

Association of Explosive Power and Agility among Cricketers of State Level

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Abstract

Often cricket is stated as an aerobic sport however when broken down the game is played by the players performing at various speeds and intensities-jumping, sprinting, catching, diving, majority of the play is in intervals and the activity does not last for long periods of time (e.g.; batting, bowling, fielding, wicket keeping, making a run). Purpose of the study is to determine association between explosive power and agility in state level cricket players. Previous studies have investigated physical performances with respect to injury incidence and prevention. In this study physical aspects such as power, agility and anaerobic fitness shall be considered. Also due to paucity of evidences and studies on this literature it is important to find an association between the explosive power, agility among cricket players of state level. Total 100 male state level cricketers from different cricket academies were included in the study. Subjects with age group of 16-23 were taken in the study. Screening and assessment protocol were followed to select participants. Performance tests were measured. Explosive power with vertical jump test, agility with run a 3 test. Result of study showed:

1. Correlation between explosive power and agility was -0.305^{**} and it was significant at $.002$.

Present study concluded that explosive power is negatively correlated with agility.

Keywords: Fast twitch muscle type, anaerobic capacity, fitness testing, professional cricket, performance.

Introduction

Cricket is a sport that is played by millions from all the corners of the globe. All over the world three formats are practised at the elite level: Test, One day, and Twenty-20.²¹ Cricket involves large physiological demands of the human body, muscular strength and endurance, CVS endurance, speed, agility, power, flexibility etc. Often cricket is stated as an aerobic sport however when broken down the game is competed by the athletes playing at a range of speeds and intensities-jumping, sprinting, catching, diving, greater part of the sport is in pauses and the movements does not last for long periods of time (e.g.; batting, bowling, fielding, wicket keeping, making a run).

Cricket involves sudden movements which are often slow and fast. A professional player is expected to perform a large number of sprints, jumps, lunges

and rapid directional changes. As well as another characteristic of cricket is execution of sporadic or fast movements of moderate to high intensity relate to repetitive actions of short duration but greater intensity as it occurs in other sports with similar characteristics like (squash etc). The shorter game formats tend to be more physically intensive when related to match duration, incorporating more maximal sprints when fielding, bowling, and batting. As a result of these demands, running speed, agility and power or strength has become an essential athletic quality for cricketers and therefore must be assessed correctly. Appropriate speed & agility assessments can provide an indicator of an athlete's level of ability, and be used to monitor physical development.

Leg strength and speed (power) are vital for cricketers. These two elements to influence the speed and agility necessarily meant for fielding, wicket keeping and

running between wickets. It is even essential for bowlers because it helps them monitor and practice their ability to absorb the forces experienced by the legs during a delivery.⁴ Strength of the muscles of lower extremity upper extremity and trunk is of utmost importance for the execution of strokes of the ground.³²

Cricket is termed as an interval sport with equally anaerobic and aerobic components.²⁶ At advanced ability intensities, technical performance may be reduced by physical attributes, physical fitness and performance qualities.³¹ Also, cardiorespiratory fitness in terms of max O₂ uptake (VO₂max) reflects physical fitness of a person hence; VO₂ max is the single preeminent measure of cardiorespiratory capacity and is considered as a bench mark to quantify CVS functional capacity and aerobic fitness.

There are various study conducted to assess agility and explosive strength but there are lack of literature studying association between explosive power agility in cricket player

Methodology

Subjects were taken after signing informed consent including 100 male state level cricket players with age group of 16-23 with normal BMI (<25). who fulfilled the inclusion criteria playing for at least 1 year at state level. Players were asked to perform general warmup for 20 mins. 2 performance tests were measured. Explosive power using vertical jump test. Agility using run a 3 test. Data will be collected from academy in Faridabad and Delhi. Assessment form was filled (details pertaining to sport, dominance, level of playing position etc.)

The demographic details are recorded and information about subject is collected in assessment form height (cms) and weight (kg) and BMI was calculated. After completing the assessment form the testing for vertical jump, run a 3 test was done after a general warmup. Height was measured using a wall mounted stadiometer with a horizontal head board. Players stood barefoot, feet together and stand tall. Height and weight was recorded to a precision of 0.1 cms and 0.1 kg respectively.

Sargent chalk jump test: Subjects stood with one side against a wall, heels together and held a one inch piece of chalk in the hand nearest to the wall. With the heels together the subject was asked to make mark as

high as possible on the wall. Then were required to jump as high as possible to make another mark on the wall, the score was calculated at the distance in centimetres between the reach mark and the highest jump mark attained by the subject.

Run a three test: To assess agility, "Run a three" protocol of Bourdon et al was chosen. The subjects were asked to warm up prior to the test and allowed at least two trials at sub maximal pace. The test was performed on a cricket wicket or crease of 17.68m or 22 yards respectively. Subjects were instructed to presume the starting position, with one foot behind the popping crease line and cricket bat in hand and with knee pads, physically and mentally ready to take run. No cue was given to begin the test. The timing began when the subject's rare foot left the ground and finished as the bat crossed the popping crease line at the end of the third run. Subjects had to perform three trials with the fastest average time was recorded as the best score. A rest interval of ≥ 5 minutes was given between trials. The average time from the two stopwatches was recorded to the nearest 0.1 second.

The statistical tests were applied which includes mean, standard deviation, Karl Pearson correlation for assessing the correlation between agility and explosive strength. SPSS 21 version was used as a statistical tool. Relationship between the test variables were determined by using bivariate correlation.

In this study the level of significance was set as $p \leq 0.05$.

Results

The descriptive values of the sample group are shown in the table below:

Descriptive characteristics of Age and BMI (Mean \pm standard deviation)

Variables	Males (N=100)
Age (years)	17.49 \pm 1.68
BMI (kg/m ²)	22.76 \pm 2.61

Descriptive statistics of Explosive power test.

Variable	Mean \pm SD
Vertical jump height (cms)	53.1 \pm 7.52

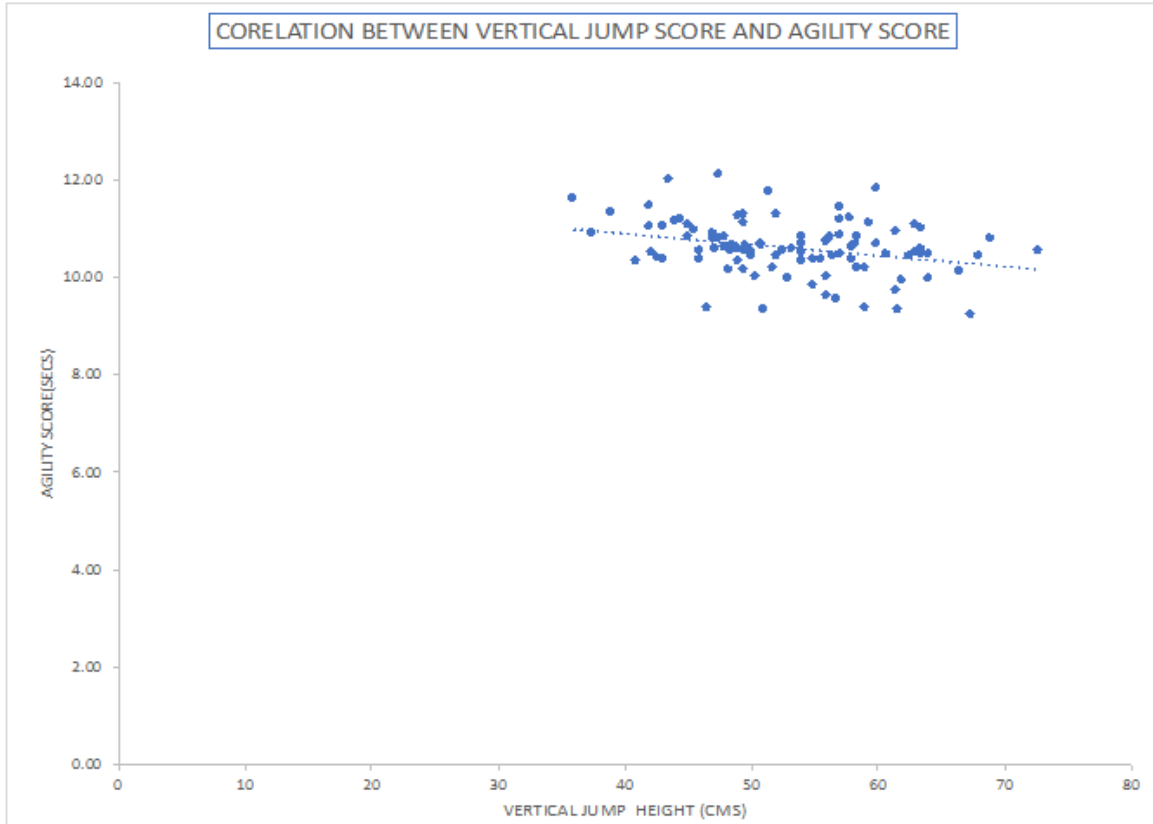
Descriptive statistics of Agility test.

Variable	Mean±SD
Run a 3 test (sec)	10.6±.563

Correlation between explosive power (vertical jump height) and agility (Run a 3 test).

Variables	r-value	p-value
Vertical jump height & Run a 3 test score	-.305**	.002

Scatter gram of vertical jump height score and Run a 3 test score.



Conclusion and Discussion

Study was to assess the explosive power of the cricket players. According to the result of the present study mean scores of explosive power (cms) were 53.10. Similar studies Gabbet et al stated there was limited research pertaining to the enhancement of athletic performance although he stated that a study on professional rugby players had a better or significant impact of lower body explosive power and speed on their physical playing performance. On the contrary longitudinal studies on rugby players found no differences in explosive strength as a marker of physical performance.²³ A study by Carr

et al on elite cricketers measuring their explosive power over a range of season showed improvements in lower body power scores overall the seasons.⁶ Studies by Johnstone on explosive power differences in batsman and bowlers showed negligible differences among them. Jakovljevic through his studies concluded “explosive power is an essential pre requisite for sports that demand explosiveness and fast maximal energy production and finds need to be incorporated for planning and training, performance prediction and talent identification in various sports”.¹⁹ Castagna has also further laid emphasis on the varying role of explosive power in various sports like cricket and basketball which is

essential for improving their performance.⁷ Secondly study was focused to assess agility of cricket players. According to results of the present study the mean scores of agility (secs) were 10.6. A study stated role and efficacy of agility in cricket is increased with implementation of a 6 week specific exercise programme.³¹ Similar study done by Shrivastava (2015) confirmed specialized exercises help in increase of cricket specific agility in male cricket players. Agility is the most crucial factor influencing movement also as important to influence motor action. Boora (2016) also emphasised agility has a distinctive role in cricket to execute competent footwork and rapid changes in body position. Various studies done to evaluate variable of physical fitness i.e. agility in batsmen and bowlers reviewed batsmen had better agility that had an influence on physical performance. According to a study on effect of different types cricket batting pads on running and turning speed showed no significant differences in running or turning speed due to the influence of different cricketing pads.²⁴

Third objective of study was to determine the association between explosive power and agility of cricket players. Results of the present study stated explosive power showed moderate negative correlation ($r=-.305^{**}$) and was highly significant at ($p=.002$) with agility and the result states that with improved vertical jump height scores there is an eventual decrease in time required to complete 3 consecutive runs. A study done to assess role of explosive power of male footballers showed explosive power was the most dominating variable for improving agility.²⁸ Numerous studies by other researchers have same results which supported this study. Conducted similar study measuring these variables on basketball players.¹⁶ Study stated that leg strength and power were most significant factors required by cricketers especially fielders such that it contributed to further increase in agility and speed required for fielding.²² Studies have supported that with specific 6-8 week exercise programme including plyometric, resistance and interval training has shown to improve the explosive power and impact the influence of agility desirable for athletic performance. Exercises have an effect on anaerobic pathway ATP-Pcr system and neuromuscular adaptations that cause improved balance and body position that favours on improving explosive power and agility. Also due to explosive nature of the sport there is definite need to develop power for increasing run up speed and agility.¹²

Conclusion

While computing the correlation coefficient between Explosive power, Agility the present study concluded that explosive power is negatively correlated with agility i.e. with peak score of jump height there is decrease in time taken to complete 3 runs by the players which stated that good anaerobic power contributes in improving the agility performance necessary for the cricket players. Findings of the study can be used by physiotherapist, coaches as well as trainers or the sports professionals to train the team in relation to certain particular aspects that needed to be improved for the team to achieve better performance.

Ethical clearance taken from: Manav Rachna International Institute of Research and Studies committee.

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