

Correlation of Trapezititis with Scapular Dyskinesia and Hand Grip Strength in Academicians

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ABSTRACT

Background: The scapula is vital to the upper limb kinematic chain and gleno-humeral rhythm. Scapular dyskinesia, caused by abnormal scapular movement, often leads to pain. Overhead tasks like writing and grading can cause muscle imbalances. This imbalance disrupts scapular mechanics and grip strength by reducing force transfer efficiency along the arm.

Methodology: After obtaining written informed consent from the academicians, the procedure was explained to them, and participants were selected based on the inclusion criteria from various schools and colleges in Ahmedabad. Scapular dyskinesia, trapezititis, and grip strength were assessed using the Lateral Scapular Slide Test, Visual Analog Scale, and Jamar Handheld Dynamometer, respectively.

Results: A total of 9 males and 41 females were included in the study. The mean \pm SD of age was 31.64 ± 4.52 years, teaching hours were 4.8 ± 0.75 hours per day, and years of experience were 7.26 ± 1.32 years. The data was not normally distributed; therefore, the Spearman rank correlation test was used. LSST1 showed Weak positive statistically significant correlation with VAS ($r = 0.168$, $p = 0.243$) or grip strength ($r = 0.243$, $p = 0.134$). LSST2 showed a Strong positive statistically significant correlation with VAS ($r = 0.609$, $p = 0.001$) and grip strength ($r = 0.312$, $p = 0.027$). LSST3 showed a moderate positive statistically significant correlation with VAS ($r = 0.504$, $p = 0.001$) and grip strength ($r = 0.323$, $p = 0.022$).

Conclusion: In conclusion, trapezititis is positively correlated with scapular dyskinesia and reduced grip strength in academicians.

Keywords: Lateral scapular slide test, Visual analogue scale, Scapular Dyskinesia, Grip strength.

INTRODUCTION

The trapezius muscle is one of the two large, superficial muscles that extend longitudinally from the occipital bone to the lower thoracic vertebrae and laterally to the scapular spine (shoulder blade).^[1] Its primary functions are to facilitate scapular movement and support the arm.^[2] The

trapezius plays a vital role in stabilizing the scapula, often working in coordination with other shoulder muscles, such as the serratus anterior.^[2] Trapezititis refers to the inflammation of the trapezius muscle, typically resulting from excessive stress or strain.^[2] Dysfunction in the trapezius, including altered activation, poor control, or

reduced strength in specific regions, can lead to abnormal shoulder movements and significant pain.^[2]

The scapula plays a crucial role in coordinating and maintaining complex shoulder kinematics.^[3] Scapular dyskinesia refers to an alteration in the normal position or motion of the scapula during coupled scapulohumeral movements.^[4] Inflexibility and contractures of the muscles and ligaments around the shoulder can significantly affect the scapula's position and movement.^[5] The scapula facilitates synchronous scapular rotation during humeral motion and serves as a critical link in the kinetic chain.^[6] When the scapular position is impaired, the forces generated from the lower extremity and trunk is not effectively transmitted to the upper extremity, resulting in altered scapular biomechanics.^[5]

Grip strength is a measure of muscular strength or maximum force/tension generated by one's forearm muscle.^[7] Grip strength is measured using Jamar dynamometer.^[8] In shoulder in adducted and neutral position; elbow in 90-degree forearm neutral and wrist extended between 0-30 degrees.^[9-10]

Academicians often engage in prolonged overhead activities, such as extended periods of blackboard writing, grading, and other repetitive upper limb tasks. These activities frequently lead to conditions such as trapezitis, characterized by inflammation and pain in the trapezius muscle. Trapezitis can exacerbate muscle imbalances around the scapula, where certain muscles become overused and tight while others weaken due to underuse. This imbalance disrupts scapular mechanics and compromises scapular stability, which in turn affects grip strength. Impaired scapular stability, compounded by the effects of trapezitis, reduces the efficiency of force transmission along the arm, thereby limiting hand function and grip performance.

MATERIALS & METHODS

The study was a cross-sectional correlation study conducted over duration of one month in various schools and colleges in Ahmedabad. A total of 50 academicians were recruited using convenient sampling. Data collection involved assessing pain levels using the Visual Analog Scale (VAS) and confirming trapezitis through palpation of the trapezius muscle. Scapular dyskinesia was evaluated using lateral scapular slide test (all 3 angles) while hand grip strength was measured using a jamar hand held dynamometer.

INCLUSION CRITERIA

- Academicians between ages of 25 to 45 years.
- Both Genders.
- Having Trapezitis since 6 month.
- Academicians who are working for 4 to 6 hours five days a week.

EXCLUSION CRITERIA

- Academician with history of shoulder, upper limb or neck injury
- Respiratory or cardiac condition
- Arthritic conditions of upper extremity
- Neurological condition
- Deformities of scapula

OUTCOME MEASURES

Lateral scapular slide test:

The Lateral Scapular Slide Test (LSST) is a clinical test used to evaluate scapular asymmetry. It involves measuring the distance from the inferior angle of the scapula to the nearest vertebral spinous process using a tape measure in three specific positions:

1. Shoulder in Neutral: The arms are relaxed by the sides.
2. Shoulder in 40–45 Degrees of Coronal Plane Abduction: The hands rest on the hips.
3. Shoulder in 90 Degrees Abduction: The arms are fully internally rotated.

A greater scapular distance on the injured or deficient side compared to the uninjured side indicates scapular asymmetry. A

bilateral difference of 1.5 cm or more is considered the threshold for determining the presence of scapular asymmetry.^[2]

Visual analogue scale

The visual analog scale (VAS) is a validated, subjective measure for acute and chronic pain. Scores are recorded by making a hand written mark on a 10-cm line that represents a continuum between “no pain” and “worst pain.”^[2]

Jammar hand held dynamometer

Position: The hand which was tested was kept with shoulder in neutral position, elbow in 90-degree forearm neutral and wrist extended between 0 to 30 degree. The handle of dynamometer was adjusted accordingly as the base should rest on first metacarpal while the handle should rest on middle of four fingers. The subject was

instructed to squeeze the dynamometer with maximum effort which was maintained for five second the readings were noted. A mean of three readings was taken. ^[11]

Statistical Analysis

- Statistical analysis was done by using SPSS version 27. Total 09 Male and 41 Female were included.
- Data was screened to check the normality by using Shapiro wilk test. Data was not normally distributed, so the spearman rank correlation test was used.
- Significance level was kept at $p \leq 0.05$. Correlation coefficient (r) ranges from -1 to +1, a positive value indicates positive correlation and negative value indicates a negative correlation.

RESULT

Table 1: Descriptive characteristics of Academicians (n=50)

MEAN±SD	
Age	31.64±4.52
Teaching hours	4.8. ±0.75
Year of experience	7.26±1.32
lateral scapular slide test 1	1.09±0.50
lateral scapular slide test 2	1.35±0.53
lateral scapular slide test 3	1.33±0.46
Visual analog scale	4.64±1.13
Jamar dynamometer	42.08±14.07

Table 2: Correlation of the LSST with VAS, and Grip strength

P value(r)	P value(r)	
	VAS	GRIP
Lateral scapular slide test 1	0.243(0.168)	0.134(0.243)
Lateral scapular slide test 2	0.001(0.609)	0.027(0.312)
Lateral scapular slide test 3	0.001(0.504)	0.022(0.323)

DISCUSSION

- This study is aimed to find out correlation of trapezitis with scapular dyskinesia and hand grip strength in Academicians.
- This study found that LSST1 has weak positive statistically significance correlation with VAS and grip strength LSST2 has strong positive statistically significance correlation with VAS and grip strength And LSST3 is moderate

positive statistically significance correlation with VAS and grip strength.

- The muscles attached to the scapula are connected to surrounding bones and function in coordination to ensure the proper movement of the scapula in relation to the thorax during upper extremity movements. Disruption in the balance of these muscles can lead to improper muscle function and reduced stability in both the cervical and shoulder joints. This loss of stability,

due to improper muscle actions, may result in pain in nearby body areas or poor posture. In this study, LSST, which measures the distance between the scapula and thorax, was used to assess scapular asymmetry.

- In recent years, the teaching method has evolved from the traditional use of blackboards to incorporating audio-visual aids. In the past, teachers often engaged the upper and middle trapezius muscles due to the extensive overhead activities required. However, today, teachers rely on PowerPoint presentations, projectors, and computers for teaching, as well as performing multiple tasks such as grading papers and carrying books between classrooms. These activities primarily involve the lower trapezius more than the upper and middle trapezius. Prolonged use of the lower trapezius in a compromised posture can lead to pain and spasms in the lower trapezius, ultimately altering scapular movement.
- Grip strength in academicians can be affected by trapezitis due to the interconnected nature of the shoulder, scapula, and arm muscles. Trapezitis causes pain, stiffness, and muscle dysfunction in the trapezius, which can lead to scapular dyskinesia (improper scapular movement). This altered movement impacts the shoulder's biomechanics, reducing the efficiency of arm and hand function, ultimately weakening grip strength. Additionally, prolonged poor posture or repetitive tasks associated with academic work may exacerbate this effect.
- R. Jain et al. (2023) conducted study to correlation between scapular dyskinesia and hand grip strength in elite badminton players. The study concluded that grip strength reduces with scapular dyskinesia.
- S. Kharbe et al. (2021) conducted study to correlation between scapular dyskinesia and grip strength in auto rickshaw driver. So as per the study

conclude that scapular dyskinesia does affect the grip strength.

CONCLUSION

This study comes to the conclusion that the trapezitis shows a positive correlation with scapular dyskinesia and grip strength in academicians. This suggests that the presence of trapezitis may contribute to altered scapular movement patterns and reduced grip strength, potentially affecting overall upper body function.

Declaration by Authors

Ethical Approval: Approved

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Conflict of Interest: The authors declare no conflict of interest.

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