**Original Article:  
 Relationship Between Hamstring And Lower Back Muscles Flexibility And Sprint Speed In Under-19 Young Male Cricket Players**

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# ABSTRACT

## Purpose: The aim of the study is to analyse the relationship between flexibility of lower back muscle and hamstring muscle with respect to sprint speed. A lot of studies are carried on hamstring flexibility and its performance on players involving acute effect of stretching on their performance. Similarly many studies have been published on sprinting speed determining the relationship between speeds, vertical jump (VJ), and squatting ability. There are limited researches available on relationship between flexibility of lower back (LB) and hamstring muscles with respect to sprint speed.

## Methods: In this study 100 young cricket players were included all of whom were between 16-19 year of age. Screening and assessment protocol were followed to select the participants. The participants went through a 30m sprint test for sprint speed and V-sit and reach test for lower back and hamstring muscles flexibility after a short warm up.

## Results: In this study we observed a significant correlation between the sprint speed and flexibility of hamstring muscle and lower back muscles (p<0.05, p=0.036, r=0.210) in respective participants.

## Conclusion: The study found that there is relationship between sprint speed with respect to the flexibility of lower back muscle and hamstring muscle.

**Keywords**: Flexibility, sprint speed, lower back, hamstring, muscle, cricket.

**INTRODUCTION**

Cricket is very old game and the origin of cricket is not known but started by England in 16th century and 1st international match was played in 1844 and test crickets began. Cricket is also known as Gentleman game. As we know that cricket is English game and English people gave us very popular and famous sports like cricket, rugby, soccer etc.(1) In all format of cricket physical health plays a significant role and also plays crucial role in fast bowling, fielding, running between the wickets, batting and over arm throw.(2) In cricket there are components of fitness which are very essential for the players and the components are:

* Good balance and core strength.
* Speed/ quickness
* Skill and technique
* Strength and power, reaction time
* Mental toughness
* Analytic and tactical ability
* Flexibility, agility
* Aerobic fitness
* Body fat and composition

All this components make the players successful. In cricket anaerobic and aerobic components are involved that is why cricket has been described as an interval sports.(3) For better performance of the player or team physical and physiological characteristics help them.(4) If a player who cannot run fast to take a runs between the wickets or not flexible to catch a ball so that means that player is of no use for the team.

Due to muscular problem of hip joint and spine player is not able to run fast or not flexible. Muscles of back and hip plays an important role in running and do any activity in match. This is the reason that in a team there are few fit players better than other. (2) Flexibility is a component of performance and fitness. The more flexible player the chances of injury is less.

Flexibility and speed also play an important role in physical fitness of cricketer because they have to dive in the field for the catch, to stop the ball, the player has to run fast to stop the ball, to take a run. If the player is not flexible the chance of injury is more. It has been presumed that probability of getting injured decreases when the athletes are stronger and/or flexible. (5)

In relations of sports, Speed is a determiner of performance and. explosive strength. Muscle strength in Speed is directly proportional to speed performance. Muscle motoric activities results into speed performance, which is an indication of anaerobic muscle metabolism. In the circumstances for a short distance run at maximal intensity, to improve speed virtually all the muscles of the bodywork are involved. (6) This is the purpose of the study to take flexibility and speed because there is no study in relationship between hamstring and lower back muscles flexibility and sprint speed.

## Methods

In this study 100 young cricket players were included all of whom were between 16-19 year of Age. Screening and assessment protocol were followed to select the participants.

ANTHROPOMETRIC MEASURMENT

For height measurement (in meter, “m”), Stadiometer was used to measure with subject standing parallel to wall.

For weight measurement (in kilograms, “kg”), weight machine was used and players’ respective reading was noted in assessment form

V SIT AND REACH TEST:-

The player shall warm up for 10 minutes. For measuring the flexibility of their hamstring and lower back muscles using V sit and reach test.

Players were asked to take out their shoes, and were made to sit on the floor with the measuring scale or tape between their legs and the soles of their foot. Tape was placed on the baseline heels apart about 15-20 cm. The thumbs of player are clutched with tape so that hand should be together. Players were asked to keep palms facing downwards, and placed on the baseline with no knee bending. Then they were asked to slide their hands slowly as far as possible, keeping their fingers on the measuring line. They were asked to keep their movement smooth, avoiding any jerky or bouncing action. Player were asked to stay in that position for 2 sec. The test was repeated twice with a small break of 3-5 min in between each test.

**Scoring**: For scoring, at the level of feet “Zero Points” was considered, measuring adverse values towards the body and positive values away from the body. The best score for the trial was recorded in “inches”.(7-10)

### SPEED OF RUNNING:-

30m sprint test was conducted for speed. The subject was asked to do warmup for 5-10 min. 30m track was marked on the field with cones and choking powder. The test procedure was explained to the subject. Player was asked to stand just immediately behind the start line. When the player hears the sound of whistle they has to start running. While running no swinging action was allowed. The tester should boost the player to run as fast as possible. Record time by stopwatch (“Brannan England”). The test was repeated twice with a small break of 5 min in between each test.(8, 11-14)

STATISTICAL ANALYSIS

Statistical analysis was performed with the help of SPSS V.20.(15)

For the demographic details, descriptive statistics (mean and standard deviation) was used.

In this study, p-value ≤0.05 has been considered statistically significant.

**Results**

In this study we observed a significant correlation between the sprint speed and flexibility of hamstring muscle and lower back muscles (p<0.05, p=0.036, r=0.210)

Table 1: Mean of Height, Weight, & BMI

|  |  |
| --- | --- |
| **Parameters** | **Mean ± Std. Deviation** |
| Height (m) | 1.6887 ± 0.08347 |
| Weight(kg) | 64.3060 ± 8.90469 |
| BMI | 22.6190 ± 2.92884 |

Table 2: Mean of 30m sprint and V sit and reach

|  |  |
| --- | --- |
| **Parameters** | **Mean± Std. Deviation** |
| 30m sprint | 4.5995 ± 0.31270 |
| V sit and reach | 4.8223 ± 1.05545 |

The significant correlation (p<0.05) were founded between flexibility (V sit and reach) and sprint speed (30m sprint). Correlation is Moderate

Table 3: Correlations of flexibility and sprint speed

|  |  |  |
| --- | --- | --- |
| **Variables** | **r value** | **p value** |
| 30m sprint and V sit and reach | 0.210\* | 0.036 |

Graph 1: Scatter Plot graph between V sit and reach test Vs 30m sprint

**DISCUSSION**

The main objective of the study is to see the relationship between “lower back and hamstring muscles and sprint speed” in under 19 young male cricket players, assessment of flexibility is elicited through “V sit and reach test and sprint speed” (30m sprint test).

Result of correlation is “Moderate” (r=0.36) p=0.210. As result says that there is a significant correlation between hamstring and lower back muscle flexibility and sprint speed, but the strength of r is in accordance to Cohen, J. (2013) “low (r≤0.3), moderate (0.3<r≤0.5), and high (0.5<r)”.(16) Some previous studies supports this study with moderate result, and recommend that the use of dynamic stretching before exercises and match gives result in improvement in speed performance, but some other studies show, that “static stretching” after the end of training and match, avoids the adverse effect of load on hamstring muscle flexibility and can promote improvement in flexibility.(10, 17)To sum up, based on experiences and results of players, we identified that trainers and players underestimate the training programs for the “hamstring and lower back muscles” related to improve the flexibility and speed of the player.

**CONCLUSION**

It is recommended that before the match and training session dynamic stretching and after the end of the match or end of training session static stretching suitable for better result of the players.Flexibility is a useful tool to prevent injury as well as muscle recovery. (18) And it is an important part of the healthy exercise routine but strength and condition professional are not promoting it to increase speed.

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