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RESEARCH ARTICLE

Evaluation of Maximum Aerobic Power, Shoot Speed and 20-m Sprint Power of Football Players at Pre-Season and Mid-Season

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Abstract

Aim of the study to investigate differences on max. Aerobic performance, shoot speed, 20m. Sprint power of footballers between pre-season and mid-season during 2015-2016 1st amateur league season. Twenty one amateur footballers with a mean age of 22.23 ± 2.22 years, height of 177.62 ± 0.41 , weight of 79.52 ± 3.50 , taken into experimental group. Participants put forward their maximum performance with shoot velocity (instep kicking technique) recorded with shot speed measurement pocket radar (Pocket Radar Classic PR1000), 20m sprint, Yo-Yo intermittent recovery test at pre-season and mid-season. Measurements were applied to the participants at 1st amateur league pre-season and mid-season 2015-2016. All statistical procedures were performed in SPSS 19.0 package program with Paired-T test. Result of paired-T test, Mean, Standard Deviation ($\bar{x} \pm ss$) and Descriptive Statistical values of the variables were determined. In conclusion, Analysis revealed that there is no statistically significant differences found between 1st test of pre-season and 2nd test of mid-season shoot speed, aerobic capacity, 20m sprint capacity tests of footballers ($p > 0.05$). According to the result, gained of the investigation, it was clearly seen that training programme applied to the footballers did not help to make any differences about the performances of footballers.

Keywords

Shoot Velocity, Sprint, Aerobic Power, Football

INTRODUCTION

Research shows that performance in football depends on a variety of physical qualities and skills, including tactical and technical skills, which are the two most important factors affecting performance in football (Polman et al., 2004). Other studies not only support this assumption, but also argue that physical abilities such as aerobic endurance, strength and running speed need to be well developed to achieve a high level of performance in football (Helgerud et al. 2001). These physical abilities do not need to be highly developed, but they must be of high level. Exactly how high it depends on the competition level and the player's position on the court. At the international level, aerobic endurance is the most desired quality among midfielders, whereas power

and running speed are of great importance (Little and Williams, 2005; Vanderford et al., 2004).

The volume, scope, intensity and effect of the exercises and the difficulty of the struggle, such as the difficulty of the performance of the individual's organism according to the phases of energy consumption is formed by understanding the correct data of maximum performance parameters. The athletic performance has also been associated with heart rate, blood pressure, oxygen intake rate, aerobic capacity, strength, balance, reaction time and so on (Abdullah & Gencer, 2019; De Meersman, 1993; Gencer et al. 2019; Sarikaya et al. 2017; Stein, 1977). In the formation of the maximum aerobic power of football players, regular football workouts, practices and positive performance variables and maximum level of

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struggle are the main reference sources (Hoff, 2005).

Rapid short sprints are important movement for goals, and give chance to meet the ball in the right time right place, before rival also assisting footballer. Sprint speed in football, scientific accurate velocity abilities, continuous sprint and agility techniques put very precise particular performance standards of footballers. Footballers had better get very fast as possible as with training, showing interest that sprinting abilities getting very very vital in new era sport line. According to the severity of the match, the footballer must take a sprint and make turns many times. At this stage of the game, Anaerobic metabolism is effective in these cases where intensity increases. Short sprinting with fast recovery is a very important capacity for football players (Reilly et al., 2000).

With the length of the 90-minute match in football, aerobic metabolism is more dominant. Written sources emphasized that many workout sessions will be implemented in a beneficial way by contributing to short sprint capacity thanks to long period of football matches and training arrangements. It is also laborious and time-consuming to incorporate many well-prepared exercises into the total football workout program (Jeffreys et al., 2018). Although, sport success cannot be attributed to maximum performance alone, but it is effected by manipulative changes in order to comprehensively update all success. Even so, Usually the maximum speed, jump, skip, or throws/hurls to the farthest place are taken into account, because these capacities are considered to demonstrate the athlete's most performance at a crucial moment or session. In addition, improvements in some performance may be attributed to a different performance decline (Jemni et al., 2018).

For instance, Shots, throwing, football shots, cricket and baseball, and darts are subject to change between speed and accuracy. It means moving faster often reduces the athlete's agility, accuracy and effectiveness (Andersen and Dorge, 2011; Freeston and Rooney, 2014). In addition, it is not clear how the effect of skeletal structure, muscle strength and flexibility factor on shot speed has not been clarified and the technical effect on shot speed has not been clarified. Torque in the knee and hip joint is thought to have a strong effect on the shot speed. The torque generated in the smashing leg joint is a factor that increases the

foot speed moving in the horizontal plane, which will increase the smash speed. The low level of energy transfer from the tip to the calf of the foot reduces the speed of the shot. In the circumstances, improving the technical level of thigh-to-end of the foot energy transfer can effectively increase oscillation rates (Jindrich et al., 2006).

Although the score the more precious in football competition is taken into account an effective determinant in football as well as in showing well performance, so that footballer's fast shooting characteristic appears as one of the very dominant determinants of football effort. From this point of view, insufficient number of reserach have stued on shooting velocity in the football shooting capacity. As a result, the expectation for the development of the shooting speed, aerobic power, 20m sprint power in football is always increased and great importance is given to the studies applied (Wheeler and Sayers 2010). One of the requirements in football is that players can run short distance sprints throughout the match and complete football season. In the present study, therefore, evaluation of maximum aerobic power, shoot speed and 20m. sprint power of football players at pre-season, mid-season were examined. So, football players must be well informed of that fatigue masters on shoot velocity, aerobic power performance, 20m. sprint throughout the football season (Fitts, 1954; Etnyre, 1998). Whole or half of football league season duration assumed to have a negative impact on shoot velocity, aerobic power performance, 20m. sprint. In this way, the purpose of this study, evaluation of maximum aerobic power, shoot speed and 20m. sprint power of football players at pre-season, mid-season

METHODS

Research group

The research population consisted of 21 football players playing football but for different football clubs in the 1st. amateur cluster in Adiyaman city province. The sample of the research consisted of male footballers aged 19-26 years. To determine the participants for assignment into research group random method was used. The players were randomly assigned to the experimental groups.

In the study, 21 football players in the experimental group with a mean age of 22.23 ± 2.22 years, height of 177.62 ± 0.41 , weight of

79.52 ± 3.50 as an averages of participants noted. While the experimental group continued football training 5 days a week, in addition to this, at the weekend players played a football matched for regular league competition. for. Measurements were applied to the subjects at 1st amateur league pre-season and mid-season 2015-2016 Denizli, Turkey. The equipment used is compatible with the objective of the research. The equipment is suitable for the research group footballers and the methods and test methods approved by the scientific community and is limited to field and field measurements.

Research Design

All tests were performed at the same time of the day. 10 minutes of warm-up was performed before all tests. The results of the athletes during the tests were noted. During the test, motivational suggestions were made for the participants to show their best performance. Measurements were applied to the participants at pre-season and mid-season, 1st amateur league, Denizli-Turkey. 1st tests applied on 3 September 2015 and 2nd tests applied on 29 December 2015. After amateur league started every team in the league played one official match at the weekend. Besides one football match every weekend the footballers took exercise with the team 3 days in a week. First leg of amateur season lasted 11 weeks. Teams approximetly had over 35 training from pre-season to mid-season of amateur league.

Data Collection Tools

Shot Speed

Soccer players hit the ball in the center of the it with maximum strength in the hardest way. The distance between the place where the soccer ball will be thrown (penalty point) and the goal is 11m. Subjects were instructed to shoot with instep kick at maximum speed. Football players used dominant leg for maximum shooting speed that measured and recorded with Shot Speed Measurement Pocket radar (Pocket Radar Classic PR1000). The subjects shot 2 times with maximum strentgh and rested for 30 seconds between every one test and the better score were noted.

Yo-Yo Intermittent Recovery Test Level 1.

For football players Yo-yo intermittent recovery level 1 test especially improved, consists

of two segments 20 m running field part and 5 m. active recovery area part. Participants done the 20 m field part on the condition of go and come and and after that done the 5 m active recovery part by jogging again as go and come. 10 seconds determined for active recovery time. The test was terminated when the person reached the point of exhaustion and three sounds were sequentially missed. Developed by the tümer prosport Ltd. company the process tmr esc 1000 test timer, provides in speed signals according to the speed set from the tempo timer. Yo-Yo AT1 test were performed on the football field

20m. Sprint Test

After the warm-up work, the participants started to sprint when they were ready on the exit line 1 meter behind the photocell. Participants with maximum speed ran 20 meters distance were recorded by photocellsystem (Powertimer 300-NEWTEST) placed on the start and finish lines. This study was repeated twice and the best scores of the athletes were noted. Photocell devices were used to determine 20 meter sprint performance and Yo-Yo intermittent Recovery Test Level 1 performance of participants.

Data Analysis

All statistical procedures were performed in SPSS 19.0 package program. Result of Paired-T test, Mean, Standard Deviation ($\bar{x} \pm ss$) and Descriptive Statistical values of the variables were determined

RESULTS

Table 1. Age, Height, Weight Data of The Experimental Groups

Tests	Group	N	\bar{X}	Std. Deviation
Age	Group	21	22.23	2.22
Height	Group	21	177.6	0.41
Weight	Group	21	79.52	3.50

Table 2. 20 M. Sprint Test Data of The Experimental Groups.

Variable	Mean	N	Std. Deviation	t	df	P
20 m. Sprint Test	1.Test	2,77	,348	1,85	20	,078
	2.Test	2,71	,360			

Significant differences were not found between first and second test of 20 m. Sprint test ($p > 0.05$)

Table 3. Yo-Yo Test, Test Data of The Experimental Groups.

Variable	Mean	N	Std. Deviation	t	df	P
Yo-Yo Test	1.Test	1702.51	46.26	1.81	20	0,85
	2.Test	1703.59	46.07			

Significant differences were not found between first and second test of Yo-Yo Test ($p > 0.05$)

Table 4. Shoot Velocity, Test Data of The Experimental Groups.

Variable	Mean	N	Std. Deviation	t	df	P
Shoot velocity	1.Test	94.52	6.18	1.74	20	0,96
	2.Test	95.57	6.01			

Significant differences were not found between first and second test of shoot velocity ($p > 0.05$)

DISCUSSION

Our research showed that there were not statistically significant differences found between pre-season and mid-season shoot velocity, aerobic capacity, 20m sprint capacity tests of football players ($p > 0.05$). Football players work with aerobic strength when their performance is below the submaximal level and keeps going regularly. With the length of the 90-minute match in football, aerobic power is more dominant. The Yo-Yo IR1 improved after training showed longitudinal and construct validity preseason and in regular season (Fanchini et al., 2015). In other studies, unlike some sources, it was not found that aerobic capacity statistically increased at pre-season and mid-season. In some researches it performance in terms of high maximum oxygen consumption (VO_2 max), running

was also found that aerobic capacity fitness and sprint performance increase from mid-football season to end of football season (Brianet al., 2009; Gravina et al., 2008; Magal et al., 2009).

The power of footballers to have and keep maintaining a well degree of physiological fitness during the season is very paramount. Significant differences were not found when compared first and second test of 20 m. Sprint test. In literary, some researchers found during preseason and mid-season with no further change in sprint, and also shoot speed, aerobic capacity of football players (Casajus, 2001; Meckel et al., 2018). Mostly the predominant capacity in professional football is aerobic power. This affects the

distance, and number of sprints. In addition, it has been demonstrated that aerobic fitness, sprint abilities, very vital for football, will influence the outcome of the match and performance and must be improved constantly whole the season (Bekris et al., 2016; Reilly, 1996).

In conclusion, sprinting is the most frequently used action in the way of goal situations (Faude et al., 2012). It is also known that speed performance develops depending on training and time. The relationship between aerobic power and sprint is irrefutably seen. Naturally, To improve the athlete's performance should increase aerobic capacity and cardiovascular capacity. But after this point, which should not be ignored that exercises can suppress neuromuscular function of short-distance sprint capacity even if cardiovascular capacity improves aerobic performance. In our research it was seen that significant differences were not found between first and second test of Shoot velocity. It is known that the long league period affects the decrease of the shoot velocity, but the exact reasons for the shoot velocity have not been fully investigated (Ostojic, 2003; Reilly, 1996).

Our research revealed that statistically significant differences were not found between pre-season and mid-season shoot velocity, aerobic capacity, 20m sprint capacity tests of football players. In order to understand the results correctly, a longer test scheduling becomes very important to find what actually happened to shooting ball's acceleration under the effect of fatigue.

In order to explain correctly the effects of long league season and matches and training on shooting velocity and to show the effects, tests should be applied more frequently, for example each week, by spreading to and a longer test period such as whole football season. In the view of the data presented, the measurements may affect the meaningfulness of the data since they are limited to the number of measurements on the shot velocity, short sprint test, aerobic power test. The noted shoot velocity, aerobic power and 20m sprint performance results may be about to the activity of footballer's tiredness on continuous shooting and performance during matches and trainings at between pre-season and mid-season. Even so, these deteriorating parameters may vary from player to player, but may heal in the natural

process due to subconscious factors and perseverance of players.

As a result; the tests should be done every week in the next research, so that footballers' progress is closely monitored. Free-weight workout should be included in the training program despite the weakness of the athlete.

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