Asian Journal of Education and Training
Vol. 8, No. 3, 95-99, 2022
ISSN(E) 2519-5387
DOI: 10.20448/edu.v8i3.4123
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Investigation of Anaerobic Power, Static Balance, and Speed Performances in 10-12 Years Old Children Doing or Not Doing Sports

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Abstract

In this study, it was aimed to investigate the anaerobic power, static balance, and speed performances of 10-12 years old children doing or not doing sports. In our study, 20 girls between the ages of 10 and 12 doing sports, and 20 girls between the ages of 10 and 12 not doing sports who both live in the city center of Batman voluntarily participated. The analysis of whether the data showed normal distribution was tested with the Shapiro-Wilk test, and the t-test was used to make comparisons between independent groups. At the end of the study, when the post-test results of the control and experimental groups were compared, a statistically significant difference was found in the vertical jump, standing long jump, static balance, and 100-meter sprint test values ($p<0.05$). There was no significant difference between the experimental and control groups in the 30 meter speed test values ($p>0.05$).

Keywords: Sports, Anaerobic power, Static balance, Child, Speed performances, Anaerobic.

Citation | Ali Kemal TASKIN (2022). Investigation of Anaerobic Power, Static Balance, and Speed Performances in 10-12 Years Old Children Doing or Not Doing Sports. Asian Journal of Education and Training, 8(3): 95-99.
History:
Received: 23 May 2022
Revised: 19 July 2022
Accepted: 5 August 2022
Published: 24 August 2022
Licensed: This work is licensed under a Creative Commons Attribution 4.0 License
Publisher: Asian Online Journal Publishing Group

Funding: This study received no specific financial support.
Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.
Transparency: The author confirms that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.
Ethical: This study followed all ethical practices during writing.

Contents

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Contribution of this paper to the literature

In this study, it was aimed to investigate the anaerobic power, static balance, and speed performances of 10-12 years old children doing or not doing sports. As a result, it is to contribute to the existing literature by believing that the physical development and performance of children at this age will improve significantly with the sports activities to be done in accordance with the age of the children in the developmental age.

1. Introduction

The role of sports in community and in intercommunal relations is increasing day by day. For this reason, sports are closely related to institutions such as culture, education, and health in society. The relationship between education and sports for centuries was found with terms such as "the person who develops his heart, mind, and body together" during the enlightenment period, "competing person" in the competitive understanding of capitalism, and "person who does sports" in the 15th century within the humanist movement of thought (Orhun, 1991).

The necessity of sports activities on the basis of all social and physical developments is a well-known fact for many years. In creation, the human organism was adapted to be able to move, and its contexture was built according to movement. Researchers have found that particularly the subconsciousness acquired in childhood affects the growth of the contexture in question. Since the 18th century, a different and special part of life has been perceived as the childhood process. Since the 19th century, moralists and educators have pointed out the necessity of child development. The 20th century has been considered the childhood century in its entirety. At the same time, the concept of sports in childhood age became widespread in the 20th century (Muratlı, 2003).

The most severe form of growth is seen during childhood and adolescence in human development. Sports make it possible for the personality structure and physical health, which develops especially at the age of 0-6, to develop in the same dimension in the following years instead of changing its dimension. A few researchers have confirmed that many parts of the achievements acquired during childhood affect the personality structure, attitude, shame, and value judgments of the individual at maturity (Sivri, 1993).

Sports are necessary and beneficial in terms of both the physical development of children and the direction of gaining a good personality and mental health in the developmental period. In the current period, sports play a valuable role in every level of human life. The family and the institutions where they receive education are of considerable importance for children to create this awareness. Education has been a valuable tool for learning at every age. The child, who advances their development with this consciousness, makes sports a way of life in the future. In relation to this, sports are carried out in different fields and scopes within society (Candan, 2005).

2. Material and Method

2.1. Population and Sample of the Study

In the study, 20 girls between the ages of 10 and 12 doing sports and 20 girls between the ages of 10 and 12 not doing sports who live in the city center of Batman participated voluntarily. The subjects not doing sports consist of girls who do not do any sports and lead a sedentary life; while the group that does sports consists of girls who play in sports clubs and train regularly.

Table 1. Demographic information of groups doing sports and not doing sports.

Variables	Not Doing Sports (N=20)	Doing Sports (N=20)
	Mean ± S.D	Mean ± S.D
Age (year)	13.18 ± 0.51	13.44± 0.18
Heigth (cm)	145.61± 1.55	149.57± 1.13
Body Weight (kg)	47.33± 1.18	41.57± 1.19
BMI (kg/m²)	22.35 ± 0.57	18.78± 0.41

According to Table 1, when we examined the demographic values of girls doing and not doing sports, the mean age values of the subjects who do sports were determined as 13.44± 0.18 years, height as 149.57± 1.13 cm, mean body weight values as 41.57± 1.19 kg, body mass index values as 18.78± 0.41 kg/m². Demographic information of the subjects who do not do sports was determined as follows: The mean age was 13.18 ± 0.51 years, mean height was 145.61 ± 1.55 cm, mean body weight was 47.33 ± 1.18 kg, body mass index was 22.35 ± 0.57 kg/m².

2.2. Body Weight and Height Measurements

The subjects' height and weight measurements were made while wearing shorts, t-shirts, and bare feet, on a scale with a sensitivity of 0.01 kg. The data obtained were written in the information form in centimeters and kilograms (Lohman, Roche, & Martorell, 1988).

2.3. Vertical Jump

Takai brand jump meters were used in the vertical jump test of the subjects. The squat jump test, in which the explosive power of the leg was measured, was performed in a squat position with the knees at 900 flexions and a full jump upwards while the hands were on the waist. Each measurement was repeated 3 times. Between trials, 2-minute resting was given and the best value was recorded (Açıkada, 2008).

2.4. Standing Long Jump Test

At the end of the long jump with both legs standing still and without gaining speed, the distance between the line at the jump point and the last trace of the athlete was measured in cm. The standing long jump test was repeated 2 times. Between trials, 2-minute resting was given and the best result was recorded (Sevim, 1997).

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2.5. Flamingo Balance Test

In this test, 50 cm long, 4 cm high, and 3 cm wide wooden beam was used. During this test, the subject tried to keep their foot on the long axis above the beam as long as possible in a flamingo-like pose. Each attempt (not a fall) to maintain balance on the beam for 1 minute was counted as points (Pekel, 2007).

2.6. 30-Meter Sprint Test (30 MST)

A 40-meter running track and smart speed system were used as test equipment. For the 30 m sprint, the 30 m distance was determined on the 40 m running track. While the subject was in a slightly forward inclined position at the starting line, they started the photocell by starting when they were ready and continued running. When the finish line was reached, the photocell automatically reflected the score on the screen. After the athletes were fully rested, the test was repeated and the athlete's best score was recorded.

2.7. 100-Meter Sprint Test (100 MST)

Care was taken to ensure that the weather conditions were not windy while measuring. For the 100-meter sprint, the 100-meter area was determined on the 120-meter running track. While the subject was in a slightly forward inclined position at the starting line, they started the photocell by starting when they were ready and continued running. When the finish line was reached, the photocell automatically reflected the score on the screen. After the athletes were fully rested, the test was repeated and the athlete's best score was recorded.

2.8. Determination of Body Mass Index

Calculation of the subjects' body mass indexes was determined by the formula below. BMI = Weight(kg) / Height(m)^2

Calculating the Heart Rates of Subjects.

Karvonen formula;

Maximum Heart Rate: 220 - years of age,

Heart Rate Reserve = Maximum Heart Rate - Resting Heart Rate.

Target Heart Rate = (60-70% x Heart Rate Reserve) + Resting Heart Rate.

During the exercise, the heart rate of the subjects was monitored on the screen with the device attached to the chest of the subjects, and it was ensured that the exercise was performed in accordance with the protocol.

2.9. Statistical Analysis

The SPSS Statistical Package for the Social Sciences 25.0 program was used to analyze the data obtained from the study. The data were summarized as mean and standard deviation. Analysis of whether the data showed normal distribution was tested with the Shapiro-Wilk test and the data was determined to show normal distribution. Comparison between independent groups was analyzed by the Independent Sample T-Test. In this study, the error level was accepted as 0.05.

3. Findings

When we examined Table 2, in the comparison of vertical jump values of girls doing and not doing sports, a statistically significant difference was found in favor of girls doing sports in the vertical jump measurement results of the subjects doing and not doing sports ($p<0.05$).

Table 2. Comparison of vertical jump measurement values of the subjects doing and not doing sports

Variables	Control Group	Mean ± SD	T	P
Vertical Jump	Doing Sports	38.32 ±5.51	7.399	0.000*
	Not Doing Sports	34.19 ±5.15		

Note: *($p<0.05$). Significant.

Table 3. Comparison of standing long jump measurement values of the subjects doing and not doing sports.

Variables	Control Group	Mean ± SD	T	P
Standing Long Jump	Doing Sports	185.65 ±14.59	6.228	0.000*
	Not Doing Sports	180.78 ±12.99		

Note: *($p<0.05$). Significant.

In the examination of Table 3 showing the comparison of vertical jump values of girls doing and not doing sports, a statistically significant difference was found in favor of girls doing sports in the measurement results of the subjects doing and not doing sports in standing long jump values ($p<0.05$).

Table 4. Comparison of Flamingo balance test measurement values of subjects doing and not doing sports.

Variables	Control Group	Mean ± SD	T	P
Flamingo balance test	Doing Sports	2.58 ±1.48	-3.876	0.001*
	Not Doing Sports	3.55 ±0.99		

Note: *($p<0.05$). Significant.

When we examined Table 4, in the comparison of flamingo balance values of girls doing and not doing sports; it was determined that the flamingo balance test scores of the girls who do sports are statistically better than the flamingo balance test scores of the girls not doing sports ($p<0.05$).

Table 5. Comparison of the 30-meter sprint test measurement values of the subjects doing and not doing sports.

Variables	Control Group	Mean ± SD	T	P
30-meter sprint test values	Doing Sports	5.48±0.39	0.391	0.539
	Not Doing Sports	5.54±0.29		

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When we examined Table 5 on the comparison of the 30-meter sprint performances of girls doing and not doing sports; there was no statistically significant difference between the 30-meter sprint performance values of girls doing sports and the 30-meter sprint performance values of girls not doing sports (p>0.05).

Table 6. Comparison of the 100-meter sprint test measurement values of the subjects doing and not doing sports.

Variables	Control Group	Mean ± SD	T	P
100-meter sprint test values	Doing Sports	17.86±1.21	-2.110	0.020*
	Not Doing Sports	18.77±1.29		

Note: *(p<0.05). Significant.

In the examination of Table 6 on the comparison of the 100-meter sprint performance of girls doing and not doing sports, a statistically significant difference was found in favor of those who do sports, between the 100-meter sprint performance values of girls doing sports (p<0.05).

4. Discussion and Conclusion

The most severe form of growth is observed in human development during childhood and adolescence. Sports make it possible for the personality structure and physical health, which particularly develop at the age of 0-6, to develop in the same dimension in the following years, instead of changing its dimension. Sports are necessary and beneficial for children, both for their physical development and for gaining a good personality and mental health, in the developmental period. In the current period, sports play a valuable role in every level of human life. In creating this awareness in children, the institutions where they receive family education cannot be underestimated. We think that the results of this study and scientific research are important in terms of contributing to the physical development of children.

In our study, when comparing the vertical jump and standing long jump values of girls doing and not doing sports, a statistically significant difference was found in favor of girls doing sports in the vertical jump measurement results of the subjects doing and not doing sports (p<0.05).

When we examine studies similar to the one we have conducted, Mihalik, Libby, Battaglini, and McMurray (2008) have stated that as a result of the complex trainings that volleyball players had two days a week for four weeks, volleyball players achieved a statistically significant improvement in vertical jump height. In the study conducted by Taşkın, Karakoç, Nacaroğlu, and Budak (2015), the average standing long jump distance of children has been determined as 184.70±29.56 cm, and the average vertical jump as 38.62±7.48 cm.

In another study conducted with hearing-impaired people, in the comparison of the muscular power performances of hearing-impaired and not hearing-impaired male and female athletes according to their situation of having the disability, it has been determined that there was no significant difference between disabled judoists and non-disabled judoists in terms of leg strength, vertical jump, standing long jump, thirty-second push-ups, right and left-hand claw powers (Karakoç, Taşkın, & Budak, 2015). In the study of Santos and Janeira (2008) with 14-15 age group young basketball players, the effect of training on the explosive power characteristics of basketball players has been investigated and at the end of complex training performed twice a week for 10 weeks, the squat jump values of basketball players (initial = 24.79 cm, end= 28.01 cm), active jump values (initial = 29.88 cm, end= 33.02 cm) and medicine ball throwing performances (initial = 3.47 cm, end= 4.15 cm) have been stated to improve significantly.

When we examined the other results of the study we have conducted, in the comparison of the balance scores, 30-meter sprint, and 100-meter sprint values of girls doing and not doing sports; a statistically significant difference was found in favor of girls doing sports in the balance scores, 30-meter sprint and 100-meter sprint results of the subjects doing and not doing sports (p<0.05).

In a study conducted by Perrin, Schneider, Deviterne, Perrot, and Constantinescu (1998), the static balance scores of individuals in the judo and dance group have been compared, and it has been found that there was no statistically significant difference between the two groups as a result of the study. When we looked at the results of this study, it has been shown that elite-level athletes exhibit a balance control that develops according to the characteristics of the sports branch they are doing.

In another study, the balance scores of the groups that did and did not play football have been examined and it has been observed that individuals who played football had better balance scores than individuals who did not play football. This has been explained as better control of the physiological system that provides balance in football players (Sucan, Yılmaz, Can, & Süer, 2005). Taşkın et al. (2015) in their study on hearing-impaired male volleyball and handball athletes, have found a significant correlation between the static balance scores of the two branches (p<0.01).

In a study, it was determined that there was a statistically significant difference in favor of the children who do sports between the 100-meter sprint performances of children doing and not doing sports (p<0.05). The main reason for this is that, in addition to sports activities, the running speed of children in this age group is in the development phase (Muratlı, 2003). Changes in growth and maturation, body structures, and sportive performance in athletic children and youngsters have been examined in various studies and it has been stated that growth may cause different development of performance (Bale, Mayhe, Piper, Ball, & Willman, 1992). In many studies on this subject, it has been reported that there was no significant improvement in the 30 m running performance of children by participation in sports (Savucu, Polat, & Biçer, 2005). The results of these studies support our study findings. In the study of Taskin, Cengiz, Turgut, and Halil (2014) on amputee football players, the 30-meter sprint performance has been determined as 5.27 ± 0.37 seconds.

In their study with elite football players, Alves, Rebelo, Abrantes, and Sampaio (2010) have examined vertical jump and sprint performances. Among the subjects classified into three groups in the study, the first group participated in complex training consisting of three stations twice a week, and the second group once a week. The last group, on the other hand, continued their regular football training and was not involved in any other training practice. As a result, it has been determined that the first group had a statistically significant improvement of 9.2% in the 5 m sprint grade and 6.2% in the 15 m sprint grade. It has been stated that the reason for these changes after complex training practices was that the complex training activates both the nervous system and muscle fibers, and then the slow-twitch muscle fibers act like fast-twitch muscle fibers (Ebben, 2002). Studies have shown that this

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training method provides improvement even in groups that do not do regular sports when applied two days a week in as little as four weeks; for this reason, it is thought that trainers and athletes can use this training method in order to get rid of monotonous training methods and to use time effectively.

When we examine the results of our study and the results of the studies in the literature, they show that the motoric characteristics of the individuals doing sports are in better condition than the individuals not doing sports. In conclusion, we are of the opinion that the physical development and performance of children at this age will significantly improve with the sports activities to be carried out in accordance with their age.

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