European Journal of Physical Education and Sport Science
ISSN: 2501 - 1235
ISSN-L: 2501 - 1235
Available on-line at: www.oapub.org/edu

DOI: 10.46827/ejpe.v6i6.3256 Volume 6 | Issue 6 | 2020

INVESTIGATION OF THE EFFECTS OF 8-WEEK FOOTBALL TRAINING ON FINE MOTOR SKILLS AND SELECTED PHYSICAL FITNESS ELEMENTS IN 11-13 YEARS OLD CHILDREN GROUP

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Abstract:
This study aims to investigate the effects of 8-week football training on selected physical fitness elements and fine motor skills in 11-13-year-old children. Among the children who participated in the study, the children playing football in Marmarisspor formed the experimental group (n: 30), and the children studying at Salih Zeki Gür Secondary School formed the control group (n: 30). In total, 60 volunteer children participated in the study. The experimental method is applied in this study. Football training was applied to the participating group for 8 weeks, 3 days a week, and 50-60 minutes, and no exercise was applied to the control group. Statistical analysis of the data obtained from the research was done in the SPPS (version 16.0) package program. After examining the normality distribution of pre-test and post-test values of experiment and control groups with the Shapiro-Wilk test, paired t-test was used to compare the averages. The significance level was accepted as $p < 0.05$. As a result of the statistical analysis, among averages of pre-test and post-test values the standing height, body weight, body mass index, flexibility, handgrip strength, balance, fine motor skill, 30-meter sprint and aerobic capacity (ml/kg/min) of the experimental group, there was a significant difference at a significance level of $p < 0.05$. When the pre-test-post-test values of the control group's height, body mass index, handgrip strength, balance, fine motor skill, 30-meter sprint and aerobic capacity (ml/kg/min) were compared, while it was observed that there was no significant difference ($p > 0, 05$); there was a significant difference between body weight and flexibility features ($p < 0.05$). It has been observed that 8-week football training positively affects body weight, body mass index, flexibility, handgrip strength, balance, fine motor skill, 30-meter sprint, and aerobic capacity (ml/kg/min).

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Keywords: football, training, physical fitness, fine motor skill

1. Introduction

Football is a game that is followed by millions of people of all ages in the world and played under certain rules with a high level of pleasure. To achieve the best performance in terms of physical, physiological, psychological, and technical-tactical football, training programs should be planned in accordance with every age group and regularly. Training programs to be applied especially to children and young people should be planned in a way to provide multi-directional development by taking into consideration the development periods, physiological, psychological, physical characteristics and loading principles of the age groups.

Football is a sports discipline where aerobic and anaerobic energy metabolism are used together, where motor and combined motor features affect performance together and are highly coordinated. Performance in football increases depending on technical-tactical, physiological, and psychological factors. These factors include the structure of the game, the skill levels, conditions, positions of the players, and environmental conditions (Aslan and Koç, 2015). Also, one of the most important factors for achieving high performance level is physical fitness. If the feature of the physical structure is not specific to the sports branch, it does not allow the performance to be well displayed. Fatigue in athletes, which starts at the beginning of the training, disrupts the nerve-muscle cooperation that has an effect on increasing the performance to the highest level and makes it difficult for the performance to reach the desired level (Aslan et al., 2015). For footballers to adapt to these conditions, it is tried to maximize their motoric features and body composition through training using scientific methods (İri et al. 2009).

Physical fitness refers to the condition of the body concerning the applying movements correctly and physical endurance. According to this definition, the person with the highest physical fitness is the person who can move for the longest time without getting tired (Zorba and Saygın, 2009). Determining the physical properties of children in advance contributes to directing them to the sports branch they are suitable for, and as a result, children can be successful by specializing in that branch (Çelik et al., 2013). The fact that the physical and motoric features are developed, and high quality also shows the difference between other athletes (Taşkın et al., 2015). Besides, motor development gradually increases with the growth and maturation of children starting from infancy. However, this motor development takes place in a series of rows, first the child's gross motor skills and then fine motor skills develop. Fine motor skills are skills that require us to control small muscle groups in our body (Konter E., 2013). The motor skills that children acquire from infancy determine the quality of their future movements. Therefore, the development of these motor skills should be supported by directing children to sports (Duman G., 2019).

The aim of this study is to investigate the effects of 8-week football training on selected physical fitness elements and fine motor skills in 11-13-year-old children.

2. Material and Methods

This study is planned as an experimental study with pretest-posttest and control groups. A total of 60 volunteer male child participated in the study, including 30 male child who regularly play football in Marmaris, who do not have any health problems and sports injuries, and 30 male child who study at Salih Zeki Gür Secondary School and who do not have any health problems. Among the children participating in the study, male child playing football in Marmarisspor formed the experimental group (n: 30) and the male child studying at Salih Zeki Gür Secondary School formed the control group (n: 30).

The footballers in the research group were trained for 8 weeks, 3 days a week, and 50-60 minutes, while the control group did not receive any training. The height, body weight, body mass index (BMI), aerobic capacity (ml/kg/min), strength, flexibility, balance, 30-meter sprint, and fine motor skills values of the research group participating in the study were recorded as pre-tests and post-tests.

The data obtained in the study are given as mean and standard deviation. The normality distribution of the experimental and control groups was examined with the Shapiro-Wilk test on the pretest and posttest values. The data were observed to show normal distribution. While the paired T-test was used to compare the pretest and posttest values of the experimental and control groups, the T-test was used in the independent groups to compare the experimental and control groups. In statistical evaluations, the level of significance was accepted as $p < 0.05$. Statistical analysis of all data obtained in the study was done in SPSS (version 16.0) package program.

3. Data Collection Tools

3.1 Anthropometric Measurements

A. Body Weight and Height

While the weight was measured with an electronic scale with an accuracy of 0,1 kg, the height was measured with a digital height measuring instrument with a precision of 0,01 cm (Zorba E.,1999).

B. Body Mass Index

Body mass index has been calculated by taking advantage of the height and body weight of the children.

$$BMI = \text{Weight (kg)} / \text{Height}^2 \text{ (m)}$$ (Zorba E., 1999).

C. Hand Grip Strength Test

Measurement was done with Takei brand digital handgrip dynamometer. When an external force was applied to the dynamometer, the steel wire was stretched, and the indicator moved. Handgrip force test was applied as follows:

- The subject was asked to be standing and the body in an upright position.

- Squeezing size middle part of the middle finger can be placed at an almost right angle, the upper arm was asked to hold in an upright position.
- The wrist and forearm of the subject were asked to be kept in a half-bent position.
- The subject was asked to apply force fast and maximum.
- The subjects were asked to apply force, two times with their right hand and two times with their left hand. In the trials between the same hand, a 30-second rest was given. The best of the two trials of the subjects were recorded as scores (Zorba and Saygın 2009).

D. Sit and Reach (Flexibility) Test

The test bench (sit and reach box) in the research has the following features. The length of it is 35 cm, width is 45 cm, height is 32 cm. The upper surface measurements of the bench are length is 35 cm, width is 45 cm. The upper surfaces are 15 cm further than the surface on which the feet rest. The measurement ruler of 0.50 mt is determined on the upper surface with parallel line spacings of 5 cm each. The application of the test; 3-5 minutes of warm-up exercises were done before the subjects started the test. The subject is seated on the ground and the feet are flat on the test bench. Without bending the knees, the trunk is bent forward and extended forward. In this way, the subject stood at the farthest point and his scores were recorded (Sevim Y., 2006).

E. Balance Test

The measurement material of this test; Metal beam, 50 cm long, 4 cm high, and 3 cm wide, was used. The subjects were given detailed information about the test protocol. The subjects were asked to stay in balance by trying to climb on the balance device with their dominant feet and to stand in balance, bending the idle foot from the knee and pulling it towards the hip. During this process, the test leader assisted the subjects to stay in the proper position. Subjects were asked to stay on the balance device for 1 minute as soon as they were ready in this position. During this application, when the participant lost his balance, the time was stopped, and the test continued by maintaining his balance again. After these balance losses, all these processes continued within 1 minute. When the time expires, the error numbers of the subjects were written and recorded as a score (Özen G., 2014).

F. 30 Meter Sprint Test

A 30-meter sprint test was applied to determine the speed of the participants. The photocells on the Newtest battery were placed at a distance of 0 and 30 meters. The participants were asked to be present behind the starting line after 6-7 minutes of warm-up and flexibility exercises. The participants were asked to start running when they were ready. The measurement started as soon as they started running and the time stopped as soon as they crossed the finish line. During this test, the participants were given two attempts and a sufficient rest period for the second running test. The test end time of the participants was recorded in seconds and recorded as the test score (Aslan and Koç 2015).

G. 20 Meter Shuttle Run Test

To determine the running speed, a 20-meter shuttle running test cassette in accordance with the protocol was used. The test started at a running speed of 8,5 km / h. The participants ran the line on the 20-meter track by touching the line marked on the ground with their feet and continued the test until they made two mistakes in a row. Running speed increased by 0,5 km / h every minute. The level at which the participant stopped was recorded as a test result. By converting the obtained result to the total distance, the maximum VO2 value of the participants is found as ml/kg/min. (Leger and Lambert 1982; Günay et al. 2010).

H. Fine Motor Skill (Purdue Pegboard) Test

The test board is placed on a table where participants can sit comfortably and lie down. There are 4 cups in the upper part of the board. 25 pins are placed in the outermost cups, 20 collars in the right eye in the middle and 40 washers in the eye in the left eye in the middle. On the 58.5 * 29 * 2,2 cm board to be applied to the participants, there are 25 pieces of hollows-4mm width, 1,2 cm depth, approximately 1,5 cm distance from each other, to the right and left of the middle line. Pins: 50 pcs, it has a perforated structure where it can easily enter into a depth of 2,5 cm and a width of 3.1 mm. Washers: 40 pieces-1,2 cm outer, 0,4 cm inner dimensions. In the application of the test, Participants were given the right to experiment twice and asked to start with the dominant hand. During the test, after the start command of 30 seconds, they were asked to take pins from the cup near the dominant hand and place them downwards starting from the top hole. When the participants dropped one of the pins during the test, they took a new one from the above cup and continued the test without stopping. When the test was over in 30 seconds, the test ended with the stop command, and the pins inserted into the slots were counted. The number of pins inserted into the slots was recorded at the end of the test (Buddenberg & Davis, 1999).

Figure 1: Applied Training Program

	1 Week	2 Week	3 Week	4 Week	5 Week	6 Week	7 Week	8 Week
1. Day	- Warm up (10 min.) - Coordination (10 min. - Technical Training (10 min.) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up (10 min.) - Coordination (With Ball 10 min.) - Technical and Tactic Training (15 min.) - Game 8:8 (15 min.) - Cooling (10 min.)	- Warm up With Ball (15 min.) - Strength Training (Educational games 15min.) - Game 8:8 (15 min.) - Cooling (10 min.)	- Warm up (5 min) Coordination (With Ball 10 min.) - Speed Training (15 min.) - Game 8:8 (15 min.) - Cooling (10 min.)	Warm up (10 min.) Balance Training (10 min.) Technical and Tactic Training (15 min.) Game 8:8 (15 min.) Cooling (10 min.)	- Warm up With Ball (15 min.) - Coordination (With Ball 10 min.) - Technical Training (10 min..) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up With Ball (15 min.) - Strength Training (Educational games 15min.) - Game 8:8 (15 min.) - Cooling (10 min.)	- Warm up With Ball and Coordination (With Ball 20 min.) - Technical Training (10 min..) - Game 8:8 (20 min.) - Cooling (10 min.)
2. Day	- Warm up (10 min.) - Coordination (With Ball 15 min.) - Technical Training (10 min..) - Game 8:8 (15 min.) - Cooling (10 min.)	- Warm up (10 min.) - Coordination (10 min.) - Balance Training (10 min.) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up (10 min.) - Coordination (With Ball 10 min.) - Technical and Tactic Training (15 min.) - Game 8:8 (15 min.) - Cooling (10 min.)	- Warm up With Ball and - Coordination (With Ball 20 min.) - Promptness and Agility Training (Educational games 15min.) - Game 8:8 (15 min.) - Cooling (10 min.)	- Warm up With Ball and Coordination (With Ball 15 min.) - Technical Training (10 min..) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up With Ball (10 min.) - Balance and Speed Training (20 min.) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up (Educational games 10min.) - Coordination (With Ball 10 min.) - Technical Training (10 min..) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up (Educational games 10 min.) - Balance Training (10 min.) - Technical Training (15 min..) - Game 8:8 (15 min..) - Cooling (10 min.)
3. Day	- Warm up (15 min.) - Strength Training (Educational games 15 min.) - Game 8:8 (15 min.) - Cooling (10 min.)	- Warm up and Coordination (With Ball 15 min.) - Speed Training (Educational games (10 min.) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up (Educational games 15 min.) - Balance Training (10 min.) - Technical Training (10 min..) - Game 8:8 (15 min.) - Cooling (10 min.)	Warm up and Coordination (15 min.) Technical and Tactic Training (15 min.) Game 8:8 (20 min.) Cooling (10 min.)	- Warm up With Ball and Coordination (With Ball 15 min.) - Speed Training (Educational games 15 min.) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up and Coordination (15 min.) - Technical and Tactic Training (15 min.) - Game 8:8 (20 min.) - Cooling (10 min.)	- Warm up With Ball and Coordination (With Ball 20 min.) - Tournament Game (30 min.) - Cooling (10 min.)	- Warm up (10 min.) - Strength Training (Educational games 15 min.) - Game 8:8 (15 min.) - Cooling (10 min.)

3. Results

Table 1: Comparison of physical fitness factors and fine motor skills pretest and posttest values of children in the experimental group

Variables	Groups	n	X±SD	t	p
Body Weight (kg)	Pre-test	30	44,85 ± 12,56	-6,240	**,000****
	Post-test	30	45,92 ± 12,65		
Standing Height (cm)	Pre-test	30	151,97 ± 11,37	-8,707	**,000****
	Post-test	30	153,01 ± 11,33		
Body Mass İndex (kg/m^2)	Pre-test	30	18,94 ± 3,43	-3,658	**001***
	Post-test	30	19,26 ± 3,29		
Hand Grip Strength (dominant hand) (kg)	Pre-test	30	20,52 ± 5,04	-7,561	**,000****
	Post-test	30	22,34 ± 5,43		
Balance (number of errors)	Pre-test	30	4,16 ± 4,51	-5,189	**,000****
	Post-test	30	1,80 ± 2,36		
Fine Motor Skill (dominant hand, number)	Pre-test	30	13,90 ± 1,78	-3,778	**,001***
	Post-test	30	14,86± 2,19		
30 m Sprint (sn)	Pre-test	30	5,38 ± ,33	-8,886	**,000****
	Post-test	30	5,26 ± ,33		
Aerobic Capacity (m/kg/dk)	Pre-test	30	31,16 ±5,26	-4,603	**,000****
	Post-test	30	34,13 ± 4,96		
Flexibility (cm)	Pre-test	30	19,65 ± 4,52	-13,716	**000****
	Post-test	30	21,92 ± 4,48		

*p<0.05

On examination of Table 1, according to the result of the paired T-test to determine whether there is a difference between pre and post-training height, body weight, body mass index, flexibility, handgrip strength, balance, fine motor skill, 30-meter sprint and aerobic capacity of the children in experiment group participating in football training, it was found that there was a statistically significant difference between the pre-test and post-test of the children participating in the football training (p<0.05).

Table 2: Comparison of physical fitness factors and fine motor skills pretest and posttest values of the children in the control group

Variables	Groups	n	X±SD	t	p
Body Weight (kg)	Pre-test	30	37,59 ± 10,50	-3,793	**,001***
	Post-test	30	38,41 ± 10,37		
Standing Height (cm)	Pre-test	30	144,88 ± 8,52	-1,033	,310
	Post-test	30	145,40 ± 9,04		
Body Mass İndex (kg/m^2)	Pre-test	30	17,66 ± 3,47	-1,494	,146
	Post-test	30	17,85 ± 3,40		
Hand Grip Strength (dominant hand) (kg)	Pre-test	30	17,40 ± 5,45	-1,677	,104
	Post-test	30	17,96 ± 5,84		
Balance (number of errors)	Post-test	30	6,56 ± 5,67	,984	,333
	Post-test	30	6,30 ± 5,09		
Fine Motor Skill (dominant hand) (number)	Pre-test	30	14,16 ± 1,44	,571	,573
	Post-test	30	14,06 ± ,94		
30 m Sprint (sn)	Pre-test	30	6,25 ± ,74	-1,561	,129
	Post-test	30	6,31 ± ,71		
Aerobic Capacity (m/kg/dk)	Pre-test	30	26,63 ± 5,51	0,374	0,71
	Post-test	30	26,72 ± 5,15		
Flexibility (cm)	Pre-test	30	17,75 ± 6,35	-5,123	**000****
	Post-test	30	19,26 ± 6,39		

*p<0.05

On examination of Table 2, according to the result of the paired T-test to reveal whether there is a difference between pre-test body mass index, handgrip strength, balance, fine motor skills, 30 meters sprint, and aerobic capacity features and post-test height, body mass index, handgrip strength, balance, 30 meters sprint and aerobic capacity features; While there was no statistically significant difference between the pre-test and post-tests of the control group (p> 0.05); it was found that there was a significant difference between the body weight and flexibility features (p <0.05).

Table 3: Comparison of experimental and control group pretest values

Variables	**Groups**	**n**	**X±SD**	**t**	**p**
Body Weight (kg)	Experiment	30	44,85 ± 12,56	2,429	**,018***
	Control	30	37,59 ± 10,50		
Standing Height (cm)	Experiment	30	151,97 ± 11,37	2,729	**,009***
	Control	30	144,88 ± 8,52		
Body Mass İndex (kg/m^2)	Experiment	30	18,94 ± 3,43	1,431	,158
	Control	30	17,66 ± 3,47		
Hand Grip Strength (dominant hand) (kg)	Experiment	30	20,52 ± 5,04	2,301	**,025***
	Control	30	17,40 ± 5,45		
Balance (number of errors)	Experiment	30	4,16 ± 4,51	-1,812	,075
	Control	30	6,56 ± 5,67		
Fine Motor Skill (dominant hand) (number)	Experiment	30	13,90 ± 1,78	-,636	,527
	Control	30	14,16 ± 1,44		
30 m Sprint (sn)	Experiment	30	5,38 ± ,33	, -5,882	**,000****
	Control	30	6,25 ± ,74		
Aerobic Capacity (m/kg/dk)	Experiment	30	31,16 ± 5,26	3,258	**,002***
	Control	30	26,63 ± 5,51		
Flexibility (cm)	Experiment	30	19,65 ± 4,52	1,334	,188
	Control	30	17,75 ± 6,35		

*p<0.05

On examination of Table 3, while there was a statistically significant difference between the pre-test values of body weight, height, handgrip strength, 30 m sprint and aerobic capacity of the children in the experimental group and control group participating in the study (p <0,0,5); it was found that there was no statistically significant difference between body mass index, balance, fine motor skill and flexibility features (p> 0.05).

Table 4: Comparison of experimental and control group posttest values

Variables	**Groups**	**n**	**X±SD**	**t**	**p**
Body Weight (kg)	Experiment	30	45,92 ± 12,65	2,516	**,015***
	Control	30	38,41 ± 10,37		
Standing Height (cm)	Experiment	30	153,01 ± 11,33	2,873	**,006***
	Control	30	145,40 ± 9,04		
Body Mass İndex (kg/m^2)	Experiment	30	19,26 ± 3,29	1,634	,108
	Control	30	17,85 ± 3,40		
Hand Grip Strength (dominant hand) (kg)	Experiment	30	22,34 ± 5,43	3,005	**,004***
	Control	30	17,96 ± 5,84		
Balance (number of errors)	Experiment	30	1,80 ± 2,36	-4,388	**,000****
	Control	30	6,30 ± 5,09		
Fine Motor Skill (dominant hand) (number)	Experiment	30	14,86 ± 2,19	1,835	,074
	Control	30	14,06 ± ,94		
30 m sprint (sn)	Experiment	30	5,26 ± ,33	-7,304	**,000****
	Control	30	6,31 ± ,71		
Aerobic Capacity (m/kg/dk)	Experiment	30	34,13 ± 4,96	5,677	**,000****
	Control	30	26,72 ± 5,15		
Flexibility (cm)	Experiment	30	21,92 ± 4,48	1,864	,068
	Control	30	19,26 ± 6,39		

*p<0.05

On examination of Table 4, while it was observed that there was a statistically significant difference between the post-test values of the body weight, height, handgrip strength, balance, 30 m sprint and aerobic capacity characteristics of the children in the experimental group and the control group participating in the research; it was found that there was no statistically significant difference between body mass index, fine motor skill and flexibility features (p> 0.05).

4. Discussion

This study was conducted to investigate the effects of 8-week football training on selected physical fitness and fine motor skills in 11-13-year-old children.

While the height pre-test average of the experimental group participating in our research was 151.97 ± 11,37 cm, the average of the post-test was 153.1 ± 11.33 cm. The length of the control group's pretest averages were 144, 88 ± 8,52 cm, while the posttest averages were found as 145.40 ± 9.04 cm. İri, et al. (2009) found that soccer training they applied on 12-14 age group children had a significant difference in height ($p < 0.01$).

While the pre-test bodyweight averages of the experimental group participating in our study were 44.85 ± 12,56 kg, the post-test averages were 45.92 ± 12,65 kg. While the bodyweight pre-test averages of the control group were 37.59 ± 10,50 kg, the post-test averages were 38.41 ± 10,37 kg. İbiş et al. (2004) in a study they conducted 12-14 years old children who attended summer football school and those who did not attend football school, according to the pre-test and post-test results, they expressed that there was a significant difference in body weight results of the children who did not attend summer football school. In their study conducted to determine the effect of six-week football training on the physical and physiological characteristics of male football players, Yıldız et al. (2016) found that there was a statistically significant difference in the body values of the participants according to the results obtained ($p<0.01$).

While the pretest flexibility averages of the experimental group participating in our study were 19.65 ± 4,52 cm, the posttest averages were 21.92 ± 4.48 cm. While the flexibility pretest averages of the control group were 17.75, ± 6,35 cm, the posttest averages were 19.26 ± 6.39 cm. In their studies named 8-week core exercise effects on some physical and physiological parameters, Doğan et al. (2016) found that there was a significant difference between flexibility pre-test and post-test values. Meliggas et al. (2015) found that there was a statistically significant difference in the values of the experimental and control groups after applying an 8-week static and dynamic stretching program in school-age children. These studies in the literature are in parallel with our study.

Skaggs et al. (2015) examined the flexibility relationship between speed and jumping performance and found no evidence that flexibility was associated with jumping. This study in the literature is not in line with our study.

In their study to examine the effect of 8-week core training on performance-related physical fitness variables in male football players, Dilber et al. (2016) found that the right-hand claw strength pretest 43.58 ± 5.00 and posttest 46.11 11.43 were statistically significant. Sarıtaş et al. (2017) in their study conducted to compare some motoric and physiological features of primary school students, found a statistically significant difference in the right-hand grip strength of basketball players than those of sedentary students.

In their study on young footballers, Güler and Eniseler (2017) found that there was a significant difference between the 6-week static and dynamic balance training

experimental group pretest-posttest and control group pretest-posttest values. Cerrah et al. (2016) found that there was a significant difference between the experimental group and the control group in their study to investigate the effects of functional balance training on the static-dynamic balance performances of adolescent footballers. Trecroci et al. (2015) found that in young footballers, there is a significant difference between the pre-test and post-test values of 8-week rope skipping workouts to improve balance and coordination.

Ulutaş et al. (2017) found that there was a significant difference between the experimental group and the control group in favor of the experimental group in the study of the effect of the motor development training program on the gross and fine motor skills of children aged 5-6. Keskin et al. (2017) performed an exercise program for autistic children aged 5-8 for 8 weeks. Comparing the fine motor skill test results before and after exercise, they found a significant difference.

Özgür et al. (2016) in the study where the effect of 6-week sprint training on speed and agility in football players was examined, they found that speed, agility, and maximal speed were analyzed and found that the training program affected speed. Kaplan et al. 2016 found that there was a significant relationship between age, height, and 30-meters sprint performance in their study where they examined the relationship between age, height, body weight, and speed, acceleration, and vertical jump performance in 9-13 aged group football players. Bucheeit et al. (2010) examined the repetitive sprint ability by applying a 10-week training program in young elite football players and found significant differences in speed values before and after training.

In their study titled the examination of the relationship between the intensity of physical activity and health-related physical fitness in 9-11-year-old boys, Karacabey et al. (2009) found that there was a significant relationship between moderate-intensity activities and maximal oxygen consumption capacity. Eler and Acar (2018) investigated the effects of skipping rope training programs on strength, speed, and maxVO2 in children in physical education classes. They found that there was a significant difference in maxVO2 between the experimental group pre-test and post-test values of rope skipping training in boys aged 10-12 who participated in the study. Marta et al. (2013) found in their study titled the investigation of the effects of 8-week training on plyometric strength and maxVO2 in children aged 10-11 that there was a significant difference in the values of the study group before and after the training. Paradisis et al. (2014) 20-meter shuttle run is a commonly used test to determine the athlete's maximal oxygen consumption and training intensity. Günay et al. (2010) stated that there is a significant change in breathing volume and frequency with training. They found an increase of over 10% in maxVO2 with 7-13 weeks of training.

Polat et al. (2003) found a significant difference in BMI values in their study of physical fitness levels of 9-11 age group football player children. Saygin et al. (2005) applied movement training for 10-12-year-old boys for 16 weeks in their study named the effect of movement education on physical fitness characteristics of children. They found that there was a significant difference in the body mass index parameters between

the experimental and control group posttest values at the level of $p < 0.01$. Arı (2012) in his master's thesis named the effect of 12-week plyometric training program on some physical and physiological parameters of 14-16-year-old female football players, 1.40% decrease in body mass index values of the experimental group after training was observed, but this difference was not found statistically significant. After the training program, a significant increase was observed in the body mass index values of the control group. The results of these studies in the literature are in line with our study.

5. Conclusions

Considering the findings of our study, 8-week football exercises applied to the athletes in the experimental group showed a significant effect on body weight, body mass index, flexibility, handgrip strength, balance, fine motor skill, 30-meter sprint, and aerobic capacity.

Pre-test body mass index, handgrip strength, balance, fine motor skill, 30-meter sprint and aerobic capacity features of the control group participating in the research and, after the post-test, while there is no statistically significant difference between pre and post-tests, there was no statistically significant difference between the pretest and posttests of body mass index, handgrip strength, balance, fine motor skill, 30-meter sprint, and aerobic capacity features, it was found that there was a significant difference between body weight and flexibility features ($p < 0.05$).

As a result; the 8-week football training program applied in our study showed that it had a positive effect on body weight, body mass index, flexibility, handgrip strength, balance, 30-meter sprint, and aerobic capacity features and fine motor skills. It is thought that ensuring the multi-faceted development of footballers is important due to the positive factors of physical fitness and motor skills.

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