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EFFECTS OF PREPARATORY PERIOD TRAININGS ON SOME PHYSIOLOGICAL AND MOTORIC FEATURES OF U19 SOCCER PLAYERS [1]

U19 FUTBOLCULARDA HAZIRLIK DÖNEMİ ANTRENMANLARININ BAZI FİZYOLOJİK VE MOTORİK ÖZELLİKLERİ ÜZERİNE ETKİSİ

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Öz: Amaç: Bu çalışmanın amacı, U19 profesyonel futbolcularda hazırlık dönemi antrenmanlarının bazı fizyolojik ve motorik özellikleri üzerine etkisini incelemektir. **Yöntem:** Araştırmaya Çanakkale Dardanel Spor A.Ş. U19 takımı sporcuları toplamda 32 futbolcu çalışmaya gönüllü olarak katıldı. Futbolcuların yaş ortalamaları 18.5±.5 yıl, boy ortalamaları 179.5±4 cm, vücut ağırlıkları ortalamaları ise 70.1±3.9 kg olarak tespit edildi. Hazırlık dönemi antrenmanları 8 hafta, haftada 4 gün, günde en az 120 dk uygulandı. Araştırmada bir maksimal kuvvet (1 RM), Yo-Yo İntermittent Koşu testi ve çeviklik testi uygulandı. Elde edilen verilerin istatistiksel analizinde istatistik paket programı kullanılarak, bağımlı gruplar arası "Paired t testi" uygulandı. **Bulgular:** Antrenman dönemi öncesi ve sonrası sporcuların bir maksimal kuvvet, dinlenik ve maksimum kalp atım sayısı, Yo-Yo koşu testinde kat edilen mesafe, MAXVO2 ve çeviklik testleri değerlerinin karşılaştırılmasında bütün ölçümler arasında istatistiksel olarak anlamlı fark bulundu ($p<0.05$). **Sonuç:** Sonuç olarak, hazırlık dönemi içerisinde uygulanan antrenman programının U19 kategorisi futbolcuların bazı motorik ve fizyolojik özelliklerini olumlu etkilediği söylenebilir.

Anahtar Kelimeler: Futbol, Oyuncu, Motorik, Fizyoloijk

Abstract: Aim: This study aims to examine the effect of preparatory period trainings on some physiological and motoric features of U19 soccer players. **Method:** A total of 32 players from Çanakkale Dardanel Spor A.Ş. U19 team volunteered to participate in the study. The mean age of the players was 18.5±5 years; mean height, 179.5±4 cms; and mean body weight, 70.1±3.9 kgs. Preparatory practices were made for 8 weeks, 4 days a week, at least 120 minutes a day. A maximal force (1 RM), a Yo-Yo Intermittent Running test and an agility test were applied in the study. In the statistical analysis of the obtained data, "Paired t-Test" was applied between dependent groups using a statistical package program. **Findings:** A statistically significant difference ($p <0.05$) was found between all the measurements in the comparison of maximal force, resting and maximum heart rate, distance covered in Yo-Yo running test, MAXVO2 and agility test values of the soccer players before and after the period of practice. **Conclusion:** As a result, it can be said that the practice program applied during the preparatory period positively affected some motoric and physiological characteristics of U19 soccer players.

Key Words: Soccer, Player, Motoric, Physiological

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INTRODUCTION

Soccer is one of the most popular sports branches in the world and when played at the elite level, the physical sanctions expected from the athletes are high. The success and efficiency of players depend on many factors. In order to improve performance, soccer skills, tactics and to prevent injury; soccer training is essential (Gümüşdağ et al., 2013: 1). Soccer is a sports branch that involves high intensity, intermittent loads, durability, quick sprints, ball skills, coordination, stable decision making and balance (Uğraş and Özkan, 2002: 242).

In order for athletes to adapt to the conditions of long and high-tempo soccer games, body composition is tried to be perfected while improving strength, endurance, speed, coordination and flexibility through training programs applied during the preparatory period (Albay et al., 2008: 12).

It is clear that all motor skills should develop well considering that elite-level soccer players run at a density close to the anaerobic threshold for approximately 10 kms at 80-90% heart rate during the match, and that they use speed, ball kicking and power factors frequently in this running distance (Stolen et al., 2005: 503). Additionally, agility is a physical component necessary for a successful performance in a team sport like soccer. Agility is a control and coordination skill that allows the body and joints to be in the right position in space during very fast changes of direction during a series of movements (Shephard and Young, 2006: 920). Agility can be seen in attempts to escape from the opponent, or during the movement reaction to the ball (Young et al., 2001: 315).

A number of field and laboratory tests used to determine the physiological characteristics of athletes in team sports, such as soccer, assist coaches and sports scientists in identifying the athletes' abilities, providing strength development, providing information for the practice program, and determining changes in physiological and physical characteristics that are a consequence of the training sessions (Yilmaz et al., 2012: 96).

This study, in line with the information obtained from the literature, aims to examine the effect of preparatory stage trainings on a number of physiological and motor characteristics of U19 soccer players.

MATERIALS and METHODS

A total of 32 players from Çanakkale Dardanel Spor A.Ş. U19 team volunteered to participate in the study. It was explained that the personal information and findings obtained during and after the research would be kept strictly confidential. An "informed Consent

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Form" was taken from the athletes who volunteered to participate in the research.

Height and Body Weight: The values of athletes were measured with bare feet and only shorts on them using a SECA brand height and weight scale having an accuracy of 1 min and 20 gr. Height was recorded in "cm", and body weight in "kg".

Maximal Force Measurements (1 RM): 1 maximal forces were taken on Precor (USA) brand Biceps Curl, Triceps Curl, Vertical Row, Bench Press, Squat, Leg Press and Leg Curl fitness equipment. The athletes practiced for 15 minutes with an ergometric bicycle before strength measurements. After the athletes got a proper sitting and holding position on the fitness tool, the maximum weight lifted was recorded in "kg" following the determination of estimated maximum weight to be lifted through a preliminary test without weight.

Yo-Yo Intermittent Recovery 2 Test: The test was carried out on a 20-m straight track in Çanakkale Dardanel Spor facilities, with markings placed at the beginning and at the end of the track, and the athletes were given audio signals from a signaling device. The athletes were asked to be within the area in front of the start and finish lines on each signal. The runs were designed to include 6 athletes at the same time. The speed was increased gradually in accordance with the test protocol. Each signal caught by the athletes was recorded as a run, and every run in which they could not catch the signal was regarded as an error. The test was terminated when the athlete made two errors consecutively.

Number of heartbeats: The heart rate was recorded with a Polar brand heart rate monitor when resting and maximal values were on stable level.

MaxVO2 Formula: This formula was estimated using the estimated formula developed by Bangsbo et al. according to the Yo-Yo IR2 test protocol (Bangsbo et al., 2008: 48).

VO2max (ml//min/kg) = IR2 distance (m) x 0.0136 + 45.3

Agility Test: The test was carried out on the training ground of Çanakkale Dardanel Spor facilities. The athletes were tested with the soccer boots worn during the match. The times were measured by a Voit 8073 chronometer. 4 cones were placed on the track for the "T test" as follows. The athletes ran straight from cone A to cone B and touched the cone with their right hands. Then, they touched cone C on the left with a side run. After that, they touched cone D on the right with right hand; and then touched cone B with left hand, and finished the test with a backward-run to cone B. Each athlete made 3 trials and their best scores were recorded.

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Data Analysis: A statistical package program was implemented for data analysis. The dependent within-group "Paired t-Test" was applied in order to determine whether there was any difference before and after preparatory training sessions in the athletes. The results were evaluated according to a significance level of "0.05".

FINDINGS

Table 1. Physical Characteristics of Soccer Players

	N	Minimum	Maximum	Mean ± SS
Age (year)	**32**	18.00	19.00	18.50±.50
Height (cm)		174.00	190.00	179.50±4
Weight (kg)		63.00	80.00	70.10±3.90
Body Mass Index (kg/m^2)		19.90	23.90	21.70±.80

Players' mean of age was 18.50±.50 years, mean of height was 179.50±4 cm and mean of weight 70.10±3.90 kg and mean of BMI was 21.70±.80 kg/m^2.

Table 2. Paired Samples t-Test Results of Players' Agility Pre and Post Test Means

AGILITY TEST	Test Sequence	Mean ± SS	t	p
T Test (sec)	Pre Test	8±,4	10,63	,000*
	Post Test	7,50±,4		

Differences found to be statistically significant as a result of comparison of players' agility pre and post test values ($p<0.05$)*.

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Table 3. Paired Samples t-Test Results of Players' 1 RM Pre and Post Test Means

1 Repetation of Maximum	Test Sequence	Mean ± SS	t	p
Biceps Curl	Pre Test	19.80±3.8	-23.67	.000*
	Post Test	25.50±3.5		
Triceps Curl	Pre Test	14.90±1.7	-19.39	.000*
	Post Test	21.10±2.3		
Bench Press	Pre Test	48±6.6	-10.41	.000*
	Post Test	54.60±7.8		
Vertical Row	Pre Test	47±3.9	-18.16	.000*
	Post Test	52.20±3		
Squat	Pre Test	96.50±8.8	-16.21	.000*
	Post Test	103.70±8.3		
Leg Press	Pre Test	80.40±14.9	-17.57	.000*
	Post Test	86.50±15.3		
Leg Curl	Pre Test	37.50±4.2	-24.67	.000*
	Post Test	42.40±4		

There were found significant differences as a result of comparison of players' 1 repetition of maximum strength pre and post test values ($p<0.05$)*.

Table 4. Paired Samples t-Test Results of Players' Yo-Yo Pre and Post Test Means

ENDURANCE TEST	Test Sequence	Mean ± SS	t	p
Resting Heart Rate (beat/min)	Pre Test	69.50±10.5	8.52	.000*
	Post Test	67.90±10.5		
Maximum Heart Rate (beat/min)	Pre Test	194.30±5.7	18.28	.000*
	Post Test	186.30±6		
Yo-Yo IR2 Test (m)	Pre Test	1109±300.2	-12.07	.000*
	Post Test	1286.8±263		
MaxVO_2 (ml/kg/dk)	Pre Test	60.30±4	-6.82	.000*
	Post Test	63.10±3.7		

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Differences found to be statistically significant as a result of comparison of players' resting and maximum heart rate, distance and $MaxVO_2$ values in Yo-Yo pre and post test values ($p<0.05$)*.

DISCUSSION

This study aims to examine the effect of preparatory stage trainings on a number of physiological and motor characteristics of U19 soccer players. A total of 32 players from Çanakkale Dardanel Spor A.Ş. U19 team volunteered to participate in the study.

In our study, the agility pre-test values of the soccer players were 8±4 sec, and the final test values were 7.5±4 sec. There was a statistically significant difference in the comparison of agility test before and after training ($p<0.05$). It was clearly indicated that the improvement of agility will come out as a factor that distinguishes the performance in terms of quality of the movements such as direction changes at high speeds, sudden acceleration and stopping movements.

In our study, a statistically significant difference was found when comparing the maximal strength pre- and post-test values of soccer players ($p<0.05$). We believe that the improvement of maximal strength parameters in soccer players is due to the involvement of strength exercises in the training program applied. We think that the increase in strength values will provide a significant benefit in performing stronger technical shots and in tackles.

In a study investigating the relative strength values in some team and individual sports, the biceps curl of the soccerers was found as 47.8±6.6 kg, bench press as 75±15.9 kg, squat as 98.3±22.8 kg. We think that the fact that some of the strength values in this study are different than those in ours is due to the higher average age of the athletes and their having higher level of physical characteristics.

Özcan (2011), in his study in which he investigated the effect of two different methods of training in basic technical tennis training on technical biomotoric and physiological properties, found significant differences in values in the comparison of strength tests of induction (Staged Technical Instructional Training) and deduction groups (Holistic Technical Instructional Training) ($p<0.05$). Although there is an interdisciplinary difference between this study and our study, there is a similarity in terms of a significant increase in the strength values in the training practices.

Alp et al. (2016) examined the preparation period trainings' effects on biomotoric features of 10-12 age male tennis players. As a result of comparison of physiologic and motoric features, they found significant differences

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(p<0,05). They stated that technic and coordination improvement training drills applied to players and contained true loading densities increased the biomotoric performance.

In Aziz et al. (2005)'s study, coaches opt to implement field tests that they can measure indirectly without using an oxygen analyzer in the laboratory to determine the maximum oxygen consumption. To this end, the most common test used in soccer to determine the maximum oxygen consumption is the Yo-Yo endurance test. The Yo-Yo test is a test that covers going and coming movements at various speeds and sudden turns. Gümüşdağ et al. (2013) examined the Yo-Yo intermittent recovery test as an assessesment of aerobic-anaerobic fitness and game-related endurance in soccer. They found that Yo-Yo intermittent test performance also had significantly VO-2max, and better soccer dribbling endurance (Hoff test) and 30m sprint times. Aziz et al. (2005) examined the movements included in soccer, and these movements are considered to be soccer-specific movements and are also used in the determination of maximum oxygen consumption. In this study, which was conducted in this context, we noticed a statistically significant difference (p <0.05) in the comparison of Yo-Yo intermittent running pre- and post-test resting heart rate, maximum heart rate, Yo-Yo running distance and $MaxVO_2$ values. After the training sessions conducted, we can say that the positive changes in the Yo-Yo intermittent running performance values have improved the soccer players' durability and maximum oxygen consumption capacity.

Saygın et al. (2016) aimed to examine the effects of 8-week Zumba and Step-Aerobics exercises on the health-related physical fitness components, blood pressure and resting heart rate. They found significant differences of $MaxVO_2$ values of both exercises.

Alemdaroğlu (2012), in his study conducted on soccer players, reported that the maximum number of heart beats was 196,69±4,70 bpm, $MaxVO_2$ was 58,65±2,40 ml/kg/min, the distance covered was 2649,23 ± 288,9 m. In their study of soccer in which they investigated the relationship between 35-meter maximal anaerobic sprint and vertical jump and standing jump scores.

Kamar et al. (2003) found that $MaxVO_2$ was 53,03±4,57 ml/kg/min after a shuttle run.

In a study conducted by Akcakaya (2009), comparing some motoric and anthropometric characteristics of athletes from different branches, the values were calculated as 46.1±5.7 ml/kg/min for basketballers, 55.3±3.3 ml/kg/min for soccer players, and 50.9±4.2 ml/kg/min for track and field athletes. We think that the low $MaxVO_2$ values are due to the shuttle run test performed or

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the fact that the athletes were not subjected to any training program. As the literature review suggests, there are similar and dissimilar studies to ours.

RESULTS

In the light of the data obtained, it was determined that the preparatory period training sessions applied to the soccer players had a positive effect on strength and some physiological characteristics and thus improving the performance.

Considering the characteristic feature of the game of soccer, and the fact that it continues throughout the year; it is suggested that this type of research should be done more frequently in different stages of the year so that the structural and conditioning properties of the athletes can be observed more clearly. It is thought that our study may contribute to the sports scientists and trainers in the future who practise preparatory period trainings in soccer game in terms of the optimum performance as a reference value.

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