

ORIGINAL RESEARCH

The association between ‘scapular dyskinesia’ and ‘elbow pain’ in patients with lateral epicondylalgia: An observational study in the outpatient department of a pacific medical college

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ABSTRACT

Lateral Epicondylalgia (LE) is characterized by pain at the elbow joint along with tenderness at the lateral epicondyle which increases on gripping activity, passive wrist flexion and resisted wrist extension. Scapular Dyskinesia can be defined as “a collective term that refers to the movement of the scapula that is dysfunctional and may create a possible impairment of overall shoulder function. **Aim:** To find the association between scapular dyskinesia and elbow pain in patients with lateral epicondylalgia. **Subjects and Method:** After the approval of the Institutional Ethics Committee (IEC), patients between the age group of 25-55 years having lateral epicondyle pain were selected for the study based on the inclusion and exclusion criteria. The intensity of pain was recorded using Visual Analogue Scale and graded as ‘no pain’, ‘mild’, ‘moderate’ and ‘severe’ and Scapular Dyskinesia Test was performed. **Result:** Distribution of mean elbow pain (VAS) did differ significantly according to the outcome of scapular dyskinesia test (Shoulder flexion/abduction-affected side) (P-value > 0.05). **Conclusion:** Pain intensity is influenced by various factors like the gender, the structural changes at the lateral epicondyle, the duration of injury, the degree of tendon degeneration, physiological response of the body to the tendon degeneration. Scapular dyskinesia is related to the severity of elbow pain in LE patients.

Key words: Lateral epicondylalgia, visual analogue scale, scapular dyskinesia test, lateral scapular slide test

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INTRODUCTION

Lateral Epicondylalgia (LE) is characterized by pain at the elbow joint along with tenderness at the lateral epicondyle which increases on gripping activity, passive wrist flexion and resisted wrist extension. LE is associated with various occupations like meat cutting, plumbing, painting, weaving, typing, using screw driver, etc. which involves repeated use of wrist extension^{3, 7}. Lateral epicondylalgia is caused due to overuse injury of Extensor Carpi Radialis Brevis (ECRB) and sometimes Extensor Digitorum Communis (EDC) muscles.⁸ A histopathological study suggests the occurrence of reactive tendinopathy,

tendon disrepair and degenerative tendinopathy. Reactive tendinopathy is defined as non-inflammatory proliferative cellular and matrix response due to overloads. The scapular motion consists of 3 rotational movements and 2 translatory movements. The rotational movements include Upward/downward rotation, Internal/external rotation and Anterior/posterior tipping. The translatory movements include Elevation/depression and Protraction/retraction¹⁰. During the normal overhead movement of the shoulder, the scapula is in setting during the first 30° of elevation followed by progressive increase in the upward rotation, maximum

up to 15° along with minimal amount of protraction or elevation¹⁰. Scapular Dyskinesia can be defined as “a collective term that refers to the movement of the scapula that is dysfunctional and may create a possible impairment of overall shoulder function, although it may also represent the cause of persistent shoulder syndromes or may be manifestation of underlying structural shoulder pathology in many types of shoulder injury”¹⁰. The acronym ‘SICK’ is used to refer the findings in scapular dyskinesia.

S: Scapular malposition.

I: Inferior and medial border prominence.

C: Coracoid pain and malposition.

K: DysKinesis of scapular movement¹³.

Scapular dyskinesis test is a test used for visual assessment of the scapular movement during shoulder flexion and abduction movements. It grades the scapular Dyskinesia as ‘no’, ‘subtle’ and ‘obvious’^{15, 16, 17}. The test is used to assess the scapular motion in all the planes. The shoulder, elbow and wrist are a part of upper limb kinetic chain. Sequenced muscle activation of the upper limb and lower limb is required to produce an integrated biomechanical task. This sequencing is called the kinetic chain. Hence, it is important to assess other adjoining kinetic chain links while rehabilitating one of the chains of the link^{2,20}. The kinetic chain theory provides a theoretical foundation for linking the importance of scapular musculature to muscle performance at the elbow. In healthy population of throwing athletes, fatigue of scapular stabilizers has been shown to produce kinematic alteration of elbow. The myo-kinetic chain may affect the range of motion of all joint which is there in sequence, which alter the movement patterns and forces applied during activity, that movement pattern disassociation is caused by Antero-postero and medio-lateral chain myo-kinetic chain and the result is scapular dyskinesia.

METHODOLOGY

- 1. STUDY DESIGN:** Hospital Based Cross-Sectional Observational Study
- 2. LOCATION OF THE STUDY:** Out-patient department of a Pacific Medical College
- 3. STUDY POPULATION:** Lateral Epicondylalgia patients
- 4. DURATION OF STUDY:** 18 months.

5. SAMPLING TECHNIQUE: Convenient sampling.

6. SAMPLE SIZE: 60.

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 25-55 years having lateral epicondyle pain were selected for the study based on the inclusion and exclusion criteria. The intensity of pain was recorded using Visual Analogue Scale and graded as ‘no pain’, ‘mild’, ‘moderate’ and ‘severe’ and Scapular Dyskinesia Test was performed.

SCAPULAR DYSKINESIS TEST^{15, 16, 17}: The patient was asked to stand with the back exposed and back facing towards the examiner. The patient was then instructed to perform 5 repetitions of bilateral shoulder flexion and abduction movement. The test was performed with the participants actively doing movement. The movement of scapula was observed for any abnormalities which included inferior angle prominence, medial border prominence, and excessive superior border elevation or winging. Each test movement was classified and recorded as having ‘no’, ‘subtle’ and ‘obvious’ abnormality. Both, the affected and the unaffected upper limbs were observed using the two test movements. The final rating of scapular dyskinesia was given using the following criteria: No Scapular Dyskinesia-when both the test movements had no abnormality or one of the test movements had a subtle abnormality. Subtle Dyskinesia-when both the test movements had subtle abnormality. Obvious Dyskinesia-when any one or both the test movements were recorded to have obvious abnormality.

STATISTICAL ANALYSIS AND RESULTS

The paired statistical comparisons of distribution of categorical variables were tested using Wilcoxon’s signed rank test. The inter-group statistical comparisons of means of normally distributed continuous variables was done using analysis of variance (ANOVA). The underlying normality assumption was tested before subjecting the study variables to ANOVA. All results are shown in tabular as well as graphical format to visualize the statistically significant difference more clearly.

Table 1: Visual analogue scale

Severity of pain (VAS) [Quartiles]	No. of cases	% of cases
0-2.8	20	33.3
2.9-4.0	21	35
4.1-7.4	19	31.6
Total	60	100.0

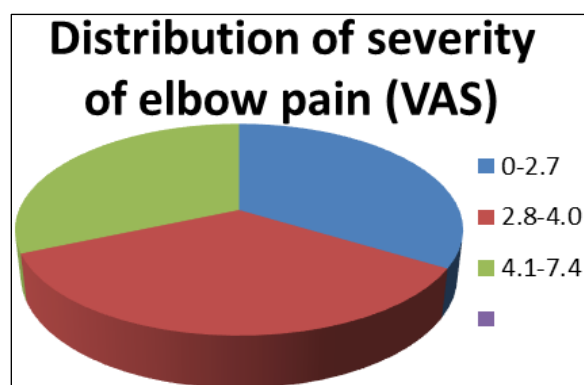


Table 2: Comparison of outcome of scapular dyskinesis test (Final rating) between affected and unaffected sides

Final rating	Affected Side		Unaffected side		P-value
	No. of cases	% of cases	No. of cases	% of cases	
No	28	46.6	49	81.6	0.001***
Subtle	10	16.6	1	0.16	
Obvious	22	36.6	10	16.6	
Total	60	100.0	60	100.0	

P-value by Wilcoxon's signed rank test. P-value<0.001 is considered to be statistically significant.

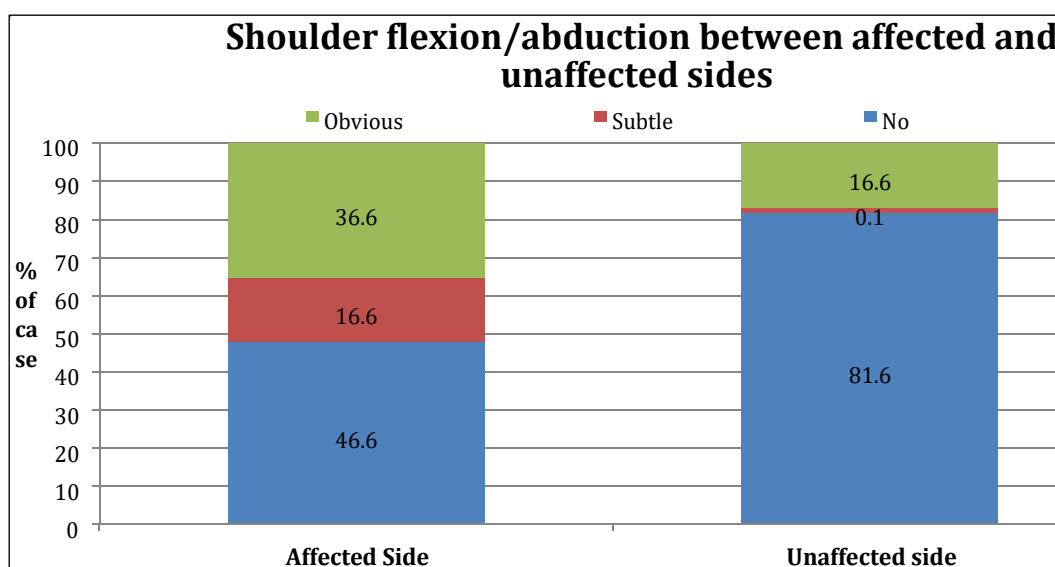


Table 3: Distribution of mean elbow pain (VAS) according to outcome of scapular dyskinesis test (Shoulder flexion/abduction-affected side)

Shoulder flexion/abduction	No. of cases	Elbow pain (VAS)		P-value
		Mean	SD	
No	28	3.26	0.87	0.037
Subtle	10	4.41	2.79	
Obvious	22	3.73	1.32	
Total	60	3.62	1.53	

P-value by ANOVA. P-value<0.05 is considered to be statistically significant. NS-Statistically nonsignificant.

RESULTS

There is significance between elbow pain and scapular dyskinesia in LE patients.

DISCUSSION

In this study, the pain was assessed using Visual Analogue scale (VAS) which is one of the most

widely accepted pain rating scale.

The lateral epicondyle pain recorded in this study was in the range of 1-7.4 cm with the average score being 3.6 ± 1.5 cm. it is evident that various factors such as the gender, the structural changes at the lateral epicondyle, the duration of injury, the degree of tendon degeneration, physiological response of the

body to the tendon degeneration and many more can influence the severity of pain. The other objective of the study was to find the association between the lateral epicondyle pain and scapular dyskinesia. Table 8 shows the comparison of outcome of scapular dyskinesia test (Final rating) between affected and unaffected sides. The P value was calculated using Wilcoxon's signed rank test and P-value<0.001 was considered to be statistically significant. The other objectives were to assess the scapular dyskinesia on the affected and unaffected sides and to compare their results. The scapular dyskinesia was assessed using Scapular Dyskinesia Test (SDT) using active shoulder flexion and abduction movement. The patient was graded as having no, subtle or obvious scapular dyskinesia during the test movements. The final rating was given based on the grading of shoulder flexion and abduction movements. P-value was calculated by Wilcoxon's signed rank test and P-value<0.001 was considered to be statistically significant. There was a significantly higher proportion of cases who had subtle/obvious scapular dyskinesia on the affected side as compared to the unaffected ($p = 0.001$). The scapular dyskinesia was evaluated using the Scapular Dyskinesia Test (SDT) in this study. The kinetic chain theory provides a theoretical foundation for linking the importance of scapular musculature to muscle performance at the elbow. In healthy population of throwing athletes, fatigue of scapular stabilizers has been shown to produce kinematic alteration of elbow.

CONCLUSION & CLINICAL IMPLICATION

We can conclude from this study, that in LE patients the pain intensity is influenced by various factors. The presence of scapular dyskinesia is one of the important components amongst the structural changes associated with LE. Scapular Dyskinesia Test is a test that can dynamically assess the position of scapula and can be used for the assessment of scapular dyskinesia. Scapular dyskinesia is related to the severity of elbow pain in LE.

The current study shows that there are a high proportion of lateral epicondylalgia patients who have underlying scapular dyskinesia which might be overlooked during the assessment of the patient. This may cause muscle imbalance and abnormal shoulder movement patterns which can later lead shoulder pain. Hence, evaluation of the scapular position and scapular stabilizer muscles strength, especially the trapezius and serratus anterior should be included in the assessment.

SCOPE & LIMITATION

SCOPE: Study should be concluded with larger sample size and duration. Study also aims to assess strength of rotator cuff muscles to have a better insight.

LIMITATION: Sample size was small.

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