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Postural Assessment in Amateur Cricket Players: An Observational Study

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Abstract:

Background: Cricket, a popular sport played by individuals of varying skill levels, carries the risk of injuries resulting from impacts or collisions. These injuries can occur through direct contact with the ball, other players, the ground, or a boundary. Postural assessment plays a crucial role in physiotherapy evaluations, helping to identify anatomical defects that contribute to musculoskeletal issues. In athletes, repetitive body loading during sports can lead to postural abnormalities, which are linked to pain and injury.

Objectives: The study was to Observe posture in amateur cricket players, abnormal postural patterns in these players and Determine imbalances between overactive and underactive muscles using NASM posture Assessment scale.

Methodology: In this observational study, 80 amateur cricket players between the ages of 18 and 35 who met the inclusion and exclusion criteria were included. Using the NASM posture assessment scale, all amateur cricket players were evaluated, and Data was Analysed.

Results: The study found that the most common compensations displayed by players were forward head, elevated shoulder, arm falling forward, low back arches, excessive forward lean, bending their knees inside, feet turn out.

Conclusion: The findings highlight several common postural compensations in amateur cricket players, suggesting that these abnormalities may contribute to injury risks. Addressing these imbalances through targeted interventions can help improve posture and prevent potential musculoskeletal issues.

Keywords: Postural assessment, amateur cricket Players, injury prevention

Introduction:

Cricket is a well-liked international sport that calls for a blend of ability, strategy, and physical condition. noncontact. Because players participate in a variety of physical activity, such as running, throwing, batting, bowling, catching, and diving, overuse and impact injuries are frequent even though the sport (1) Players of different skill levels love playing cricket, which is a popular sport in many nations. The length of the game and the frequent changes in pace make cricket a physically demanding sport that demands a great deal of expertise. (2) a player being hit by a bat or ball, quick rotations, diving and sliding, running into other players, and overuse injuries. The most often injured parts of cricket players were the lower limbs

(50%), upper limbs (23%), and back and trunk (23%). cricket players with shoulder injuries have reduced grip strength, and even the sort of bowling used in the game can alter foot posture, which can ultimately result in ankle and foot injuries. (3) The injury's most common anatomical locations are the knee (11.42%), lumbar spine (17.14%), thigh (8.57%), and shoulder (22.85%). Muscles accounted for 40% of the injuries, followed by fractures and other injuries (28.57%), tendon (14.28%), and ligament (11.42%). Fast bowlers accounted for 20% of injuries, wicket keepers for 8.57%, and batsmen and medium pacers for 25.71%. Fielding injuries accounted for 42.85% of all injuries, with bowling injuries accounting for 40%. The most frequent injuries were from training (28.57%) and matches (45.85%) (4) Although playing sports has many health advantages, there is a chance of becoming hurt. Athletes, both competitive and recreational, suffer from a wide range of soft tissue, bone, ligament, tendon, and nerve injuries at all ages. These injuries are brought on by repetitive stress or direct damage. While age, gender, and activity type (e.g., competitive versus practice) affect the occurrence of injuries, different sports are linked to distinct patterns and types of injuries. (5)

Even prior to the mechanism of injury, a number of risk variables may predispose young people to sports-related injuries. There are two types of risk factors: intrinsic (such age and strength) and extrinsic (like play regulations). Modifiable risk factors are those that can be changed by injury prevention techniques (e.g., strength). Identifying risk characteristics that cannot be changed, including age, will also help identify high-risk groups. (7) "Posture" refers to the body's spatial location. It serves to keep the body balanced during both dynamic motions and immobility and shows where the body is in relation to space. Numerous elements, such as neurophysiological, biomechanical, and Psych emotive elements connected to the species' evolutionary history, influence posture. The human spine is balanced by three physiological curves: the dorsal kyphosis concave forward, the cervical and lumbar lordosis convex forward. About five to six years following the foot's proprioceptive maturity, these curves form and solidify. In addition to provide support and resistance against longitudinal stresses, the three curves preserve equilibrium. (8) The body responds to gravity through posture, which is an instinctive and unconscious position. It is sustained by the contraction of skeletal muscles, which is regulated by a number of different inputs, as well as by ongoing neuromuscular type adjustment. Thus, posture can be defined as any position that maximizes stability, minimizes energy consumption, and minimizes stress on the anatomical systems in order to maintain balance (8) 2 Amateurism can be defined as performing tasks for enjoyment, without compensation or money gain, or in an unprofessional manner. (9) Sport and recreation participation has major positive effects on public health across the lifespan, but there is a significant burden of sport-related musculoskeletal injuries, with youth and young adults being at the highest risk. (10) An assessment of posture is the cornerstone of physiotherapy evaluation. It is helpful in identifying anatomical defects that lead to various musculoskeletal problems. Postural assessment is a useful tool in determining the underlying causes of different ailments in athletes because repetitive loading of the body during sports can lead to certain anomalies in posture that can cause pain and injury. A plumbline approach is the most widely used of the several postural examination approaches that has been used Because plumblines are inexpensive and easy to use, they are frequently used in conjunction with postural grids to assess posture. The optimal plumb line alignment for side and back views is used to assess posture in accordance with Kendall's standards. One drawback of this approach was that it was also unable to generate data that could be quantified (11) A young organism's posture and physical development are influenced by physical activity. Sports training, as a particular type of directed physical exercise, can have a big impact on young men's posture development because of its intense training loads and frequent unilateral exercises. Many

researchers are interested in the posture of athletes, and they have all discovered that physical training influences body posture. Whether a person develops their posture normally or abnormally also relies on the sport they play. Postural abnormalities are characterized by asymmetries in the frontal and horizontal planes as well as aberrant anteroposterior (AP) spinal curvatures, which can be flattened or deepened (12) For screening purposes, static posture can be quicker and easier to evaluate than dynamic posture, although it's unclear how static posture and dynamic movement are related. Consequently, the main focus of this review is whether an athlete's standing posture provides any insight into their future movements. This analysis examines the literature's reports of the ideal static standing posture and offers biomechanical justification for them. An examination of sport-specific postures that are 3 biomechanically incorrect but seem to improve performance is also included in this review. Athletes exhibit a range of postural abnormalities that seem to be beneficial to the generation and application of force Because of the mechanical edge in performance, some trainers think there's value in encouraging certain atypical postures (13) Each joint in the body has an impact on body posture, which is defined as how the body is positioned in space and how its parts are aligned with respect to one another and the surroundings at a given moment. Building up posture against gravity and making sure that balance is maintained are referred to as postural control. The subjective conscious awareness of one's body position, mostly derived from proprioceptive signals from the body's periphery to the central nervous system, is known as postural awareness, as we define it There. Based on the long-held belief that "bad" posture and "poor" postural control are key factors to pain problems, particularly back and neck pain, a substantial corpus of therapies tries to improve posture and postural control in patients with musculoskeletal pain (14).\ Static posture evaluation, overhead squat assessment, single-leg squat assessment, and pulling/pushing assessment are the four components of the National Academy of Sport Medicine posture assessment scale (NASM). The Static Postural Assessment takes a still image of your posture. Here, the fit expert will look for pes planus, lower cross, and higher cross syndromes. The evaluation of the client's ability to regulate their movement, average range of motion, stability, and coordination is demonstrated by the overhead squat. Similar to the Single leg-squat assessment, the is viewed from the front and focuses mostly on knee and pelvic stability. Pulling/pushing assessments are conducted for clients with performance-related goals and those with greater levels of stability, coordination, and control. (15) The aim of this study is to assess the posture of amateur cricket players and identify common postural problems that could impair their performance or increase their risk of injury. The information will be used to guide potential corrective measures, training modifications, and injury prevention techniques in order to improve amateur cricket players' performance and general physical health. This will be achieved through 4 an assessment of the players' alignment and posture, as well as the finding of any postural abnormalities that may lead to long-term musculoskeletal problems. The study was proceed to identify the posture of amateur cricket players in order to prevent injuries, as maintaining proper posture is crucial for injury prevention. Proper posture plays a significant role in reducing the strain on muscles and joints, thereby minimizing the risk of injury. By assessing the players' posture, the study seeks to identify any misalignments or imbalances that could lead to overuse injuries or affect performance. Addressing these issues through corrective measures and proper training techniques can not only enhance players' overall performance but also ensure their long term physical health and safety on the field.

Materials And Methods:

Source of Data: Dr. Balasaheb Vikhe Patil, Rural Medical College, PIMS (DU) Loni (MH). Method of

Data Collection: Data was collected by primary investigator. Type of Data: Quantitative Study Design: Observational study Study Sample: Amateur cricket players. Study Setting: study was conducted in kinesotherapy department Of Dr.APJAK Collage of physiotherapy, PIMS,LONI. Study Population: Amateur cricket players. Sample Size: 80 Age Criteria:18 to 35 years. Study Duration: 6 months Tools to be used: 1.Plumb line 2.mobile phone for video recording. Material: 1.Consent form 2.Data Collection sheet 3.NASM posture assessment Scale

Inclusion Criteria:

Age group 18 to 35 years.
Amateur cricket players of Dr. APJ Abdul Kalam College of Physiotherapy.
Players who are willing to participate

Exclusion Criteria:

Participants with any recent spinal trauma or surgery.
Recent Fracture to the bones of upper extremity, lower extremity or spine.
Players who are not willing to participant

Procedure:

FLOWCHART REPRESENTING THE PROCEDURE OF SELECTION OF PARTICIPANTS

INSTITUTIONAL ETHICAL APPROVAL

↓

PARTICIPANTS WERE RECRUITED AS PER THE INCLUSION AND EXCLUSION CRITERIA

↓

INFORMED CONSENT WAS TAKEN PATIENT WERE INFORMED ABOUT THE PROCEDURE AND ASSESSMENT WAS DONE ACCORDING TO THE NASM SCALE

↓

STATISTICAL ANALYSIS WAS DONE

↓

INTERPRETATION OF RESULTS WAS DONE

↓

DISCUSION WAS DONE

Outcome Measures:

1. NASM posture assessment Scale:

Reliability (0.75) and validity (0.75) of NASM Scale.
Use to measure static and dynamic Posture.

Result:

I) Age

Table No.1: Age Distribution

Age	**15-25**	**25-35**
No. of participants	**66**	**14**

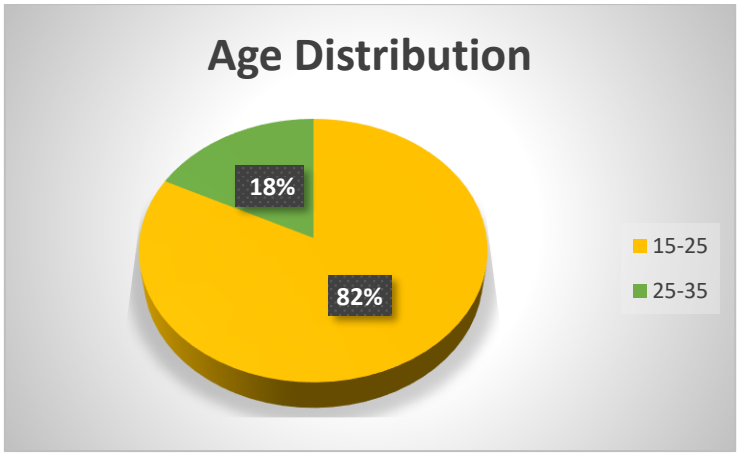


Chart 1: Age Distribution of amateur cricket players

The above pie chart depicts the age distribution of study participants. A majority Participants fall in category of 15-25 years of age with mean age (22.95).

II) Gender

Table 1: Gender Distribution of amateur cricket players

Gender	Male	Female
No. of Participants	43	37

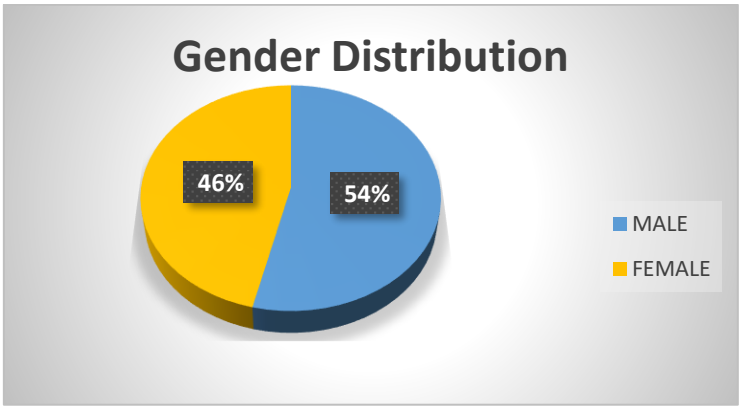


Chart 1: Gender Distribution of amateur cricket players

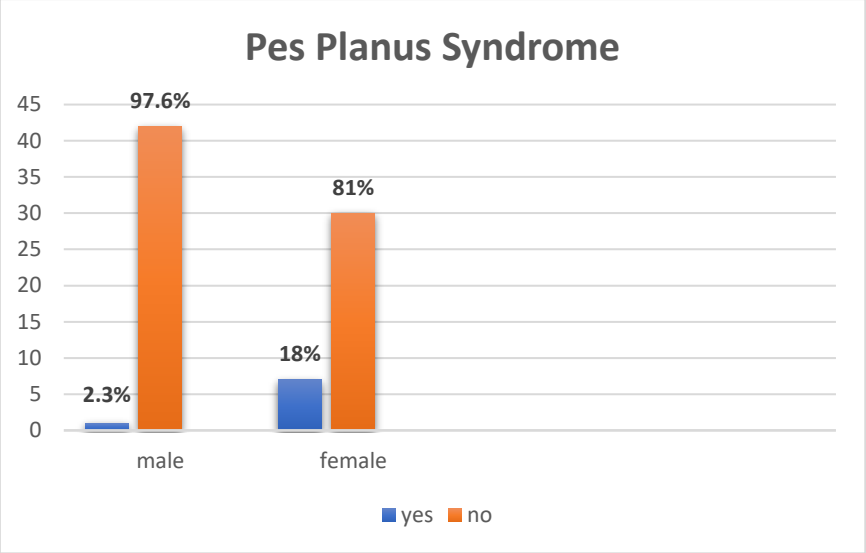
The above pie chart depicts the male predominance in the study between the ages ranging from 18-35 years.

II) Static Postural Assessment

a. Pes planus syndrome

Table 1: Pes Planus Syndrome

Pes Planus Syndrome	Yes	No
Male	1	42
Female	7	30



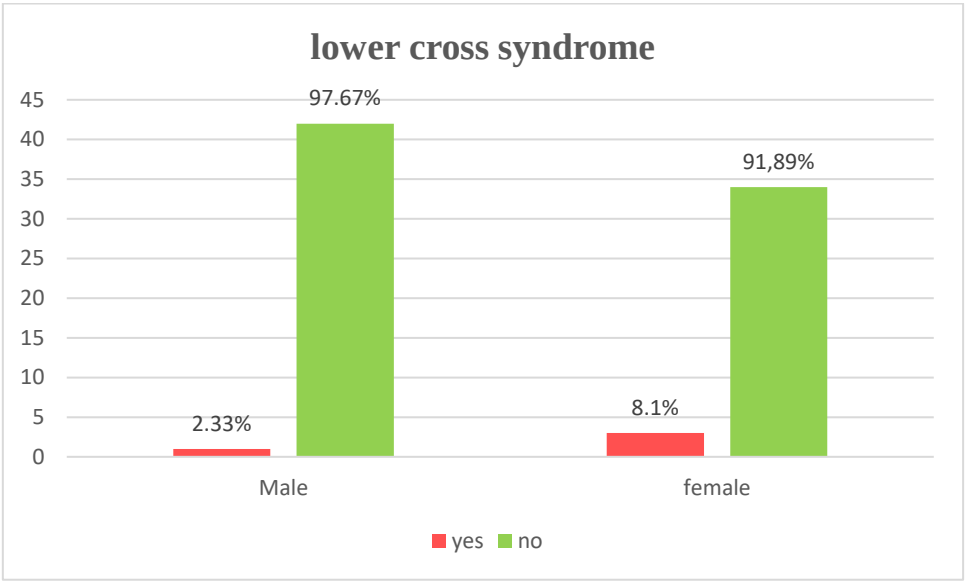
Graph 1: Pes Planus Syndrome

The above graph Indicate high prevalence of pes planus syndrome in female with 18 % and 2.3% in males respectively.

b. Lower Cross Syndrome

Table 2: Lower cross Syndrome

Lower Cross Syndrome	Yes	No
Male	1	42
Female	3	34



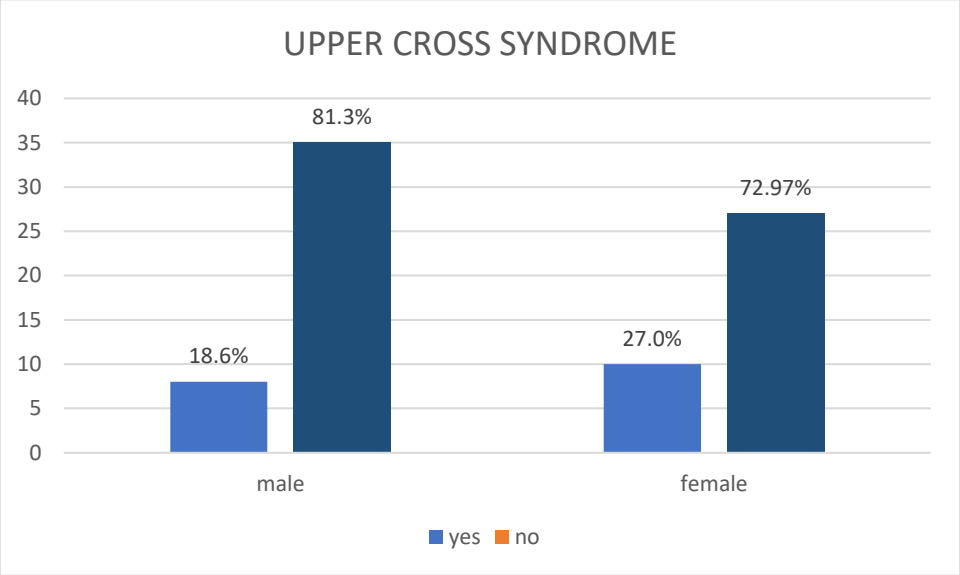
Graph 2: Lower Cross Syndrome

The above graph Indicate high prevalence of Lower Cross syndrome in female with 8.1% and 2.33% in males respectively.

c. Upper Cross Syndrome

Table 3: Upper cross Syndrome

Upper cross syndrome	Yes	No
Male	8	35
Female	10	27



Graph 3: Upper Cross Syndrome

The above graph Indicate high prevalence of upper cross syndrome in Female with 27% and 18.6% in males respectively.

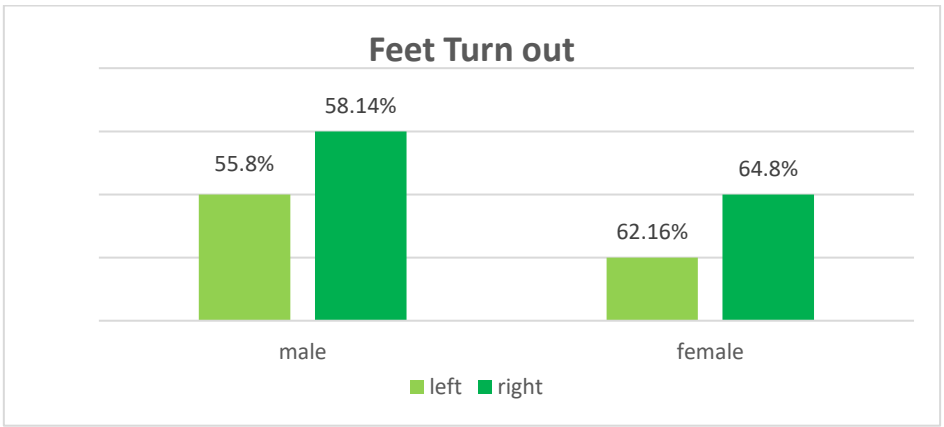
III) Dynamic Postural Assessment

1.Overhead squat Assessment

a. Foot /Ankle

Table 1: Feet turn out

Feet turn out	left	right
Male	24	25
Female	23	24



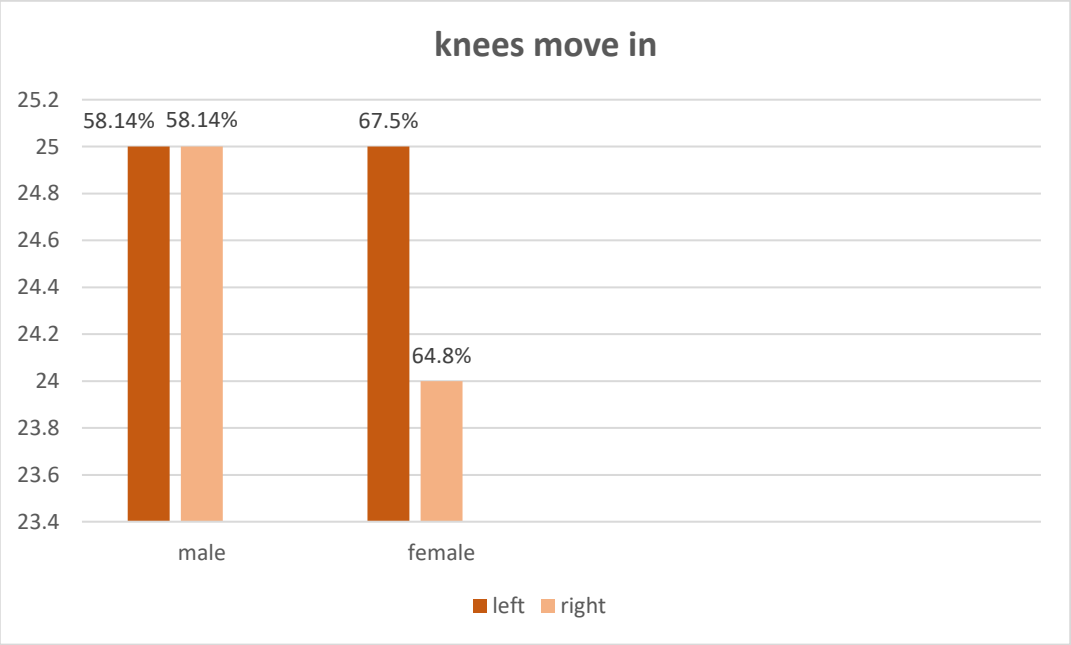
Graph 1: Feet turn out

The above graph shows that there is a higher incidence on the right side with the right foot turned out, with 58.14% in males and 64.8% in females, whereas on the left side with the left foot turned out, there is 55.8% in males and 62.16% in females.

b. knee

Table 2: knee move in

Knee move in	Left	Right
Male	25	25
Female	25	24



Graph 2: knee move in

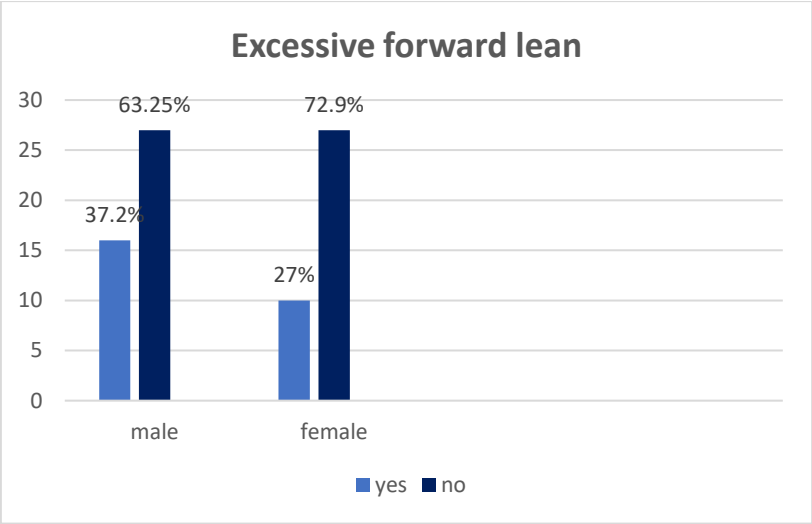
The above graph shows that on the right side, the knee moves inward with 58.14% in males and 64.8% in females, whereas on the left side, there is 58.14% in males and 67.5% in females.

c. lumbo-pelvic-hip-complex

1)Excessive forward lean

Table 3: Excessive forward lean

Excessive Forward lean	Yes	No
Male	16	27
Female	10	27



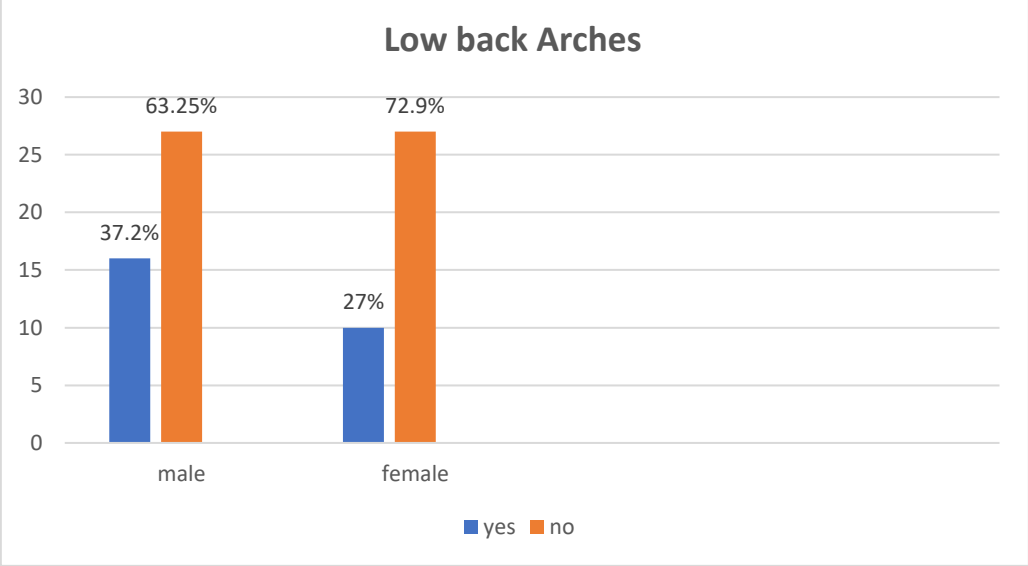
Graph 3: Excessive Forward lean

The above graph depicts that 27% of females and 37.2% of males have excessive forward lean.

2)low back arches

Table 4: low back arches

Low back arches	Yes	No
Male	16	27
Female	10	27



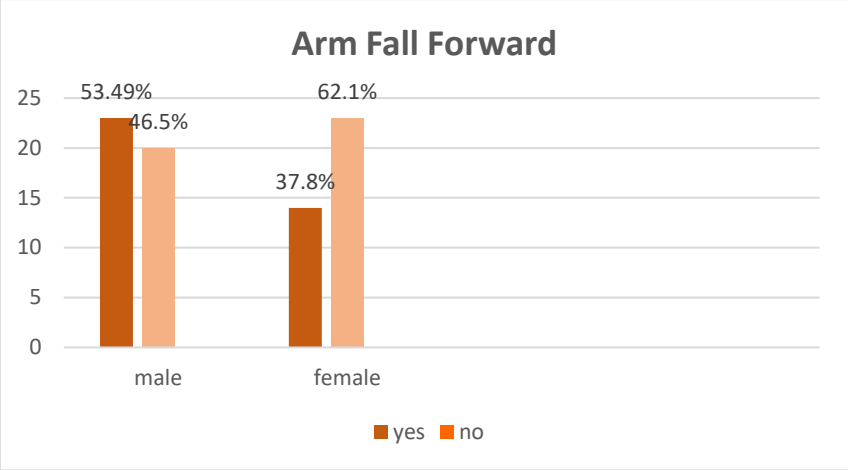
Graph 4: low back arches

The above graph depicts that 27% of females and 37.2% of males have low back arches.

d. Arm Fall Forward

Table 5: Arm fall forward

Arm fall forward	Yes	No
Male	23	20
Female	14	23



Graph 5: Arm fall forward

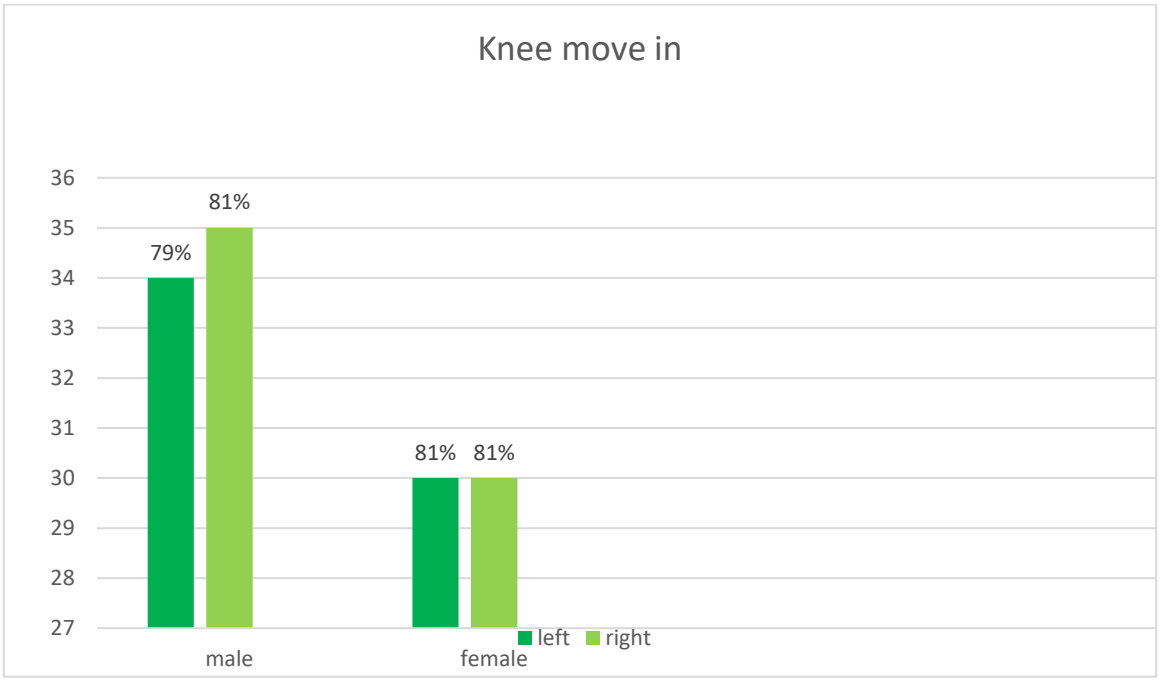
The above graph depicts that 37.8% of females and 53.49% of males have their arm fall forward.

2.Single -leg Squat assessment

a. knee

Table 1: knee move in

Knee move in	Left	Right
Male	34	35
Female	30	30



Graph 1: knee move in

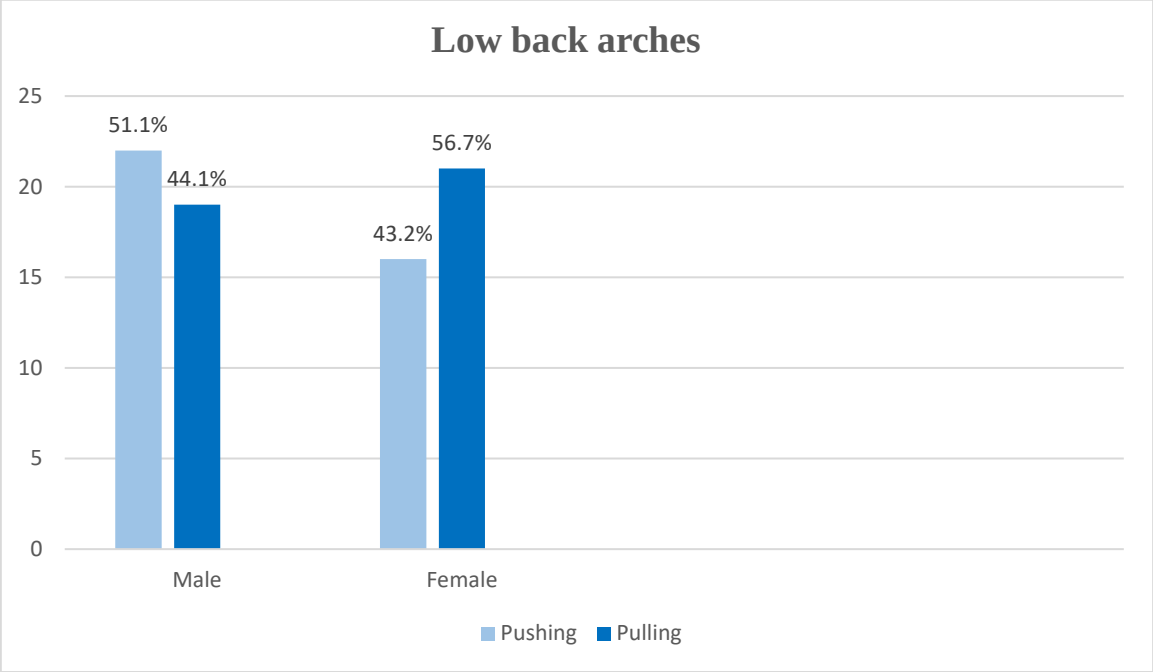
The above graph shows that on the right side, the knee moves inward with 81% in males and 81% in females, whereas on the left side, there is 79% in males and 81% in females.

3.Pushing / pulling Assessments

a. Lumbo-pelvic -hip complex

Table 1: low back arches

Low back arches	pushing	pulling
Male	22	19
Female	16	21



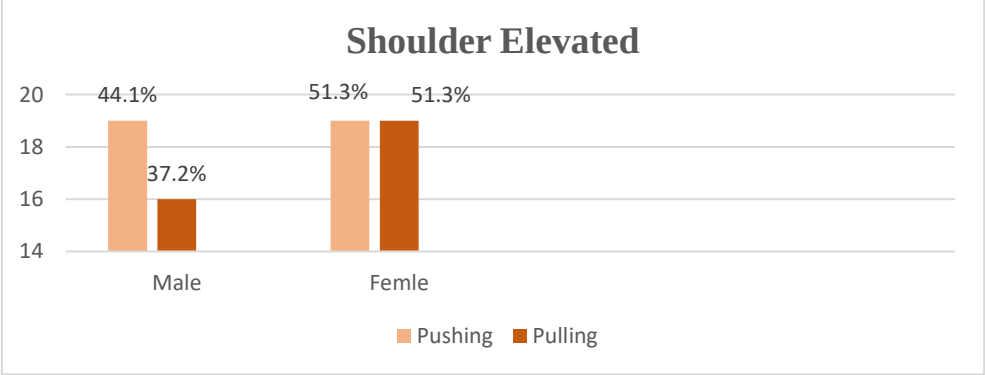
Graph 1: Low back arches

The above graph shows that the low back arches during pushing higher in males with 51.1% of males while on pulling higher in female with 56.7%.

b. shoulder

Table 2: shoulder elevated

Shoulder	pushing	pulling
Male	19	16
Female	19	19



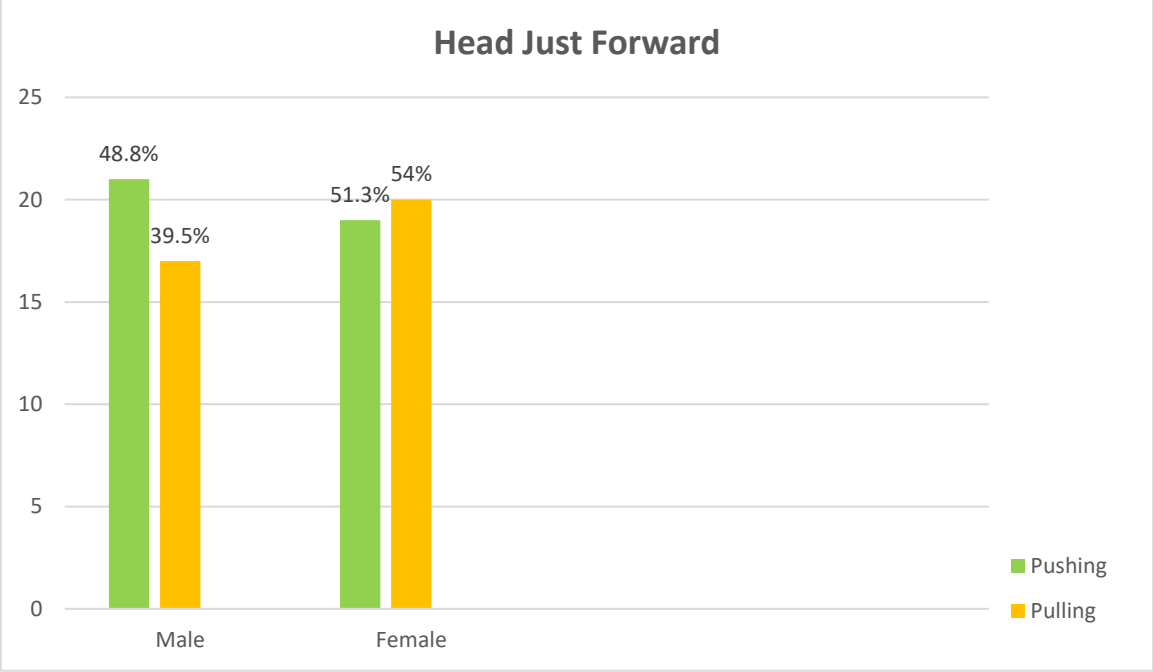
Graph 2: Shoulder elevated

The above graph shows that the shoulder elevation during pushing and pulling is observed higher in female with 51.3%.

c. Head /neck

Table 3: Head just forward

Head just forward	pushing	pulling
Male	21	17
Female	19	20



Graph 3: Head just forward

The above graph indicates that 51.3% of females and 48.8% of males describe the forward head posture when pushing. Whereas on pulling, 54% of females and 39.5%.

Discussion:

The Present Study entitled," POSTURAL ASSESSMENT IN AMATEUR CRICKET PLAYERS:AN OBSERVATIONAL STUDY." was conducted at Dr. Vithalrao Vikhe Patil Pravara Rural Hospital, Loni, and its constituent college, Dr. APJ Abdul Kalam College of Physiotherapy. This was an observational study conducted for a period of 6 months. The study included the amateur cricket players at the Pravara Institute of Medical Sciences. The study included a total of 80 participants as per inclusion and exclusion criteria with the mean age of 22.95) years. Table 1 shows the demographic details of the study population, with ages ranging were between 15 and 25 years old, which accounts for a major share in our study, and 18% (14) of the patients participating in the study were between 25 and 35 years old. According to a related study by Moinuddin Inamdar et.al (2021), the majority of respondents (40%) were between the ages of 15 and 25. This result is in line with our findings and implies that younger individuals are frequently overrepresented in studies. (1) Table 2 shows the demographic details of the study population with gender. Out of 80 recruited subjects, a male predominance was more accounting for the % (54), and

females of 46% (37) were observed in the study population. The majority of responses are male, according to Moinuddin Inamdar et.al (2021) (1)

STATIC POSTURE ASSESSMENT

According to studies, pes planus syndrome is highly prevalent in females (18%) as measured by static posture. In a separate investigation, Azhagiri R et al. (2021) discovered that pes planus affected 29% of 500 individuals. Of them, 145 people had flatfoot, 92 of whom were female, accounting for 63% of the total. The remaining 37% of men in their survey provide evidence that flatfoot is more common in women than in men (2). Additionally, Lower Cross Syndrome (LCS) was found in 8.1% of females. The results of Shriya Das et al. (2017) indicate that compared to males in the same age range, females are more prone to develop Lower Cross Syndrome. Particularly, 14 out of 117 male volunteers and 30 out of 83 female volunteers had LCS. (3) Also a high 27.0% prevalence of Upper Cross Syndrome was observed in females. In 32 the study "Screening of Upper Cross Syndrome in Asymptomatic Individuals," 300 participants within the ages of 18 and 40 were included (Heena Pathan et al., 2021). There were 180 (60%) females and 120 (40%) males among them. (4) OVERHEAD SQUAT ASSESSMENT

According to the assessment of the overhead squat, a greater proportion of females than males demonstrated outward foot rotation. According to Straub et al. (2024), this can be the result of tension in the gastrocnemius and soleus muscles or restricted hip mobility. Compensatory foot placement to maintain balance may result from these tense muscles. Both sexes may have knee inward movement, which could be a sign of weakening in the hip rotators, especially the gluteus Medius, which is essential for maintaining pelvic stability and regulating femoral rotation. Low back arches and an excessive forward lean were also common, which could be caused by weak core muscles and tight hip flexors. These muscular imbalances might result in postural compensations, which exert additional tension on the lumbar spine (Straub et al., 2024). Lastly, weak upper back muscles and restricted thoracic spine mobility may be the cause of the arm fall forward seen in many participants. These conditions make it difficult to maintain appropriate overhead placement throughout the squat. (5)

SINGLE LEG SQUAT ASSESSMENT

In a single-leg squat test, 81% of men and women showed inward knee movement on the right side, whereas 79% of men and 81% of women performed the same on the left. This study is similar to one conducted by Laura S. Lagares et al. (2021), in which 61.5% of athletes had evidence of knee valgus when put through a step-down test. Age, height, BMI, and body mass had little impact on knee valgus, according to the study, indicating that these variables have little influence on knee valgus. This demonstrates how knee valgus is frequent in males and females and stresses the importance of improving muscular strength and control to reduce the risk of injury. (6) 33

PULLING /PUSHING ASSESSMENT

Low back arching occurs in 51.1% of males when pushing and 56.7% of females when pulling. Females show a higher incidence of the shoulders in both movements (51.3%). During pushing, 48.8% of males and 51.3% of females exhibit a slight forward head position, whereas during pulling, 39.5% of males and 54% of females exhibit the same posture. Stronger relations were observed for more severe cases of shoulder and low back pain, according to an associated study by M. Houseman's et al. (2002)

Conclusion:

The study concluded that amateur cricket players exhibited significant postural compensations, which were definitely a contributing factor to musculoskeletal imbalances and the risk of injury. Forward head

posture, lifted shoulders, arms falling forward, low back arches, excessive forward lean, knees bending inward, and feet turning out was the most frequently seen abnormal postural patterns. The findings suggest that muscular imbalances, in which certain muscles become overactive while others become underactive, may result from repetitive motions and takes in cricket. In along with impairing performance, these postural abnormalities can also increase the risk of injury, mainly to the lower limbs, shoulders, and spine. Amateur cricket players may experience less injury and have better posture and performance if these abnormalities are corrected with focussed physiotherapy and corrective exercises. Strength training and posture correction may be the focus of future research and interventions with the goal of reducing the long-term effects of these common compensations.

Limitations:

1. Limited sample size
2. Lack of long-term follow-up for assessing the effect of postural deviations on injury rates
3. Failure to account for differences in playing experience, injury history, or environmental factors.

Future scope:

1. Develop rehabilitation programs to prevent injuries related to sports.
2. Study the impact of posture on various aspects of cricket activities, including fielding, bowling, batting.
3. Similar studies can be conducted for Amateur basketball players to reduce the risk of injurie

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