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THE EFFECT OF JUMPING ROPE EXERCISES ON PHYSICAL FITNESS LEVELS OF CHILDREN

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Abstract

This study was conducted to examine the effects of jump rope exercises on physical fitness levels in children. 120 students participated in the study. The participants were divided into two groups as training and control groups. Jump rope program was applied to the training group three days per week. At the beginning and end of the 12-week study, measurements from the fitnessgram test battery were applied to all students and the data obtained were evaluated in SPSS 21.0 program. T-test was used, statistical significance level was taken as $p<0.05$. When the pre-test and post-test results of the control group were compared, it was determined that there were no difference in curl-up and flexed arm measurement averages ($p>0.05$), while there were differences in push-up, flexibility left, and trunk lift tests ($p<0.05$). In the training group, significant difference determined in all measurements ($p<0.05$). When the post-test control and training group measurements were compared, it was found that there was difference in push-up, curl-up and flexibility right measurements ($p<0.05$). As a result, it was determined that jump rope exercises have a positive effect on push-ups, curl-ups and flexibility

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right mean values and it may be recommended to include in physical education lessons.

Keywords; *Jumping rope, Physical fitness, Exercise, Sport, Physical education*

İP ATLAMA EGZERSİZLERİNİN ÇOCUKLARIN FİZİKSEL UYGUNLUK DÜZEYLERİNE ETKİSİ

Öz

Bu çalışmanın amacı, ip atlama egzersizlerinin çocukların fiziksel uygunluk düzeylerine etkilerini incelemektir. Çalışmada 120 öğrenci yer almıştır. Çalışmada antrenman ve kontrol grubu oluşturulmuş, antrenman grubuna haftada 3 gün ip atlama programı uygulanmıştır. 12 haftalık çalışmanın başlangıcında ve sonunda tüm öğrencilere fitnessgram test bataryası ölçümlerden uygulanmış ve elde edilen veriler SPSS 21.0 programında değerlendirilmiştir. Bağımlı ve bağımsız gruplarda t testi uygulanmış, istatistiksel anlamlılık düzeyi $p<0.05$ olarak alınmıştır. Kontrol grubunun ön test ve son test sonuçları karşılaştırıldığında mekik ve bükülü kol ölçüm ortalamalarında anlamlı fark olmadığı ($p>0.05$), şınav, esneklik sol, gövde kaldırma testlerinde ise anlamlı farklar olduğu tespit edilmiştir ($p<0.05$). Antrenman grubunda ise tüm ölçümlerde anlamlı fark olduğu tespit edilmiştir ($p<0.05$). Son test kontrol ve antrenman grubu ölçüm ortalamaları karşılaştırıldığında şınav, mekik ve esneklik sağ ölçümlerinde anlamlı fark olduğu saptanmıştır ($p<0.05$). Sonuç olarak ip atlama egzersizlerinin şınav, mekik ve esneklik sağ ortalama değerlerine olumlu etki ettiği tespit edilmiştir ve beden eğitimi ders içeriklerinde yer alması tavsiye edilebilir.

Anahtar kelimeler; *İp atlama, Fiziksel uygunluk, Egzersiz, Spor, Beden eğitimi*

1. INTRODUCTION

Physical fitness is a concept that typically includes various characteristics such as endurance, muscular endurance, muscular strength, cardiorespiratory endurance, flexibility, speed, balance, agility, body composition and reaction time. These characteristics are important for both sports performance and

general health. It is widely accepted that physical fitness plays a critical role in determining an individual's overall performance level and maintaining health (Graham et al., 2001). Health-related fitness includes muscular strength and endurance, cardiorespiratory fitness, flexibility and body composition, while performance-related fitness includes characteristics such as coordination, agility, speed and explosive strength. These two types of fitness play different but complementary roles in maintaining an individual's general health and enhancing sport performance. While fitness associated with health aims to improve the overall quality of life, physical fitness associated with performance aims to achieve a high level of performance, especially in sportive activities. In this context, for a healthy individual, adopting a balanced approach to both general fitness and performance-oriented fitness can ensure the effective implementation of a holistic health and sport program (Graham et al., 2001, Özer and Özer, 2007). For this reason, it is important to determine physical fitness especially in young age groups and some methods are used for this purpose.

One of these methods, the fitnessGram Test Battery, which was designed as a simple measurement method and used to determine a child's athletic performance parameters, was first developed by Charles L. Sterling in 1977, and since 1981, the test has been used for educational purposes by Charles L. Sterling at the Cooper Institute for Aerobics Research. Since 2013, it has been developed with software and the test has created the opportunity for physical education teachers and coaches around the world to learn about children's health, fitness levels and physical fitness (Raj and Maniazhagu 2022).

Considering that there are generally limited opportunities especially in schools, fitnessgram tests can be considered as a suitable method for physical education teachers to determine the physical fitness levels of their students and to follow

their development. In today's world and especially during the pandemic period, the restriction of children's movement areas is a negative situation for children at developmental level. Furthermore, we can say that the exam-centred education system encourages a sedentary lifestyle by limiting the time that children need to spend on social activities. This situation increases the importance of physical education courses that can fulfil the needs of movement required for children to maintain their development in a healthy way. When we consider the fact that space and opportunities are limited in lesson activities, it would be useful to include and diversify applicable activities in the lesson curricula. For this purpose, jumping rope games and activities, which are especially low-cost, effective and applicable everywhere, which almost everyone can do, which are known to be fun and contribute to the development of motor skills, can provide the expected benefit from these lessons.

Jumping rope is an effective physical activity and it may be preferred because it is a low-cost activity that can be applied with simple materials. It is a widely used exercise method for athletes to increase their coordination, improve their jumping ability and maintain their overall levels of physical fitness. Jumping rope exercises have positive effects on, muscle strength, cardiovascular harmony, endurance, flexibility, balance, vertical jumping, coordination, speed, bone density and skills development (Carazo and Moncada 2015). Jumping rope exercises, which stand out as a pleasant and fun activity for children, offer many advantages that support physical activity. This activity not only provides children with the opportunity to have a fun time, but also provides many health benefits (İri and Aktuğ 2017).

The formation of a healthy physical structure, especially before and at the beginning of adolescence, when rapid changes and developments are

experienced, is very important for a healthy life in later ages. Physical development is particularly critical for children. Starting sports in childhood represents a vital phase. This phase usually begins at school age and leads to an increase in muscle strength with age (Nuttall 2015). Although it varies relatively depending on individual and environmental factors, it is very important to provide students with effective and correct physical activities for a healthy development during the growth spurt period, which starts at an average age of 11 years and usually lasts 2-3 years. There are many studies on the effects of jumping rope on children (Nuttall 2015, Aksoy 2022, Chen and Lin 2012). However, when the literature was examined, no studies were found in which 12-week jumping rope exercises were evaluated with fitnessgram tests in children aged 10-12 years, who are in a critical period. The study have some limitations; uncontrolled variables like participants' dietary habits and extracurricular physical activity may have influenced results. Future studies should track these factors. This study was conducted to investigate the effects of jumping rope exercises on physical fitness levels in children aged 10-12 years.

2. METHOD

2.1. Participants

Study group consisted of a total of randomly selected 120 students, 68 girls and 52 boys, aged 10-12 years who were studying in xxxx. Voluntary participation forms were taken from all student's families. For the study, xxxx University 12/09/2023 dated 2023/16 numbered ethics committee approval was received.

2.2. Procedures

The curl up, trunk lift, flexed arm hang and sit and reach test from the fitnessgram Test Batteries were applied in the multi-purpose sports hall of xxx

Secondary School. The students were informed about each measurement tool and test before participating in the measurements, and necessary measures were taken to increase the motivation of the students during the test. Detailed information about the health status of the students was collected before participating in the measurements and healthy students were included. Permissions were taken from the parents of the students. Before the tests, the students made 30 minutes of warm-up exercises.

2.3. Measurements of Height and Body Weight

The height of the students who participated in the study was measured with bare feet and by using a Sega brand height measuring device with a sensitivity of 0.01 cm. Body weight was measured with a Baster brand scale with a sensitivity of 0.1 kg.

2.4. Body mass index (BMI)

Body Mass Index (BMI) of the students was calculated by dividing the body weight (kg) by the square metre (m²) of the height (Muratlı 2013).

2.5. Fitnessgram Test Battery

In this study, it was performed twice as pre-test and post-test. Fitnessgram test battery tests applied for physical fitness measurements were curl up, trunk lift test, sit and reach test, flexed arm hang test, and push-up tests.

2.6. Curl-Up

Students were placed on their backs on the gymnastics mat, feet slightly apart with the soles of the feet on the floor, arms parallel to the body and palms placed on the mat. In accordance with the protocol of the fitnessgram test

battery, this test, which was performed with a two-minute audio recording, was performed by determining the starting and ending positions. It was performed twice and 2-minute rest was given after each movement. The scores of the students who did not act according to the instructions were not taken into account. The measurements of the students who successfully completed the test were recorded at the end of two trials and the best score was recorded in seconds (Masterson 1991).

2.7. Trunk Lift Test

Students were placed on the gymnastics mat in a prone position, with their feet adjacent to each other and their kneecaps outside the mat. The hands were fixed in the groin area, the eyes were focused on the mat and held on an object while the body was pulled up slowly and in a controlled manner. Students waited at the highest point where they could lift their body upwards, the distance between the chin of the subject and the cushion was recorded as the subject's score, and they maintained the posture for 1-2 seconds. A two-minute rest was given during each trial and tests that were not performed as instructed were invalidated. The best score in two measurements was recorded in centimetres (Masterson 1991).

2.8. Flexed Arm Hang Test

The students were taught the overhand (claw) grip technique as a bar holding technique in detail. The students placed their hands on a shoulder-width horizontal bar and lifted their body to a hanging position. After the hands were placed with the palms facing their faces and the arms were slightly bent, they remained hanging. If the students' chin touched the bar, if their chin was above the bar, if their head was back while their chin was above the bar and if their chin fell below the bar level, the time was stopped and the test was finished

and not scored. A two-minute break was given at the end of each test. Test time was measured in seconds and the best score after two repetitions was recorded (Masterson 1991).

2.9. Sit and Reach Test

The leg of the athlete to be measured was placed tensely on the measuring table without bending the sole of the foot and the other leg was kept on the floor in a position where the knees were bent. Hands were placed on top of each other and the athlete pushed the object on the table forwards with a slow and controlled movement and was asked to maintain the position for 1-2 seconds. The same movement was repeated by changing the feet. After two repetitions, the best measurement in centimetres was recorded (Masterson 1991).

2.10. Push-up

The arms were shown shoulder-width apart, feet together and the body in a tense position. While performing the movement, the angle at the elbow was shown to be 90 degrees and the push-up movement was recorded every 3 seconds. The test was not valid if the students made two mistakes and broke the rhythm (Masterson 1991).

2.11. Jumping Rope

Jumping rope exercises were designed by taking the opinions and approvals of three faculty members who had previously worked on this subject in the field of sports sciences. These exercises were designed and applied to each student 3 days a week, for a total of 10 minutes per day for 12 weeks, consisting of five sets of two minutes, 2 minutes of jumping rope, 2 minutes of rest, 2 minutes of jumping rope, 2 minutes of rest, 2 minutes of jumping rope, 2 minutes of rest, 2

minutes of jumping rope, 2 minutes of jumping rope, 2 minutes of jumping rope, respectively. Warm-up and stretching exercises were performed for 10 minutes before each exercise and cool-down exercises were performed for 10 minutes after the exercise. All of the participants were given exercises to learn the skill of jumping rope by jumping with both feet before starting the exercises, and the important points in jumping rope (looking across while jumping rope, jumping 3-5 cm above the ground while jumping rope and not jumping on the heel, etc.) were explained. There was no one among the participants who could not continue smoothly. Jumping rope program was applied to the training group for a total of 10 minutes a day, 3 days a week. The program was applied to the students on Mondays, Wednesdays and Fridays between 11:40 and 12:20 at lunch time for 12 weeks. Jumping rope exercises were performed on Mondays by jumping rope as many times as possible with both feet, on Wednesdays by jumping left and right, and on Fridays by jumping back and forth with both feet. In rope jump exercise adjustable standard ropes with a length of 280 cm, a weight of 80 gr and a rope diameter of 4.5 mm were used. No jumping rope exercises were applied to the control group, and the control group only attended classes in accordance with the physical education curriculum in the Ministry of National Education.

2.12. Data Analysis

SPSS 21.0 software was used for data analysis. For descriptive statistical analysis of the data, parameters such as mean, standard deviation and frequency percentage were used to describe the characteristics of the research group. Independent-sample t test was used to compare the data between the groups. The level of statistical significance was determined as $p < 0.05$.

3.RESULTS

Table 1. Rope-Jump Training Program

Week	Day	Warm up	Exercise	Time	Cool down
1-12	Monday	10 min.	Duble feet jump	2 min rope jump- 2min rest (X5) (20 minutes)	10 min.
	Wednesday		Right and left feet jump		
	Friday		Double feet forward and backward jump		

Table 2. Age, Height, Body Weight and BMI Values of the Participants

		n	min	max	\bar{x}	sd
Training Group	Age (year)	60	10.00	12.00	11.03	8.22
	Height (cm)	60	132.00	166.00	145.32	8.09
	Weight (kg)	60	25.00	56.00	36.24	6.64
	BMI (kg/m ²)	60	13.32	25.44	17.05	2.08
Control Group	Age(year)	60	10.00	12.00	10.93	8.80
	Height (cm)	60	126.00	164.00	144.95	9.12
	Weight (kg)	60	23.00	60.00	36.13	8.42
	BMI (kg/m ²)	60	13.65	25.08	16.99	2.46

The height, body weight and BMI averages of the children measured in the study are given in Table 1. When the general averages are examined, the average age in the training group was 11.03 (cm), while it was 10.93 (cm) for the students in the control group. The average height in the training group was 145.32 (cm), while it was 144.95 (cm) for the students in the control group. The average body weight of the students in the training group was 36.24 (kg), while it was 36.13 (kg) for the students in the control group. The average BMI of the

students was determined as 17.05 (kg/m²), and the average BMI of the students in the control group was determined as 16.99 (kg/m²).

Table 3. Control Group Pre-Test - Post-Test Comparison

		n	\bar{x}	sd	difference	p
Push-up	Pre-test	60	6.35	4.07	0.767	0.001*
	Post-test		7.12	3.79		
Curl-up	Pre-test	60	8.68	3.84	0.367	0.086
	Post-test		9.05	4.05		
Trunk lift	Pre-test	60	20.95	4.84	1.017	0.001*
	Post-test		21.97	4.36		
Flexibility Right	Pre-test	60	15.83	3.40	1.400	0.000*
	Post-test		17.23	2.17		
Flexibility Left	Pre-test	60	16.00	3.24	1.233	0.000*
	Post-test		17.23	2.20		
Flexed Arm	Pre-test	60	7.95	6.24	0.283	0.217
	Post-test		8.23	5.72		

(p<0.05*)

According to the pre-test post-test comparison of the measurements made in the control group, a statistically significant difference (p<0.05) was found in push-up, trunk lift, flexibility right and flexibility left measurements, while there was no significant difference in curl-up and flexed arm measurements (p>0.05).

Table 4. Training Group Pre-Test - Post-Test Comparison

		n	\bar{x}	sd	difference	p
Push-up	Pre-test	60	7.22	3.91	1.933	0.000*
	Post-test		9.15	4.23		
Curl-up	Pre-test	60	8.87	3.97	2.917	0.000*
	Post-test		11.78	4.25		
Trunk lift	Pre-test	60	20.05	4.30	2.617	0.000*
	Post-test		22.67	4.29		
Flexibility Right	Pre-test	60	15.55	2.82	2.700	0.000*
	Post-test		18.25	2.41		
Flexibility Left	Pre-test	60	15.97	3.05	2.117	0.000*
	Post-test		18.08	2.75		
Flexed Arm	Pre-test	60	8.38	5.36	1.517	0.000*
	Post-test		9.90	5.46		

(p<0.05*)

According to the pre-test post-test comparison of the measurements made in the training group, a statistically significant difference was found in all measurements ($p < 0.05$).

Table 5. Training and Control Group Pre-Test - Post-Test Comparison of Female Students

			n	\bar{x}	sd	difference	p
Push-up	Training Group	Pre-test	30	5.17	2.70	2.067	0.002*
		Post-test	30	7.23	3.43		
	Control Group	Pre-test	38	4.55	2.44	0.763	0.001*
		Post-test	38	5.32	2.41		
Curl-up	Training Group	Pre-test	30	7.17	3.85	2.900	0.000*
		Post-test	30	10.07	4.03		
	Control Group	Pre-test	38	7.05	3.19	0.158	0.474
		Post-test	38	7.21	3.25		
Trunk lift	Training Group	Pre-test	30	20.23	5.08	2.400	0.000*
		Post-test	30	22.63	4.68		
	Control Group	Pre-test	38	21.21	5.34	0.395	0.257
		Post-test	38	21.61	4.50		
Flexibility Right	Training Group	Pre-test	30	15.57	3.17	3.200	0.000*
		Post-test	30	18.77	2.93		
	Control Group	Pre-test	38	15.82	3.26	1.263	0.001*
		Post-test	38	17.08	2.02		
Flexibility Left	Training Group	Pre-test	30	15.83	3.30	2.933	0.000*
		Post-test	30	18.77	2.93		
	Control Group	Pre-test	38	15.92	3.15	1.184	0.001*
		Post-test	38	17.11	2.04		
Flexed Arm	Training Group	Pre-test	30	5.67	3.72	1.667	0.000*
		Post-test	30	7.33	3.67		
	Control Group	Pre-test	38	4.74	2.79	0.395	0.049*
		Post-test	38	5.13	2.23		

($p < 0.05^*$)

When the measurements were evaluated according to gender, a statistically significant difference was found between control and training groups in females in push-ups, curl-ups, trunk lifts, flexibility right, flexibility left and flexed arm measurements ($p < 0.05$).

Table 6. Training and control group pre-test - post-test comparison of male students

			n	\bar{x}	sd	difference	p
Push-up	Training Group	Pre-test	30	9.27	3.89	1.800	0.004*
		Post-test	30	11.07	4.12		
	Control Group	Pre-test	22	9.45	4.50	0.773	0.101
		Post-test	22	10.23	3.75		
Curl-up	Training Group	Pre-test	30	10.57	3.36	2.933	0.001*
		Post-test	30	13.50	3.79		
	Control Group	Pre-test	22	11.50	3.23	0.727	0.104
		Post-test	22	12.23	3.28		
Trunk lift	Training Group	Pre-test	30	19.87	3.42	2.833	0.000*
		Post-test	30	22.70	3.93		
	Control Group	Pre-test	22	20.50	3.92	2.091	0.000*
		Post-test	22	22.59	4.15		
Flexibility Right	Training Group	Pre-test	30	30	15.53	2.47	2.200
		Post-test	30	30	17.73		
	Control Group	Pre-test	22	15.86	3.69	1.636	0.010*
		Post-test	22	17.50	2.44		
Flexibility Left	Training Group	Pre-test	30	16.10	2.82	1.300	0.041*
		Post-test	30	17.40	2.42		
	Control Group	Pre-test	22	16.14	3.47	1.318	0.010*
		Post-test	22	17.45	2.48		
Flexed Arm	Training Group	Pre-test	30	11.10	5.43	1.367	0.038*
		Post-test	30	12.47	5.79		
	Control Group	Pre-test	22	13.50	6.69	0.091	0.864
		Post-test	22	13.59	5.97		

(p<0.05*)

A statistically significant difference was found in push-up, curl-up, trunk lift, flexibility left and flexed arm values of the male students in the training group (p<0.05).

Table 7. Comparison of Pre-Test and Post-Test Results Between Groups

		n	\bar{x}	sd	t	p
Push-up pre-test	Training Group	60	7.22	3.91	-1.189	0.237
	Control Group	60	6.35	4.07		
Push-up post-test	Training Group	60	9.15	4.23	-2.776	0.006*
	Control Group	60	7.12	3.79		
Curl-up pre-test	Training Group	60	8.87	3.84	-0.257	0.798
	Control Group	60	8.68	3.97		
Curl-up post-test	Training Group	60	11.78	4.25	-3.609	0.000*
	Control Group	60	9.05	4.05		

Trunk lift pre-test	Training Group	60	20.05	4.30	1.076	0.284
	Control Group	60	20.95	4.84		
Trunk lift post-test	Training Group	60	22.67	4.29	-0.886	0.377
	Control Group	60	21.97	4.36		
Flexibility Right pre-test	Training Group	60	15.55	2.82	0.497	0.620
	Control Group	60	15.83	3.40		
Flexibility Right post-test	Training Group	60	18.25	2.41	-2.425	0.017*
	Control Group	60	17.23	2.17		
Flexibility Left pre-test	Training Group	60	15.97	3.05	0.058	0.954
	Control Group	60	16.00	3.24		
Flexibility Left post-test	Training Group	60	18.08	2.75	-1.870	0.064
	Control Group	60	17.23	2.20		
Flexed Arm pre-test	Training Group	60	8.38	5.36	-0.408	0.684
	Control Group	60	7.95	6.24		
Flexed Arm post-test	Training Group	60	9.90	5.46	-1.633	0.105
	Control Group	60	8.23	5.72		

($p < 0.05^*$)

When the training and control groups were compared, a statistically significant difference was found in the post-test push-up, curl-up and flexibility right measurements ($p < 0.05$)

4. DISCUSSION

In this study, the effects of regular jumping rope exercises on the physical fitness levels of children were examined in line with the data obtained. A significant increase was found in mean curl-up values as a result of 12-week jumping rope exercises in the present study ($p < 0.05$). In a study involving 36 university students, Masterson (1993) investigated the effects of jump rope exercises 3 days a week on curl-up measurements and found a statistically significant difference in curl-up values ($p < 0.05$). In a study in which 11 students were given jumping rope and strengthening training two days a week for 8 weeks, Urhan (2018) found a significant difference in curl-up measurements ($p < 0.05$). Çolakoğlu and Kaur (2017), applied 12-week jumping rope exercises to

25 female volleyball players and found a statistically significant increase in curl-up values ($p<0.05$). Aksoy (2022) examined the effects of jumping rope exercises on the eurofit battery in 11-12 years old female volleyball players and found a statistically significant difference between curl-up mean values as a result of jumping rope exercises performed 4 days a week for 6 weeks ($p<0.05$). According to these results, it can be said that jumping rope improves curl-up values in girls positively. It may first come to mind that jumping rope only increases jumping and leg strength. According to these results, it can be said that jumping rope also has positive effects on the core.

In our study, as a result of 12-week jumping rope exercises, a statistically significant difference was found in the mean values of flexibility right ($p<0.05$), while no significant difference was found in the mean values of flexibility left ($p>0.05$). Sekhon and Maniazhagu (2018), applied jumping rope exercises 5 days a week for 6 weeks among secondary school students aged 11-15 years in different schools and found a statistically significant difference in flexibility measurements ($p<0.05$). Shen and Huang (2000), applied jumping rope exercises to 78 male and 65 female children for 4 weeks and found a significant difference in flexibility values ($p<0.05$). When studies conducted according to gender are examined; olakođlu and Kaur (2017), applied 12-week jumping rope exercises to 25 female volleyball players in their study and found a statistically significant increase in flexibility values ($p<0.05$). In their study conducted on 9 female participants for 12 weeks, Chen and Lin (2012) found that physical activity programs including jumping rope exercises significantly increased the flexibility skills of students ($p<0.05$). Arazi et al. (2016) applied jumping rope exercises to 33 male students aged 10-12 years for 8 weeks and found a significant difference in flexibility values ($p<0.05$). In their meta-analysis they investigated the effects of jump rope exercises in pre-adolescent children, Zhao et al. (2023) reported an increase in flexibility values in 2 of 8 studies and a

minimal improvement in flexibility skills in boys and no significant difference in girls. In our study, a significant difference was found in the flexibility values of female students ($p<0.05$), while no significant difference was found in the right flexibility values of male students ($p>0.05$). In our study, it can be said that there are differences in both right and left flexibility results and in the results according to gender. At the same time, our findings show differences from the findings according to gender in the meta-analysis studies of Zhao et al. (2023). Zhao et al. (2023) stated that jumping rope did not improve flexibility in girls and had minimal effect in boys. Although it is not possible to come to a clear conclusion about the effects of jump rope exercises on flexibility according to these results, this situation emphasises the need for new studies on the subject. In order to resolve the uncertainty about the relationship between jumping rope and flexibility, new studies involving groups with similar hereditary characteristics in the same age groups and at the same time evaluating flexibility exercises to be performed at different durations after jumping rope exercises may contribute to the literature in terms of reaching healthier results.

Shi et al. (2023), applied jumping rope exercises 3 days a week for 12 weeks to secondary school students and found significant differences in trunk lift measurements ($p<0.05$). The results of our study differ from the results of Shi et al. No other studies were found in the literature review on this subject and new studies are needed in this field.

Raj et al. (2022) applied jumping rope exercises to 30 male students aged 11-14 years 5 days a week for 6 weeks and found a significant difference in push-up skills ($p<0.05$). Cengizel et al. (2022) applied jumping rope exercises to 22 male basketball students aged 13-15 years 3 days a week for 4 weeks and found a statistically significant difference in push-up skills ($p<0.05$). We have the same

results and according to these results, it can be said that jump rope exercises affect push-up skills positively.

In the present study, no statistically significant differences were found in flexed arm measurements ($p>0.05$). In the literature, there is no research on the effects of jumping rope on flexed arm skills. New studies are needed on this issue.

5.CONCLUSION AND RECOMMENDATIONS

According to the data obtained, it was found that jumping rope exercises had a positive effect on push-ups, curl-ups and flexibility. In today's world where inactivity is becoming more and more common, it may be recommended to include jumping rope exercises which can contribute to the physical development of children, in physical education lessons, which are becoming more and more important.

Conflict of Interest Statement:

The authors declares that there is no conflict of interest regarding the conduct and publication of this research.

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REFERENCES

- Aksoy, S. (2022). The effect of jumping rope training on the eurofit test battery in volleyballers aged 11-12. Master's thesis. Kastamonu University. Institute of HealtySciences. Kastamonu.
- Arazi, H., Jalali-Fard, A., and Abdinejad, H. A. (2016). Comparison of two aerobic training methods (running vs rope jumping) on health-related physical fitness in 10 to 12 years old boys, *Physical Activity Review*, (4):9-17, DOI: 10.16926/par.2016.04.02
- Carazo-Vargas P, Moncada-Jiménez J, A Meta-Analysis On The Effects Of Exercise Training On The Vo2max İn Children And Adolescents, *Nuevas Tendencias en Educación Física, Deporte y Recreación*, 27:184, 2015.
- Cengizel, C. O., Oz, E., & Cengizel, E. (2022). Short-term plyometric and jump rope training effect on body profile and athletic performance in adolescent basketball players. *International Journal of Sport Studies for Health*, 5(2), 32-41. <https://doi.org/10.61838/kman.intjssh.5.2.5>
- Chen, C. C. & Lin, S. Y. (2011). The İmpact of Rope Jumping Exercise on Physical Fitness of Visually İmpaired Students, *Res Dev Disabil*, 32:25–29. doi: 10.1016/j.ridd.2010.08.010.
- Chen, C. C., and Lin, Y. C. (2012). Jumping rope intervention on health-related physical fitness in students with intellectual impairment. *The Journal of Human Resource and Adult Learning*, 8(1):56-62.
- Koley, S., & Kaur, S. (2017). Estimation of handgrip strength and its correlations with selected anthropometric variables and performance tests in Indian inter-university female field hockey players. *Archives of Sports Medicine and Physiotherapy*, 2(1):101-104. DOI: 10.17352/asmp.000003.

- Graham, G., Holt/Hale, S.A., Parker M. (2001). Children Moving A Reflective Approach to Teaching Physical Education Mayfield Publishing Company, Mountain View, 5. edition, California, 17(5):35-62.
- İri, R. & Aktuđ, Z.B. (2017). Investigating the effect of sports on motor skills in children. Journal of Human Sciences,14(4), 4300-4307. Doi:10.14687/jhs.v14i4.4780.
- Masterson G.L., Brown, S.P. (1993). Effects of weighted rope jump training on power performance test in collegians. J. Strength and Cond Res 7: 108-114. <https://doi.org/10.1519/00124278-199305000-00006>.
- Muratlı, S. Çocuk ve Spor, 1. Basım, s. 398-402, Nobel Yayın Dađıtım, Ankara, 2013.
- Nuttall, F. Q. (2015). Body mass index: obesity, BMI, and health: A critical review. Nutr Today, 50(3):117-128. DOI: 10.1097/NT.0000000000000092.
- Özer, D.S., Özer, K. Çocuklarda Motor Gelişim. 11. Basım, s. 250-258, Nobel Akademik Yayınları, Ankara, 2007.
- Raj, D. S. L., & Maniazhagu, D. (2022). Effect of circuit training combined with speed agility quickness drills and jump rope drills on upperbody muscular endurance. Journal of Advances in Sports and Physical Education, 5(2):24-30. DOI: 10.36348/jaspe.2022.v05i02.003.
- Sekhon, B. S., & Maniazhagu, D. (2018). Effects of aerobic training and jump rope training on flexibility of overweight children. J Emerg Technol Innov Res., 5(5):385-389.
- Shen, C. K., Huang, J. S. (2002). The relationship between active space and health- related fitness in primary school students. Physical Education Journal. 31:81- 90. Doi.org/106222/pej0031.200109.5608.
- Shi, Z., Xuan, S., Deng, Y. et al. The effect of rope jumping training on the dynamic balance ability and hitting stability among adolescent tennis

players. *Sci Rep* 13, 4725 <https://doi.org/10.1038/s41598-023-31817-2023>.

Urhan, M. (2018). The effectiveness of rope jumping and strength training in children with low vision Master's thesis, Pamukkale University, Physical Therapy and Rehabilitation, Denizli.

Zhao, Q., Wang, Y., Niu, Y., & Liu, S. (2023). Jumping Rope Improves the Physical Fitness of Preadolescents Aged 10-12 Years: A Meta-Analysis. *Sports Sci Med*. 2023 Jun 1;22(2):367-380. doi: 10.52082/jssm.2023.367.

GENİŞLETİLMİŞ ÖZET

Giriş

Fiziksel uygunluk, çocukların sağlıklı gelişimi ve yaşam kalitesi için kritik bir öneme sahiptir. Bu kavram, dayanıklılık, esneklik, kas kuvveti ve kardiyovasküler sağlık gibi çeşitli bileşenleri içerir. Özellikle ergenlik öncesi dönemde (10-12 yaş) düzenli fiziksel aktivite, sağlıklı bir gelecek için temel oluşturur (Nuttall 2015). İp atlama, düşük maliyetli, her yerde uygulanabilir ve eğlenceli bir aktivite olması nedeniyle özellikle okul müfredatlarına dâhil edilmesi önerilen bir egzersizdir (Chen and Lin 2012). Bu çalışmada, ip atlama egzersizlerinin çocukların fiziksel uygunluk düzeyleri üzerindeki etkilerini incelemek amaçlanmıştır.

Yöntem

Çalışmaya 10-12 yaş arası (n=60) kadın ve (n=60) erkek toplam (n=120) öğrenci gönüllü olarak katılmış ve bu öğrenciler rastgele olarak antrenman ve kontrol olmak üzere iki gruba ayrılmıştır. Kontrol grubu sadece beden eğitimi derslerine katılırken, antrenman grubu beden eğitimi dersine ek olarak 12 hafta boyunca pazartesi, çarşamba ve cuma günleri 11:40- 12:20 saatleri arasında ip atlama egzersizlerine katılmıştır. İp atlama egzersizleri pazartesi günlerinde çift ayak ile atlayabildiği kadar çok ip atlama, çarşamba günlerinde bir sağ bir sol atlayarak ip atlama ve cuma günlerinde ise çift ayak öne geriye ip atlayarak ip atlama şeklinde uygulanmıştır. Toplam 10 dakika süreyle iki dakikalık beş setten oluşan egzersizler sırasıyla; 2 dakika ip atlama 2 dk dinlenme şeklinde yapılmıştır. Öğrencilere her çalışmadan önce 10 dakika ısınma ve germe, çalışmadan sonra ise 10 dakika soğuma egzersizleri yaptırılmıştır. Katılımcıların tamamına çalışmalara başlamadan önce çift ayak sıçrayacak şekilde ip atlama becerisini

öğrenebilecekleri alıştırmalar yaptırılmış ve ip atlamada önemli noktalar (ip atlarken karşıya bakılması, ip atlarken yerden 3-5 cm yukarı sıçranması ve topuk üzerinde sıçramaması vb. kurallar anlatılmıştır. Çalışmanın başlangıcında ve sonunda tüm katılımcılara Fitnessgram Test Bataryası kullanılarak mekik, gövde kaldırma, otur-uzan esneklik, bükülü kol asılma ve şınav testleri uygulanmıştır. Elde edilen veriler SPSS 21.0 programı ile analiz edilmiş, Verilerin analizinde araştırma grubunun özelliklerinin tanımlanması için betimsel istatistik analizi yapılmıştır. Kontrol ve deney grubunun ön test ve son test ölçümlerinin değerlendirilmesi için bağımlı ve bağımsız gruplarda t testi kullanılmıştır ve istatistiksel anlamlılık düzeyi $p < 0.05$ olarak kabul edilmiştir.

Bulgular

Elde edilen verilere göre; kontrol grubunun ön test ve son test sonuçları karşılaştırıldığında mekik ve bükülü kol ölçüm ortalamalarında istatistiksel olarak anlamlı fark olmadığı ($p > 0.05$), şınav, esneklik sağ ve esneklik sol, gövde kaldırma testlerinde ise anlamlı farklar olduğu tespit edilmiştir ($p < 0.05$). Deney grubunda ise şınav, mekik, gövde kaldırma, esneklik sağ ve esneklik, bükülü kol testlerinde istatistiksel olarak anlamlı fark olduğu tespit edilmiştir ($p < 0.05$). Son test kontrol ve deney grubu ölçüm ortalamaları karşılaştırıldığında şınav, mekik ve esneklik sağ ölçümlerinde istatistiksel olarak anlamlı fark olduğu saptanmıştır ($p < 0.05$).

Sonuç ve Tartışma

Bu çalışmada düzenli ip atlama egzersizlerinden elde edilen veriler doğrultusunda çocukların fiziksel uygunluk düzeyleri üzerindeki etkileri incelenmiştir. Sunulan çalışmada 12 haftalık ip atlama egzersizleri sonucunda mekik ortalama değerlerinde anlamlı bir artış olduğu saptanmıştır ($p < 0.05$). Masterson (1993), Urhan (2018), Çolakoğlu ve Kaur (2017) ve Aksoy (2022), çalışmalarında benzer sonuçlar elde etmişlerdir. İp atlamanın sadece atlama ve bacak kuvvetini arttırdığı ilk akla gelebilir ancak bu sonuçlara göre ip atlamanın core bölgesine de olumlu etkileri olduğu söylenebilir.

Çalışmamızda 12 haftalık ip atlama egzersizleri sonucunda esneklik sağ ortalama değerlerinde istatistiksel olarak anlamlı fark tespit edilmiş iken ($p < 0.05$) esneklik sol ortalama değerlerinde anlamlı fark olmadığı tespit edilmiştir ($p > 0.05$). Sekhon ve Maniazhagu (2018), Shen ve Huang (2000), Çolakoğlu ve Kaur (2017), Chen ve Lin (2012), Arazi vd., (2016) ip atlama egzersizleri sonucunda katılımcıların esneklik değerlerinde anlamlı fark tespit etmişlerdir ($p < 0.05$). Zhao vd., (2023) ise ip atlamanın kızlarda esnekliği geliştirmede erkeklerde ise minimal etki ettiğini belirtmişlerdir. Bu sonuçlara göre ip atlama çalışmalarının esnekliğe olan etkileri ile ilgili net bir sonuca varabilmek mümkün olmamakla

birlikte, bu durum konu ile ilgili yeni alıřmalara ihtiya olduđuna vurgu yapmaktadır. İp atlama ve esneklik iliřkisi ile ilgili belirsizliđi giderebilmek iin aynı yař gruplarında benzer kalıtsal zelliklere sahip grupların yer aldıđı ve aynı zamanda ip atlama egzersizlerinden sonra farklı srelerde gerekleřtirilecek esneklik alıřmalarının da deđerlendirildiđi yeni alıřmalar daha sađlıklı sonulara ulařılabilmesi aısından literatre katkı sađlayabilir.

Sunulan alıřmada 12 haftalık ip atlama egzersizleri ile gvde kaldırma lmleri arasında istatistiksel olarak anlamlı fark olmadıđı tespit edilmiřtir ($p>0.05$). Shi vd., (2023), gvde kaldırma lmlerinde anlamlı farklar tespit etmiřlerdir ($p<0.05$). Arařtırma sonularımız ile Shi vd., (2023)'nin alıřma sonuları farklılıklar gstermektedir. Bu konu ile ilgili yapılan literatr taramasında bařka alıřmalara rastlanmamıřtır. Yine alıřmamızda bkl kol lmlerinde istatistiksel olarak anlamlı farklar olmadıđı tespit edilmiřtir ($p>0.05$). Literatrde ip atlamanın bkl kol becerilerine olan etkilerine ynelik arařtırmaya rastlanmamıřtır. Bu konularda yeni alıřmalara ihtiya duyulmaktadır.

alıřmamızda 12 haftalık ip atlama egzersizleri ile řınav lmleri arasında istatistiksel olarak anlamlı fark olduđu tespit edilmiřtir ($p<0.05$). Raj vd., (2022), Cengizel vd., (2022), arařtırmalarında ip atlama egzersizleri sonucu řınav becerilerinde istatistiksel olarak anlamlı fark tespit etmiřlerdir ($p<0.05$). Bu sonulara gre ip atlama egzersizlerinin řınav becerilerini olumlu ynde etkilediđi sylenebilir.

Sonu olarak elde edilen verilere gre ip atlama egzersizlerinin řınav, mekik ve esnekliđe olumlu etki ettiđi tespit edilmiřtir. Hareketsizliđin giderek yaygınlařtıđı gnmz dnyasında nemi daha da artan beden eđitimi derslerinde, ocukların fiziksel geliřimine katkı sayılabileceđi belirlenen ip atlama egzersizlerine yer verilmesi nerilebilir.