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RELATIONSHIP AMONG SELECTED MOTOR ABILITY COMPONENTS AND BOWLING ABILITY OF CRICKETERS



Sukanta Goswami¹ and P. Samraj²

INTRODUCTION :

Each sport has its own entity since they differed from one another in nature. Meanwhile, though a particular sport has been defined in the requirements of these characteristics, within variance in sport may arise because of variations exist among the players of particular sport in terms of motor fitness aspects.

General athletic ability is considered simultaneously with general motor ability. Motor ability is present acquired and innate ability to perform motor skills of a general or fundamental nature, - exclusively of highly specialized sports or gymnastics techniques (Barrow and Mc Gee, 1971). Include several items such as strength, power, agility, speed reaction

ABSTRACT

The article attempts to examine the relationship among selected motor ability components and bowling ability of cricketers. The study focuses on selected motor fitness components to ensure the bowling ability among university level Cricket players. Motor fitness is a present aptitude for physical skills, includes speed, agility and explosive power enriches today's Manpower in players performance. To achieve the purpose of this study, Twenty two (N=22) men cricket players (Bowlers) were purposively selected as subjects from Tamil Nadu Physical Education and Sports University at Chennai in Tamil Nadu. Their age ranged from 18 to 25 years (20.17 ± 2.37 years). Three motor fitness components, such as Speed, Agility and Explosive Power and bowling skill ability tests were evaluated of each subject. Descriptive statistics and correlation were used as a statistical technique for the present study. The hypotheses were tested using Pearson Product Moment Correlation with the help of IBM SPSS (22.00) software. The level of significance was fixed at 0.05. The results of the study show that there is a positive correlation between the explosive power and bowling ability of cricketers. Other variables were not shown any significant relationship with the bowling ability. Hence the study concluded that successful performance in cricket bowling requires the ability to generate explosive power. To achieve desired objective researchers showed that bowling ability and explosive power was inter related.

KEYWORDS : Skill Performance, Speed, Agility, Explosive power.

SHORT PROFILE

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time and flexibility, and these traits plays major role in enhancing the performance of any game's skills. With a good and well efficient combination of all these motor performance traits a player can give all his/her utmost throughout the most strenuous of competitive matches (Nabhendra Singh, 2010). The cricket is a game, which demands a very high level of fitness (Baake, 1974). Motor fitness is to be measured by performance and this performance is based on composition of many factors. The most commonly mentioned factors are power, speed, agility, strength, endurance, balance and flexibility. Some of these factors evidently are more

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dominant than others and thus have relation with motor fitness (Barrow and Rose Mary, 1979). Abilities are genetically predetermined characteristics that affect movement performance such as agility, coordination, strength, and flexibility. Abilities are enduring and as such, difficult to change in adults. Abilities differ from skills in the sense that skills are learned, whereas abilities are a product of both learning and genetic factors (Fleishman, 1972). Scientific research shows that long, slow distance running causes an athlete's muscles to take on aerobic characteristics. This effect may be desirable for a long-distance runner, but it is counterproductive in developing the explosive and powerful muscle contractions needed for sports specific demands of cricket (Virgo, 2009). One of the challenges that coaches face is that individual differences among athletes make each of them unique in their ability to succeed in sports. The uniqueness of athletes, instructional and coaching strategies will not be equally effective. Analyzing motor abilities can help coaches optimize each athlete's genetic potential. Hence, the priority in conceiving and programming the training process requires knowledge of motor skills which play a major role in the accomplishment of better results, and which require dedication of most time during the training process.

Bowling is one of the most exciting aspects in the game of cricket. The mark of a successful bowler is their ability to bowl precisely for sustained periods, bowl consistently accurate, and deceive the batsman in order to achieve their wicket. The concept of performance may be deemed as the modification of performance factors. Accordingly, cricket performance is not limited to technical and tactical aspects but it is also with other aspects of the game. Sports performance is the sum of numerous factors which can vary from individual to individual and in spite of variations the players may give similar results in competitions

The fast bowling in cricket is to deliver the

ball with a straight arm so that it reaches the batter at high speed after having first bounced once off the ground. The greater the ball speed, the less time the batter has to respond. However, fast bowlers require high run-up speeds, generate large ground reaction forces, and produce high joint torques (Ferdinands, 2004). To attain high ball release speeds, the bowler's trunk must flex, extend, laterally flex, and rotate within a short period and the body must absorb ground reaction forces as high as six times body weight (Bartlett et al. 1996). Modern cricket is an international sport and team at all levels strive to develop fast bowlers who can generate high ball release speeds. The ability of bowlers to bowl with high ball release speeds contributes to the successful performance of cricket teams (Portus et al. 2000). In a sample of nine male fast-medium bowlers, Glazier et al. (2000) reported a high correlation between ball release speed and the length of the bowling arm. Anthropometric dimensions and morphological characteristics play an important role in determining the success of a sportspersons (Rico-Sanz, 1998; Wilmore, & Costill, 1999; Keogh, 1999). Body size had a strong positive influence on bowling performance in a heterogeneous population of different ages (Pyne et al. 2006).

In modern day cricket, the importance of physical preparation for the bowler has been established through structured training programmes in all ranks of competitive cricket. However, practitioners have generally prescribed exercises based on intuition of what they felt was important for bowling performance, as little research has been conducted on the relationship among motor ability components and bowling ability of cricketers. The research scholar hereby made an effort to broaden the horizon of knowledge by bringing new facts and thoughts by this study, which may give a new direction to the field of cricket. Therefore the purpose of this study is to examine the relationship among selected motor

ability components and bowling ability of cricketers.

MATERIALS AND METHODS

Selection of the subjects

A total of twenty two male intervarsity cricket players of 18 to 25 years (mean age 20.17 ± 2.37 years, mean height 172.3 ± 2.90 cm, and weigh 61.1 ± 2.97 kg) were selected from cricket match practice of Tamil Nadu Physical Education and Sports University by using consecutive sampling. Subjects were provided written, voluntary, informed consent prior to participation. As the subjects had been undergoing training for a considerable period, therefore, it is assumed that they possess a good level of technique of bowling. The purpose of the research was explained to all the subjects and subjects were motivated to put their best during each trial.

Selection of variables

Three independent variables (motor components) and dependent variables (bowling performance) were selected for the purpose of this study.

Criterion variables: Speed, Agility & Explosive Power

Administration of the Test and Collection of Data

Sl.No.	Motor Variables	Fitness Methods	Equipments/Test Items	Unit/Measures
1	Speed	50 Meters Run	Electronic Clapper, Stopwatch, Starting	In Second
2	Agility	Shuttle Run(4x10 mts.)	Playfield Area, Measuring Tape, Stopwatch, Whistle and Two Wooden Blocks	In Second
3	Explosive Power	Standing Broad Jump	Measuring Tape and Marking Powder	In Meter & cm

Criterion Measures

For the purpose of present study, the bowling performance of each selected subjects was recorded on the basis of certain criteria

(point system). Subjective judgment was used with the help of three judges. Marks were divided into 5 components {1.Run-up, 2.Back foot Contact, 3.Loading, 4.Release and 5.Follow through}, each consist of maximum 2 points. The average score of the three judges on each moment were considered as the final points obtained by each bowler in that particular skill.

Statistical Methods

- Descriptive statistics was used for describing the data and nature of the data obtained on the samples of the study. It was also used to developing the profile of identified variables on bowling performance.
- Pearson's Product Moment Correlation was used for evaluating the various relationships of the selected variables towards the performance of bowling. The level of significance to check the relationship obtained by Pearson's product moment correlation was set at 00.5. The data in the study was analyzed by using IBM SPSS 22.

RESULTS

The statistical analysis of the data, collected on six male cricket players and the results of the study were presented in this section. Before discussing the research issues the nature of the variable were analysed through Descriptive Statistics which have been presented in Section A. The first research issue has been discussed in this chapter by means of Pearson's Product Moment Correlation and has been presented in Section B.

Section A: Descriptive Statistics for Evaluating the Nature of the Data

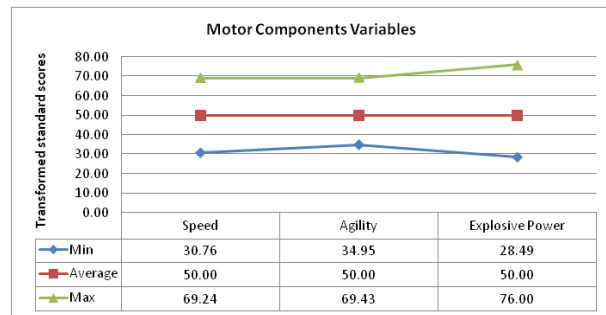
Table I: Descriptive Statistics of selected Motor Components Variables

	Speed	Agility	Explosive power
Mean	6.95	10.85	2.42
Std. Error of Mean	0.04	0.11	0.03
Std. Deviation	0.18	0.53	0.16
Skewness	-0.21	-0.03	0.19
Std. Error of Skewness	0.49	0.49	0.49
Kurtosis	-0.60	-0.97	1.70
Std. Error of Kurtosis	0.95	0.95	0.95
Range	0.70	1.84	0.74
Minimum	6.60	10.05	2.08
Maximum	7.30	11.89	2.82

N=22

Table I; indicates the values of descriptive statistics (Mean, Standard Deviation, Skewness, Kurtosis, Standard Error of Skewness (SES) and Standard Error of Kurtosis (SEK), Range, Minimum, Maximum score of the data measured in the time of bowling. The mean and standard deviation scores of speed was 6.95 ± 0.18 , range of speed 0.70, for agility mean and standard deviation of subjects was 10.85 ± 0.53 , range of agility was 1.84, for explosive power mean and standard deviation of subjects was 2.42 ± 0.16 , range of explosive power was 0.74 respectively. Standard error of mean is the least for performance of explosive power whereas the maximum for the agility.

For testing the normality of the data (Table I) skewness and kurtosis (descriptive statistics) has been performed. As a guideline, a skewness value more than twice its standard error indicates a departure from symmetry. Since all of the variables were symmetrically distributed. Similarly, as a guideline, kurtosis values more than twice its standard error indicates a significant kurtosis. Hence all of the variables have normal kurtosis. In other words the distribution of all the variables is meso-kurtic. Fig I: Graphical Representation of Descriptive Profile of Identified Motor Components Variables



Here by looking at the identified motor components variables of bowlers in cricket. we could say that for being a bowlers in the game of cricket one must fall within the above range of motor components parameters (i.e. speed, agility and explosive power) shown in Figure I. It helps to know the minimum and the maximum scores within which the player must fall. The profile also helps the coaches to train their players accordingly and it also gives an idea to the coaches so that they can work on the weak points of the players so that they can perform better and develop as complete sports persons. Section B: Pearson's Product Moment Correlation for Evaluating the Relationship of Identified motor ability components with bowling performance

The scores of each of the selected motor variables of the bowlers were correlated with the bowling performance, in order to find out the relationship, which are depicted in Table II. Table II: Relationship of Motor Ability Components with the Bowling Performance of the subjects

Variables	Correlation Coefficient
Speed	0.365
Agility	0.232
Explosive Power	0.952*

*Correlation is significant at the 0.05 level. Significant value of the correlation coefficient at 0.05 level with 20 df = 0.42.

Table II; reveals that the significance level for each of the correlation coefficients at

0.05. Significance has been tested for two-tailed test. The correlation coefficient with mark (*) indicates that it is significant at 5% level. The Explosive power was significantly correlated to bowling performance ($r= 0.952$), whereas no significant relationship was obtained between rests of the motor components variables to the performance of bowling. Therefore it was evident that speed and agility variables did not show a significant relationship to bowling performance and were less contributing to bowling performance as shown in above. Out of all the variables a significant relationship the explosive power are positive in nature.

DISCUSSION

The results from the present study indicate that there is a strong positive relationship between explosive power and bowling ability of cricket players. There was no significant relationship between speed, agility and bowling ability of cricketers. Explosive power is significantly correlated to the bowling performance because explosive power of leg plays a dominant role in the run-up, placement of foot prior to the release of the ball and in follow through. Greater leg explosive power may lead to greater speed which may contribute to bowling performance. Leg explosive power plays a significant role in running ability. Usually fast bowlers take a longer run-up to generate more speed and in this respect leg strength will play an important role. The straighter leg causing more force to be applied, therefore causing a greater ground reaction force, maintaining more momentum in the movement. Bowling speed is generated by momentum from the run up and rotational power in the trunk. It therefore makes sense that you also focus on running speed development. Linear running speed is crucial to bowling quickly therefore creating a greater need for leg strength. Strength development in the legs will enable the bowler to better overcome the stresses on back foot and front foot contact so they can move through the bowling action with

more velocity.

This is where examining the literature can aid us. Simply looking at the bowling action may lead you to believe that bowling is an upper body strength activity. What may surprise you then is that the lower body has more relevance. Research by Phillips et al. (2010) showed significant contributions by the lower extremities in the way in which bowling speeds were generated. A study in 2006 (Zatsiorsky et al.) also highlighted the fact that the higher velocity bowlers had greater lower body strength levels. More specific to this, analysis has shown that the centre of mass deceleration over the delivery stride phase was the strongest predictor of ball speed in fast bowling groups. Given that the legs need to absorb forces of around 4 times your bodyweight, it is clear a large amount of strength is required in the legs. Pathak et al (2004) also suggested that leg explosive power of cricketers is high. Power is one important factor in muscle fitness programs that can represent the combination of speed and power. The increase in strength or speed or both can cause an increase in power and this leads to the athlete can do more work in shorter time (Salimi, 2000). Pyne et al. (2006) suggested that lower body strength is a more important contributor to V peak in senior bowlers. These findings could be interpreted as an overall influence of motor ability components on the bowling performance. A good level of explosive power of cricketers could allow the players to bowl more accurate.

CONCLUSION

We believe that this paper can contribute to safer and more efficient planning and programming of training with cricket players, because the results of our tests helped us detect the basic motor abilities that are predominantly responsible for the success of the performance of cricket bowling. Therefore, we will provide suggestions that in our opinion can improve the training process.

On the whole, the low value of coefficient of correlation shown by the variables does not mean that these variables are not contributing or are not related to the bowling ability of subjects. It may be possible that the players have adopted their own style of playing or they do contribute but the insignificant value of coefficient of correlation of these variables with the technique may be due to the level of players. It may be due to the reason that the subjects of the groups are of same level. It may be possible that the results may differ if the same study was conducted with different level of subjects. More research should be carried out in relation to motor ability components of bowling ability in elite level. Since, the results have shown only explosive power significant relationships with selected motor components variables to the performance of subjects in bowling and speed & agility variables showed insignificant relationship, so the hypothesis as stated earlier is rejected in those variables, while other variables (such as explosive power) it is accepted.

At the end we have to say that excellent success is only possible if the athletes' preparation process and sport itself are based on scientifically founded tendencies, and this is probably the only and the right way in guiding our league competition towards contemporary attainments of the cricket game. Ultimately, it is also likely that effective training procedures to improve motor fitness that cricketers made the biggest progress.

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