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Comparison of maximal oxygen uptake and perception of fitness in young male football players and cricketers

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Abstract

Background: In today's fitness conscious society, people seek various modes of fitness like gymming, aerobic dance football cricket etc. All such tasks help to improve maximum oxygen uptake.

Inclusion Criteria: Age Group 18 to 25, Male subjects playing football for more than 3 years and less than 5 years at district level, Male subjects playing cricket for more than 3 years and less than 5 years at district level, Both having 90min per session of workout for 5 days/wk.

Exclusion Criteria: Any cardio-pulmonary diseases in past 6 months, any cognitive impairment, orthopedic conditions limiting the subject activity

Aim: To compare VO_{2MAX} IPAQ score between young male football players and cricketer. Methods: Football players and cricketer practiced for more than 3 years and less than 5 years having age of 18 to 25 years were included in the study. Subjects having cardiopulmonary, orthopedic and neurological impairments were excluded. VO_{2MAX} was calculated by Rockport method for both the groups and they were asked to fill IPAQ questionnaire.

Results and Conclusion: On comparison, VO_{2MAX} statistically higher in football players. On comparison there was no statistically significant IPAQ score between football players and cricketers.

Keywords: football, VO_{2MAX} , IPAQ questionnaire

Introduction

Physical fitness is a general state of well-being ^[1]. Physical fitness is generally achieved through correct nutrition, moderate-vigorous physical activity, exercise and rest ^[2]. It is a set of attributes or characteristics seen in people and which relate to the ability to perform a given set of physical activities. Before the industrial revolution, *fitness* was the capacity to carry out the day's activities without undue fatigue ^[3]. However with automation and changes in lifestyles *physical fitness* is now considered a measure of the body's ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypokinetic diseases, and to meet emergency situations. Cardiovascular capacity can be measured using VO_{2max} , a measure of the amount of oxygen the body can uptake and utilize. Cardiorespiratory training involves movement that increases the heart rate to improve the body's oxygen consumption. This form of exercise is an important part of all training regiments ranging from professional athletes to the everyday person. Also, it helps increase stamina ^[4]. Physical activity is a multi-dimensional behavior. It is viewed most often in terms of energy expenditure and the stresses and strains associated with weight bearing and ground reaction forces. Fitness (performance- and health-related) and skill (proficiency in a variety of movements) are other important dimensions of activity. Context is an important dimension of physical activity that is often overlooked. Context refers to types and settings of activity, and includes play, physical education, exercise, sport, work, and others. Contexts per se and meanings attached to them vary with age among youth and also among and within different cultural groups (R.M. Malina, 2008). Sedentary behavior or physical inactivity also has several dimensions. Public health and medicine view inactivity in terms of insufficient energy expenditure, force generation and health-related fitness ^[6].

Examples are: Jogging – Running at a steady and gentle pace. This form of exercise is great for maintaining weight. Elliptical Training – This is a stationary exercise machine used to perform walking, or running without causing excessive stress on the joints.

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This form of exercise is perfect for people with achy hips, knees and ankles.

Walking: Moving at a fairly regular pace for a short, medium or long distance. Many walkers enjoy getting their workouts in at their local mall.

Swimming: Using your arms and legs to keep yourself afloat and moving either forwards or backwards. This is a good full body exercise for those who are looking to strengthen their core while improving cardiovascular endurance.

Biking: Riding a bicycle typically involves longer distances than walking or jogging. This is another low stress exercise on the joints and is great for improving leg strength. Sport are help to keep ones fit [19, 20]. Endurance fitness is the cornerstone of your cricket fitness; it helps you generate energy and resist fatigue, so you can perform effectively for the duration of the game.

Cricket is not a continuous steady state sport - there are frequent changes in running speed and intensity of effort, plus various strength and power movements like batting, bowling and fielding the ball at pace. Players, therefore, require of aerobic energy to sustain performance. The intensity and the duration of a n activity determines the extent to which each energy system is used. Physical fitness is one of the most important aspects of football performance. A skillful player will go a long way in the sport, but without the fitness part of their game they will not be the complete player⁷. Aerobic endurance fitness is one of the most important physical fitness attributes for football players. Players need to be able to maintain a high level of intensity throughout the 90 minute game [8]. Aerobic walk test are the most common field tests of cardio respiratory fitness. The Rockport 1.0 Mile Walk Test predicts aerobic fitness for individuals of all ages [12]. This test incorporates the time to finish the walk, exercise heart rate, body mass, age, and gender into an equation to predict aerobic fitness⁹. The Rockport Fitness Walking Test (RFWT), a maximal-paced 1-mile track walk, appears to satisfy several considerations deemed important in field tests that estimate maximal oxygen consumption VO_{2MAX} [10].

Material and Methodology

Study Design: Observational cross sectional study

Sample Size: Two groups were selected group A and group B, where group A is football players and group B is cricketers. 30 football players and 30 cricketers were selected on the basis of inclusion criteria.

Procedure: The study was conducted among football players and cricketers who has practice session of 90 min for 5days/week. Two groups were selected GROUP A and GROUP B where group A is football players a group B is cricketers. After taking written consent from the subject of both groups that is group A and group B, the test (Rockport method) [9, 10, 11]. Procedure was explained to them and they were requested to fill the questionnaire (International physical activity questionnaire) (IPAQ) [13, 14].

The purpose of test was to briefly explain to the subjects. Participants should wear appropriate clothing plus shoes and perform 5-10 min of light stretching before commencing the walk of one mile as quickly as possible. The VO_{2max} can be

calculated by, Estimated VO_{2max} (in $ml \cdot kg^{-1} \cdot min^{-1}$) = $132.853 - (0.0769 \times weight) - (0.3877 \times age) + (6.315 \times gender) - (3.2649 \times time) - (0.1565 \times HR)$. Where, Weight is in (lb), age in (yr), and gender (Males = 1, females = 0), time in min, and post exercise heart rate (bpm)

Data analysis

Data was interpreted with SPSS Version 20.0. Level of significance at $p \leq 0.001$. Unpaired “t test” was used to compare the differences in VO_{2max} and fitness scoring on IPAQ between Group A and Group B.

Demographics charts

Table 1: Demographic Data

	Group	Mean age	Std. Deviation
Age in year	A	20.2	0.886683
	B	25.53809	1.135124
	Group	Mean BMI	STD. Deviation
BMI	A	23.93	1.3
	B	25.53	1.17

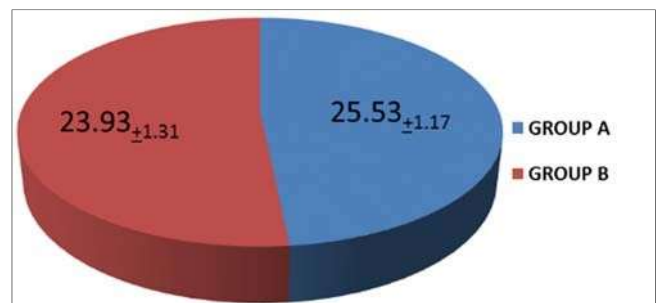


Fig 1: Mean BMI of Football players and Cricketers

Table 2: comparison of VO_{2max} in group A and group B

	Group	Mean	Std. Deviation	Std. Error Mean	t value	p value
VO_2 Max	Group A	51.017	3.0752	0.5614	-3.875	<0.001
	Group B	47.633	3.6623	0.6686		

Table 3: On comparison of VO_{2max} group A showed higher values than group B which was statistically highly significant

	Group	Mean	Std. Deviation	Std. Error Mean	t value	p value
IPAQ score	Group A	2764.687	2274.2132	415.2126	0.338	0.736
	Group B	2581.217	1908.5475	348.4515		

Results

On comparison of VO_{2max} group A showed higher values than group B which is statistically significant. On comparison there was no statistically significant IPAQ score between football players and cricketers. IPAQ score of football players was 6.6% higher than cricketers.

Discussion

The study of comparison of aerobic capacity and perception of fitness between young male football players and cricketers shows that, there was statistically significantly higher VO_{2max} found in football player than in cricketers¹. Football players focuses on their speed and coordination while training session. All players required speed. Everything else being equal, the faster you are the better

player you will be. Football speed is reactive and often unpredictable the first step makes all the difference to getting past an opponent or close enough to make a winning tackle. A skill will often be have to performed from the basis of speed tackles, headers, passes, shots and so on [2]. Although elite players play on pitches that could support a game of bowls, muddy undulating surface will impair speed generation.

Training reflect turn and sprint drill, run and dribble intervals, speed dribble, floor speed ladder etc. In football players as training effect there is quick pivot turns and speed-cut is lesser. Football players need functional strength to throw faster, defend better and catch more easily. A sound weight training program promotes stability and reduces the risk of injury. Cardiovascular and endurance training includes shot interval high intensity sprinting sequences. By using same energy system, and tactical movement utilize in football game, athletes become fitter and faster. Polymeric training combines elements of both speed and strength. Improved flexibility exercises help to prevent injury by assuring muscle and tendon work together properly [3]. It also makes muscle more elastic for increased lower body explosiveness [4].

Football is a game, where players are center of gravity and body control incredibly important. Agility is the ability to change speed and direction while maintain effective control of body in order to improve agility, football is game of strength, fast foot, quick reaction and enormous power. Its staying centered on the ball of your feet to block a defensive line man from sacking your quarter back or sprinting downfield full speed to catch a pass players does not have much pause throughout matches. objectives football training includes improve running biomechanics, increase explosive power, stride length, stride frequency, maximum sprinting speed and aerobic tolerance, increases food speed /agility, improve eye hand coordination, enhance the body positioning. Improve overall strength to reduce the risk of injury [5, 6].

Endurance trained subject will tend to have lower blood lactate values at any given running speed or intensity than untrained this difference owing partly to better ability to use aerobic metabolism in the trained subject. A better ability to remove lactate from circulation one reason why blood lactate is an important variable to asses is that hydrogen ions that result from lactate production in the cell are known to cause muscle fatigue [7, 8]. An athlete who can perform at high circulation will be better able to avoid fatigue on other hand during high intensity exercise, the ability to use anaerobic energy system is very important, thus it is not uncommon to find very high max blood lactate values in athletes competing in high intensity events [9, 10].

The anaerobic threshold is an outstanding predictor of endurance performance.it correspond with the intensity beyond which progressive increases in blood lactate occur. Relationship between anaerobic threshold and VO_{2MAX} is highly variable. The one way to the athlete continue to improve performance is to modify their training to focus on improving their fitness. Thus due to conditioning higher VO_{2MAX} is achieved in football players [11, 12].

Conclusion

On the basis of findings of the study, the following conclusions may be drawn: Football players (67.6700) have highest level of VO_2 . Max in comparison to Cricket players.

The result of the study shows that there is a significant difference between the players different games in relation to maximum oxygen consumption ($F=4.927, p<0.05$).

Future implications

This leads for the future scope for studying the strength as an outcome measure in addition between the two groups. So that, we can incorporate such components in training to make football as a complete tool of fitness

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