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The Effect of 12 Weeks of Regular Rope Jumping Exercises on Speed and Agility

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Research Article
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Abstract

This study was conducted to examine the effects of 12 weeks of regular rope jumping exercises on speed and agility. A total of 73 participants, including aged between 10 and 11, who participated in regular basketball training, were included in the study and also parental consents were obtained. Participants were instructed to perform rope jumping exercises before the study; those who lacked rope jumping skills (n=4) were not included. The participants were randomly assigned to either a training group or a control group before the intervention. At the start and at the end of the study, all participants underwent tests for standing long jump, speed, balance, and agility. Training group engaged in rope jumping exercises and the control group solely participated in basketball training sessions. The data obtained were analyzed using SPSS 20.0 software. The Mann-Whitney U test was employed to determine differences between groups, while the Wilcoxon test was applied to identify differences between the pre-test and post-test results within the dependent groups. The findings indicated statistically significant differences in the training group regarding standing long jump, speed, balance, and agility when comparing pre-test and post-test data ($p<0.05$), whereas no statistically significant differences were found in the control group ($p>0.05$). Consequently, it was established that the 12 weeks of regular rope jumping exercises improved standing long jump, speed, static balance, and agility. Therefore, it is recommended that rope jumping exercises, which have been shown to contribute to the development of certain motor skills in this age group, be incorporated into training routines.
Keywords: Rope jumping, Speed, Standing long jump, Agility, Balance

12 Haftalık Düzenli İp Atlama Egzersizlerinin Sürat ve Çevikliğe Etkisi

Öz

Bu çalışma 12 haftalık düzenli ip atlama egzersizlerinin sürat ve çevikliğe etkisini incelenmek amacıyla yapıldı. Çalışmada Zonguldak ilinde 10-11 yaş aralığında haftada 3 kez düzenli basketbol antrenmanlarına katılan, herhangi bir sağlık problemi olmayan (n=38) erkek, (n=35) kız ve (n=4) elemeleri geçemeyen katılımcılar olmak üzere veli izinleri alınan toplam (n=73) katılımcı yer aldı. Katılımcıların tamamına çalışmalara başlamadan önce çift ayak sıçrayacak şekilde ip atlama alıştırmaları verildi, ip atlama becerisi olmayan (n=4) katılımcılar çalışmaya dahil edilmedi. Katılımcılar çalışma öncesinde rastgele seçilerek deney ve kontrol grubu olarak ikiye ayrıldı. Bütün katılımcılara çalışma başlangıcında; durarak uzun atlama, sürat, denge, çeviklik testleri uygulandı. Deney grubunda yer alan katılımcılara haftada 3 gün katıldıkları basketbol antrenmanlarının sonunda, 12 hafta boyunca haftada 3 gün günde 5 setten oluşan ip atlama egzersizleri uygulandı. Kontrol grubu ise sadece basketbol çalışmalarına katıldı. Elde edilen veriler SPSS 20.0 paket programı ile değerlendirildi. Gruplar arasındaki farklılıkların belirlenmesinde Mann-Whitney U, bağımlı iki grup (ön test ve son test) arasındaki farklılıkların belirlenmesinde ise Wilcoxson testi kullanıldı. Çalışma sonucunda; deney grubu durarak uzun atlama, sürat, denge, çeviklik ön test-son test verileri karşılaştırıldığında istatistiksel olarak anlamlı fark olduğu ($p<0.05$), kontrol grubunda ise istatistiksel olarak anlamlı fark olmadığı tespit edildi ($p>0.05$). Sonuç olarak 12 haftalık düzenli ip atlama egzersizlerinin durarak uzun atlama, sürat, statik denge ve çevikliği geliştirdiği saptandı. Buna göre bu yaş gruplarında bazı motor becerilerin gelişimlerine katkı sağladığı tespit edilen ip atlama çalışmalarının antrenmanlara dahil edilmesi tavsiye edilebilir.
Anahtar Kelimeler: İp atlama, Sürat, Durarak uzun atlama, Çeviklik, Denge

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INTRODUCTION

Regular physical activity is crucial for the balanced and healthy development of children. This is particularly important during the pre-adolescent and early adolescent phases, where motor skill development requires consistent and appropriate exercises. This is a delicate period that plays a key role in establishing a healthy physical structure and developing sport-related skills that should not be overlooked.

Motor development occurs at its fastest rate between the ages of 8 and 13 (Solum et al., 2020). While this development can vary based on individual and environmental factors, the growth spurt that typically begins at any age between 11 and 16 years and lasts approximately 2-3 years is referred to as the Pubertal Growth Spurt (Köseoğlu, 2017). The growth and development during the ages of 11 to 16 are so rapid that the term 'growth spurt' is used to describe this remarkable increase in size. Girls experience their fastest growth between the ages of 11 and 12, whereas boys undergo their most significant growth between 13 and 14 (Söker, 2022). Therefore, it is essential to thoroughly assess and apply the correct training techniques for this age group in almost all sports disciplines to facilitate their athletic movement development.

In order to nurture elite athletes in sports disciplines, early identification of talent, combined with sport-specific development and achieving a high level of physical capacity, is crucial. This is particularly true for the age groups in question, where proper and regular training plays an essential and effective role in development. For instance, attributes such as agility, explosive strength, and jumping ability are indispensable for achieving top-level performance in basketball. Although basketball is often perceived as a sport where anaerobic capacity does not play a significant role due to the duration of play, analyses of in-game activity profiles reveal that anaerobic activities, such as jumping, which involve explosive strength, are more prominent. It has been noted in the literature that even though anaerobic capacity is not a dominant characteristic in gameplay, the performance of players is closely linked to activities requiring anaerobic power, like jumping ability (Delextrat and Cohen, 2008). Explosive strength, alongside the ability to jump, provides players with substantial advantages in basketball, particularly in rapid movement, quick turns, and stopping skills. These skills highlight the importance of agility.

Agility is often considered as the ability to change direction quickly and to start and stop rapidly (Sinkovic et al., 2022). In basketball, where agility holds significant importance, training programs that can develop skills such as speed, explosive strength, and balance should be introduced to players at the earliest and most appropriate ages. High-level proficiency in these skills can reduce the duration players spend in contact with the ground and provide substantial advantages during repeated jumping, bounding, and changing positions. Among the various methods available for developing these skills, jumping rope exercises are particularly favored in basketball training, as they can be performed by both novices and experienced athletes alike.

Due to the repetitive nature of jumping and ground contact involved in jumping, it particularly aids in enhancing leg strength, minimizing ground contact after jumps, and

allowing for a softer landing. In this respect, jumping exercises can not only contribute to skill development but also help minimize one of the most common injuries in basketball players ankle injuries (Lin et al., 2022).

Jumping enables athletes to maintain fitness, move more swiftly, improve heart health, strengthen their bones and muscles, and enhance coordination. Additionally, a solid jumping routine can assist basketball players in improving their stability and balance during matches. Moreover, jumping is an exercise that can enhance body mass index, cardiorespiratory endurance, motor coordination, agility, speed, strength, and balance capability, playing a vital role in the development of athletic prowess.

In addition, jumping rope offers clear advantages for a diverse range of participants, including health-conscious adults, exercising youth, expert athletes, and growing children (Chen and Wu, 2022). It is crucial that jumping rope exercises are included in the training of sports disciplines that require high-level skills, such as basketball. The literature includes studies examining the relationships between jumping rope exercises and certain motor developments in basketball players (Orhan et al., 2008; Orhan, 2013). However, there appears to be a lack of research in literature that involves children aged 10-11 years old, who are in the transitional phase from specific to general motor skills according to Gallahue's pyramid model, and where these parameters are investigated collectively (Gallahue, 1982; Gallahue and Ozmun, 1995). Considering that the average age of the participants in our study is 10.51 years, it is evident that they belong to this sensitive transitional age group. In a discipline such as basketball, where rapid and balanced movement, as well as short ground contact times, can be advantageous, investigating the effects of jumping rope exercises on speed and agility in this age group could significantly contribute to the literature and hold potential for pioneering research in this field. The aim of this study is to examine the effects of a 12-week jumping rope exercise program on speed and agility in children aged 10-11 years who regularly play basketball.

METHOD

Research Model

The pre-test-post-test design from experimental research methods was used. Starting from the first week, jumping rope exercises were implemented three times a week for each child, comprised of five sets consisting of 25 jumps followed by progressive rest intervals: 45 seconds, 40 seconds, 35 seconds, and two sessions of 30 seconds. Each session began with 5 minutes of warm-up and stretching exercises, followed by 5 minutes of cool-down exercises after the workout. Before the commencement of the study, all participants underwent exercises to learn the skill of jumping with two feet and were instructed on key points in jumping (such as looking ahead while jumping, jumping 3-5 cm above the ground, and avoiding jumping on the heels) Before and after the exercise training, the maximum number of jumps for each child was recorded alongside other parameters.

Universe-Sample (Sampling or Participants)

The research involved participants aged 10-11 after obtaining consent from their families. A total of 73 participants, including 38 regular basketball training attendees (n=35 boys, n=38 girls) with no health issues, were included in the study. Those who did not pass the preliminary round in the first week (n=4) were excluded. The participants involved in the study had been attending basketball training at least three times a week for the past three months.

Ethical Approval

Prior to the research, approval was obtained 25.05.2022 dated, 2022/10 numbered from the Zonguldak Bulent Ecevit University Ethics Committee confirming that the study adhered to ethical guidelines.

Data Collection Tools

Standing Long Jump Test: During the test, participating students positioned their feet shoulder-width apart behind the line, ensuring their toes did not cross the line. Children were instructed to keep their knees bent and jump as far forward as possible while swinging their arms forwards and backwards. After jumping, the participant's heel position was marked, and the distance to the starting line was measured using a tape measure, recorded in centimeters.

Thirty-Meter Sprint Test: To determine the participants' speed, a 30-metre sprint test was conducted. Photocells were set up at 0 and 30 meters. Before beginning the test, students completed a 5-minute warm-up jog followed by 5 minutes of dynamic stretching and short sprint movements as part of a warm-up protocol. Students ran the test twice, after a 5-minute rest interval, and the best time was recorded in seconds. Once ready, the student started one meter behind the starting photocell and ran at maximum speed to the finishing photo cell at 30 meters, with the running time automatically recorded.

Lengthwise Static Balance Test with a Bass Stick: For the application of the test, a wooden stick measuring (2.54x2.54x30.5 cm) and a timing device were used. Participants were briefed on the test procedures. They were asked about their dominant foot, and it was explained that they needed to balance along the length of the stick on their dominant foot, with their hands

free. At the moment the timer was started, they were instructed to lift their heel off the ground. Once the process began, the timer was stopped if the participant's heel or any part of their body touched the ground. The time recorded was noted.

Illinois Agility Test: The Illinois agility test was used to measure agility. Three cones were placed in a straight line, each 5 meters apart. A cone designated as the starting cone was placed 10 meters from the middle cone, which was referred to as cone 1. Athletes were instructed to start running from a line 10cm behind the starting point and touch cone 1 with their right hand. After that, they were to reach cone 2 from cone 1 using slide steps and touch it with their right hand. Then, they were to touch cone 3 from cone 2 using lateral slide steps with their left hand. Finally, they would run sideways back to cone 1 and touch it with their right hand before returning to the starting point running backwards, thus completing the test. The results obtained were recorded in seconds using a photocell.

Data Collection

The study was conducted at Berkant Gürleyen Sports Hall of Zonguldak Examination College. Before the commencement of the study, all participants underwent exercises to learn the skill of jumping with two feet and were instructed on key points in jumping (such as looking ahead while jumping, jumping 3-5 cm above the ground, and avoiding jumping on the heels). Consequently, four participants who frequently made mistakes and could not skip fluently (n=4) were not included in the study.

The participants were randomly divided into two groups: a study group and a control group. The study group performed jumping exercises for 12 weeks after their basketball training. The control group continued with their regular basketball training only. All participants completed tests for standing long jump, speed, static balance, and agility both before and after the study.

The jumping rope exercises were designed with the perspectives and approvals of three faculty members who are experts in the field of sports sciences and have previously conducted research on this subject. Starting from the first week, these exercises were implemented three times a week for each child, comprised of five sets consisting of 25 jumps followed by progressive rest intervals: 45 seconds, 40 seconds, 35 seconds, and two sessions of 30 seconds. Each session began with 5 minutes of warm-up and stretching exercises, followed by 5 minutes of cool-down exercises after the workout. Before and after the exercise training, the maximum number of jumps for each child was recorded alongside other parameters.

Analysis of Data

In the study, qualitative variables were presented in terms of frequency and percentage, while descriptive statistics for quantitative variables were indicated by mean and standard deviation. The normality of the quantitative variables was assessed using the Shapiro-Wilk test, which determined that the variables did not conform to a normal distribution. Consequently, non-parametric tests, namely the Mann-Whitney U and Wilcoxon tests, were employed. The Mann-Whitney U test was used to examine the relationship between two independent variables, while the Wilcoxon test was utilized for comparing two dependent groups.

For identifying differences between independent groups, the Mann-Whitney U test was applied, and for detecting differences between dependent groups, the Wilcoxon test was employed. To ascertain whether there were changes in agility, balance, standing long jump, and speed among male and female participants in both training and control groups, the Mann-Whitney U test was utilized. The Wilcoxon test was used to discern differences in pre-test and post-test findings between male and female participants in the study and control groups concerning agility, balance, standing long jump, and speed. The analyses conducted in the research were carried out using SPSS 20.0 (IBM Corp, Armonk, NY).

FINDINGS

Table 1. Pre-test physical and demographic characteristics of the groups

	Gender	n	Training Group (x̄±SD)	n	Control Group (x̄±SD)
Age (year)	Male	18	10.57±0.50	17	10.51±0.60
	Female	17	10.47±0.50	17	10.53±0.50
	Total	35	10.52±0.50	34	10.52±0.53
Weight (kg)	Male	18	40.40±11.82	17	46.19±11.20
	Female	17	40.02±4.59	17	42.42±11.82
	Total	35	40.22±8.93	34	44.30±11.50
Height (cm)	Male	18	150.72±6.51	17	153.52±6.52
	Female	17	152.76±6.62	17	151.47±10.48
	Total	35	151.71±6.55	34	152.50±8.65
BMI	Male	18	17.59±3.97	17	19.41±3.85
	Female	17	17.14±1.69	17	18.23±3.52
	Total	35	17.37±3.04	34	18.82±3.68

As a result of examining the pre-test physical and demographic characteristics of the participants; it was determined that the average age of the male experimental group participants was 10.57±0.50 years, their body weight was 40.40±11.82 kg, their height was 150.72±6.51 cm, and their body mass index was 17.59±3.97 kg/m². It was found that the average age of the male control group participants was 10.51±0.60 years, their body weight was 46.19±11.20 kg, their height was 153.52±6.52 cm, and their body mass index was 19.41±3.85 kg/m². The average age of the female experimental group participants was determined to be 10.47±0.50 years, their body weight was 40.02±4.59 kg, their height was 152.76±6.62 cm, and their body mass index was 17.14±1.69 kg/m². It was found that the average age of the female control group participants was 10.53±0.50 years, their body weight was 42.42±11.82 kg, their height was 151.47±10.48 cm, and their body mass index was 18.23±3.52 kg/m².

Table 2. Comparison of pre-test measurement results between groups

	Training Group (n=35)		Control Group (n=34)		
	(x̄±SD)	(Min-Max)	(x̄±SD)	(Min-Max)	p
Agility	17.34±1.28	(15.44-20.91)	17.72±1.45	(15.81-20.27)	0.547
Balance	28.54±13.96	(10.78-60.34)	29.33±10.73	(11.78-51.40)	0.134
Standing Long Jump	144.45±23.46	(90-180)	144.44±17.76	(95-186)	0.070
Speed	7.30±0.65	(6.25-8.77)	7.66±0.61	(6.36-9.09)	0.456

* $p < 0.05$

No statistically significant difference was found between the training and control groups in the results of the Illinois agility test, balance, standing long jump, and speed running tests (p>0.05).

Table 3. Comparison of pre-test measurements by gender in the exercise and control groups

		Training Group			Control Group			
	Gender	**n**	**(x̄±SD)**	**(Min-Max)**	**n**	**(x̄±SD)**	**(Min-Max)**	**p**
Agility	Male	18	17.20±0.95	(16.09-20.06)	17	17.93±1.11	(16.57-20.48)	0.547
	Female	17	17.50±1.57	(15.44-20.91)	17	17.50±1.34	(15.81-20.27)	0.672
Balance	Male	18	31.22±11.76	(10.78-55.39)	17	30.64±6.38	(23.24-45.12)	0.134
	Female	17	25.86±11.77	(12.61-60.34)	17	28.02±12.96	(11.78-51.40)	0.070
Standing Long Jump	Male	18	153.88±12.38	(135-171)	17	154±16.17	(128-186)	0.547
	Female	17	134.47±28.29	(90-180)	17	134.17±18.18	(95-160)	0.578
Speed	Male	18	6.88±0.47	(6.25-8.31)	17	7.54±0.58	(6.36-8.51)	0.456
	Female	17	7.73±0.52	(6.76-8.77)	17	7.78±0.64	(6.98-9.09)	0.765

* p< 0.05

No statistically significant difference was found between the training and control groups both males and females in the results of the Illinois agility test, balance, standing long jump, and speed running tests (p>0.05).

Table 4. Comparison of the pre-test and post-test values of the groups

		Pre test		Post test		
	Group	**(x̄±SD)**	**Min-Maks**	**(x̄±SD)**	**Min-Maks**	**p**
Agility	Training	17.34±1.28	(15.44-20.91)	16.18±0.93	(15-18.52)	0.001*
	Control	17.72±1.45	(15.81-20.27)	17.28±1.50	(15.40-19.95)	0.091
Balance	Training	28.54±13.96	(10.78-60.34)	75.22±31.34	(33.25-175.01)	0.001*
	Control	29.33±10.73	(11.78-51.40)	30.71±12.43	(13.40-59.78)	0.085
Standing Long Jump	Training	144.45±23.46	(90-180)	161.82±19.65	(121-192)	0.001*
	Control	144.44±17.76	(95-186)	145.32±15.19	(109-182)	0.099
Speed	Training	7.30±0.65	(6.25-8.77)	6.61±0.40	(5.97-7.65)	0.001*
	Control	7.66±0.61	(6.36-9.09)	7.48±0.54	(6.23-8.65)	0.122

* p< 0.05

In the training group, it was found that the difference between the pre-test and post-test results of the Illinois agility, balance, standing long jump, and speed tests was statistically significant (p<0.05). In the control group, however, there was no statistically significant difference among all test results (p>0.05).

Table 5. Comparison of pre-test and post-test results by gender

	Group	Gender	**Pre-Test (x̄±SD)**	**Post Test (x̄±SD)**	**p**
Agility	Training	Male	17.20±0.95	15.95±0.88	0.001*
		Female	17.50±1.57	16.43±0.93	0.004*
	Control	Male	17.93±1.11	17.48±1.34	0.076
		Female	17.50±1.34	17.09±1.20	0.094
Balance	Training	Male	31.22±11.76	68.06±32.20	0.001*
		Female	25.86±11.77	82.79±29.44	0.001*
	Control	Male	30.64±6.38	31.13±6.79	0.268
		Female	28.02±12.96	30.29±15.10	0.296
Standing Long Jump	Training	Male	153.88±12.38	170.11±14.51	0.002*
		Female	134.47±28.29	153.05±20.93	0.001*
	Control	Male	154±16.17	153.94±13.96	0.111
		Female	134.17±18.18	136.70±15.92	0.340
Speed	Training	Male	6.88±0.47	6.46±0.34	0.004*
		Female	7.73±0.52	6.77±0.41	0.002*
	Control	Male	7.54±0.58	7.34±0.48	0.059
		Female	7.78±0.64	7.62±0.58	0.269

* $p < 0.05$

When comparing pre-test and post-test results by gender in the training group, it was found that the differences in agility, balance, standing long jump, and speed values were statistically significant for both girls and boys ($p<0.05$). In the control group, however, no significant differences were observed among all averages ($p>0.05$).

DISCUSSION AND CONCLUSION

The presented study examined the effects of regular rope jumping exercises on the physical characteristics such as speed and agility of basketball players aged 11-12 over a 12-week period. Based on the obtained data, a literature review was conducted, and the discussion is presented below.

In the study, a statistically significant difference was identified between the 12 weeks of regular rope jumping exercises and agility ($p<0.05$). It was found that the agility levels improved positively among both male and female participants in the study group engaged in the 12-week program. Partavi et al., (2013) investigated the effect of a 7-week rope jumping exercise on agility in a study involving male students with an average age of 11 (n=28) and reported a significant increase of 3.17% in the agility performance of the participants ($p<0.05$). Orhan et al., (2008) conducted a study over 8 weeks with male basketball players aged 17 to 19 (n=36) and found significant changes in agility performance among students participating in rope and weighted rope exercises ($p<0.05$). Turgut et al., (2016) researched the impact of a 12-week standard and weighted rope jumping training on agility performance in adolescent female volleyball players with an average age of 14.6 (n=25). As a result of this study, after twelve weeks of training, a statistically significant difference was found when comparing the weighted rope jumping group to the control group ($p=0.003$). Elidemir et al., (2022) examined the effects of a six-week rope jumping and agility ladder exercise program on agility performance in male boxers with an average age of 17.95 (n=21). They detected a significant increase in the results

of the rope jumping group in the Illinois agility test conducted as a pre- and post-test ($p<0.05$). Our study findings align with those of others. Although some research has been conducted in different sports and age groups, the positive effects of rope jumping on agility have been reported. Additionally, Turgut et al., (2016) and our study had the exercise group perform rope jumping exercises for twelve weeks. Despite Partavi et al., (2013), Orhan et al., (2008), and Elidemir et al., (2022) conducting studies lasting seven, eight, and six weeks respectively, the significant improvement in agility suggests that rope jumping exercises can positively impact agility even in short-duration studies. In our study, a statistically significant difference was found between regular jump rope exercises over 12 weeks and balance ($p<0.05$). It was determined that the balance levels of both male and female participants in the study group, who participated in the 12 weeks of regular jump rope exercises, improved positively. Uymur and Müniroğlu, (2020) compared the physical values of children receiving sports education with those who only attended physical education classes in their study involving 100 children aged 8-9 years from sports clubs, focusing on speed, agility, standing long jump, and balance performance. This comparison revealed that the performance values of children receiving sports school education were better than those of children who only had physical education classes ($p<0.05$). Kurt (2019), studied the physical and motor characteristics of 80 obese students aged 13 and 14 in a regular jump rope program, administering 12-minute jump rope session three days a week for 12 weeks to the training group, which showed positive development in the balance characteristics of the jump rope group ($p<0.05$). Trecroci et al. (2015) conducted 8 weeks of jump rope exercises during football training with 24 participants and found a statistically significant difference in balance development between the groups ($p<0.05$). Karadenizli and Türegün, (2017) demonstrated in their 8-week study on 28 child athletes aged 14 that jumping exercises significantly improved both dynamic and static balance performance ($p<0.05$). Based on these results, it can be concluded that jump rope and jumping activities enhance balance capabilities. The study presented found a statistically significant difference ($p<0.05$) between the results of regular jump rope exercises over 12 weeks and standing long jump performance. In the group participating in the 12-week regular jump rope exercises, both male and female participants showed positive development in their standing long jump levels. Pancar et al., (2018) indicated in their study with female handball players aged 12-14 that 8 weeks of jumping training significantly improved their standing long jump skills ($p<0.05$). Uluçay, (2009) reported that 8 weeks of jumping exercises significantly enhanced jump skills in male basketball players aged 12-14 ($n=36$) ($p<0.05$). Işıldak, (2020) found that 8 weeks of jump exercises for male children aged 9-11 ($n=16$), conducted three times a week for 70 minutes, led to significant changes in their standing long jump scores ($p<0.05$). Chen and Wu, (2022), established that 8 weeks of jump rope exercises improved standing long jump skills in male students ($n=15$, aged 19.07 ± 0.70 years) at a school of physical education and sports ($p<0.05$). According to these results, it can be said that jump rope exercises improve the standing long jump ability. Our study included participants aged 11 to 14, who are in a period of rapid development, similar to the participants in the studies of Pancar et al., (2018), Uluçay, (2009), and Işıldak, (2020). All results indicate that jump rope exercises positively enhance performance in standing long jump. On the other hand, despite the higher average age of participants in Chen and Wu, (2022)'s research, a positive development in standing long jump performance suggests that the effects of jump rope exercises on standing long jump may benefit

not only children in the 11 to 14 age group but also individuals throughout the entire adolescent period. Furthermore, the finding that all studies outside of ours have identified an improvement in standing long jump performance due to 8 weeks of jump rope training indicates the effectiveness of such exercises and suggests that improvements could be achieved in even shorter time frames.

The presented study found a statistically significant difference in speed with 12 weeks of regular jump rope exercises ($p<0.05$). In the study by Arı et al., (2021), which examined the effects of 8 weeks of jumping training on speed and agility in 18 female indoor football players aged between 18 and 22 (n=18), it was determined that jumping exercises positively impacted agility and speed, with a statistically significant difference ($p<0.05$). Orhan and Ayan, (2018), also contributed to similar findings. They examined the effects of jumping rope and weighted rope exercises on horizontal jump and 10m sprint parameters in basketball players. In an 8-week study involving male basketball players aged 17-19 (n=36), they found that jumping rope and weighted rope exercises created a statistically significant difference in horizontal jump and sprint abilities ($p<0.05$). Miyaguchi et al., (2015), investigated the effects of jumping on sprint performance in a study with 5th and 6th grade primary school students aged 11-12, concluding that jumping improved sprint performance in primary school children ($p<0.05$). Pratama et al., (2018), identified that the effects of stair exercises and rope jumping exercises on speed showed that the rope jumping exercises had a significant impact on the development of speed and agility (n=30, $p<0.05$). Eler and Acar, (2018), conducted a 6-week study with students aged 10-12 (n=240) and found significant improvements in speed abilities for students who participated in rope jumping exercises for 5 minutes, three times a week alongside their physical education classes ($p<0.05$). Endo et al., (2007), indicated that rope jumping exercises are an effective training tool for shortening sprint times in children aged 9-13 over a 12-week program. Masterson, (1991), suggested that weighted rope jumping could be a suitable training method in place of high-intensity plyometric exercises. Overall, the results indicate that jumping rope exercises can positively influence speed performance. Based on these findings, it can be asserted that jumping rope exercises enhance speed capabilities and it can be stated that regular jump rope exercises improve standing long jump, speed, static balance, and agility.

SUGGESTIONS

It is advisable for jump rope training to be included regularly in training sessions of sports disciplines that require high demands for rapid movement, jumping, coordination, and explosive strength. Particularly before the period of developing sports skills, in age groups that experience rapid growth, jump rope exercises, which are both low-cost and enjoyable activities, may positively influence children's motivation and willingness, significantly contributing to the development of their motor skills. The detection of no significant differences in the mentioned motor skills among players in the control group after 12 weeks and the notable differences found in the motor skills of students in the exercise group supports this line of thinking.

Conflict of Interest: There is no personal and financial conflict of interest within the scope of the study.

Researchers' Statement of Contribution Rate: TG and HA designed the study research design. HA supervised the study TG collected and HA analysed the data. All authors prepared and approved the final manuscript.

Ethical Approval
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