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INVESTIGATION OF THE EFFECTS OF BADMINTON BASIC TRAINING PROGRAM APPLIED IN 11-12 YEARS OLD CHILDREN ON MOTOR DEVELOPMENT

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Abstract: In this study, it was aimed to examine the effects of badminton basic training program applied on 11-12 year old children on motor development. Experimental group (EG) mean age was 11.40±.507 years, mean body weight was 38.48±10.10 kg, mean height was 143.26±6.61 cm, Control group (CG) mean age was 11.46± 30 children (13 Female, 17 Male) with a mean body weight of 5.516 years, an average body weight of 34.84±10.05 kg, a mean height of 139.13±6.17 cm and a training age of 2±1.8 years participated voluntarily. Children participating in the study were randomly divided into two groups as control and experimental groups. Different training programs were applied to these two groups. (EG) A 60-minute badminton basic training program was applied for 8 weeks (3 days/week). The control group (CG), on the other hand, only participated in recreational activities without specifying any branch. Pre-test measurements (agility, balance, strength and vertical jump) of both groups were performed before the studies. At the end of 8 weeks, the last test measurements of the groups were taken. Paried Samples T test was used to compare the preliminary and final values of the groups. When the first and last test measurements of the groups were compared between the groups; According to the analysis of the data, a statistically significant difference was observed in the agility test, balance test, strength test and vertical jump test measurement values ($p<0.05$). As a result; It was observed that the badminton basic training program applied to 11-12 year old children in (EG) was effective on agility, balance, strength and vertical jump performance values (4.785, 2.995, 5.445, -7.651).

Key Words: Badminton, agility, balance, strength, vertical jump

11-12 YAŞ ÇOCUKLARDA UYGULANAN BADMİNTON TEMEL ANTRENMAN PROGRAMI MOTOR GELİŞİM ÜZERİNE ETKİSİNİN İNCELENMESİ

Öz: Bu çalışmada, 11-12 yaş çocuklarda uygulanan badminton temel antrenman programının motor gelişim üzerine etkilerinin incelenmesi amaçlanmıştır. Çalışmaya deney grubu (EG) yaş ortalamaları 11,40±,507 yıl, vücut ağırlığı ortalamaları 38,48±10,10 kg, boy ortalamaları 143,26±6,61 cm, Kontrol grubu (CG) yaş ortalamaları 11,46±,516 yıl, vücut ağırlığı ortalamaları 34,84±10,05 kg, boy ortalamaları 139,13±6,17 cm ve antrenman yaşı 2±1.8 yıl olan 30 çocuk (13 Kadın, 17 Erkek) gönüllü olarak katıldı. Araştırmaya katılan çocuklar rastgele olarak kontrol ve deney grubu olarak iki gruba ayrıldı. Bu iki gruba farklı antrenman programı uygulandı. (EG) 8 hafta süresince (3gün/hafta) 60 dakika süren badminton temel antrenman programı uygulandı. Kontrol grubu (CG) ise herhangi bir branş belirlenmeksizin sadece rekreasyonel aktivitelere katıldı. Çalışmalar öncesi her iki grubun da ön test ölçümleri (çeviklik, denge, kuvvet ve dikey sıçrama) gerçekleştirildi. 8 hafta sonunda ise grupların son test ölçümleri alındı. Grupların ön ve son değerlerini karşılaştırmak için Paried Samples T test kullanıldı. Grupların ilk ve son test ölçümleri gruplar arası karşılaştırıldığında; verilerin analizine göre çeviklik testi, denge testi, kuvvet testi ve dikey sıçrama testi ölçüm değerlerinde istatistiksel olarak anlamlı bir fark gözlendi ($p<0,05$). Sonuç olarak; (EG) daki 11-12 yaş çocuklarda uygulanan badminton temel antrenman programının çeviklik, denge, kuvvet ve dikey sıçrama performans değerinde etkili olduğu gözlemlendi (4.785, 2.995, 5.445, -7.651).

Anahtar Kelimeler: Badminton, çeviklik, denge, kuvvet, dikey sıçrama

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INTRODUCTION

Badminton is one of the most popular racket sports in the world (Lee, 2003). The popularity of badminton as a sport is increasing rapidly (El-Gizawy and Akl, 2014). Badminton can be expressed with short-term repetitive movements of high speed and intensity in an area of 80 m2 (Lee, 2003). Badminton includes changes of direction, jumps, forward and backward moves, rapid arm movements and a wide variety of positions (Manrique and Gonzales-Badillo, 2003).

Badminton players need many motoric features such as balance and agility during high-speed movements in the field (LM. Tiwari et al, 2011). The badminton player moves intermittently during the competition. For this reason, during the competition, while moving in defensive and offensive positions, high-intensity demands occur on the aerobic and anaerobic systems physiologically (Andersson et.al, 1996).

Movement is considered the most important part of their lives for children, the 6-12 age period is one of the most important periods for children in terms of movement skills (Ö. Kayapınar, Pınar, & Karakaş, 2004). In this period, a well-planned physical activity program in terms of age characteristics improves the coordination characteristics of children and contributes to their movements in a healthier way and with fewer mistakes (Çelik, 2016). In addition, it is known that low performance in children's motor skills affects participation in physical activity negatively, while motor skill proficiency is positively related to physical activity (Getchell, 2006; Wrotniak et al, 2006). Therefore, it is thought that an insufficient level of participation in physical activities may negatively affect motor skills. However, insufficient development of children's motor skills may negatively affect movement development in adolescence and youth (Deli, Bakle and Zachopoulo 2004).

According to Ozman and Gallahue (2016), children should be offered various physical activities that can improve and support their development as a whole. However, these physical activities should be developmentally appropriate according to their age and physical characteristics (Ozman and Gallahue 2016). There are many activities that can both attract the attention of children of all ages and contribute to their development in a healthy way. Movement training; They are activities that provide children with learning environments by doing and living, provide social, emotional, mental and physical development, gain experience, gain the ability to use objects, control their body, and develop their imaginations (Jones, 2001). According to the results of the research, it is necessary to apply more long-term applications to increase the positive effect of 12-Weeks basic game education at the levels of motor development in children aged 4 to 6 years old (Gümüşdağ et al., 2019).

With the change in the sociological and economic structure of our country, it is seen that families choose sports branches that are more preferred in the world and in our country while directing their children to sports. Families who are aware of the physical, mental, sociological and psychological benefits of sports on children direct their children to sports activities from a very young age. When choosing this sportive branch, it should be noted that there are sportive branches that will enable the children to move at the maximum level, improve their conditional features, and where they can easily find the sports field and materials. One of the sports branches that meet all these conditions is badminton. Badminton is a sport that can be played at any age, has no problem finding a field, does not discriminate against gender, is fun and has cheap materials. Thanks to all these positive aspects of badminton sport, it has become an effective sport that is widely used in children's movement training (Erol, 2019).

Based on the positive effects of the badminton basic training program on the motor development of children, this type of training may be quite suitable for 11-12 year olds. However, the literature on the effects of badminton basic training program on motor development for 11-12 year old children is not very rich. Therefore, the aim of this study is to examine the effect of badminton basic training program applied on 11-12 year old children on motor development.

METHOD

Participation

30 children (13 Female, 17 Male) aged 11-12 from Özübir Sports Club, operating in Bursa, voluntarily participated in the research. Children participating in the study were randomly divided into two groups as (EG) and (CG) groups. Different study programs were applied to these two groups. (EG) applied badminton basic training program lasting 60 minutes for 8 weeks (3 days/week), while (CG) only participated in recreational activities without determining any branch. This study was approved by Bursa Uludağ University Faculty of Medicine Clinical Research Ethics Committee (date 30.03.2022, 2022-7/30 numbered).

Table 1. 8-week badminton basic training program

11-12 AGES BASIC BADMINTON TRAINING PROGRAM			
WEEK	**SUNDAY**	**WEDNESDAY**	**FRIDAY**
1	Training target Forehand service information	Forehand drive operation and Backhand drive information	Forehand drive operation and Backhand drive information
	General and special warm-up	General and special warm-up	General and special warm-up
	Forehand high service work and conditioning work.	Backhand short service training and conditioning training	Agility and speed training
	Cooling down – recovery phase	Cooling down – recovery phase	Cooling down – recovery phase
2	Purpose of training and knowledge of drive technique.	Purpose of training and knowledge of drive technique.	Badminton basic batting High service knowledge of techniques
	General and special warm-up	General and special warm-up	General and special warm-up
	Agility and speed training	Speed training and coordination ant.	Forehand and Backhand high service work
	Cooling down- recovery phase	Cooling down - recovery phase	Cooling down- recovery phase
3	Forehand dunk exercises and forehand clear information	Forehand and Backhand drive information Badminton basic hitting techniques Drive kicking technique; diagonal, parallel, right-left) work.	Target oriented ball feeding. information
	General and special warm-up	General and special warm-up	General and special warm-up
	Forehand net drop stroke training and agility training	Forehand and backhand drive exercises	Aerobik Training
	Cooling down - recovery phase	Cooling down - recovery phase	Cooling down - recovery phase
4	Forehand drop training agility speed training information	Backhand drop training, agility and speed training information	Overhead clear work agility speed training. information
	General and special warm-up	General and special warm-up	General and special warm-up
	General strength training and technical work.	General strength training and technical work.	General strength training and technical work.
	Cooling down - recovery phase	Cooling down - recovery phase	Cooling down - recovery phase
5	Forehand and Backhand short service training and speed training information	Badminton basic stroke techniques. Drive stroke technique; diagonal, parallel, right-left work. information	Ball information on target
	General and special warm-up	General and special warm-up	General and special warm-up
	Bounce drills Forehand and Backhand high service Bounce drills Forehand and Backhand high service	Jump drills backhand drive exercises exercises	Speed development studies and technical work.
	Cooling down - recovery phase	Cooling down - recovery phase	Cooling down - recovery phase

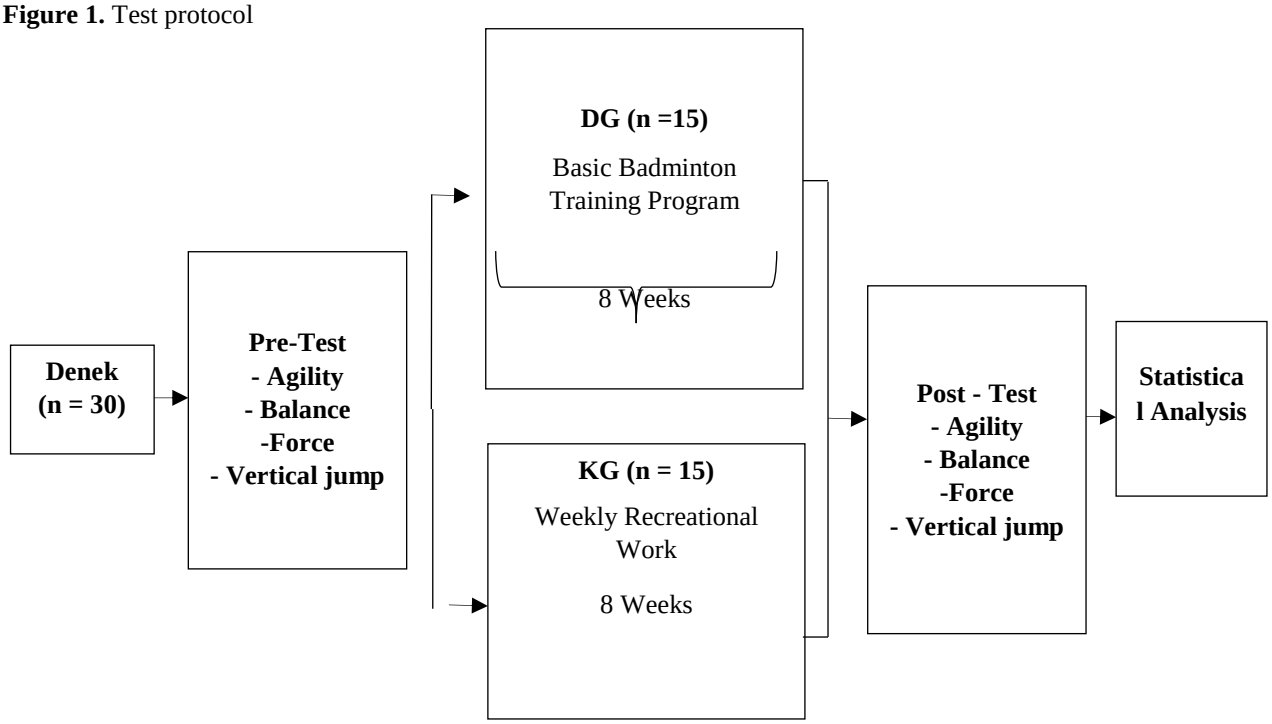
Table 1. 8-week badminton basic training program (Cont.)

WEEK	SUNDAY	WEDNESDAY	FRIDAY
6	Singles competition information	Doubles competition information	Agility and speed training information
	General and special warm-up	General and special warm-up	General and special warm-up
	Practice badminton basic stroke techniques (overhead clear, cross, parallel, right-left). Targeted ball feeding.	Practice badminton basic stroke techniques (overhead clear, cross, parallel, right-left). Targeted ball feeding.	General and special forces exercises
	Cooling down - recovery phase	Cooling down - recovery phase	Cooling down - recovery phase
7	Practice badminton basic stroke techniques (overhead clear, cross, parallel, right-left). Targeted ball feeding.	Badminton basic stroke techniques; Net drop and back court drop work. Combined drill studies covering all techniques. doubles match studies.	Practice badminton basic stroke techniques (overhead clear, cross, parallel, right-left). Targeted ball feeding.
	General and special warm-up	General and special warm-up	General and special warm-up
	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches
	Cooling down - recovery phase	Cooling down - recovery phase	Cooling down - recovery phase
8	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches information	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches information	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches information
	General and special warm-up	General and special warm-up	General and special warm-up
	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches	Boys Singles, Girls Singles, Girls Doubles, Boys Doubles And Mix Matches
	Cooling down - recovery phase	Cooling down - recovery phase	Cooling down - recovery phase

Test protocol

Before the study, all of the subjects were given detailed information about the risks they may encounter and the possible negative aspects of the study, and the volunteering form was read to them. Parents of the subjects were asked to fill in and sign a consent form in the form of a parent approval letter. Pre-tests (agility, balance, strength and vertical jump) of 2 groups of 30 children were taken before the studies. At the end of 8 weeks, the last test measurements of the groups were taken. 20 minutes before the tests were given to the subjects. General and special warming were done. The subjects were not given a heavy training program (obligation) within 24 hours before the test. The test protocol is given in Figure 1.

Figure 1. Test protocol



Height and Body Weight

A measuring instrument with an accuracy of 0.01 m was used to measure the heights of the subjects. It was prevented from wearing shoes or clothes that would affect the measurement of the athletes who were to be measured during the height measurement. Tanita BC418 (Japanese) body composition analyzer was used for weight and weight measurements of the subjects.

Agility Test

T test is applied for agility measurement. Four cones are arranged in a T-arrangement. The subject starts running from point (a) with the starting mark. Straight run from point (a) to point (b), slip step from point (b) to point (c) and slip step from point (c) to point (d) slip step from point (d) to point (b) starting point It is returned to the point (a) by running back. (Scanlan et al., 2021). Time measurement is made as the duration of this process.

Static Balance Test

Prokim Tecnobody PK 200 (Italy) balance measuring device was used for the measurements of this test. Measurements were completed with the device and data were collected. The data collected with the device were transferred to the computer via wireless connection.

Strength Measurement Test

Takei brand dynamometer was used for leg strength measurement test. The subject was placed on the measuring instrument, slightly bent at the knees, with both feet fully pressing on the instrument. While the arms were in a stretched position, they grasped the bar of the device with both hands and pulled it vertically upwards. When the traction was completed, the value in kg displayed by the device was recorded as the measurement value (Ateş, 2007).

Vertical Jump Test.
(Active Jump Test Protocol) was used for vertical jump test measurements. Standing with feet shoulder-width apart. The vertical jump from the squat position was performed maximally. Subjects performed 2 jumps. A 1 minute rest was applied between jumps. The higher of the two measurements was recorded as data.

Statistical Analysis of Data
SPSS 18.0 statistical package program was used to evaluate the data obtained within the scope of the research. Arithmetic mean and standard deviations were calculated and recorded. One-way analysis of variance was used for all age groups averages. The ANOVA was used to determine whether there was a significant difference between pre-, intermediate and post-test measurements according to the training groups and the control group and participants. Significance level was taken as $p < .05$.

RESULTS

In the study (EG), mean age was 11.40±.507 years, mean body weight was 38.48±10.10 kg, mean height was 143.26±6.61 cm, (CG) mean age was 11.46±516 years, 30 children with a mean body weight of 34.84±10.05 kg, a mean height of 139.13±6.17 cm and a training age of 2±1.8 years participated voluntarily. Motoric development parameters are given in Table 2.

Table 2. Intergroup Comparison of Changes According to (EG) and (CG) Pre-Test and Post-Test Measurements and Descriptive Values

Variables	EG (n = 15)			CG (n =15)		
	Pre-test Mean ± SD	Post-Test Mean ± SD	T	Pre-test Mean ± SD	Post-Test Mean ± SD	T
T-agility (sec)	15,60 ± 2,27	14,05 ± 2,13	4,785*	14,94± 1,95	15,03± 2,12	-1,408
Balance Text (sec)	336,60± 58,62	306,15± 41,30	2,995*	333,23 ± 60,59	324,36± 67,57	1,320
Strenght Test (kg)	43,16 ± 13,79	50,80 ± 18,17	5,445*	38,90± 13,62	40,26± 12,82	-,890
Vertical jump (cm)	16,91± 5,02	27,63 ± 3,96	-7,651*	22,20 ± 4,59	23,035± 5,35	-,598

***p<0.005**

As can be seen in Table 2., a statistically significant difference was found in the agility test, balance test, strength test and vertical jump test measurement values in terms of the comparison of the changes between the groups according to the (EG) and (CG) pre-test and post-test measurements, and their descriptive values. ($P < 0.05$). The data obtained showed that the movement education program provided a positive development on the motor development of (EG) children.

DISCUSSION AND CONCLUSION

For this purpose, badminton practiced by children aged 11-12 is to research on motor development for basic training purposes. The main findings in the present study show that; When the pre- and post-test measurements of the groups after the badminton basic training program were compared; According to the analysis of the data, a significant difference was

observed in the agility test, balance test, strength test and vertical jump test measurement values in the comparison between the groups ($p<0.05$).

The literature is examined, it can be concluded that many studies have been carried out on various motoric development and various sports branches of badminton athletes, but when the relations between the badminton basic training program and agility, balance, strength and vertical jumping related to pre-adolescent children are few, the studies are limited. High physical activity level may be the most important feature for skill development in childhood Drenowatz & Greier, (2019). For this reason, he stated that increasing physical activity is effective in contributing to the development of basic motor skills in children (Zahner et al, 2009). The present study results suggest that Yo-Yo IR1 could be used to determine HRmax of soccer players and have strong relationship with VO2max and this test may provide a more effective field-based assessment of both aerobic and anaerobic performance in soccer players (MST, CMJ & Hoff DT). Thus, soccer coaches can use the Yo-Yo IR1 test as a valid assessment of aerobic endurance performance in soccer players to monitor fitness, the effectiveness of physical conditioning programmes, and prepare for further training content (Gümüşdağ et al., 2013).

In the study where he applied 14-week badminton training to 10-13 age group girls and boys (n=56), a statistically significant improvement was found in agility feature. (Hazar, 2005) A significant difference was found in the agility variable of the badminton basic training program applied to 11-12 year old students (Erol, 2019). In the study conducted by Altıntaş, (2018), the research group found a significant difference in the agility variable. Another study reported a significant difference in agility parameter (Erdil et al, 2013).

In her research, in which she applied badminton training to 14-16 year old children, a statistically significant improvement was found in the balance feature (Tuna, 2020). Çakıroğlu et al., (2013) found a significant difference in balance characteristics as a result of 12-week Judo training applied to children aged 8-10 years. An exercise program was applied to 58 boys and 61 girls aged 10 years, who did not do sports actively before, and a statistically significant improvement was observed in the balance feature (Cepero et al, 2011) In another study, it was reported that children who do sports at primary school level have a statistically significantly higher level of balance than children who do not do sports (Özsay et al, 2015).

An improvement was observed in the vertical jump value of the girls in the 10-12 age group of the badminton basic training program applied for 8 weeks (Can, 2021). 12 weeks of shadow badminton training for children aged 8 to 10 GB after the study of the effects on some physical performance values the average flamingo balance error score of the male and female subjects forming the values were statistically significantly lower than both BP and CG subjects found (Yüksel, 2015).

Male and female badminton players under the age of 15 as a result of the overlap made for the purpose of comparing their physiological fitness, physiological and physical fitness of little girl and boy badminton players compared. 14 male (13.8± years) and 13 female (13.2±1.7 years) badminton players from Bursa formed the experimental group. Male badminton players age 13.8±1.7 years, height 165.5±1.7 cm, weight 54.3±9.2kg and BMI 19.6±2.3 (kg/m2), age group of female badminton players 13.2±1.7 years, height 154.9±6.9 cm, weight 47.5 ±7.7 kg, and BMI 19.7±2.1 (kg/m2). only between height found a statistically significant difference (Arabacı, 2007).

Yüksel, (2017) examined the physical characteristics of 11-years old children and reported that children who received badminton training had a statistically significantly higher level of vertical jump and balance than children who did not receive badminton training. In a similar study, Polat (2009) found a significant difference in vertical jump values as a result of 12-week Judo training applied to children aged 9-12 years. They found that children who received sports training had significant increases in vertical jump values compared to children who did not receive sports training (Kaite et al, 2003).

She reported that there was a significant difference in leg strength value as a result of 14 weeks of agility-weighted badminton training applied to children aged 10-13 (Hazar, 2005). In a study conducted on 200 boys and girls aged 11-12 years in order to determine the effects of the recreational exercise program on physical development within the scope of the summer school, leg strength tests found a statistically significant improvement (Karacabey, 2014). It was determined that the strength values of the children who participated in basketball training were higher than those who did not participate in basketball training (Pense et al, 2010). It can be said that the average values of agility, balance, strength and vertical jump obtained as a result of the study are compatible and similar to the literature researches.

SUGGESTIONS

Due to the fact that there are not enough open and closed areas where physical education and sports classes are held in Jul schools in our country, both the materials of badminton sports can be easily and cheaply obtained physical education in terms of playing sports, as well as in terms of being able to easily play with crowded groups in open spaces it is useful to have a branch that can be used to achieve the goals of their courses.

As a result, encouraging young people to play sports in ensuring their motoric development as one of the most necessary and especially suitable sports we can recommend that badminton be preferred and that this sport be widespread in all schools.

As a result of this study we conducted on 11-12 age group children, there are also limitations. Some suggestions were made taking into account;
- This study, which is planned for a period of 12 weeks, is applied in longer time periods.
To determine the effect of badminton on children's motor performance and the results can contribute to the literature.
- If the planned working time is longer than 12 weeks, may be more meaningful in terms of determining the effect on the characteristics.
- Since our study covers the 11-12 age group, future studies applied to younger and older age groups and evaluated by gender. more efficient results can be obtained.
- For children aged 11-12 (with a 12-week basic branch training program), different applying the basic training program from the branch and comparing it with the badminton branch can be done.
- Having the necessary criteria for high level sports efficiency in badminton sports branch. may not be detected.
- Similar to this study, which was conducted in a narrow scope in terms of contributing to the literature, it can be applied by creating more provinces and the number of subjects in different geographical regions.
-The effects of basic badminton training in different age groups can be investigated.
- In such studies, more various tests are used to determine the effect on physical performance. procedures can be developed and implemented.

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