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ORIGINAL ARTICLE

The Effect of Hıgh Intensıty Narrow Fıeld Exercıses and Technıcal Traınıngs on Macro Mıneral Blood Parameters ın U14-U15 Football Players

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ABSTRACT

Aim: The aim of this study is to examine the effects of 8-week ıntensity narrow field exercises and technical trainings on macro mineral blood parameters of U14-U15 football players. A total of 22 football players in the U14-U15 category participated in the study.

Method: In the study, ıntensity narrow field exercises and technical trainings were performed 3 days a week for 8 weeks in the experimental group, and technical training was performed on the control group. A "Family Informed Consent (Consent) Form" was obtained from the parents of the athletes who wanted to participate in the study voluntarily. The study was prepared in accordance with the principles of the Declaration of Helsinki. Macro mineral blood parameters were taken for pre-test and post-test measurements in both groups. Appropriate SPSS statistical program was used in the analysis of the obtained data. The Shapiro-Wilk test was used to determine whether the data showed a normal distribution. Intragroup “Paired t test” to determine whether there is a difference before and after training; The difference between the groups was analyzed using the "Independent-t test". The significance level was evaluated according to the 0.05 significance level.

Results: When the findings of the study were examined, there was a statistically significant difference in the macro mineral blood parameters of the experimental group before and after the training ($p<0.05$); no significant difference was found in the control group ($p>0.05$). As a result of the analysis of the comparison between the groups, there was a significant difference between the sodium post-test, potassium pre- and post-test results, while no significant difference was found in other measurement values.

Conclusions: As a result, it has been determined that 8-week high ıntensity narrow field exercises applied to U14-U15 football players have effects on macro mineral blood parameters.

Keywords: Football, Technical, Narrow field, Training, Macro mineral

INTRODUCTİON

Football is defined as a long-term and variable branch, which has a wide variety of movements, has features such as strength, endurance and agility when viewed in its structure, includes technical and tactical, sudden change of direction and double struggles (Tessitore vd., 2006). In addition to gaining technical, tactical, physical and mental characteristics in football, the players also gain motor skills.

Narrow field games that serve a certain purpose are the normal football rules in a smaller field than the normal field size with fewer players than the normal number of players, or they are training models integrated into the football game by changing the normal rules. The purpose of narrow field games is to develop the work to be done according to the game to be played in the normal competition by playing according to the stepping principle. In order to repeat and reinforce the physical, technical and tactical training of a real competition, trainers pay more attention to narrow field games within their training programs (Aktaş S, 2013).

While in the past years, narrow field games were used to increase the technical and tactical skills of the players, today it is seen as a powerful method for the development of aerobic and anaerobic endurance. It is recommended to use narrow field games in order to protect and improve the current condition levels of the players, especially during competition times (Hoff ve ark 2002). In addition, it will help the players to improve their decision-making skills during the competition by creating a chance to repeat the physiological and technical needs necessary for the competition more (Ngo ve ark. 2012, Rampinini ve ark. 2006, Jones ve Drust 2007). It is also known that narrow space games increase the motivation of the players and enable them to adapt to the game even more (Bizati Ö, 2010). At the same time, if technical skill and endurance are used at the same time in narrow field games, it can contribute to more efficient use of time and physical load (Jastrzębski vd., 2015).

Narrow playgrounds and technical trainings increase the technical-tactical skills of the players, their offensive-defensive abilities, and also support the development of the aerobic and anaerobic capacities of the players (Bekris ve ark 2012). The positive effects of trainings of sufficient intensity and duration on blood plasma lipids and lipoproteins have been demonstrated in many studies (Crigui M.H. 1986, Hesgel ve ark 1988).

The aim of this study is to examine the effect of 8-week high-intensity narrow field games and technical training of U14-U15 football players on macro mineral blood parameters.

MATERİAL AND METHOD

22 football players in the U14-U15 category were included in the study. In this context, the football players were divided into two groups as the experimental group (n:11) and the control group (n:11). Experimental group did 90 minutes of high Intensity narrow field studies, 3 days a

week, for 8 weeks. The control group, on the other hand, did only technical studies during this eight-week period.

Athletes do not have any health problems. A statement was made to the athletes and parents that the personal information and findings obtained in the research would be kept strictly confidential. A "Family Informed Consent (Consent) Form" was obtained from the parents of the athletes who wanted to participate in the study voluntarily. The study was prepared in accordance with the principles of the Declaration of Helsinki.

Body Weight Measurement: It was weighed with bare feet, while the athletes were wearing only shorts and t-shirts, using a SECA brand electronic scale with a precision of 0.5 kg.

Height Measurement: Measured with a SECA brand height scale with 0.1 m precision.

Blood Collection from Football Players: Blood collection from football players in Experimental Group and Control Group, before starting the training on the 1st day and immediately after the training at the end of 8 weeks, approximately 10 ml of blood was taken from the arm vein by the nurse in the health institution to determine their basal levels and transferred to biochemistry tubes and was taken in the medical biochemistry laboratory. Data were recorded by measuring Calsium, Phosphorus, Magnesium, Sodium, Potassium and Chlorine levels.

Applied Training Program: Each training unit was implemented by creating warm-up, loading and cooling-down phases in itself. Technical training and high intensity narrow field exercises were applied for 8 weeks, 3 days a week for 90-120 minutes. The High intensity narrow exercise program was implemented in a way that the maximum heart rate level would be 70-80% and above. 5v5 narrow field 3 sets (1 minute rest between sets) were played in a 20x28 meter playing field for 15 minutes. 6v6 narrow field 6 sets (1 min rest between sets) set time 15 minutes were played in a 24x32 playing field. 7v7 narrow field 2 sets (1 min rest between sets) set time 15 minutes were played in a 28x36 meter playing field.

Analysis of data: SPSS statistical program was used in the analysis of the obtained data. The arithmetic mean (X) and standard deviation (SD) values of all football player groups were taken. The Shapiro-Wilk test was used to determine whether the data showed a normal distribution. As a result of the analysis, it was determined that the data showed a normal distribution. Intragroup “Paired t test” to determine whether there is a difference before and after training; The difference between the groups was analyzed using the "Independent-t test". The significance level was evaluated according to the 0.05 significance level.

RESULT

According to Table 1; When the demographic information of the football players was examined, the average age of the experimental group was 14.18±.40 years, their average height was 172±7,36 cm, and their body weight average was 58.18±8.71 kg. The mean age of the control group was 14.72±.46 years, mean height was 176.90±5.71 cm, and mean body weight was 65.18±8.02 kg.

Table 1: Demographic information of football players

Variables	Groups	N	Minimum	Maximum	Mean ±Ss
Age (years)	Experimental group	11	14,00	15,00	14,18 ±,40
	Control group	11	14,00	15,00	14,72 ±,46
Height (cm)	Experimental group	11	162,00	185,00	172± 7,36
	Control group	11	169,00	184,00	176,90±5,71
Body weight(kg)	Experimental group	11	47,00	71,00	58,18 ±8,71
	Control group	11	50,00	79,00	65,18 ±8,02

Table 2: Comparison of Macro Mineral Blood Parameters Measurements of Experimental and Control Groups Within Groups

Variables	Groups	Test	Mean±Ss	t	p
Calsium (mg/dl)	Experimental group	Pre Test	9.80±.20	4.580	.001*
		Post Test	9.66±.17		
	Control group	Pre Test	9.75±.28	-.053	.958
		Post Test	9.76±.35		
Phosphorus (mg/dl)	Experimental group	Pre Test	4.64±.33	2.586	.027*
		Post Test	4.32±.46		
	Control group	Pre Test	4.36±.65	.363	.721
		Post Test	4.30±.52		
Magnesium (mg/dl)	Experimental group	Pre Test	1.97±.06	2.963	.014*
		Post Test	1.89±.07		
	Control group	Pre Test	1.96±.31	.155	.880
		Post Test	1.94±.09		
Sodium (mmol/L)	Experimental group	Pre Test	141.09±1.07	3.077	.012*
		Post Test	139.91±.94		
	Control group	Pre Test	139.11±1.61	-.985	.348
		Post Test	139.70±.57		
Potassium (mmol/L)	Experimental group	Pre Test	4.27±.15	3.958	.003*
		Post Test	4.08±.15		
	Control group	Pre Test	4.60±.37	1.131	.284
		Post Test	4.58±.35		
Chlorine (mmol/L)	Experimental group	Pre Test	104.40±1.15	3.575	.005*
		Post Test	102.70±1.34		
	Control group	Pre Test	103.26±1.71	-.576	.577
		Post Test	103.66±1.31		

According to the in-group analysis in Table 2, there was a significant difference between the macro mineral levels in the experimental group before and after the training, while there was no statistically significant difference in the measurements of the control group, although there were changes in the macro mineral blood values before and after the training.

Table 3: Comparison of Macro Mineral Blood Parameters Measurements of Experimental and Control Groups Between Groups

Variables	Groups	Test	Mean± Ss	t	p
Calsium (mg/dl)	Experimental group	Pre Test	9.80±.20	.456	.653
	Control group		9.75±.28		
	Experimental group	Post Test	9.66±.17	-.774	.448
	Control group		9.76±.35		
Phosphorus (mg/dl)	Experimental group	Pre Test	4.64±.33	1.223	.235
	Control group		4.36±.65		
	Experimental group	Post Test	4.32±.46	.098	.923
	Control group		4.30±.52		
Magnesium (mg/dl)	Experimental group	Pre Test	1.97±.06	.074	.942
	Control group		1.96±.31		
	Experimental group	Post Test	1.89±.07	-1.592	.127
	Control group		1.94±.09		
Sodium (mmol/L)	Experimental group	Pre Test	141.09 ±1.07	3.366	.003*
	Control group		139.11 ±1.61		
	Experimental group	Post Test	139.91 ±.94	.625	.539
	Control group		139.70 ±.57		
Potassium (mmol/L)	Experimental group	Pre Test	4.27±.15	-2.723	.013*
	Control group		4.60±.37		
	Experimental group	Post Test	4.08±.15	-4.164	.001*
	Control group		4.58±.35		
Chlorine (mmol/L)	Experimental group	Pre Test	104.40 ±1.15	1,826	.083
	Control group		103.26 ±1.71		
	Experimental group	Post Test	102.70 ±1.34	-1.703	.104
	Control group		103.66 ±1.31		

According to Table 3, when the macro mineral blood values of the experimental and control groups were compared between the groups, it was determined that there was a significant difference between the experimental and control groups in terms of sodium pre-test (p<.003), potassium pre (p<.013)-post (p<.001) test measurements. No significant difference was found in other measurements.

DİSCUSSİON

In this study, it was aimed to determine the effects of narrow playgrounds and technical training on macro mineral blood parameters in U14-U15 football players.

In the present study, when the analysis applied to the calcium levels of the football players was examined within the group, there was a significant difference in the pre- and post-tests of the experimental group (p<0.05), while there was no significant difference in the pre- and post-tests of the control group (p>0.05). When the analysis between the groups was examined, no significant difference was observed in the experimental and control groups (p>0.05). There was a slight decrease in the calcium levels of the experimental group. As training intensity increases, lactic acid accumulation increases and blood pH level decreases. In order to balance the pH level, calcium begins to be released while the hydrogen ions bind, and all these functions can be said to be the reason for the decrease in the calcium level. In a study of football and basketball players, it was determined that the calcium values of basketball experiment and control groups decreased over time (Kıvrak, 2013).

When the analysis applied to the phosphorus levels of the football players was examined within the group, there was a significant difference in the pre- and post-tests of the experimental group (p<0.05), while there was no significant difference in the pre- and post-tests of the control group (p>0.05). When the analysis between the groups was examined, no significant difference was observed in the experimental and control groups (p>0.05). The decrease in the amount of phosphorus in the experimental group can be attributed to the increase in energy need due to high-intensity narrow space games and technical training, and the incorporation of phosphorus into the cell for ATP production.In a study, it was stated that phosphorus levels decreased after 3 months of exercise, but the decrease was not significant (Cappy and et all, 1999). In different studies, it has been observed that the phosphorus level increases depending on the training (Göksu, 2015; Prokop, 1983; Bassini-Cameron, 2007). The reason for this can be listed as the difference of sports branches, the difference of the training program applied to the athletes and the physiological characteristics of the athletes.

When the analysis applied to the magnesium levels of the athletes was examined within the group, there was a significant difference in the pre- and post-tests of the experimental group (p<0.05), while there was no significant difference in the pre- and post-tests of the control group (p>0.05). When the analysis between the groups was examined, no significant difference was observed in the experimental and control groups (p>0.05). Considering the analysis, the magnesium level of the experimental group decreased more than the control group. The reason for this is that depending on the intensity and type of training, there is more magnesium excretion from the body with sweat and urine. There are studies stating that magnesium level increases in high-intensity short-term training and decreases in intense and long-term training. (Rayssiguier ve diğerleri, 1990). Hazar et al. (2012) explained in a study

that the most important feature of the decrease in magnesium level is the transfer of magnesium to erythrocytes.

When the analysis applied to the sodium levels of the football players was examined within the group, there was a significant difference in the pre-test and post-tests of the experimental group ($p<0.05$), while there was no significant difference in the pre- and post-tests of the control group ($p>0.05$). When the analysis between the groups was examined, there was a significant difference in the experimental group ($p<0.05$), but no significant difference was observed in the control group ($p>0.05$). As a result of the analysis, the reason for the decrease in the sodium level of the experimental group can be explained by high-intensity narrow space games and technical training. This loss is thought to decrease again in sweat and urinary tract. When the studies are examined, it has been stated that the sodium level decreases with sweating during the training, and the decrease in this level differs according to the exercise type (Emenike ve diğerleri, 2014; Sanders ve diğerleri, 2001).

When the analysis applied to the potassium levels of the athletes was examined within the group, there was a significant difference in the pre- and post-tests of the experimental group ($p<0.05$), while there was no significant difference in the pre- and post-tests of the control group ($p>0.05$). When the analysis between the groups was examined, a significant difference was observed in the experimental and control groups ($p<0.05$). When the analysis is examined, the reason for the difference in both groups and the difference in the experimental group is thought to be the cell damage during training and the excretion of lost potassium through sweat and urine. In a study, it was stated that potassium values decreased before and after the five-day competition (Koç, 2011). Göksu et al. (2003) found that potassium levels decreased before and after 10 weeks of training. On the other hand, there are some studies that indicate an increase in potassium levels before and after exercise (Baydil 2013, Pakdil 2013). Contradictory to this study can be listed as the difference of sports branches, the difference of the training program applied to the athletes and the physiological characteristics of the athletes.

When the analysis applied to the chloride levels of the athletes was examined within the group, there was a significant difference in the pre- and post-tests of the experimental group ($p<0.05$), while there was no significant difference in the pre- and post-tests of the control group ($p>0.05$). When the analysis between the groups was examined, no significant difference was observed in the experimental and control groups ($p>0.05$). The reason for the decrease in the chlorine level of the experimental group is thought to be due to the high-intensity loads during exercise. In a study conducted by Bayram et al. (2017), the blood parameters of the athletes were compared and it was observed that the chlorine level of the experimental group was lower than the control group in the study.

CONSLUSTONS

Looking at the analyzes in the research, it was found that high-intensity narrow space exercises and technical training applied for 8 weeks decreased the macro mineral serum levels. It is thought that the training intensity and scope are effective as the reason for the differences between the experimental and control groups. We can say that it will be important to follow the nutritional levels of the athletes in order to replace the losses in the macro mineral blood level that occur during football training and to provide fluid support before, during and after the training to increase their performance to a higher level.

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