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Performance analysis of batsman and bowler in relation to core stability in cricket

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Abstract

Introduction: Core stability is defined as the ability to control the position and motion of the trunk over the pelvis to allow optimum production, transfer and control of force and motion to the terminal segment in integrated athletic activities. Core stability and core strength have been subject to research since the early 1980s. However, less research has been performed on the benefits of core training for elite athletes and how this training should be carried out to optimize sporting performance.

Purpose: The study was conducted with the purposes to examine the correlation between performances of batsman and bowler with the core muscle stability in Cricket.

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. Performance of bowlers and batsman and core stability 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. Core stability was measured by back extensor test, flexor endurance test, side bridge test left and side bridge test right. Two independent groups were used and Coefficient of Correlation (r) between variables was computed by Pearson Product Moment method. Mean and standard deviation were calculated as descriptive statistics. All statistical calculations were done using standard statistical software. 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 core stability for bowler was 81.82 sec, 197.76 sec, 55.21 and 62.07 sec respectively for BET, FET, SBTL and SBTR respectively. The core stability for batsman was 109.42 sec, 117.58 sec, 65.69 sec and 70.81 sec respectively for BET, FET, SBTL and SBTR respectively. Result revealed that all computed values of coefficient of correlations between performance and core abilities were statistically insignificant both for bowlers and batsman.

Conclusion: Study was concluded that there was no significant correlation between performance and core stability of batsman and bowler in cricket.

Keywords: Performance, Bowlers, Batsman, Core stability, Cricketer.

Introduction

The core region is the region of the body consisting of muscle and joints of the abdomen, the lower back, the pelvic and the hips. These core muscles have dual roles. The first role is to protecting (stabilizing) the spine from excessive force; the second role is in the criterion transfer of force in a proximal to distal sequence (Brumitt, 2010) [1]. Stability of the core muscles has been defined as the ability to control the position and motion of the trunk over the pelvis to allow optimum production, transfer and control of force and motion to the terminal segment in integrated athletic (or kinetic chain) activities (Lederman 2010) [2].

'Core stability' is defined as the ability to control the position and motion of the trunk over the pelvis to allow optimum production, transfer and control of force and motion to the terminal segment in integrated athletic activities. Core muscle activity is best understood as the pre-programmed integration of local, single-joint muscles and multi-joint muscles to provide stability and produce motion (Kibler, Press & Sciascia, 2006) [3].

Core stability and core strength have been subject to research since the early 1980s. However, less research has been performed on the benefits of core training for elite athletes and how this training should be carried out to optimize sporting performance. Many elite athletes undertake core stability and core strength training as part of their training programme, despite

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contradictory findings and conclusions as to their efficacy (Hibbs, Thompson and French, 2008) [4].

The importance of function of the central core of the body for stabilization and force generation in all sports activities is being increasingly recognized. 'Core stability' is seen as being pivotal for efficient biomechanical function to maximize force generation and minimize joint loads in all types of activities ranging from running to throwing. However, there is less clarity about what exactly constitutes 'the core', either anatomically or physiologically, and physical evaluation of core function is also variable. The core is particularly important in sports because it provides "proximal stability for distal mobility (Kibler, Press & Sciascia 2006) [3].

Performance is the ultimate execution of results of the players in competition. In case of cricket the performance of the batsman depends on runs scored and strike rate of the batsman and for bowlers it was measured on the basis of wickets taken and run economy of the particular by the bowler. Analysts and coaches use performance indicators to assess the performance of an individual, a team or elements of a team. They are sometimes used in a comparative way, with opponents, other athletes or peer groups of athletes or teams, but often they are used in isolation as a measure of the performance of a team or individual alone (Hughes, Roger and Bartlett, 2002) [5]. The study was conducted with the purposes to examine the correlation between performances of batsman and bowler with the core muscle stability in Cricket.

Materials and Methods

The Subjects

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).

Criterion Measure

The performance of batsman and bowlers and core muscle stability were considered as criterion measured in this study.

Instruments and Tools Used

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

- a) 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.
- b) Core muscle stability of the subjects was measured by the following tests-
 - Back extensor test (BET)
 - Flexor endurance test (FET)
 - Side bridge test left (STBL)
 - Side bridge test right (STBR)

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 bowler. 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.

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.

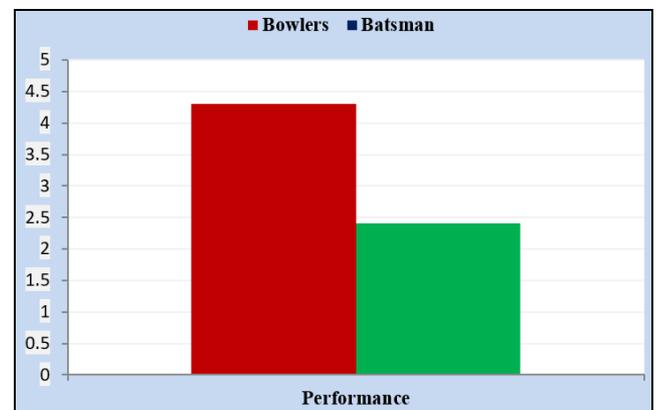


Fig 1: Comparison of mean scores of performance between bowlers and batsman

Core stability of the batsman and bowler was measured by four different tests- Back extensor test (BET), Flexor endurance test (FET), Side bridge test left (SBTL) and Side bridge test right (SBTR). The score of the core stability of the batsman and bowler were measured in seconds. The mean score and standard deviation of each aspect of core stability for bowlers and batsman have presented in Table No. 2 and Table No. 3 respectively.

Table 2: The mean score and standard deviation of core stability of bowler

Core stability of bowlers				
Statistical Parameters	BET	FET	SBTL	SBTR
Mean	81.82	197.76	55.21	62.07
SD	31.3	119.45	15.87	26.88
N	12	12	12	12

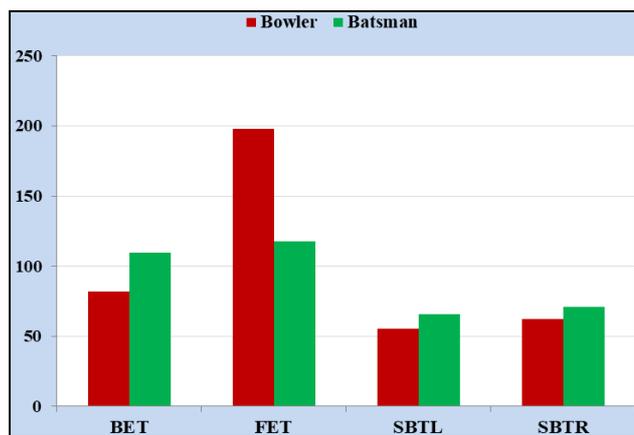
Table 3: The mean score and standard deviation of core stability of batsman

Core stability of batsman				
Statistical Parameters	BET	FET	SBTL	SBTR
Mean	109.42	117.58	65.69	70.81
SD	27.49	59.85	18.88	19.61
N	14	14	14	14

Table 7: The Co-efficient correlation in between performance with core stability of batsman

Parameters	BET	FET	SBTL	SBTR
Performance	-0.36	-0.201	0.189	0.284
Remarks	Not significant	Not significant	Not significant	Not significant

The core stability measured by four different test items for bowlers and batsman separately have been compared and presented graphically in the figure-2. Findings revealed that bowlers were superior in FET and batsman was superior position in BET, SBTL and SBTR. However the correlation coefficient between performance and four test items of core stability were found insignificant in this study.

**Fig 2:** Comparison of mean scores of core stability between bowlers and batsman

Discussion on Findings

Finding of the present study was further supported by several studies conducted in different parts of the world. Scibek *et al.* (2001) tested swimming performance and core strength in high school-level swimmers and unable to establish a significant relationship between these variables [6]. Tse *et al.* (2005) tested rowing performance and core strength in their study on college aged rowers, they were unable to establish a relationship between core endurance and functional performance [7]. Nesser *et al.* (2008) reported in their study titled as the relationship between core stability and performance in division-I football players and suggested that core stability is moderately related to strength and performance. Thus, increases in core strength were not contributed significantly to strength and power and should not be the focus of strength and conditioning [8]. Okada, Huxel and Nesser (2011) conducted a study on relationship between core stability, functional movement, and performance and

The correlation between performance of bowlers and batsman with their core stability were computed by Pearson product moment method. The coefficient of correlation (r-value) was calculated between performance and SBTL, SBTR, BET and FET separately and results have presented in Table No. 6 and Table No. 7 respectively for bowler and batsman.

Table 6: The Coefficient of correlation between performance and core stability for bowler

Parameters	BET	FET	SBTL	SBTR
Performance	0.019	0.374	0.498	0.454
Remarks	Not significant	Not significant	Not significant	Not significant

found no significant correlations between core stability and FMS. Moderate to weak correlations identified suggest core stability and FMS were not strong predictors of performance [9]. Shinkle *et al.* (2012) found from their study that core strength does have a significant effect on an athlete's ability to create and transfer forces to the extremities [10]. Sanghvi *et al.* (2014) found in male cricketers, Core muscle training of six weeks on unstable surface produced more statistically significant hypertrophy in transverses-abdominis muscle, but there was no difference on functional performance tests when compared to core muscle training on stable surface [11]. Few study reported the different findings from the present study. Reed, Ford and Myer (2012) concluded from their research that targeted core stability training provides marginal benefits to athletic performance [12]. Sharrock *et al.* (2011) conducted a study on relationship between core stability and athletic performance and reported about appearance of a link between a core stability test and athletic performance tests. However, they concluded with say that more research is needed to provide a definite answer on the nature of this relationship [13].

But most of the study conducted on necessity of core stability had found a direct and significant relationship between developed core stability and injury prevention. Several study reported that increase the strength of the core muscles was helpful to prevent injuries of lower extremities. Asplund & Ross (2010) summarized from their study on Core stability in bicycling that core stability is being recognized as an important facet of injury prevention in a wide variety of sports. In addition, they mentioned that an increase in core stability can enhance recovery from injury [14]. Akuthota *et al.* (2008) conducted a study on "core stability exercise principles" and observed that core strengthening has a strong theoretical basis in treatment and prevention of LBP, as well as other musculoskeletal afflictions, as is evidenced by its widespread clinical use [15]. Leetun *et al.* (2004) conducted a study- core stability measures as risk factors for lower extremity injury in athletes on male and female intercollegiate basketball and track athletes and reported that core stability has an important role in injury prevention [16]. Therefore, from the above discussion it can be said that improved core stability is much more require for the athletes to prevent and recovery from injury in competitive sports but core stability does not have much more significant importance for

enhancement of sports performance.

Conclusions

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

- a) There was no significant correlation between performances of bowler with core stability.
- b) There was no significant correlation between performances of batsman with core stability.

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