CARDIO RESPIRATORY ENDURANCE OF FOOTBALL PLAYERS AT INTER UNIVERSITY LEVEL

(**Received on**: 12 July 2013, **Reviewed on**: 16 Aug 2013 and **Accepted on**: 19 September 2013)

Mr. Shivamurthy A., Director Physical Education
Sahyadri Arts and Commerce College, Shimoga
Dr. Appanna M. Gasti, Physical Cultural Instructor
Kuvempu University, Shankaraghatta
Dr. Gajanana Prabhu B., Assist. Prof. of Physical Education
Kuvempu University, Shankaraghatta



Abstract

The game of football is generally assumed that through the years, the game has developed to become faster, with more intensity and aggressive play than seen previously. It is widely acknowledged that a scientific approach has to be employed for selecting prospective athletes and training them for better performance. As an essential stage for adopting a scientific approach, systematic collection of empirical data and materials are essential. The purpose of the study was to compare cardio respiratory endurance of football players belonging to different states at the South Zone Inter University level competitions. Subjects for the study were randomly selected 259 inter-University level male football players who competed at south zone inter-university competitions during the academic years 2011-2012 and 2012-2013. The criterion measure to assess cardio respiratory fitness selected for the present investigation was the beep Test. In order to examine the hypotheses of the study, analysis of variance (ANOVA) was employed apart from other descriptive statistics. There is significant difference in cardio respiratory fitness of inter University level football players belonging to different south Indian states. Players representing different Universities from Tamil Nadu and Kerala states have higher vital capacity than those from Karnataka and Andhra Pradesh states. It is also observed that, the players from Kerala had the highest amount of vital capacity whereas their counterparts from Karnataka had the least. Physical fitness profile of football players provides essential information for identification of talent and preparation of a team at any level. Success of any football team directly depends upon the cardio respiratory fitness of players. Novice and feasible techniques of assessing physical fitness have to be adopted by coaches and sports trainers to constantly uplift the standard of their teams.

Keywords: Physical Fitness, Cardio Respiratory Endurance, Beep Test and football.

Introduction

Football is a sport that has attracted more attentions by the people around the world. Over the past two decades, considerable scientific information about the physiology and medicine in football has been collected. But this information is mainly about the physiological profile of elite soccer players in America and West Europe, while this information is limited about players from other parts of the world (Ostogic, 2003). Professional football is a difficult sport in which various activities such as fast sprints, kicks and tackles are done in succession (Kargarfard and Keshavarz, 2005). It is a sport characterized by short sprints, rapid acceleration or deceleration, turning, jumping, kicking, and tackling Wisloff, Helgerud and Hoff (1998). It is generally assumed that through the years, the game has developed to become faster, with more intensity and aggressive play than seen previously (Tumilty, 1993)). Based on various research results, physical and physiological characteristics of soccer players are required to such a high level of anaerobic power, aerobic capacity, speed, muscular strength, agility and flexibility (Chaleh Chaleh, 2007; Minasian, 1997; Arnason et al., 2004; Bangsbo et al., 1991). The assessment and determination of the anthropometric and physiological characteristics are essential to a successful achievement of a soccer team not only during a game, but also along the whole sportive season, and such information can and must be used by the coach to change the player's function or even the tactical formation of the whole team with the purpose to maximize the performance, once each positioning presents specific features (Shephard, 1999).

Football is widely acknowledged that a scientific approach has to be applied for selecting potential athletes and training them for better performance. As a fundamental stage for adopting a scientific approach, systematic collection of empirical data and materials are essential. Until now, many sports scientists have conducted diverse kinds of research to elucidate various characteristics of elite athletes including morphology, fitness, psychology, and physical capacity. And the majority of these studies were on the scientific analyses of elite athlete's physical characteristics and fitness and/or competition and their records (Barnes, 1981;

Bompa, 1985; Buckley & Kerwin, 1988; Carter, 1982; Daniels, 1974; Melnikov & Singer, 1998). Although one might expect team success to be strongly correlated to physical fitness, but there is limited evidence for such a relationship.

Objective of the Study

The purpose of the study was to compare cardio respiratory endurance of football players belonging to different states at the South Zone Inter University level competitions.

Methodology

Subjects

Subjects for the study were inter-University level male football players who competed at south zone inter-university competitions during the academic years 2011-2012 and 2012-2013. All together 259 subjects from different Universities were selected for this study. Random proportional sampling technique was observed for the present investigation to give equal importance to University level football players from all the four South Indian states. Randomly selected subjects for the present study were tested at their respective coaching venues for the South Zone Inter University competitions. Prior to the administration of the test the investigator had a meeting with the selected subjects in order to orient them to the forth coming series of tests. The objectives and importance of the test was made clear to the subjects. Data regarding physical fitness was collected by the researcher with the help of trained helpers.

Criterion Measure

All the subjects selected for this study were tested for cardio respiratory endurance. The criterion measure to assess cardio respiratory fitness selected for the present investigation was Beep Test. Brief description of procedure employed in beep test is given as under.

Procedure

Beep test involves continuous running between two lines 20m apart in time to recorded beeps. The test subjects stood behind one of the lines facing the second line, and began running when instructed by the CD or tape. The speed at the start was quite slow. The subject continued running between the two lines, turning when signaled by the recorded beeps. After about one minute, a sound indicated an increase in speed, and the beeps were closer together. This continued each minute (level). If the line was not reached in time for each beep, the subject ran to the line turn and try to catch up with the pace within 2 more 'beeps'. In case if the line was reached before the beep sounded, the subject waited until the beep sound was heard. The test was stopped when the subject failed to reach the line (within 2 meters) for two consecutive ends.

Scoring: The athlete's score was the level and number of shuttles (20 meter) reached before they were unable to keep up with the recording. The last level completed was recorded (not necessarily the level stopped at). The scores were listed as the number of levels / number of shuttles completed. Predicted VO2 Max score was calculated using the results of beep test in terms of level reached and number of shuttles completed. The online calculator was available at the link "http://www.topendsports.com/testing/beepcalc.htm".

Statistical Analysis

The raw data on predicted Vo2 Max was treated with descriptive statistics like Mean and Standard Deviation for ascertaining the homogeneity of samples. In order to examine the hypotheses of the study, analysis of variance (ANOVA) was employed. The results of the study were tested under LSD (Least Significant Difference) post hoc test.

Results

Descriptive statistics relating to vital capacity measured in terms of beep test is provided in table 1 in terms of mean and standard deviation.

Table 1
MEAN AND STANDARD DEVIATION OF VITAL CAPACITY OF FOOTBALL PLAYERS REPRESENTING SOUTH INDIAN STATES AT SOUTH ZONE INTER UNIVERSITY COMPETITIONS

States	Subjects	Mean	Standard Deviation
Karnataka	65	39.1620	6.0484
Andhra Pradesh	64	39.2070	3.6346
Tamil Nadu	64	42.7220	4.8398
Kerala	66	45.4285	6.2642
Total	259	41.6497	5.9062

From table 1 it is obvious that the data pertaining to predicted Vo2 Max is normally distributed and homogeneity given in terms of standard deviation is acceptable. The raw data on predicted Vo2 Max was further statistically treated in order to find significant difference between south Indian states. The results are provided in table 2.

Table 2
ANALYSIS OF VARIANCE FOR PREDICTED VO2 MAX OF FOOTBALL PLAYERS

	Sum of Squares	df	Mean Square	F
Between Groups	1800.148	3	600.049	21.25
Within Groups	7199.858	255	28.235	
Total	9000.006	258		

*Significant at 0.05 level of Significance

Table 2 on ANOVA for predicted Vo2 Max indicates a significant F ratio. Hence Least Significant Difference post hoc test was employed to make between state comparisons. The results are given in table 3.

Table 3.
LSD POST HOC TEST

(I) States	(J) States	Mean Difference (I-J)
Karnataka	Andhra Pradesh	-045031
	Tamil Nadu	-3.5600*
	Kerala	-6.2665*
Andhra Pradesh	Tamil Nadu	-3.5150*
	Kerala	-6.2215*
Tamil Nadu	Kerala	-2.7065*

*Significant at 0.05 level of Significance

From table 3 it is evident that there is significant difference in cardio respiratory fitness of inter University level football players belonging to different south Indian states. Players representing different Universities from Tamil Nadu and Kerala states have higher vital capacity than those from Karnataka and Andhra Pradesh states. It is also observed that, the players from Kerala had the highest amount of vital capacity whereas their counterparts from Karnataka had the least.

Discussion

Universities have a key role in promoting sport at different levels by producing outstanding players. Inter University competition is a perfect platform for local talents to exhibit their skills. Budding sports persons get ample opportunity to display their sporting prowess and obtain incentives in terms of jobs, selection into National squad, monetary rewards etc.

Cardio respiratory endurance is a decisive physical fitness component as far as success in competitive football is concerned. Assessment of this component provides useful information for coaches and sport administrators in the form of feedback. The data shall be helpful in future selection of teams and adopt measures for improving their cardio respiratory fitness apart from their skill levels. Achieving supremacy over the remaining competing teams at the south zone inter University level competitions is another important aspect that will be addressed through the result of this study.

In a similar study by Ko and Kim (2005) physical characteristics were compared between elite ball game athletes and university students, and physical profiles of elite ball game athletes were made. Apart from other components, aerobic capacity of elite soccer athletes was identified as superior distinguishing factor from other ball game players. These profiles were assumed to serve as useful criteria for identification of talent and selection of soccer players.

Sporis, et. al. (2009) evaluated whether players in different positional roles have a different physical and physiologic profile. It was obvious that players in different positions have different physical and physiologic profiles. Experienced coaches use this information in the process of designing a training program to maximize the fitness development of soccer players to achieve success in soccer.

According to Boone, et. al. (2012) aside from the predominant technical and tactical skills, a physical profile that is well adjusted to the position on the field might enhance game performance. a study was conducted to gain an insight into the physical and physiological profile of elite Belgian soccer players with specific regard to the player's position on the field. It was concluded that players in different positions have different physiological characteristics. The results of this study might provide useful insights for individualized conditional training programs for soccer players.

Conclusion

Physical fitness profile of football players provides essential information for identification of talent and preparation of a team at any level. Success of any football team directly depends upon the cardio respiratory fitness of players. Novice and feasible techniques of assessing physical fitness have to be adopted by coaches and sports trainers to constantly uplift the standard of their teams.

References

Arnason, A. Sigurdsson, SB. Gudmundsson, A. Holme, I. Engebretsen, L. Bahr, R. (2004). Physical fitness, Injuries, and Team performance in soccer. Med.Sci. Sport Exerc, 36 (2), PP: 278-285.

Bangsbo, J. (1994). The physiology of soccer--with special reference to intense intermittent exercise. Acta Physiol Scand Suppl, 619, 1-155.

Bangsbo, J. Norregaard, L. Thorsoe, F. (1991). Activity profile of competition soccer. Canadian Journal of applied sports science. 16. PP: 110-116.

Barnes, W. S. (1981). Selected physiological characteristics of elite male sprint athletes. Journal of Sports Medicine, 21, 49-53.

Bompa, T. (1985). Talent identification. Sport Science Periodical on Research and Technology in Sport, 1-11.

Boone, J., Vaeyens, R., Steyaert, A., Vanden B. L., and Bourgois, J. (2012) "Physical fitness of elite Belgian soccer players by player position", Journal of Strength Conditioning Research 26(8): 2051–2057.

Buckley, J. P., & Kerwin, D. G. (1988). The role of the biceps and triceps brachii during tennis serving, Ergonomics, 31, 1621-1629.

Carter, J. E. L. (1984). Physical structure of Olympic athletes. Part 2. Kinanthropometry of Olympic athletes. Medicine and Sports Science, 18, Karger, Basel.

Chaleh Chaleh, M. (2007). Study of physiological and anthropometric characteristics of soccer players in different positions: Comparison Iranian First Soccer

League with England League. Master's thesis, Faculty of Physical Education and Sport Sciences, University of Shahid Beheshti University of Tehran, Iran (Persian).

Daniels, J. (1974). Physiological Characteristics of Champion male athletes. Research Quarterly, 45, 342-348.

Duquet, W., & Carter, J. E. L., (2001), Somatotyping. In R. Eston, Reilly, T. (Ed.), Kinanthropometry and exercise physiology laboratory manual: Tests,Procedure and data (2 ed., Vol. 1, pp. 47-65). London and New York: Routledge, Tayler and Francis Group.

Kargarfard, M. Keshavarz, S. (2005), Study of Aerobic and anaerobic power of the Iranian Premier League soccer players playing in different positions. Journal of Harekat, Tehran, 27:137-152. (Persian).

Ko, B. G., and Kim, J. H. (2005) "Physical fitness profiles of elite ball game athletes", International Journal of Applied Sports Sciences, Vol. 17, No. 1, 71-87.

Melnikov, A., and Singer, R. N., (1998), Analysis of event-related potentials to filmed action situations. Research Quarterly for Exercise and Sport, 69, 400-405.

Minasian, V. (1997), Review of physiological characteristics of Iran National Teanager football team and comparison between different playing positions. MS Thesis, Tehran, Tehran University. (Persian).

Ostogic, JM. (2003), Characteristics of elite and non-elite Yugoslav soccer players; correlation of success. Journal of Sports Science and Medicine,2,PP:34-35.

Ostojic S.M. (2004) Elite and nonelite soccer players: preseasonal physical and physiological characteristics. Res.Sports Med. 12:143-150

Shephard R.J. (1999) Biology and medicine of soccer: An update. J.Sports Sci. 17:757-786

Sporis, G., Jukic, I., Ostojic, and S.M., Milanovic, D. (2009) "Fitness profiling in soccer: physical and physiologic characteristics of elite players", Journal of Strength Conditioning Research 23(7):1947-53.

Tumilty, D., (1993), Physiological characteristics of elite soccer players. Sports Med. 16:80–96,.

Wisloff, U., J. Helgerud and J. Hoff. (1998), Strength and endurance of elite soccer players. Med. Sci. Sports Exerc. 30:462– 467,