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Performance analysis of batsman and bowler in relation to dynamic balance in cricket

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Abstract
Introduction: Balance is an integral component of almost every activity of daily living. The relationship between balance ability and sport injury risk has been established in many cases, but the relationship between balance ability and athletic performance is less clear. Balance ability was related to competition level for some sports, with the more proficient athletes displaying greater balance ability.
Purpose: Present study was designed to find out the relationship between the performance of the batsman and bowlers in Cricket with their core muscle stability and dynamic balance.
Materials and Methods: A total of 26 state level female cricketers were volunteered for this study. Among them 14 were specialist batsman's and other 12 were specialist bowlers. All the subjects participated for Bengal Team in National level. Their age was ranged from 17 to 27. Their selection for Bengal team was done by Cricket Association of Bengal (CAB). Performance of bowlers and batsman and dynamic balance were considered as criterion of this study.The performance of batsman and bowlers was measured by considering the score given by the professional coach attached with the team. Dynamic balance was measured by Star Excursion Test. Two independent groups were used to compute co-efficient of correlation between variables. Mean and standard deviation were calculated as descriptive statistics. Coefficient of Correlation (r) was computed by using Pearson Product Moment Method. All statistical calculations were done using standard statistical software (Excel-2010). Only 0.05 level of confidence was used to judge the significance in this study.
Results: The mean score of performance for bowlers and batsman were 9.58 and 11.42 respectively. The balance abilities for bowler were 73.61 sec, 74.02 sec, 81.73 sec, 81.06 sec, 80.07 sec, 75.62 sec, 66.83 sec and 69.53 sec respectively for anterior, ant-med, medial, pos-med, posterior, pos-lat, lateral, ant-lat. The balance abilities for batsman were 76.26 sec, 81.44 sec, 83.41 sec, 86.87 sec, 84.60 sec, 77.16 sec, 69.47 sec and 78.16 sec respectively for anterior, ant-med, medial, pos-med, posterior, pos-lat, lateral, ant-lat. Result revealed that correlation between performance and dynamic balance abilities for bowlers were significant only for anterior (r=0.719) and posterior-lateral (r=0.694) and for batsman no significant correlation was found between these two parameters.
Conclusion: Study was concluded that there was no significant correlation between performances with dynamic balance of batsman and bowler in cricket except only for anterior and posterior-lateral side for bowlers.

Keywords: performance, bowlers, batsman, dynamic balance, cricketer

Introduction

Balance is an integral component of almost every activity of daily living. A decrement in balance can result from musculoskeletal injury, head trauma, disease or ageing. As a result of balance decrements/inadequacies, everyday functioning may be impaired. Thus balance is of key clinical relevance to any rehabilitation/prophylactic physiotherapy program (Crymble, 2013) [1].

The relationship between balance ability and sport injury risk has been established in many cases, but the relationship between balance ability and athletic performance is less clear. Balance ability was related to competition level for some sports, with the more proficient athletes displaying greater balance ability. There were significant relationships between balance ability and a number of performance measures. Evidence from prospective studies supports the notion that balance training can be a worthwhile adjunct to the usual training of non-elite athletes to enhance certain motor skills, but not in place of other conditioning such as resistance training. (Hrysomallis, 2011) [2]

Coaches and sports medicine professionals generally agree that athletes should possess good balance in order to be successful at their sport. The term balance relates to one's ability to maintain his or her center of mass within his or her base of support. For example, a running back demonstrates good dynamic balance by staying upright and continuing forward progress despite being hit by a defensive back. Balance training is often incorporated into a functional exercise program. Coaches and sports medicine professionals are usually able to observe and correct gross balance dysfunction with specific exercises or drills.

Balance ability was related to competition level for some sports, with the more proficient athletes displaying greater balance ability. There were significant relationships between balance ability and a number of performance measures. Evidence from prospective studies supports the notion that

balance training can be a worthwhile adjunct to the usual training of non-elite athletes to enhance certain motor skills.

The SEBT has been shown to be a reliable measure and has validity as a dynamic test to predict risk of lower extremity injury, to identify dynamic balance deficits in patients with a variety of lower extremity conditions, and to be responsive to training programs in both healthy people and people with injuries to the lower extremity. Clinicians and researchers should be confident in employing the SEBT as a lower extremity functional test. (Plisky *et al*. 2006) [3].

Dynamic balance is one another impotent factor which need in every situation in cricket such as to maintain balance during running with ball, at the time of delivery or at the time of follow through by the bowler. In another side to hit the ball by the batsman and to hit the ball forcefully in desire direction dynamic balance play a vital role.

Balance may be defined as one's ability to maintain the body's centre of gravity over the centre of supporting base of the body. Balance is of two types namely Static balance and dynamic balance. Static Balance may be defined as one's ability to hold a stationary position for a reasonably long duration in comparatively less stable position. Dynamic balance may be defined as the one's ability to maintain body balance during vigorous movement in comparatively less stable movement. For example, walking over a narrow wall, leaping from stone to stone, walking on a moving roller, walking over a rope with or without support etc. Dynamic balance is an important factor in physical activities involving controlled movements. For example, running, dismounting from gymnastics apparatus, series of movement in floor exercise in gymnastics, offensive movement in wrestling and fencing etc. (Kansal 2012) [4].

There is evidence to indicate that the ability to balance easily, whether statically or dynamically, depends upon the function of the mechanism in the semicircular canals; the kinesthetic sensation in the muscles, tendons, and joints; visual perception while the body is in motion; and the ability and the ability to coordinate these three sources of stimuli (Johnson and Nelson 2012) [5].

Balance is considered the ability of a person to maintain equilibrium in an upright posture by maintaining the Centre of gravity within a base of support. Balance can also refer to the ability to control body movements. Some have used the term "Balance," "Proprioception," "kinesthesia" interchangeably, but each of these term has a specific meaning. Although not clearly defined, proprioception and kinesthesia generally refer to the ability of the central nervous system to sense position and movement of a given body segment in space. Proprioception and kinesthesia are harder to test than balance, and such testing often requires sophisticated balance type equipment (Reiman and Manske, 2009) [6].

The sport of cricket has a known history beginning in the late 16th century. Having originated in South-East England, it became the country's national sport in the 18th century and has developed globally in the 19th and 20th centuries. International matches have been played since 1844 and Test cricket began, retrospectively and recognized in 1877. Cricket is the world's second most popular spectator sport after Football.

Earlier it was popular as a recreational game but now days it's a very much competitive sports. Someone still believes that playing cricket is very easy and require minimal fitness but now a days it's concept became changed. Today's cricket demands high level of fitness and training. To become a world class cricketer one needs to develop his or her fitness level up to date and that required highly qualified physical trainers and coaches.

Present study was designed to find out the relationship between the performance of the batsman and bowlers in Cricket with their core muscle stability and dynamic balance.

Materials and Methods

The Subjects

A total of 26 state level female cricketers were volunteered for this study. Among them 14 were specialist batsman and other 12 were specialist bowlers. All the subjects have participated for Bengal Team in National level. Their age was ranged from 17 to 27. Their selection for Bengal team was done by Cricket Association of Bengal (CAB).

Criterion Measure

The relationship between performance with core muscle stability and dynamic balance was computed by measuring the following criteria in this study:

1. Performance of bowlers and batsman
2. Dynamic balance

Instruments and Tools Used

The criterions of this study were measure by the following test and tools:

1. The performance of batsman and bowlers was measured by considering the score given by the professional coach attached with the team. The coaches were qualified and appointed by the CAB.
2. Dynamic balance measured by Star Excursion Test

Design of the study and statistical procedure

Two independent groups were used to compute co-efficient of correlation between variables. Mean and standard deviation were calculated as descriptive statistics. Coefficient of Correlation (r) was computed by using Pearson Product Moment Method. All statistical calculations were done using standard statistical software (Excel-2010). Only 0.05 level of confidence was used to judge the significance in this study.

Results and Findings

Performance of the batsman and bowler was measured by the two coaches. Both coaches have given score out of 20 on the basis of the runs scored and strike rate for the batsman and for bowlers it was given on the basis of numbers of wickets taken and run economy of the particular the blower. The performance of batsman and bowler were considered according to their performance on selection matches as well as national level matches of 2016-17 year. The mean value and standard deviation of the performance score for bowlers and batsman have presented in Table No. 1. The raw score of the performance for bowlers and batsman measured by the coaches have presented in Appendix-A.

Table 1: The mean score and standard deviation of performance of bowler

Performance Score	Bowlers	Batsman
Mean	9.58	11.42
SD	4.27	1.74
N	12	14

The results regarding performance (mean value of scores) of bowlers and batsman measured by the coaches have been presented graphically in figure-1. It was already mentioned that the score allotted for the cricketers was given by their concern coaches as per their evaluation on performance of the player in the field. The performance was assessed on the basis of the wickets taken and economy rate for the bowlers and for the batsman performance was assessed by the run scored and strike rate of the batsman.

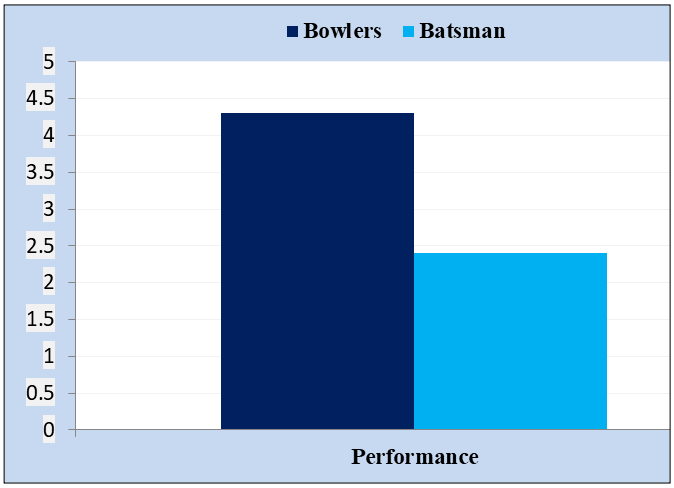

Fig 1: Comparison of mean scores of performance between bowlers and batsman

Dynamic balance of the batsman and bowler was measured by star excursion balance test. This test was administered with the reach distance by one leg in eight direction while strong leg in the centre of the star. The eight directions has different name – i) anterior ii) anterior medial iii) medial iv) posterior medial v) posterior vi) posterior lateral vii) lateral and viii) anterior lateral. The scores of the dynamic balance test were taken in cm. The mean score and standard deviation of bowlers and batsman have presented in Table No. 2 and Table No. 3 respectively. The raw score for different test items of dynamic balance for bowlers and batsman have presented in Appendix-C.

Table 2: The mean value and standard deviation value of dynamic balance of bowler

	Dynamic balance of bowlers							
	anterior	ant-med	medial	pos-med	posterior	pos-lat	lateral	ant-lat
MEAN	73.61	74.02	81.73	81.06	80.07	75.62	66.83	69.53
SD	8.46	9.62	10.62	10.7	11.32	9.4	13.07	11.61
N	12	12	12	12	12	12	12	12

Table 3: The mean value and standard deviation of dynamic balance of batsman

	Dynamic balance of batsman							
	anterior	ant-med	medial	pos-med	posterior	pos-lat	lateral	ant-lat
MEAN	76.26	81.44	83.41	86.87	84.6	77.16	69.47	78.16
SD	8.58	9.21	10.05	8.98	12.71	9.85	12.13	15.32
N	14	14	14	14	14	14	14	14

The correlation between performance of bowlers and batsman and their dynamic balance were also computed by Pearson product moment method. The coefficient of correlation was calculated between performance with different test items of star excursion balance test and results have presented in Table No. 4 and Table No. 5 respectively for bowler and batsman.

Table 4: The co-efficient correlation in between performance with dynamic balance of bowler

Parameters	anterior	ant-med	medial	pos-med	posterior	pos-lat	lateral	ant-lat
Performance	0.719	0.487	0.263	0.403	0.402	0.694	0.386	0.314
Remarks	S	NS	NS	NS	NS	S	NS	NS

S=Significant; NS=Not Significant

Table 5: The coefficient of correlation in between performance with dynamic balance of batsman

Parameters	anterior	ant-med	medial	pos-med	posterior	pos-lat	lateral	ant-lat
Performance	-0.03	0.148	-0.157	0.418	0.386	0.285	-0.083	-0.035
Remarks	NS	NS	NS	NS	NS	NS	NS	NS

NS=Not Significant

Discussion on findings

The dynamic balance of bowlers and batsman was measured in this study by star excretion test using eight test items in different directions and results have been presented in graphical form at Figure-3. Results revealed that the bowlers were inferior position in eight aspects of dynamic balance than the batsman. Batsman had much more higher dynamic balance in Ant-med, Pos-med, Posterior and Ant-lat aspects. However, the coefficient of correlation computed between performance and different eight aspects of dynamic balance were found statistically not significant except for Anterior and Post-lateral aspects of bowlers only.

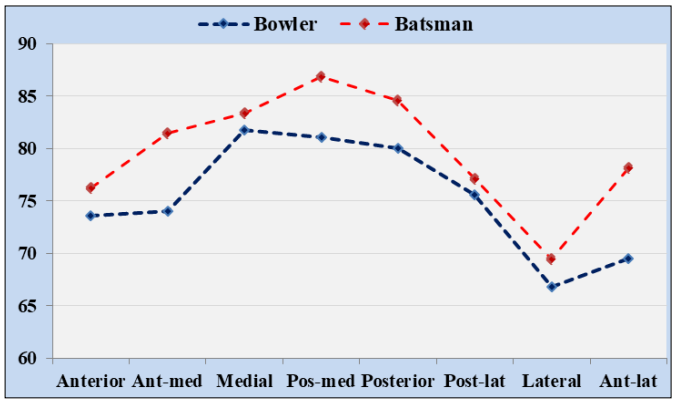

Fig 2: Comparison of mean scores of dynamic balance between bowlers and batsman

Extensive review has not identified studies conducted on establishing relationship between performance in competitive sports and dynamic balance. Few studies found high level performer had more balance ability than poor performer. Hrysomallis (2011) conducted a study to compare the balance ability of athletes from different sports; determine the relationship of balance ability with performance measures; and examine the influence of balance training on sport performance or motor skills and they found Balance ability was related to competition level for some sports with the more proficient athletes displaying greater balance ability. There were significant relationships between balance ability and a number of performance measures [2]. Barati *et al*. (2013) evaluated the relationship between trunk muscle endurance and static balance in male students and found a significant relationship exist between trunk muscle endurance and static balance [7].

Balance ability is necessary for better performance. Evidence from conducted studies supports that balance training can be a worthwhile adjunct to the usual training of non-elite athletes to enhance certain motor skills but not in place of other conditioning such as resistance training (Hrysomallis, 2011) [2]. However improved balance abilities are helpful not only for showing better performance but also helps to prevent injuries. Butler *et al*. (2013) in their study-Dynamic Balance Performance and Noncontact Lower Extremity Injury in College Football Players and found poor performance on the SEBT may be related to an increased risk for sustaining a noncontact lower extremity injury over the course of a competitive American football season [8]. That's why the sports trainers must think to include balance training in their training schedule. More research is required to determine the influence of balance training on the motor skills and sports performance of elite athletes.

Conclusions

With the limitation of the present investigations following conclusion were drawn on the basis of obtained results.

1. There was no significant correlation between performances of bowler with dynamic balance except only for anterior and posterior-lateral side which had statistically significant positive correlation.
2. There was no significant correlation between performances of batsman with dynamic balance.

References

1. Crymble S, Glennie C, Leech M, Mullen S, Ryan C, Wallace N, *et al*. Evaluation of human performance: The star excursion balance test. Available in the internet, Link: https://scholar.google.co.in/scholar?hl=en&q=THE+STAR+EXCURSION+BALANCE+TEST+++++Sarah+Crymble%2C+Caroline+Glennie%2C+Mary+Leech%2C+Susan+Mullen%2C+Cormac+Ryan%2C+Nicola+Wallace&btnG, 2013.
2. Hrysomallis C. Balance Ability and Athletic Performance. Sports Med. 2011; 41:221.
3. Plisky JP, Rauh MJ, Kaminski TW, Underwood FB. Star Excursion Balance Test as a Predictor of Lower Extremity Injury in High School Basketball Players. Journal of Orthopaedic & Sports Physical Therap. 2006; 36(12):911-919.
4. Kansal DK. A practical approach to test measurement and evaluation.Sports and spiritual science publications, 2012: 253-263.
5. Johnson BL, Nelson JK. Practical measurements for evaluation in physical education. Surjeet publications. 2012; 3:227-243.
6. Reiman MP, Manske RC. Functional testing in human performance. Human kinetics. 2009; 10:103-117.
7. Barati A, Safar Cherati A, Aghayari A, Azizi F, Abbasi H. Evaluation of Relationship between Trunk Muscle Endurance and Static Balance in Male Students. Asian J Sports Med. 2013; 4(4):289-294.
8. Butler RJ, Michael E Lehr, Michael ME, Fink L, Kyle ML, Kiesel B, Phillip J, Plisky PJ. Dynamic Balance Performance and Noncontact Lower Extremity Injury in College Football Players Sports Health. 2013; 5(5):417-422.