CORRELATION BETWEEN FLEXIBILITY AND AGILITY IN MALE CRICKET BOWLERS

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ABSTRACT

The purpose of the study was to find correlation between flexibility and agility in male cricket players of the age group 18-25 yrs. A demographic data of sample of 60 subjects were collected and their and BMI was calculated. The flexibility of the subjects was measured using sit and reach test and agility was measured using T- Test. This study concludes an increase in flexibility reduces the time taken for completing agility test which means flexibility has a positive impact on agility of male cricket bowlers.

KEY WORDS: Flexibility, Agility, T-Test, Sit and reach test, Cricket bowlers.

INTRODUCTION

The game of Cricket has historically been known as "the gentleman's game." Until about three decades ago Cricketers were certainly not the fittest athletes on the planet. Cricket was not really considered a physical game, thus proper strength development was often ignored by Cricketers (1). Often it was remarked that Cricket is physically an easy game which requires one to stand on the field for most of the day and requires little running, jumping or strength. However with the introduction of one day Cricket, the game has gone through major changes and the physical demands made on a cricketer's body has also increased dramatically in the past. Presently, with the introduction of T20 Cricket, the need for physical demand has increased even more compare to one day cricket which includes quick running, more flexibility and more strength. Cricket occupies a significant place in sports.

The essential element of successful cricket performance is to accelerate, change direction quickly and move your feet quickly while at the crease (2,3). This requires development of speed and agility. In Cricket, the ability to accelerate, decelerate and rapid movements in all directions is more important than simply running fast (4). Universally, agility can often be described as an athlete’s collective coordinative abilities (5,6) .

Some benefits of agility and quickness training include increase in reaction, flexibility, muscular power in all multi planer movements. Reaction and explosive strength is the integral part of agility. During a match a player frequently performs activities that require rapid development of force, such as sudden sprinting or quickly changing direction, diving etc (7,8). Agility can be largely assessed by using various tests designed to measure efficiency of a player. The components of agility have been designed as balance, coordination, power and speed (9). Flexibility and agility are two important parameters of fitness for athletes and for the selection of athletes for any competition (10). Flexibility is defined as the ability of the muscle to lengthen to the end of the ROM. It is influenced by muscles, tendons, ligaments, bones, and bony structures. (11)

Adequate flexibility prevents soft tissue injuries. (12,13). Poor flexibility is a commonly proposed risk factor for soft tissue injury (14) Some studies have found poor flexibility as a contributing factor (15) while others have shown that it makes no difference(16) . One of the consequences of limited flexibility is diminished efficiency of exercise (17). Anyone who has suffered a muscle strain injury will have experienced the acute negative impact on flexibility. Sometimes reductions in flexibility become chronic and some have proposed that long-lasting reductions in flexibility increase the risk of re-injury (18). There are correlative studies done between hand grip and shoulder power and hand grip strength and core muscle strength which state that there is positive correlation between the hand grip strength and the shoulder power (23) and there was weak correlation between dominant and non-dominant hand grip strength with core muscle strength (24). Hence the purpose of this study was to find the correlation between flexibility and agility in male cricket bowlers.

METHODOLOGY:

SAMPLE SIZE: 60

STUDY SETTINGS: Bowlers were recruited from Dr. D.Y.Patil Sports Academy, Achievers Academy, Chembur.

INCLUSION CRITERIA:
1. Apparently healthy cricket elite bowlers
2. Age criteria: 18- 25 years
3. Experience: 3 or more years

EXCLUSION CRITERIA:
1. Recreational players
2. Any present musculoskeletal or history of major injury. (hip, knee, ankle, back).

PROCEDURE:

Ethical clearance has been obtained from the institutional ethical committee of D.Y.Patil University, school of Physiotherapy, Nerul, Navi Mumbai. Subjects willing to participate

voluntarily were selected for the study. A written informed consent was taken from each of the subjects. Demographic data which includes age, height and weight were measured by and BMI was calculated. The T- test was used for measure agility of all the players (meters) and sit and reach test was used to measured flexibility (cm) of cricket players.

T-Test: The testing protocol was adherent to as this would affect validity of the test. Test result would not be counted if the proper footwork was not used. It was ensured that: Subjects always face the same direction during the test. Shuffle between cones without crossing over their feet. Touch each cone with nearest hand. Subjects were made to do specific warm-up before the test including the rapid change in direction, side shuttles and running backwards. They were given 3 attempts and the fastest time was recorded.

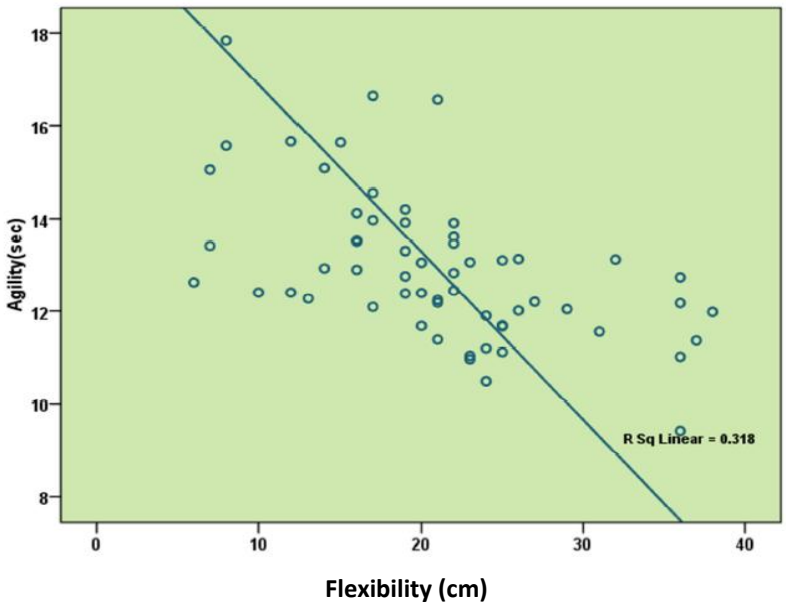
Sit and reach test. The subject was asked to remove shoes and sit on the flat surface. The subject was instructed to sit against the wall with full back support, leg extended in front of the body, toes pointing up and feet slightly apart with the soles of the feet against the base of the sit and reach box. Ask the subject to place one hand on the top of the other. Then ask the subject to extend the arm without stretching and this reading was noted as R1. Then ask the subject to reach forward as far as they can without bending the knees and this reading was noted as R2. The difference between R2 and R1 (R2-R1) was the final reading. They were given 3 attempts and the best attempt was recorded.(19)

RESULT

One-Sample Kolmogorov-Smirnov Test

		Flexibility (cm)	Agility(sec)
Number		**60**	**60**
Normal Parameters	**Mean**	**20.9**	**12.95**
	SD	**7.78**	**1.584**
Most Extreme Differences	**Absolute**	**0.099**	**0.107**
	Positive	**0.099**	**0.107**
	Negative	**-0.074**	**-0.073**
Kolmogorov-SmirnovZ		**0.768**	**0,826**
Asymp.Sig.(2-tailed)		**0.598**	**0.502**

Conclusion: p-value >0.05 hence it is not Statistically Significant



LINEARITY:

The association of the two variables is computed using Pearson's Correlation.

Correlation is significant at the 0.01 level (2-tailed). The value of the Pearson's correlation coefficient is statistically significant (Pearson's r = -0.564, p>.05). The negative sign of the correlation coefficient reveals a negative relationship and it is moderate in nature.

The scatter plot in figure below reveals that most of the data points are along the reference line, revealing a linear relationship between two variables. The reference line is going from left top to the right bottom, indicating a negative relationship between two variables. Thus, as the Hamstring flexibility increases the agility decreases and vice versa.

DISCUSSION

This study was conducted on 60 cricket players of the age group 18-45yrs. The objective of the study was (1) To assess flexibility using sit and reach test in elite male cricket bowlers. (2) To assess agility using T-test in elite male cricket bowlers. (3) To find correlation between agility and flexibility in elite male cricket bowlers. Impact of flexibility on agility: Flexibility was measured using sit and read test (cm) and agility (sec) was calculated using T-test. Since both the variables are on ratio scale, parametric test to find out correlation coefficient is most appropriate provided underlying assumptions are fulfilled. To test the normality Kolmogorove-Smirnov test for normality was used which was not statistically significant (p>.05). Thus, the two distributions approached normality.

The linearity assumption was checked through a scatter plot using Pearson's correlation. The scatter plot reveals negative relationship between two variables. The two variables included were

flexibility and agility. As described in the methodology flexibility was measured using sit and reach test where, greater the difference between R2-R1, greater is the flexibility. Similarly, greater agility was seen in the subjects who completed the test in less time. The value of the Pearson's correlation coefficient is statistically significant at 0.01 level (Pearson's r = - 0.564, p>.05). The negative sign of the correlation coefficient reveals a negative relationship and it is moderate in nature. Thus, the result indicates that as the flexibility increases, the time taken to complete T-test decreases and vice versa. Velocity, agility, and flexibility are ranked among the fundamental motor abilities, and not only because they contribute greatly to high performance in team sports to improve technical and tactical skills (20). Flexibility is critical in athletes because of the joint stress associated with dynamic multi-joint movements.

Testing flexibility can help diagnose if the player is at risk from injury. Athletes at all levels are often shown to have poor levels of flexibility, especially in the hamstring muscle. By improving the flexibility, player mobility and stability can be improved and also has a positive effect on strength and speed. Increased joint flexibility will help the body parts to work over a greater range of movement and therefore generate greater force and speed. Difficult technical movements such as bringing down a high pass will also be improved. Lack of range of flexibility can lead to injury and a reduction in speed, agility, strength and endurance potential. It can also limit individual skills. Joint flexibility is an important factor in the performance of skills and especially in injury prevention. Decreased flexibility is suggested to be one of the predisposing factors for muscle strains (21,22) It is believed that a tighter musculotendinous structure may reduce the ability of the muscle to elongate rapidly without injury. A stiffer system may apply greater muscular opposition to the eccentric contraction, whereas a more compliant muscular system would transfer the eccentric loading to the tendon. This transfer of the load to the tendon would reduce myofibrillar strain, potentially reducing the risk of soft tissue injury (21).

CONCLUSION

This study concludes that an increase in flexibility reduces the time taken for completing agility test, which means flexibility has a positive impact on agility of male cricket bowlers.

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