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Prevalence Of Scapular Dyskinesia In Elite Lawn Tennis Players In Pune Region

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Abstract:

Background : Shoulder pain affects or had affected over 50% of elite lawn tennis players, with 20% reporting ongoing pain. Most continue to play through the pain but report an impact on training, competition and activities of daily living. Shoulder kinematics were different for dominant and non-dominant shoulders.

It has been proven that muscle imbalance due to the overuse leading to instability is a major factor leading to scapular dyskinesia.

Objective: Aims to find the Prevalence of Scapular Dyskinesia in Elite Lawn Tennis Players in Pune Region.

Methods : Study had begun with the presentation of Synopsis to the ethical committee in PES MCOP. An approval was granted from the ethical committee, various Tennis Clubs were visited in and around the city.100 Lawn tennis players were selected on the basis of their inclusion and exclusion criteria. Lateral Scapular Slide Test was performed on the subjects and the data analysis was done. Data entered and Analyzed.

Result: Out of 100 participants 43% had Scapular Dyskinesia while the other 57% participants were normal when Lateral Scapular Slide Test (LSST) was performed. 37 Participants out of 43 had Scapular Dyskinesia on the Dominant Side, While the other 6 had Scapular Dyskinesia on the non dominant side. The most common type of Scapular Dyskinesia observed was Type I, followed by type II and Type III.

Conclusion : This study concludes that the prevalence of Scapular Dyskinesia in Elite Lawn tennis players in Pune is 43% among 100 participants.37 Participants out of 43 had Scapular Dyskinesia on the Dominant Side, While the other 6 had Scapular Dyskinesia on the non dominant side.This study also concludes that Scapular Dyskinesia type I was the most common type of Scapular Dyskinesia in Elite Lawn Tennis Players.

Keywords **:Prevalence, Scapular Dyskinesia , Lawn Tennis , Dominant side.**

I. INTRODUCTION

Scapular dyskinesia (which may also be referred to as SICK scapula syndrome) is an alteration or deviation in the normal resting or active position of the scapula during shoulder movement. For most people, the scapula moves in abnormal ways due to the repetitive use of the shoulder.(1)

Scapular biomechanics is described on the basis of movements at sternoclavicular (SC), acromioclavicular (AC), scapulothoracic (ST) and glenohumeral (GH) joints. Scapulohumeral rhythm plays a major role to function the shoulder complex in a co-ordinated manner. The ratio of 2° of GH motion to 1° of ST motion during elevation of the arm is referred to as scapulohumeral rhythm. [2]

A key factor in overhead athletes is normal scapular function.

Scapular Dyskinesia is defined as a non-specific response to a painful shoulder condition.[3] Three types of SD exist. Type 1,type 2,type 3.There is a rise in injury and repetitive trauma risk with participation in sports.

Scapular Dyskinesia, or alterations in dynamic scapular control is seen in 61% of the overhead athletes. SD is mostly seen in overhead or throwing athletes due to their heavy demand of work on unilateral upper extremity function. During throwing and overhead sports, the shoulder complex joints have an increased stress acting as a bridge that transfers power from the lower limbs and trunk to the playing arm.(4)

Elite Lawn Tennis players are defined as those who have played the sport at a competitive level with a tennis velocity of 50-75 m.s-1 at an average during the match. These players possess fine technical skills, flexibility, muscle strength and endurance. Elite players have more demand on quick reflexes, visual acuity and anticipation compared to sub elite players.(11)

Lawn tennis is a racquet sport which has a structure characterized by motions of high intensity and short duration. Scapular Dyskinesia alters normal scapular role during coupled scapulohumeral motions which is associated with shoulder injury due to functional deficit. [5] Muscle imbalance due to the overuse leading to instability may be a lone factor leading to SD. (6) Elite athletes complain of shoulder pain with an impact on training and competition.(7)

Shoulder pain affects or had affected over 50% of elite lawn tennis players, with 20% reporting ongoing pain. Most continue to play through the pain but report an impact on training, competition and activities of daily living. Shoulder kinematics were different for dominant and non-dominant shoulders. [7]

It has been proven that muscle imbalance due to overuse leading to overuse leading to instability is a major factor leading to Scapular Dyskinesia.(6)

As a resultant of Scapular Dyskinesia, players may suffer from compromise in performance. (10)

II. NEED OF STUDY :

Lawn Tennis being an overhead sport requires scapular stability and co-ordinated motion at the shoulder complex.

It has been proven that muscle imbalance due to the overuse leading to instability is a major factor leading to scapular dyskinesia (SD).(6)

Instability of the scapula might affect the player`s performance during the match and may lead to injuries or complications.

Lawn Tennis being a unilateral overhead sport was not deeply evaluated and no emphasis given on the side of affection and type of SD. Therefore it is important to find the prevalence of Scapular Dyskinesia in Elite Lawn Tennis players.

III. AIM:

To study prevalence of Scapular Dyskinesia in Elite Lawn Tennis Players in Pune Region.

IV. OBJECTIVE

To find the prevalence of Scapular Dyskinesia in elite Lawn tennis players in Pune using Lateral Scapular Slide test.

To observe the Scapular Dyskinesia with its relation to the dominant side (playing hand)

To find the commonest type of Scapular Dyskinesia in Elite Lawn tennis players in Pune.

V. MATERIALS :

Pen

Paper

Consent form

Evaluation sheet

Measuring Tape

VI. METHODOLOGY

Study Design: Cross sectional Study

Sample Size: 100

Sampling Method : Convenient Sampling

Study Population : Both Male and Female Elite Lawn Tennis Players in Pune.

Study Setting : Sports Club in and around the city

Study Duration : 6 Months

VII. INCLUSION CRITERIA:

Age group 18 -29 years [12]

Gender: Both male and female [12]

Playing Lawn Tennis since 5 to 10 years[12]

Elite Lawn Tennis players having an experience of playing at a competitive level for 5 to 10 years [12]

No.of hours of practice: regular training of 1.5-2 hours per session with 4 or more sessions per week .[12]

Hand Dominance: Both Hand.[12]

VIII. EXCLUSION CRITERIA:

Recreational Lawn tennis players

Those with Rotator Cuff injury, Shoulder Dislocation, Tennis elbow etc

Restricted shoulder joint range of motion are excluded.

Neurologic dysfunctions like MS, Stroke, SCI, Brachial plexus injury, etc

Inhibition by intra-articular GH or subacromial processes such as subacromial impingement, rotator cuff pathology, internal impingement, labral injury, GH arthritis and adhesive capsulitis.

IX. PROCEDURE

The project began with the presentation of synopsis to the ethical committee of PES modern college of physiotherapy and ethical clearance was obtained.

Participants were be selected according to the inclusion and exclusion criteria

The study was explained and written consent was taken from the participants.

Lateral scapular slide test was done.

The data was recorded and analysed after the study.

X. OUTCOME MEASURES:

LATERAL SCAPULAR SLIDE TEST

The test is done in 3 positions. With the arm abducted to 0, 45 and 90 degrees in the coronal plane.[8,9]

Position 1 involves placing the shoulder in neutral position, with the arms relaxed at the sides.

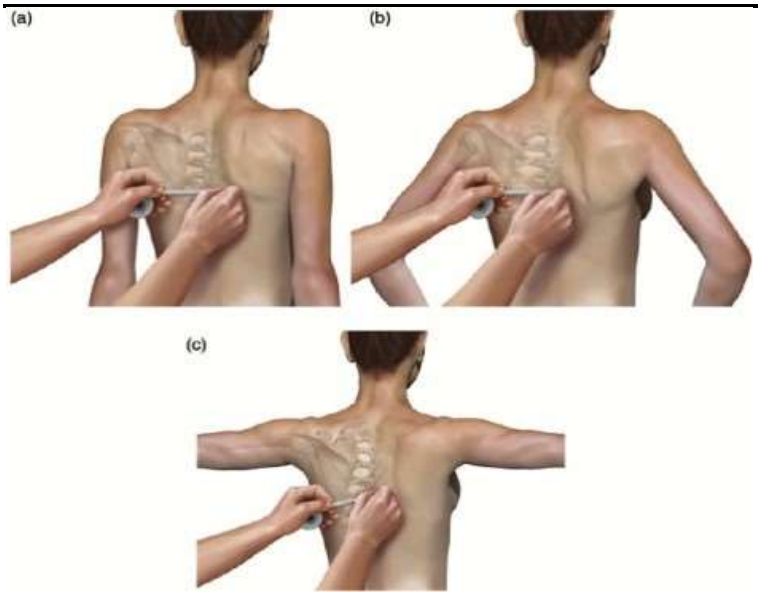
Position 2 the humerus is placed in medial rotation and 45 degrees abduction, by positioning the patient's hands around the waist.

Position 3 the humerus is placed in maximal medial rotation and 90 degrees abduction.

The test is positive when there is a difference of 1.5 cm when measurements are compared bilaterally.

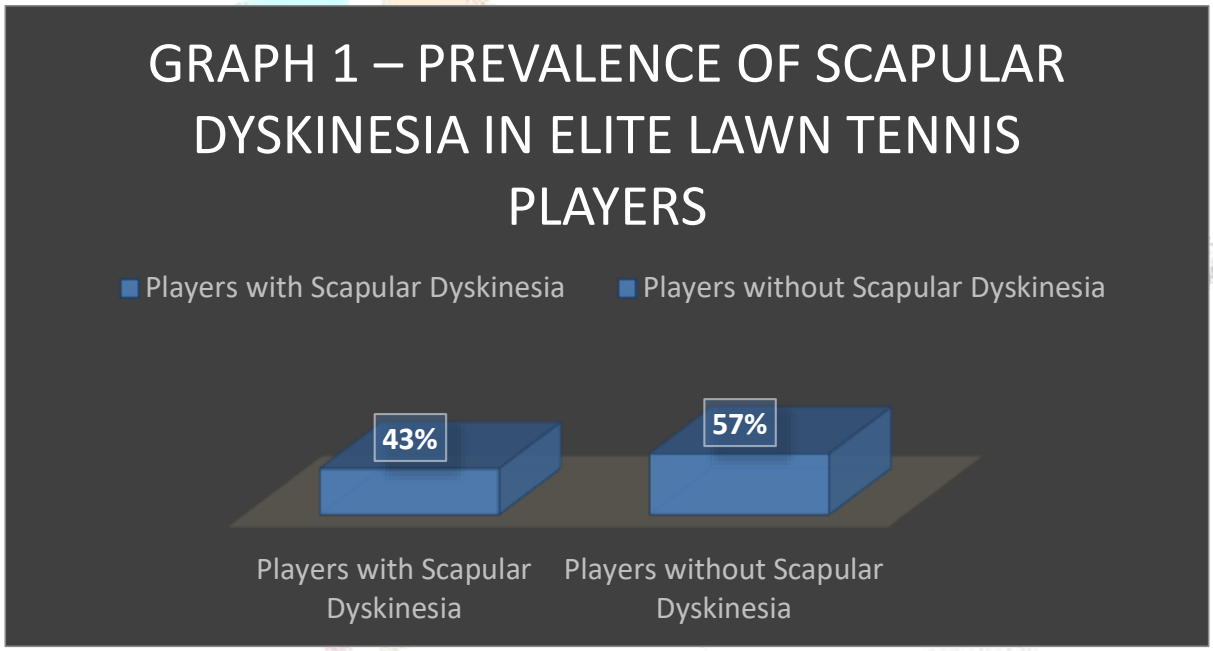
The examiner measures the distance from the base of the spine of the scapula to the spinous process of T2 or T3[most common], form the inferior angle of the scapula to the spinous process of T7 toT9, or from T2 to the superior angle of the scapula.

The patient is then tested holding two or four other positions:45′ abduction [hands-on waist, thumbs posteriorly] 90′ abduction with medial rotation,120′ abduction,&150′ abduction.



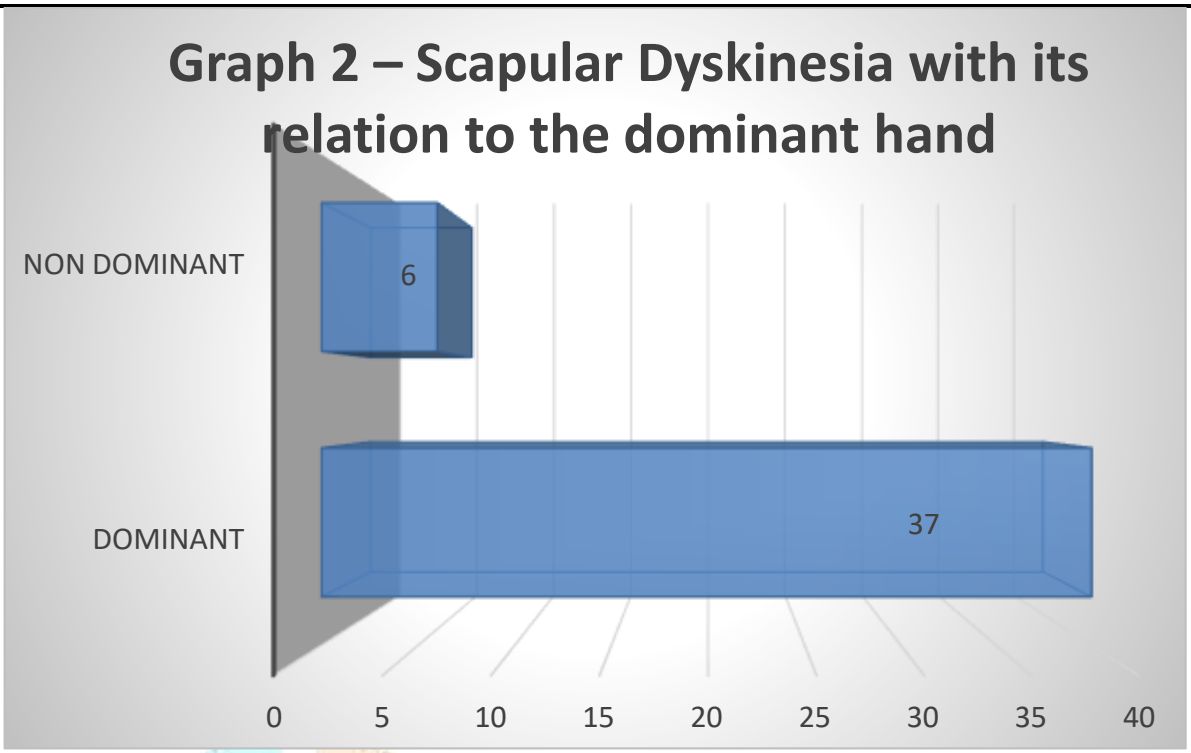
Lateral Scapular Slide Test Performed in 3 different positions.

XI.DATA ANALYSIS:



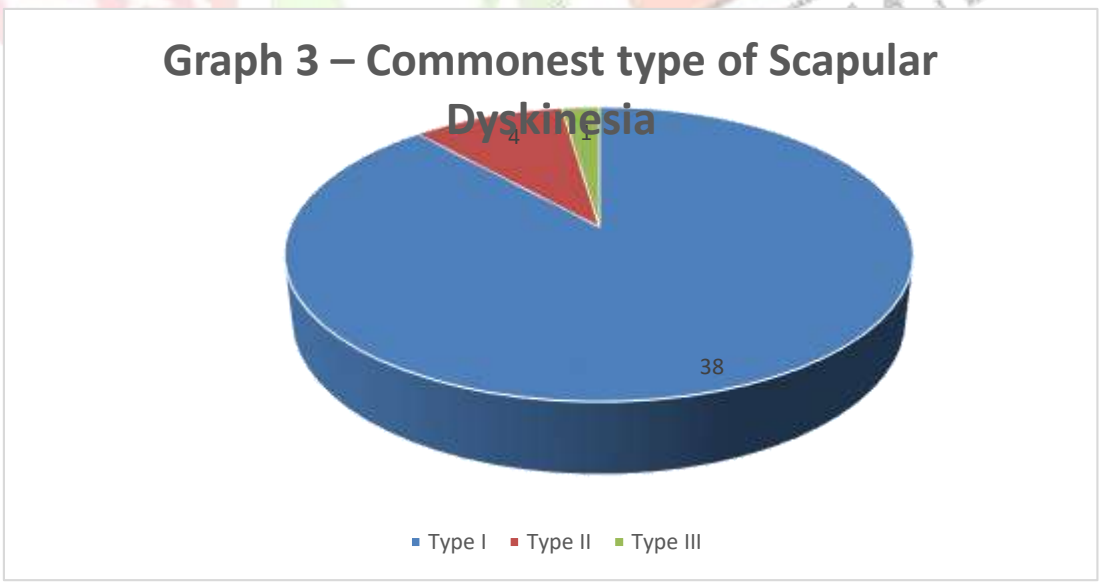
Out of 100 participants 43% had Scapular Dyskinesia while the other 57% participants were normal when Lateral Scapular SlideTest (LSST) was performed.

No. of Participants	**Players with Scapular Dyskinesia**	**Players without Scapular Dyskinesia**
100	43	57



37 Participants out of 43 had Scapular Dyskinesia on the Dominant Side, While the other 6 had Scapular Dyskinesia on the non dominant side.

No. of Participants with Scapular Dyskinesia	**Scapular Dyskinesia with its relation to dominant hand**	**Scapular Dyskinesia with its relation to the non- dominant hand**
43	37	6



Out of 43 Participants 38 Participants had Type I scapular Dyskinesia,4 participants had Type II Scapular Dyskinesia and 1 had Type III scapular Dyskinesia.

No.of Participants with Scapular Dyskinesia	Type I Scapular Dyskinesia	Type II scapular Dyskinesia	Type III Scapular Dyskinesia
43	38	4	1

According to Chi Square and Yates correction formula the p-value equals **0.0005202**

P-value ≤ 0.05	It indicates the null hypothesis is very unlikely.

XII. RESULT:

Total 100 samples were recorded according to inclusion and exclusion criteria.

Out of this 100 responses 66 participants were males and 34 were Females.

Out of 100 participants 43% had Scapular Dyskinesia while the other 57% participants were normal when Lateral Scapular Slide Test (LSST) was performed.

37 Participants out of 43 had Scapular Dyskinesia on the Dominant Side, While the other 6 had Scapular Dyskinesia on the non dominant side.

The most common type of Scapular Dyskinesia observed was Type I, followed by type II and Type III.

Out of 43 Participants 38 Participants had Type I scapular Dyskinesia,4 participants had Type II Scapular Dyskinesia and 1 had Type III scapular Dyskinesia.

XIII. DISCUSSION:

The Aim of this study was to evaluate the Prevalence of Scapular Dyskinesia in Elite Lawn Tennis Players in Pune. The age group of 18-29 were taken in this study with those having experience of playing from 5 to 10 years with regular training sessions.100 Elite Badminton Players were recruited for this study.

Scapular Dyskinesia was commented upon by performing the LSST bilaterally.

The study showed that the Prevalence of Scapular Dyskinesia in Elite lawn tennis players came out to be 43%.

SD alters normal scapular role during coupled scapulohumeral motions which is associated with shoulder injury due to functional deficit. [5]

Muscle imbalance due to the overuse leading to instability may be a lone factor leading to SD. (6)

It has been proven that muscle imbalance due to overuse leading to instability is a major factor leading to Scapular Dyskinesia.

Scapular Dyskinesia is mostly seen in overhead or throwing athletes due to their heavy demand of work on unilateral upper extremity function. During throwing and overhead sports, the shoulder complex joints have an increased stress acting as a bridge that transfers power from the lower limbs and trunk to the playing arm.(4)

As per the results of this study given in graph. 1, we found the overall prevalence of SD in elite badminton players to be 43%. Out of the 100 samples taken, 43 presented with SD. Amongst these 43, 37 players presented with SD on the dominant side (playing side) and 6 were observed to have it on the non-dominant side.

According to a case study on the EMG activity of Serratus Anterior and Trapezius during glenohumeral abduction in a participant with SD, it was concluded that, the ratio of serratus anterior to lower trapezius on involved left side showed less EMG activity compared to the right side(dominant side).[12]

As per a prior study, SD occurs due to weakness and fatigue of scapular stabilizing muscles, tightness of anterior shoulder, poor overhead mechanics and overuse or repetitive motions such as throwing or serving.[13]

Muscle imbalance due to the overuse leading to instability may be a factor leading to SD. [6] Elite athletes complain of shoulder pain with an impact on training and competition.[7]

The scapula functions as a bridge between the shoulder complex and the cervical spine and plays a very important role in providing both mobility and stability of the neck/shoulder region.[10]

In this study as per graph 3, While calculating the results, we observed that out of the 43 players presenting with SD, 38 had Type 1 and 4 had type 2 SD and 1 had type 3 SD. This implied that, Type 1 was more common in the elite badminton players as compared to Type 2 and Type 3.

Previous studies have stated that, Type 1 is due to weakness of lower trapezius and serratus anterior. The inferomedial scapular border is prominent. Posterior scapular tipping is responsible for functional narrowing of the subacromial space during an overhead activity, leading to pain in abduction and external rotation. Type 2 presents with the scapular winging pattern where the entire scapular medial border is prominent due to weakness of trapezius and rhomboids. Superomedial scapular border is prominent in type 3 where excessive and early elevation of the scapula is observed during upper extremity elevation.[5]

Many papers studied SD, but no research was conducted on the types of SD in a lawn tennis sport. Therefore, this study shows that SD is prevalent in elite Lawn Tennis players on the dominant side where types 1 and 2 were observed amongst which type 1 was the commonest and the number of years of played had an effect on the prevalence of SD.

XIV. CONCLUSION:

This study concludes that the prevalence of Scapular Dyskinesia in Elite Lawn tennis players in Pune is 43% among 100 participants.

37 Participants out of 43 had Scapular Dyskinesia on the Dominant Side, While the other 6 had Scapular Dyskinesia on the non dominant side.

This study also concludes that Scapular Dyskinesia type I was the most common type of Scapular Dyskinesia in Elite Lawn Tennis Players.

XV. LIMITATION:

The Sample size of the present study was limited.

XVI. FUTURE SCOPE OF STUDY:

Future research can be done by recording the response in the players after the training period by focusing on the strengthening of the scapular muscles that commonly go into weakness due to overuse. Additionally, comparative studies of scapular strengthening protocols can be done between types 1 and 2.

XVII. CLINICAL IMPLICATIONS:

Instability of the scapula might affect the player`s performance during the match and may lead to injuries or complications.

Lawn Tennis being a unilateral overhead sport was not deeply evaluated and no emphasis given on the side of affection and type of SD. Therefore it is important to find the prevalence of Scapular Dyskinesia in Elite Lawn Tennis players.

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