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A Study of Anaerobic Fitness of Cricket Players in Punjab

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Abstract

Aims: The purpose of this study was to observe anaerobic fitness of cricket players in Punjab. The design of this study required participants to perform six sprints each of 35 meter. **Materials & methods:** There was one hundred fifty (N=150) trained male cricketers between the ages of 15 and 25 years volunteered for this study. Anthropometric rod, Weighing machine were used. **Results:** The mean age, height, weight and BMI of cricketers were 17.77±2.663years, 171.19±7.526cm, 57.45±9.421Kg and 19.54±2.585kg/m^2. The mean sprint time of -1st, 2nd, 3rd, 4th, 5th and 6th of cricketers were 5.209±.3907seconds, 5.361±.3906seconds, 5.491±.399seconds, 5.619±.414seconds 5.737±.427 seconds and 5.885±.440 seconds respectively. The mean power of -1st, 2nd, 3rd, 4th, 5th and 6th sprints of cricketers was 510.33±131.402watts, 467.27±119.055watts, 434.64±110.242watts, 406.23±103.291watts, 379.59±95.486watts and 353.19±92.720watts respectively. The mean maximum power, minimum power, average power and fatigue index of cricketers was 510.33±131.402watts, 353.18±92.731watts, 424.60±106.663watts watts and 4.7891±2.093respectively. **Conclusion:** It was concluded from the results of this study that sprint time and power decline in cricketers may be due to reduced energy production via anaerobic glycolysis and muscle acidosis.

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Introduction

Cricket, a global sport played in 100 countries, is watched by billions worldwide, and elite players can earn multimillion dollar contracts annually. Recent increased interest in sport has led to further professionalization of elite, or first-class, performance who can play high volumes of matches (n=100 days approximately) in a calendar year, with 3 established formats of the game, twenty-twenty (T20) being a 3-hour match, one day (OD) match lasting 6-7 hours, and multiday (MD) matches played between 3 and 5 days, differing physical qualities may be performance. Cricket players will have a distinct role in the team, either batting or bowling (i.e., fast medium, or slow speed), and fitness qualities are developed by strength and conditioning coaches on these roles (James A. joshnstone et al., 2014). The game of cricket has evolved considerably since it was first played in England some 400 years ago (Eagar, 1986). Cricket like many other sports has changed significantly over the years. The game has seen substantial changes in the nature of the activity over the years. The nature of the game has also seen dramatic changes, from it being a fairly subdued form of recreation to highly competitive international sports. Modern cricket matches typically take two forms, Limited over (1-day) and First class (4-5 day) matches. At the 'elite' level, cricket comprises of 'One-day international' matches (ODI) and 'Test' matches. One-day matches being more intense (Noakes and Durandt, 2000) but of shorter duration, while the intensity of test

matches is very less but the duration significantly increases (Fletcher, 1955).'T20' is a short form of cricket. At professional level, it was originally introduced by the 'England and Wales Cricket Board' (ECB) in 2003 for the inter-county competition in England and Wales(Wikipedia, 2015).Depending on the nature of cricket, intermittent activities such as batting, bowling and fielding for long duration of time requires significant anaerobic fitness and operates within a well-developed aerobic system. Thus, aerobic capacity and cardiovascular variables are of great interest to those involved with cricket, as they heavily rely on the player's ability to move quickly and powerfully. Apart from the metabolic changes, the intensity of the activity also has an influence on the cardiovascular system, especially on heart rate. The degree of increase in the heart rate depends on the intensity of the load (Astrand & Rodahl, 1986).

Materials & Methods

One hundred fifty (N=150) Punjabi male cricketers between the age group of 15 to 25 years voluntarily participated in the study. Anthropometric measurements were recorded according to the standard procedure. The power and fatigue index was calculated using the equations of Draper and Whyte (1997).

Statistical analysis was performed with SPSS version 20.0 (free trial, SPSS Inc, Chicago). Mean and Standard Deviation was observed for age, height, weight, speed, power and fatigue index.

Results

The mean age, height weight and BMI (body mass index) of cricketer was 17.77±2.663 year, 171.19±7.526cm, 57.45±9.421 kg and 19.54±2.585 kg/m^2 respectively. (Table1).

Table 1: Mean ±SD of Age, height, Weight and BMI of Male Cricketers

Variable(s)	Mean ± S D
Age, (year)	**17.77±2.663**
Height (cm)	**171.19±7.526**
Body weight (kg)	**57.45±9.421**
BMI (kg/m^2)	**19.54±2.585**

The mean sprint time 6 sprints of each 35m with rest intervals of 10s between each trial of the cricketers sprints-1, sprints-2, sprints-3, sprints-4, sprints-5 and sprints-6 was 5.209±.3907 seconds, 5.361±.3906 seconds, 5.491±.399 seconds, 5.619±.414 seconds, 5.737±.427 seconds and 5.885±.440 seconds respectively.

The mean power-1, 2,3,4,5 and 6 of cricketers at each trial was 510.33±131.402 watts, 467.27±119.055 watts, 434.64±110.242 watts, 406.23±103.291 watts, 379.59±95.486 watts and 353.19±92.720 watts respectively. In addition, the maximum power, minimum power and average power of cricketer was 510.33±131.402 watts, 353.18±92.731 watts, and 424.60±106.663 watts respectively.

The fatigue index was calculated using the equation (maximum power – minimum power) ÷ total time for the six sprints (Draper and Whyte 1997). The mean fatigue index of cricketer was 4.7891±2.093 (Table 2).

Table 2: Mean ±SD of Sprint Time, Power and Fatigue Index of male cricketers

Variable(s)	Mean ± S D
Sprint 1 sec	**5.209±.3907**
Sprint 2 sec	**5.361±.3906**
Sprint 3 sec	**5.491±.399**
Sprint 4 sec	**5.619±.414**
Sprint 5 sec	**5.737±.427**
Sprint 6 sec	**5.885±.440**
Power - 1 Watts	**510.33±131.402**
power-2 watts	**467.27±119.055**
power-3 watts	**434.64±110.242**
power-4 watts	**406.23±103.291**
power-5 watts	**379.59±95.486**
power-6 watts	**353.19±92.720**
Maximum Power (Watts)	**510.33±131.402**
Minimums Power (Watts)	**353.18±92.731**
Average Power (Watts)	**424.60±106.663**
Fatigue Index	**4.7891±2.093**

Discussion

The result of present study shows that the mean of BMI 19.54±2.585 kg/m^2 is normal. The results of present study shows that the mean fatigue index was 4.7891±2.093, it indicates the rate at which power was declined for the cricketer. The lower fatigue index value means the higher the ability of the cricketer to maintain anaerobic performance. With a high fatigue index value (>10) the cricketer may need to focus on improving their lactate tolerance (Draper, N and Whyte 1997).The repeated sprint ability (RSAT) tests which have been performed in previous studies involved 6x40 m sprints departing every 30s *(*Dawson et al., 1993). This would be expected to deplete the CP stores during each sprint to a greater extent than the protocol used in the present study *(*Hirvonen et al., 1987*)*.However; these previous RSA test protocols also provide an additional 7- 8s of recovery. These longer recovery periods may offset the additional 2-3s of sprinting and allow for similar proportions of phosphagen depletion and resynthesis when compared with the sprint protocol used in this study. In the present study, sprint time, power and fatigue index was used as an indirect measure of anaerobic glycolytic energy production in age group of 15 and 25 year male cricketers. The results showed that power following sprint-1 to sprint-6 declined. Moreover, the decline in power was related to increases in running times. Therefore, these data support the view that reduced energy production via anaerobic glycolysis in cricketers may be a factor in the deterioration in sprint performance (Reaburn and Dascombe, 2009). High intensity exercise can be performed continuously only for a short period of time and energy demand fluctuate from a high to low level

between the work and rest periods. Work of high intensity that it can be performed continuously only for a short period of time is accompanied by a high rate of glycogen depletion, lactate accumulation and a greater contribution of carbohydrate to oxidative metabolism (Ercan Gür 2012). In the present study, results, suggesting muscle acidosis might have played a role in the fatigue response among these cricketers in different sprint runs.

Conclusion: It was concluded from the results of this study that sprint time and power decline in cricketers may be due to reduced energy production via anaerobic glycolysis and muscle acidosis.

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Conflict of Interest: None declared