



# The Effectiveness Of Scapular Stabilizing Reversal Technique On FEV1 Among Information Technology Professionals Having Forward Head Posture At The End Of 4 Weeks. - An Experimental Study.

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**Abstract:** This study has been undertaken to check the effectiveness of scapular stabilizing reversal technique on FEV1. Because of rising popularity of Media, devices such as smartphones and computers and due to COVID work from home, frequent users often exhibit incorrect posture. Forward head posture is a poor habitual neck posture, which leads to weakening of respiratory muscles affecting respiratory function. The scapular stabilizing reversal technique aim to improve the mobility and muscle strength. Experimental study was performed from Oct 22 to April 23. A purposive sampling technique was applied to select 21 participants. The CVA measurement and pectoralis minor length test was performed to assess forward head posture. Peak flow meter was used to measure FEV1.

21 participants were included in the study. Paired T test was done. The result obtained for scapular stabilizing reversal technique on IT professionals with forward head posture measured by peak flow meter suggests significance as P value obtained was (<0.00001) and T value was (15.943).

This study shows that the effectiveness of scapular stabilizing reversal technique is extremely significant to increase FEV1 in forward head posture in IT professionals measured by peak flow meter.

**Keywords – CVA, FEV1, scapular stabilizing reversal technique.**

## I. INTRODUCTION

Because of the rising popularity of media, devices such as smartphones and computers and due to COVID work from home, frequent users often exhibit incorrect posture. <sup>(1)</sup> Forward head posture is a poor habitual neck posture that is defined by hyperextension of the upper cervical vertebrae and forward translation of the cervical vertebrae. <sup>(2)</sup>

Forward head posture greatly influences respiratory function by weakening the respiratory muscles. <sup>(3,4)</sup> Forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1.0), and accessory respiratory muscle activity were significantly lower in the forward head posture group, when compared with the normal group. <sup>(5)</sup> Another study showed that respiratory function is affected by forward head posture <sup>(6)</sup>. Another study suggested that inappropriate posture might impair respiratory function, particularly among patients with respiratory diseases. <sup>(7)</sup>

Forward head posture is known to have a large influence on respiratory function by weakening the respiratory muscles. <sup>(4,8)</sup> The SCM, scalene muscles, UT, pectoralis major (PM), and thoracolumbar ES muscles are important accessory respiratory muscles involved in inspiration <sup>(7,9)</sup> and prolonged forward head posture weakens these muscles, thereby decreasing their respiratory function. <sup>(9)</sup>

Because of this, patients with forward head posture accompanied by chronic neck pain have been shown to have less respiratory muscle strength than normal individuals <sup>(10)</sup> and their accessory respiratory muscles are shortened, which largely affects their respiratory function. <sup>(11)</sup> In addition, a study reported that forward head posture changes the alignment of the thoracic spine and rib cage due to a slightly bent posture, thereby causing respiratory dysfunction. <sup>(3)</sup>

Proprioceptive neuromuscular facilitation (PNF) as a physical therapy technique can improve function by stimulating proprioceptive sense in muscles, tendons, ligaments, and joints. PNF increases muscle strength, flexibility, and balance and improves physical and motor function. PNF is widely used for treatment of muscle, bone, and joint disorders, as well as central nervous system disorders following stroke.

The purpose of PNF concept is to enhance mobility, muscular strength and endurance, neuromuscular control and joint coordination. This goal can be achieved through diagonal patterns of movement through various stimuli and guidance provided by the therapist. <sup>(12)</sup>

Stabilizing reversals is characterized by alternating isotonic contractions opposed by enough resistance to prevent motion. The command is a dynamic command (»push against my hands«, or »don't let me push you«) and the therapist allows only a very small movement. <sup>(13)</sup>

The stabilizing reversal technique is used to enhance the muscle strength of the postural muscles of the trunk, the shoulder girdle, and the hip joint, stabilizing the muscles and increasing the stability of the relevant joints. <sup>(14)</sup>

The scapular patterns occur in two diagonals: anterior elevation–posterior depression and posterior elevation–anterior depression. Movement in the diagonals is an arc that follows the curve of the patient's torso. When the scapula is moved within the diagonal, the patient will not roll forward or back or rotate around one spinal segment. <sup>(13)</sup>

## II. NEED OF STUDY

IT professionals spent a lot of time sitting in front of a computer focusing on a computer screen because of which they develop an abnormal posture, which leads to muscular imbalance.

When this posture is maintained for prolonged periods the neck flexors and the erector spinae muscles in the upper thoracic region are weakened due to their lengthening, and the scapula is elevated, due to tension in the levator scapulae, sternocleidomastoid, splenius muscles which cause tension in upper trapezius which causes the weakening of respiratory muscles, thereby causing decrease in FEV<sub>1</sub> and respiratory dysfunction.

This study will be conducted to investigate the effect on FEV<sub>1</sub> by increasing the stability of scapula and decreasing the craniovertebral angle using of scapular stabilizing reversal technique.

## III. AIM

To Check the Effectiveness of Scapular Stabilizing Reversal Technique on FEV<sub>1</sub> among IT Professionals with Forward Head Posture At the End of 4 Weeks

## IV. OBJECTIVE

To Study The Effectiveness Of Scapular Stabilizing Reversal Technique On FEV<sub>1</sub> Among IT Professionals With Forward Head Posture At The End Of 4 Weeks.

## V. HYPOTHESIS

**Null hypothesis (h<sub>0</sub>):** scapular stabilizing reversal technique exercises will have no effect on fev<sub>1</sub> and posture among it professionals having forward head posture.

**Experimental hypothesis (h<sub>1</sub>):** scapular stabilizing reversal technique exercises will have an effect on fev<sub>1</sub> and posture among it professionals having forward head posture.

## VI. METHODOLOGY

- Source Of Data: IT professionals
- Study Design: Experimental study
- Sample Size: 21
- Study Duration: 4 weeks
- Intervention: 5 Sessions per week for 4 weeks
- Treatment Time: 20-30 minutes

## VII. MATERIALS

- Pen
- Paper
- Tape
- Mobile phone camera
- Peak Flow Meter
- Couch
- Non elastic measuring tape
- Image J software
- Consent form
- Data collection sheet

### VIII. INCLUSION CRITERIA

- Age group between 24 to 60 years
- Both males and females
- Rounded shoulders: Distance between the couch and tip of shoulder >2.5 cm
- Craniovertebral Angle < 50°
- Work in a day  $\geq$  4 hours

### IX. DIAGNOSTIC CRITERIA

- (Forward head) Craniovertebral Angle < 50°
- (Rounded shoulders) Distance between the couch and tip of the shoulder > 2.5 cm.

### X. EXCLUSION CRITERIA

- No neurological symptoms
- Scapula or Upper limb fractures
- Patients with other upper limb musculoskeletal disorders
- Patient with respiratory disorders.
- Patient with Cognitive impairments
- Patients with auditory deficits
- Cervical Instability
- Trauma to cervical spine within past 1 year
- Cervical surgery within past 1 year
- Congenital spinal deformities

### XI. PROCEDURE

- The study has begun with the presentation of synopsis and Ethical clearance from the ethical committee of PES Modern College of Physiotherapy.
- Participants were selected accordingly to inclusion and exclusion criteria and were explained about the study.
- Consent form were taken from the participants.
- Pre intervention CVA, pectoralis minor length test and FEV<sub>1</sub> measurement was done of the participants.
- PNF exercises was given 5 days per week for 4 weeks, 15 repetitions of 3 sets with pectoral stretches was given
- Post intervention FEV<sub>1</sub> measurement was done of the participants.

### XII. EXERCISE PROTOCOL

#### *Anterior Elevation*

- Grip  
Place one hand on the anterior aspect of the glenohumeral joint and the acromion with your fingers cupped. The other hand covers and supports the first. Contact is with the fingers and not the palm of the hand.
- Elongated Position  
Pull the entire scapula down and back toward the lower thoracic spine (posterior depression) with the inferior angle rotated toward the spine. Be sure that the glenohumeral complex is positioned posterior to the central anteroposterior line of the body (mid-frontal plane). You should see and feel that the anterior muscles of the neck are taut. Do not pull so far that you lift the patient's head up. Continued pressure on the scapula should not cause the patient to roll back or rotate the spine around one segment.
- Command  
Shrug your shoulder up toward your nose.
- Movement  
The scapula moves up and forward in a line aimed approximately at the patient's nose. The inferior angle moves away from the spine.



Figure 1: Resistance to Anterior Elevation

### ***Posterior Depression***

- **Grip**  
Place the heels of your hands along the vertebral border of the scapula with one hand just above (cranial to) the other. Your fingers lie on the scapula pointing toward the acromion. Try to keep all pressure below (caudal to) the spine of the scapula.
- **Elongated Position**  
Push the scapula up and forward (anterior elevation) with the inferior angle moved away from the spine until you feel and see that the posterior muscles below the spine of the scapula are tight. Continued pressure should not cause the patient to roll forward or rotate the spine around one segment.
- **Command**  
Push your shoulder blade down to me.
- **Movement**  
The scapula moves down (caudal) and back (adduction), toward the lower thoracic spine, with the inferior angle rotated toward the spine.



Figure 2: Resistance to Posterior Depression.

- ***Pectoralis minor stretching***

Patient position: In supine lying.

Physiotherapist: Retracts the patient shoulder and depresses the shoulder. Hand should be cupped around shoulder to allow firm, uniform pressure that helps to rotate the shoulder girdle back.

Done 3 times with 30 seconds hold.

- ***Pectoralis major stretching***

Patient position: In lying

Physiotherapist: abduct the patients arm to 90 degree and flex the elbow to 90 degree and the therapist will extend the shoulder and externally rotate the shoulder.

Done 3 times with 30 seconds holds.



Figure 3: Pectoralis Stretching

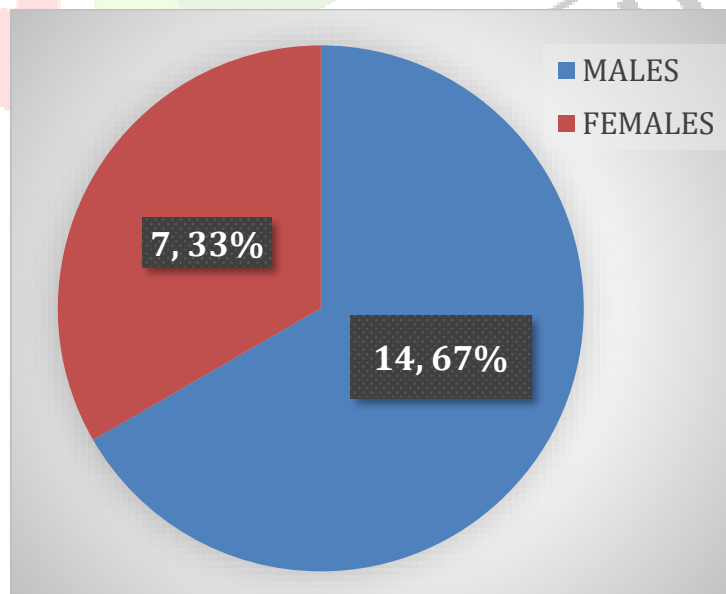
**XIII. RESULT**

21 participants were included in the study. Paired test was done.

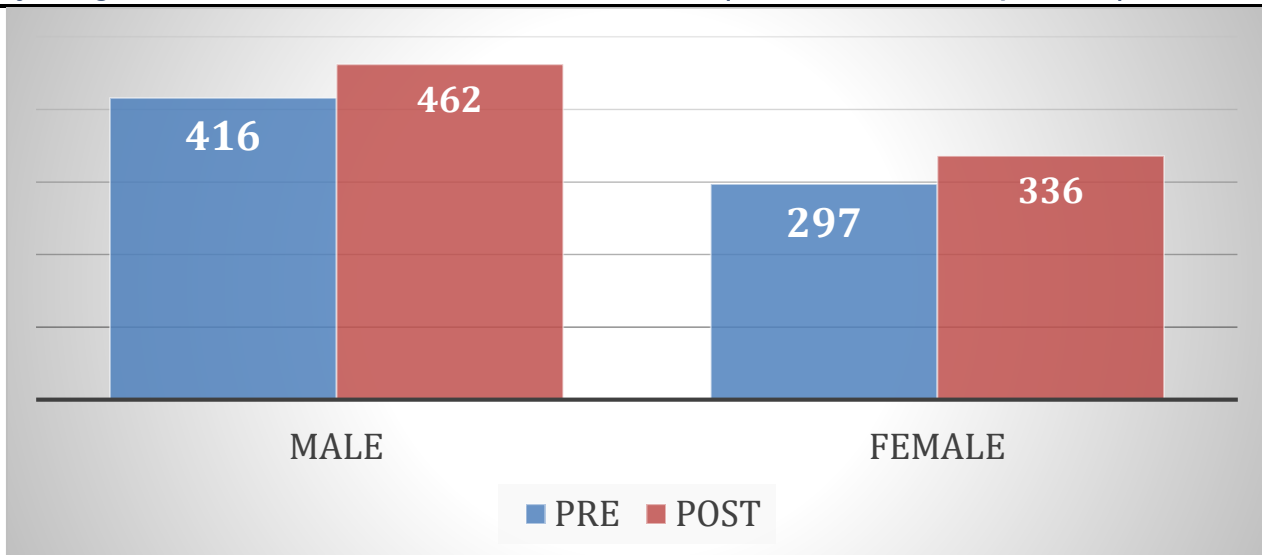
The result obtained for scapular stabilizing reversal technique to increase FEV1 among IT Professionals with Forward head posture measured by peak flow meter suggests significance as P value obtained was (<0.0001) and T value was (15.943).

PARAMTER	PRE TEST		POST TEST		T VALUE	P VALUE	RESULT
	MEAN	SD	MEAN	SD			
FEV1	395.5	±39.132	441	±40.640	15.943	<0.00001	EXTREMELY SIGNIFICANT

Table 1: Data Analysis of FEV1



Graph 1: Gender Distribution



Graph 2: Comparison of Pre Post FEV1 in males and females

#### XIV. DISCUSSION

The aim of the study was to check the effectiveness of scapular stabilizing reversal technique on FEV<sub>1</sub> among IT professionals with forward head posture at the end of 4 weeks.

Total 21 subjects were given protocol for 4 weeks to find the effectiveness of scapular stabilizing reversal technique on FEV<sub>1</sub>.

2 lateral photographs of subjects were taken to measure CVA using ImageJ software and pectoralis length test to check for forward head posture.

Peak flow meter was used to measure the Forced expiratory volume for 1 sec (FEV<sub>1</sub>).

Stabilizing reversals is characterized by alternating isotonic contractions opposed by enough resistance to prevent motion. The command is a dynamic command (»push against my hands«, or »don't let me push you«) and the therapist allows only a very small movement.<sup>(13)</sup>

The stabilizing reversal technique is used to enhance the muscle strength of the postural muscles of the trunk, the shoulder girdle, and the hip joint, stabilizing the muscles and increasing the stability of the relevant joints.<sup>(14)</sup>

The scapular patterns occur in two diagonals: anterior elevation–posterior depression and posterior elevation–anterior depression. Movement in the diagonals is an arc that follows the curve of the patient's torso. When the scapula is moved within the diagonal, the patient will not roll forward or back or rotate around one spinal segment.<sup>(13)</sup>

The pre and post assessment result of FEV<sub>1</sub> in males and females after scapular stabilizing reversal technique protocol found that p value is less than 0.000001, which is considered extremely significant.

The pre-treatment mean was 377 with SD of ±39.132 while post treatment mean was 420 with SD of ±40.64.

The T value was 15.943.

According to Eudora D'souza et al., there is effectiveness of scapular stabilizing reversal technique on pain and neck posture among young adult having upper cross syndrome and show that scapular stabilizing reversal technique is extremely significant to improve neck posture.

In the present study, the most possible reasons for the improvement could be PNF, which improves the strength of accessory inspiratory muscles and mobility of the muscles thus improving the mobility of chest. This improves the forced expiratory volume. According to TAIICHI KOSEKI ET AL.(2019), the effect of forward head posture on upper and lower thoracic shape in adults to better understand the relationship between a forward head posture and respiratory function. The forward head posture causes expansion of the upper thorax and contraction of the lower thorax, and these morphological changes because decreased respiratory function.

#### XV. CONCLUSION

There is a significant effect of scapular stabilizing reversal technique on fev1 in it professionals with forward head posture.

#### XVI. LIMITATIONS

Lack of long-term follow up

#### XVII. FUTURE SCOPE

Other professions can be considered.

Lifestyle modifications and its relation with FEV<sub>1</sub> can be compared.

This study can be conducted over a larger population of a state or Country

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