]. Muscle impairment is a known feature of painful neck disorders scapula shares common muscle attachments with the neck, and it has been proposed that altered axioscapular muscle function potentially contributes to neck pain due to abnormal loading of the cervical spine [10].

Upper trapezius is a primary scapula stabiliser and causes elevation of scapula. When the upper trapezius is shortened the scapula may also displays asymmetry and disorientation which can cause slight scapular elevation. Due to prolonged static sitting posture causes overloading of upper trapezius muscle and weakness in the scapulothoracic region mainly in the middle and lower trapezius. This mechanism results in muscle imbalance causing pain and functional disability. Scapulothoracic muscle reduce biomechanical loading of cervicoscapular musculature.

Muscle imbalance in the scapulothoracic region occur when the upper trapezius muscle becomes tight and the middle and lower trapezius muscles weak which results in pain.

**Need of Study**

There has been evidence suggesting that manual therapy along with exercises is effective for patients with trapezius spasm and it also enhances quality of life in patients. Undergraduate students study for long hours which cause overuse of upper trapezius muscle. Undergraduate students have been reported to have a high prevalence of neck and upper extremity pains. The prevalence of neck pain has been reported as 48-78% [4]. This study will focus of reducing the overactivity of upper trapezius and facilitate the other weakened muscles around scapula (serratus anterior, lower trapezius and rhomboids) which will help reduce the pain due to upper trapezius spasm.

There is lack of evidence on application of positional release technique and scapular stabilisation exercises on neck pain. This study is sought to find out the efficacy of positional release technique and Scapular Stabilization Exercises in reducing pain and in improving the functional status in patients with unilateral upper trapezius spasm and to develop evidence by assessing VAS and NDI as outcome measures.

**Criteria**

**Inclusion**

Trapezius spasm( unilateral), Suffered at least 3 months of neck pain, VAS of 4-8, NDI score of 15-34 points, Both male and female participants, No. of hours studying 5, Age: 18-25.

**Exclusion**

Recent surgery and cervical spine fracture, recent temporomandibular surgery, Recent trauma or injury to shoulder, Torticollis, Disc pathology.

**Method**

Various undergraduate colleges were visited in and around the city. Total 60 subjects were selected according to the inclusion and exclusion criteria. The subjects were explained about the study and procedure and the consent was taken from whoever wished to participate. The subjects were then allotted in the Group A which is the control group (total n=30) and Group B which is the experimental group (total n=30) by chit method. The outcome measures Visual Analogue Scale and Neck Disability Index scores were taken before the treatment began and after the treatment was given at the end of 4weeks in both the groups. Group A were given Positional Release Technique and Group B were given Positional Release Technique along with Scapular Stabilisation Exercises.

**Protocol**

**Positional Release Technique**

The subjects will receive Positional release technique in supine lying with the therapist sitting on the affected side, tender points were located along with the upper fibres of trapezius muscle [6]. The subject's head is laterally flexed towards the side of tender point, then therapist grasps the subject's forearm and abducts shoulder to approximately 90degree and adds slight flexion or extension to fine-tune. The ideal position of comfort achieved is held for a period of 90 sec and followed by passive return of body part to an anatomically neutral position continued for 5 minutes [6].

**Scapular Stabilisation Exercise**

Patient position - Side lying, with the affected extremity up draped on the therapist shoulder [7].

The degree of shoulder flexion, scaption, or abduction can be controlled by your stance and the relative position of the patient. Progress to sitting with the patient's arm draped over your shoulder; apply resistance to all scapular motions elevation, depression, protraction, or retraction with pressure directly on the scapula in the direction opposite to the motion [7].

Scapular elevation/depression. (upper trapezius, lower trapezius) Place your top hand superiorly and the other hand inferiorly around the scapula to provide manual resistance [7].

Scapular protraction/depression (serratus anterior, lower trapezius). Place your top hand along the medial border and the other around the coracoid process to provide resistance [7]. Scapular upward and downward rotation (trapezius, rhomboids and levator scapulae).

Place one hand around the inferior angle and the other hand around the acromion and coracoid process to provide resistance [7].

**Data Analysis**

**Group A:**

**Table 1:** VAS

| | MEAN | SD | | | |
|---|---|---|---|---|---|
| Pre VAS | 6.033333333 | 1.139688 | T value 25.25 | P value <0.0001 | Signifiance Considered Extremely Significant |
| Post VAS | 2.266666667 | 0.727427 | | | |

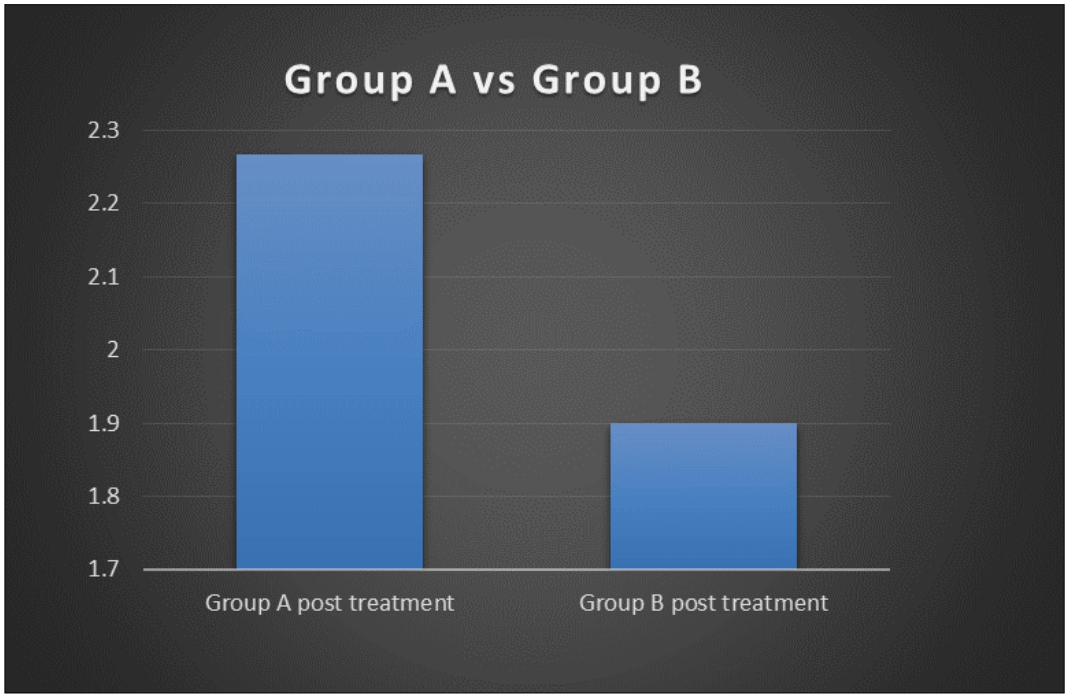


**Fig 1**

**Table 2:** NDI

| | **MEAN** | **SD** | T value 52.25 | P value <0.0001 | Significance Considered Extremely Significant |
|---|---|---|---|---|---|
| Pre NDI | 22.93333333 | 2.264705 | | | |
| Post NDI | 11.2 | 1.777639 | | | |

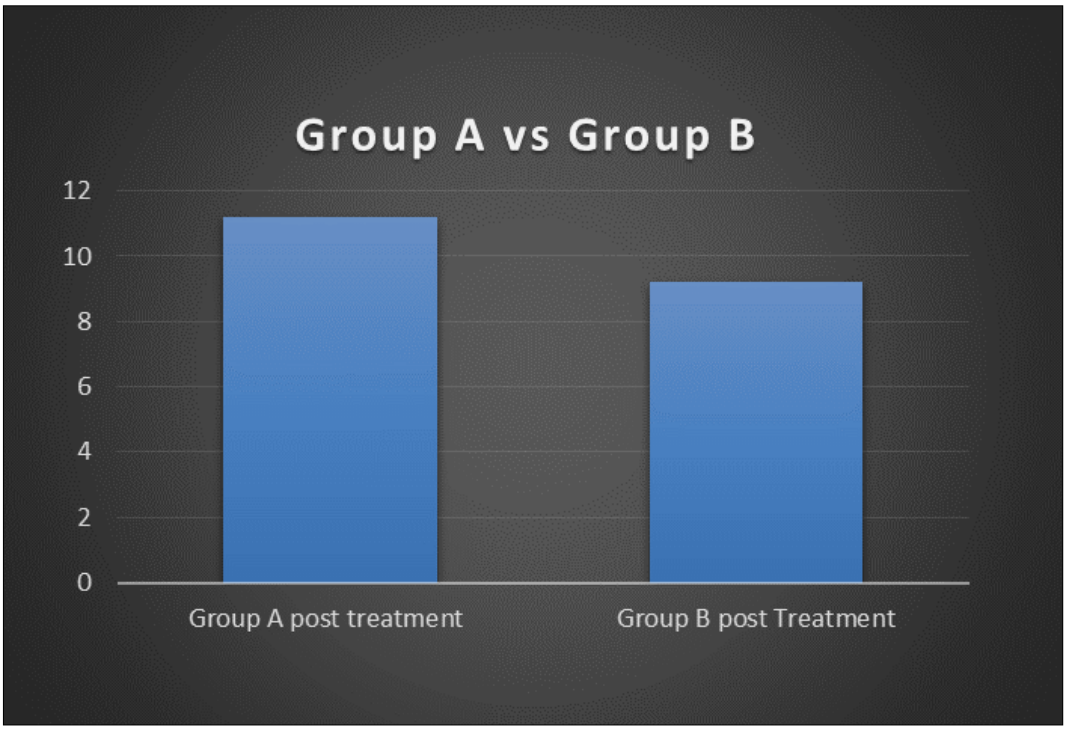


**Fig 2**

**Group B**

**Table 3:** VAS

| | **MEAN** | **SD** | T value 20.04 | P value <0.0001 | Significance Considered Extremely Significant |
|---|---|---|---|---|---|
| Pre VAS | 6.233333333 | 1.22972445 | | | |
| Post VAS | 1.9 | 0.65064071 | | | |

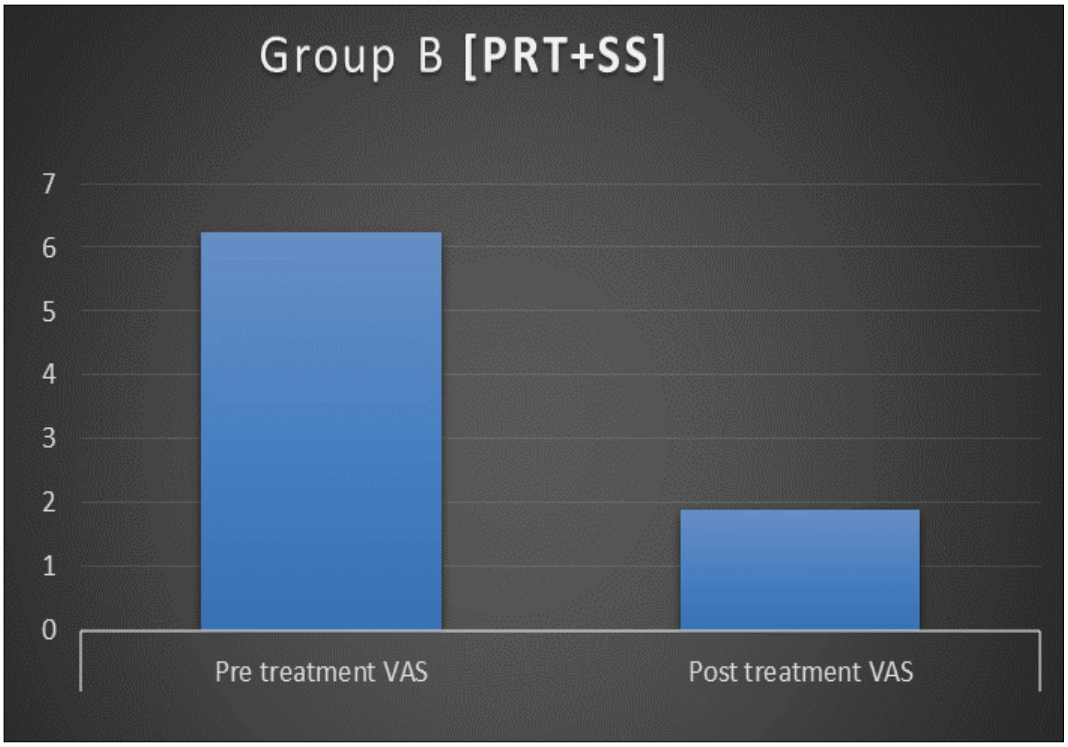


**Fig 3**

**Table 4:** NDI

| | **MEAN** | **SD** | T value 25.27 | P value <0.0001 | Significance Considered Extremely Significant |
|---|---|---|---|---|---|
| Pre NDI | 22.13333333 | 4.4042734 | | | |
| Post NDI | 9.2 | 3.1559468 | | | |

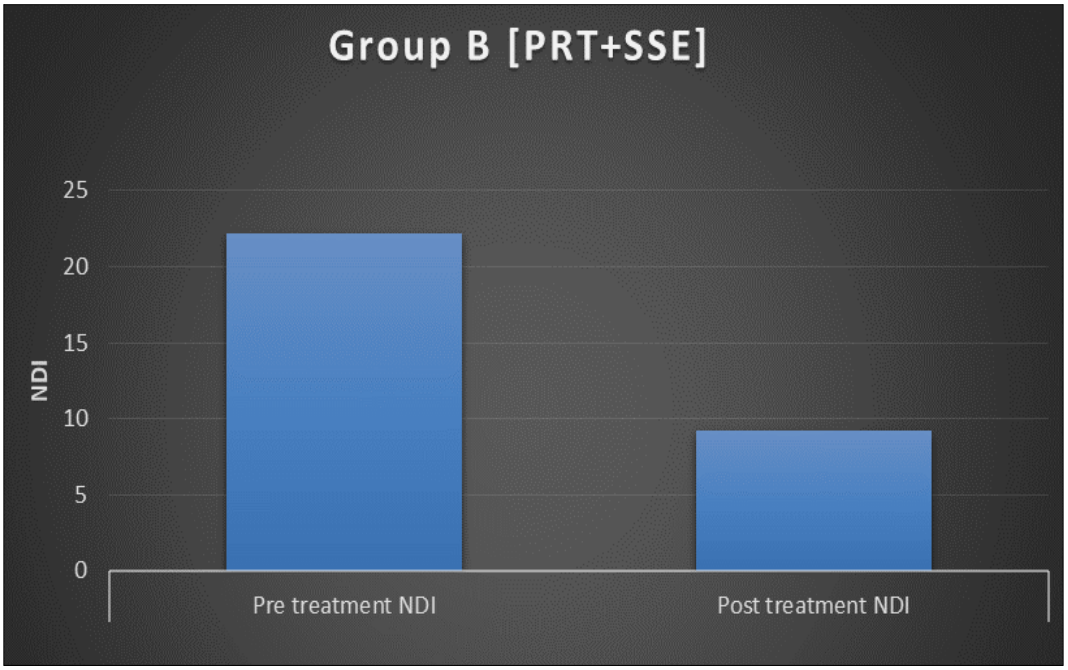


**Fig 4**

**Group A when compared to Group B**

**Table 5:** VAS

| | **Mean** | **SD** | T value 2.023 | P value 0.046 | Significance Considered Moderately Significant |
|---|---|---|---|---|---|
| 1. Post VAS [PRT] | 2.266666667 | 0.727247 | | | |
| 2. Post VAS [PRT+SS] | 1.9 | 0.65064071 | | | |

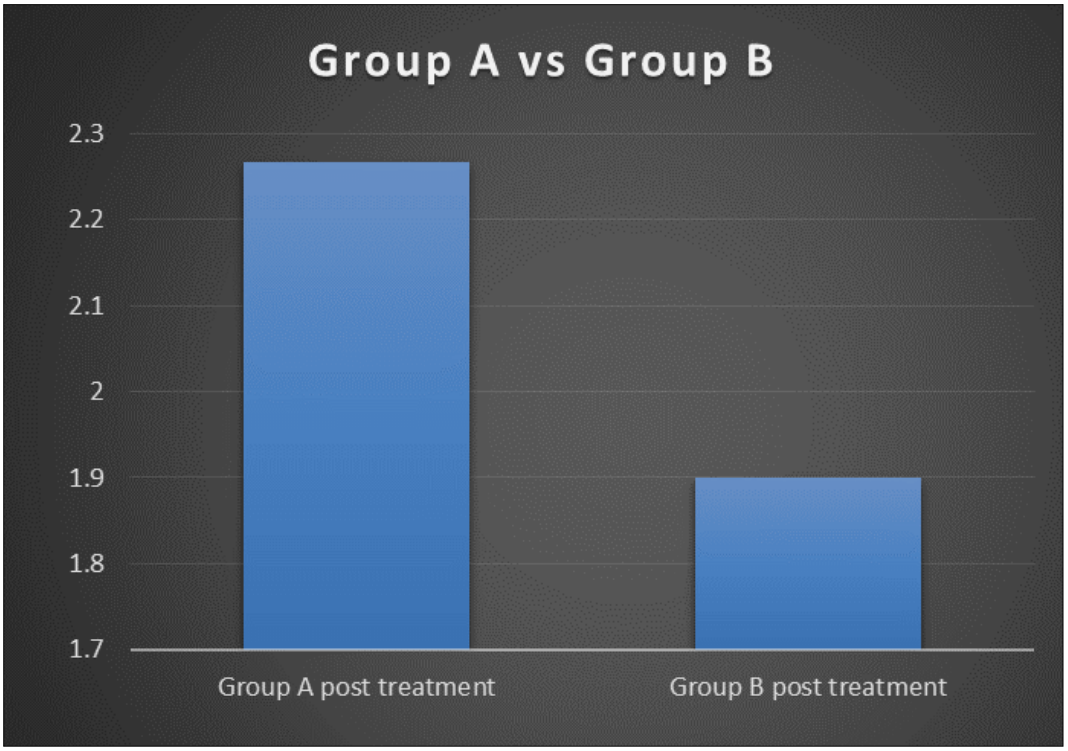


**Fig 5**

**Table 6:** NDI

| | **Mean** | **SD** | T value 2.973 | P value 0.0043 | Significance Considered Moderately Significant |
|---|---|---|---|---|---|
| 1. Post NDI [PRT] | 11.2 | 1.777639 | | | |
| 2. Post NDI [PRT+SS] | 9.2 | 3.1559468 | | | |

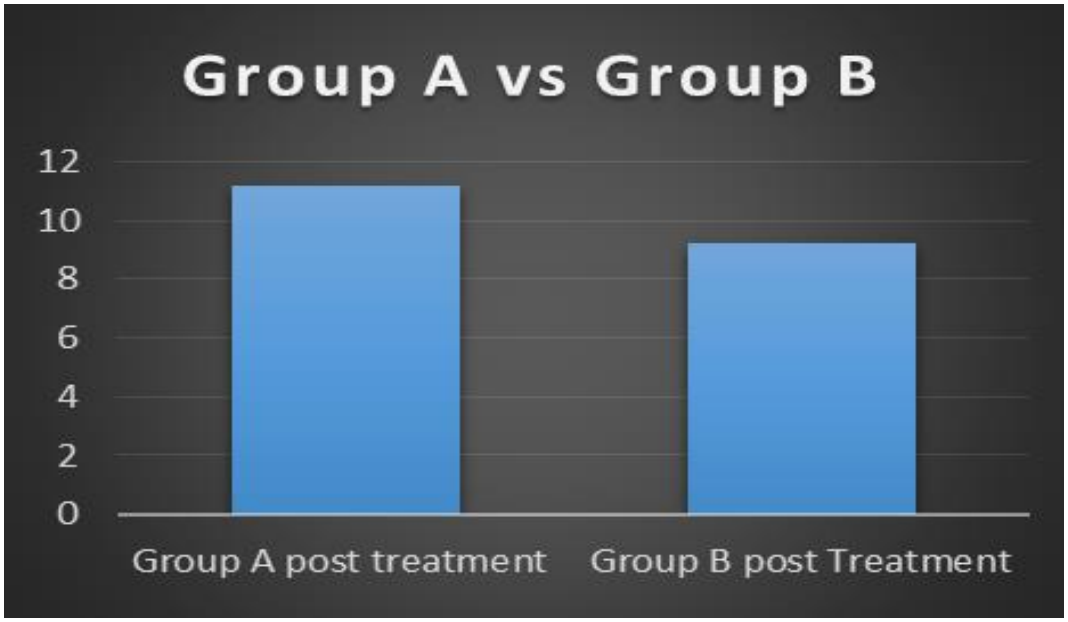


**Fig 6**

**Results**

In this study 30 students in Group A (control group) were given positional release technique and 30 students in Group B (experimental group) were given positional release technique and scapular stabilisation exercises.

The pre and post mean values of VAS in Group A are 6.0333 and 2.266 respectively and NDI scores 22.93 and 11.2 respectively.

The pre and post mean values of VAS in Group B are 6.233 and 1.9 respectively and NDI scores 22.133 and 9.2 respectively.

The difference between the pre and post visual analogue scale and neck disability index were compared within the groups and analysed using paired t test.

VAS and NDI values in Group A shows pvalue <0.0001 which is statistically extremely significant thus positional release technique is effective in relieving unilateral trapezius spasm.
VAS and NDI values in Group B shows p value<0.0001 which is statistically extremely significant thus positional release technique and scapular stabilisation exercises are effective in relieving unilateral trapezius spasm.
When the post treatment values of VAS and NDI in Group A and Group B were compared the p value obtained is <0.05 which is statistically significant.
Although positional release technique is effective in relieving upper trapezius but when combined with scapular stabilisation exercises the VAS and NDI scores showed Group B has experienced more pain relief as well as improved functional status.

**Discussion**

The present study was to done to study the effect of Positional Release Technique and Scapular Stabilisation exercises on unilateral trapezius spasm in undergraduate students at the end of 4 weeks. In this study 60 subjects randomly allotted to two groups i.e. Group A and Group B.
Group B has shown more relief in pain as compared to group A according to visual analogue scale and also showed improvement in the functional activity and reduction in disability according to Neck Disability Index.
The functional disability improved from moderate to mild in both the groups but the effect was observed more prominently in the Group B.
Neck pain can be multifactorial in origin. Excess physical loading or strain can cause microtrauma in the tissues.
The principle muscle to carry load and maintain postural stability in the cervicothoracic region is the trapezius.
Upper trapezius is a primary scapula stabiliser and causes elevation of scapula.
When the upper trapezius is shortened the scapula may also displays asymmetry and disorientation which can cause slight scapular elevation. Due to prolonged static sitting posture causes overloading of upper trapezius muscle and weakness in the scapulothoracic region mainly in the middle and lower trapezius. This mechanism results in muscle imbalance causing pain and functional disability.
Positional Release Technique treats the somatic dysfunction by slowly shortening the muscle to reset the muscle spindle gamma-motor neuron output and decrease the intrafusal and extrafusal fibre disparity so that the muscle spindle is no longer activated and decreases its firing frequency (contraction reflex) when the muscle resets to resting length [1].
Repositioning the upper trapezius can increase local circulation, reduce inflammation and swelling and help in waste removal thus relieving spasm in upper trapezius.
The Visual analogue scale score in Group B is less that Group A as it may be that the improvement in muscular control around the cervicoscapular region from stabilization exercises decreases the stresses placed on the joints with the combined effect of positional release technique which reduced the muscle spasm in upper trapezius.
Positional Release Technique in combination with Scapular Stabilisation Exercises resulted in more pain relief as the subjects in group B were given Positional Release Technique as well as performed targeted postural muscle stabilisation exercises. The primary scapular stabilisers lower trapezius and serratus anterior were isometrically strengthened in side lying as well as in sitting position to improve the postural stability in sitting posture. As the postural stability improved it also helped in alleviating the pain along with Positional Release Technique which has proven to be effective in pain relief.
A.kumaresan *et al* has suggested that Positional Release Therapy can be used as an adjunct with other conventional treatment methods for the relief of pain and trapezitis [1].
A study revealed by Petersen and Wyatt says that individuals with unilateral neck pain on compared to the contralateral side exhibited significantly less lower trapezius strength on the side of neck pain. (11)

**Conclusion**

Positional Release Technique and Scapular stabilisation is effective in relieving unilateral trapezius spasm, pain and in improving functional disability in undergraduate students after 4 weeks.

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