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## Scapula in cricket bowlers without shoulder problem

**Dr. P Sathya and Tanmaae Dhopaokar**

### Abstract

The purpose of this study was to assess the scapula position in pace bowlers and spinners without any acute shoulder injury. The right hand dominant cricket players of the age group 17-21yrs were selected. All the players were assessed for weight, height, BMI. Kibler's Modified lateral scapular slide test was used to assess scapular position on each player. The results of the study showed that the P3 position i.e., unloaded scaption position was affected in pace bowlers and the P7 position i.e., players taking their arm beyond 90degrees along the markers of the scaption without any weights was affected in spinners. The risk prediction analysis reveals that pace bowlers were at a higher risk of shoulder injury in the unloaded scaption position than the spinners.

**Keywords:** Pace bowlers, spinners, kibler's modified lateral scapula slide test

### Introduction

Cricket is one of the most popular sport in India and it is enjoyed by players of all levels of ability<sup>[1]</sup>. It is a sport that requires great amount of skill, dedication, strength, endurance. Bowling in cricket is a complex movement requiring the co-ordinated actions of the upper and lower limbs to deliver a ball with the right technique. The pace bowlers and spinners, both have their unique way of bowling with a different technique, different pace, different demands on the body and a different outcome.

Although cricket is a non-contact sport, there is a wide variety of causes of injuries. Injuries on the cricket field tend to fall into one of two categories: repetitive/overuse and impact. Overuse injuries occur predominantly in bowlers and in fielders who have to throw the ball frequently during matches or training. Studies have shown that shoulder contributes 25% to the release of the ball while throwing or batting<sup>[5]</sup>. Shoulder injuries have been reported to compromise 5-7% of all injuries amongst elite cricketers in Australia<sup>[6, 7]</sup>, South Africa<sup>[8]</sup> and the United Kingdom<sup>[9]</sup>. A recent study of English county cricket players suggested that upto 23% may experience some form of shoulder injury, with the majority affected in their throwing arm<sup>[11]</sup>.

For a bowler to perform it is not only the upper limb that contributes but it comes from the scapula. The body does not act in isolated units but acts as a whole, the entire kinetic chain has to function properly in order to get the desired delivery. There are many studies done concerning on upper limb of bowlers taking into account their extent of injury but a very few studies are done on players with any acute injuries.

Therefore the need of the study was to assess the scapula position in pace bowlers and spinners without any acute shoulder problem using kibler's modified lateral scapula slide test.

### 2. Materials and methods

**2.1 Research approach:** Cross sectional survey study

#### 2.2 Study setting

- Navi Mumbai sports academy, Vashi
- Pravin Tambes cricket academy, Mulund
- Achievers academy, Chembur

**2.3 Study sample:** 105 (50 spinners, 55 pace bowlers)

**2.4 Sampling technique:** Convenience sampling

**2.5 Inclusion criteria**

- Male bowlers ( Spinners and Pace bowlers)
- Age 17 - 21 yrs
- Minimum 3 yrs of experience
- Right hand dominant and right handed bowler

**2.6 Exclusion criteria**

- Bowlers with an acute shoulder injury
- Female bowlers
- Age less than 17 or more than 21
- Bowlers with an experience of less than 3 yrs
- Left hand dominant and left handed bowler
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**2.7 Procedure**

Demographic details of the subjects were collected age, height, weight and BMI was calculated accordingly. Weight and height were measured using a weighing scale and a tape respectively. Subjects were chosen as per the inclusion

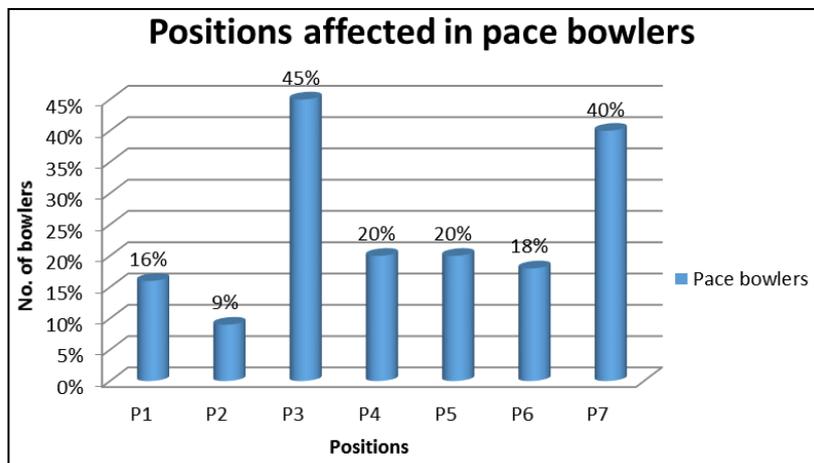
criteria with no acute shoulder injury. Also the subjects were well informed about the procedure and the need for this study. The Modified lateral scapula slide test was used to find out the scapula position in the in pace bowlers and spinners. Measurements of scapular position are taken bilaterally from the inferior angle of the scapula to the spinosus process of the thoracic vertebra (T7) in the same horizontal plane. The position of the scapula was measured by deriving the difference in side-to-side measurements of scapular distance in 7 test positions <sup>[2]</sup>.

Ethical approval:

The study was approved by Institutional Ethics and Research committee of D.Y Patil University. Written informed consent was taken from all subjects and their identification information which was collected during the study was kept strictly confidential.

**3. Results & Discussion**

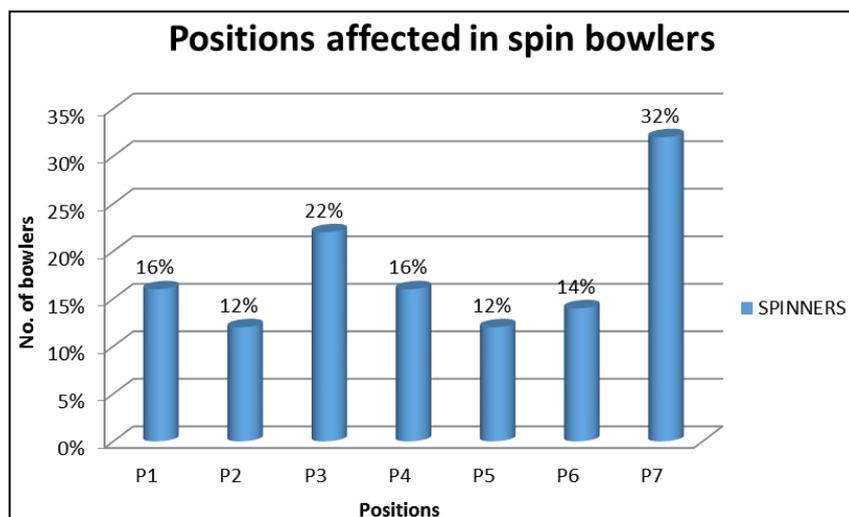
**3.1 Results**



**Graph 1**

Inference : The above graph shows the affection of positions of Kibler’s modified scapula slide test in pace bowlers in which all the positions show certain degree of affection out of

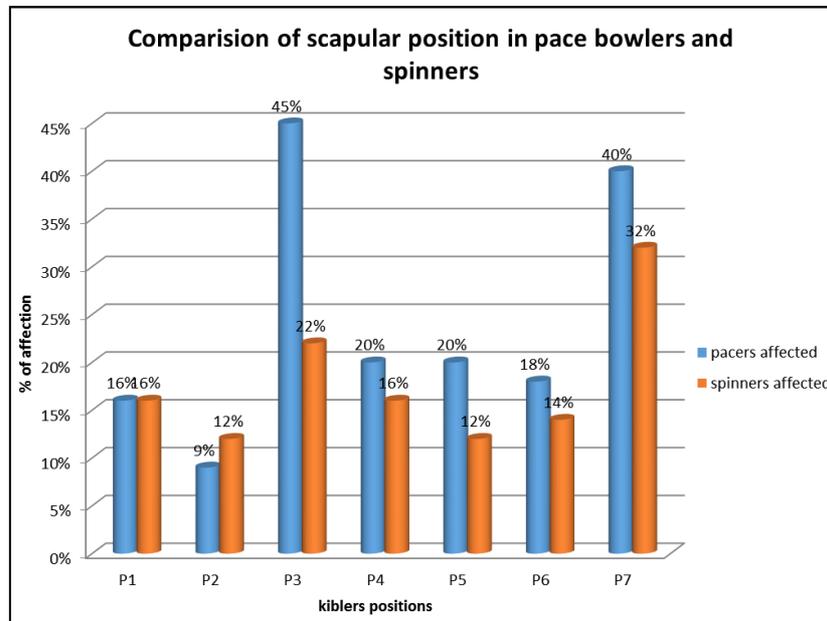
which P3 was the most affected position with 45 % affected players followed by P7 with 40% affected player.



**Graph 2**

Inference : The above graph depicts the percentage of affection of positions of Kibler’s modified lateral scapula slide test in spinners in which all the positions show certain degree

of affection out of which P7 was the most affected position with 32 % affection followed by P3 with 22% affected players.



Graph 3

Inference: The above graph shows the number of pace bowlers and spin bowlers affected in the positions P1 to P7. Pace bowlers show a higher degree of affection in all the positions when compared to the spinners except in P2 where spinners show an affection of 12% and pace bowlers show an affection of 9%. P1 shows same percentage of affection in both the type of bowlers i.e. of 16%.

### 3.2 Discussion

In this study a total of 105 right handed cricket bowlers of right dominance were taken out of which 55 were pace bowlers and 50 were spinners. The objectives of the study were: 1. To assess position of scapula in pace bowlers 2. To assess position of scapula in spinners 3. To compare the scapular position in pace bowlers and spinners.

According to 1<sup>st</sup> objective, graph 1 shows the various positions of Kibler's modified LSST that are affected in pace bowlers. The result shows that P3 is the most affected position in pace bowlers with 45% affection (P3 position - upper limbs at 90 degrees of scaption with internal rotation of shoulder without having weights in his hand along the markers for scaption), followed by P7 with 40% affected (Position P7 was described as: subjects with their trunk fixed and were asked to move up their arms along with the markers put up on the wall without having weights as far as possible). Positions P4 and P5 show equal affection of 20% in pace bowlers (Position P4 and P5 is similar to that of P3 but with weights in his hand of 1kg and 2kg respectively). Here, affection means that there is lateral displacement of the scapula that crosses the bilateral difference of 1.5 cm.<sup>2</sup>

In comparison to the loaded scaption values it was found that there was more lateral displacement of scapula in the unloaded scaption position. The lateral displacement of the scapula in unloaded scaption position suggests that the scapula stabilizer muscles that are responsible to keep the scapula in place and bring about a well-co-ordinated movement were weak<sup>[7]</sup>.

Burkhart *et al.*, Van der Hoeven *et al.*, have stated in their study that any kind of scapular malposition may predispose the athletes to posteriosuperior labral tears, supraspinatus tears, damage to anterior inferior capsular structures, and mechanical impingement<sup>[8,9]</sup>.

According to our 2<sup>nd</sup> objective, graph 2 shows the various positions of kiblers modified LSST affected in spinners. The results show that P7 is most affected position in spinners with 32% affected players followed by P3 with 22% and P1 and P4 with 16% affected players in both the position. Here the positions P3, P4 and P7 all include scaption in their test position and P1 includes the scapula at resting position with hands relaxed at the side<sup>[2]</sup>.

However, more affection was seen when the player moved his arm beyond 90 degrees as far as possible P7. A study suggests that in the phase 1 of bowling i.e. from the point between upper arm horizontal upto ball release i.e. approximately from 180 degrees of shoulder abduction, it has been shown that the spinners presented with a greater risk of instability at the joint which supports the finding that P7 - arm beyond 90degrees in scaption upto the maximum limit, being more affected in spinners amongst all the kiblers test positions<sup>[10]</sup>.

Here, affection signifies the abnormal lateral displacement of the scapula that is seen in spinners predominantly in the full scaption position i.e. P7. The scapula stabilizer muscles that bring about this action like the serratus anterior, upper and lower fibres of trapezius need to be strengthened and trained in order to avoid the scapula malpositioning which may further lead to injuries<sup>[7]</sup>.

According to our 3<sup>rd</sup> objective, graph 3 shows us the comparison of the positions of kibler's modified lateral scapula slide test between pace bowlers and spinners. In this, all the scaption positions show affection in pace bowlers and spinners. But more affection was seen in pace bowlers especially in the scaption positions P3, P4, P5, P6 than spinners whereas P7 showed approximately similar affection in both pace bowlers and spinners.

The risk prediction analysis showed that pace bowlers were at a higher risk of injury in scaption position than the spinner's i.e. in P3. The phase 2 of bowling i.e. from ball release to the point between ball release and end of trial i.e. the follow through phase, the Glenohumeral joint force for fast bowlers was at the glenoid edge during the ball release and early follow through, hence indicating the fast bowlers to be at a higher risk in this phase than spinners<sup>[10,12]</sup>.

#### 4. Conclusion

The study concludes that the abnormal lateral displacement of the scapula was seen more in the unloaded scaption position P3 in pace bowlers and it was seen more in the full scaption position without weights i.e P7 in spinners which suggests the scapula stabilizers i.e mainly serratus anterior and upper and lower fibres of trapezius were weak. According to risk prediction analysis the pace bowlers were at higher risk of shoulder injury than spinners in the unloaded scaption position P3.

#### 5. Recommendations

Thus, it becomes important to include strengthening exercises in their training programme especially of those muscles bringing about the unloaded scaption position in pace bowlers and of those muscles bringing about the action with arms beyond 90 degrees along the markers of scaption in spinners

#### 6. Acknowledgements

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