SUDA VE KARADA YAPILAN THERA-BAND ÇALIŞMALARININ YÜZME PERFORMANSINA ETKİSİ

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A Çalışma Deseni (Study Design)

B Verilerin Toplanması (Data Collection)

C Veri Analizi (Statistical Analysis)

D Makalenin Hazırlanması (Manuscript Preparation)

E Maddi İmkanların Sağlanması (Funds Collection)

Özet: Bu araştırma, 11-13 yaş grubu kız yüzücülerde 8 haftalık thera-band antrenmanının serbest stilde yüzme performansına etkilerini saptamak amacıyla yapılmıştır. Araştırmaya, Gebze Denizyıldızları Yüzme Kulübü'nde düzenli olarak yüzen 21 gönüllü kız sporcu katılmış ve yüzücüler random yöntemiyle Deney1, Deney2 ve Kontrol grubu olmak üzere 3 eş gruba ayrılmıştır. Denek1 grubuna (n=7; yaş ortalamaları=11.85±0.89 yıl; ağırlık ortalamaları=47.02±7.45 kg; boy ortalamaları=148.00±0.84 cm) suda yapılan direnç lastiği+yüzme antrenmanları, denek2 grubuna (n=7; yaş ortalamaları=12.00±0.81 yıl; ağırlık ortalamaları=51.67±7.16 kg; boy ortalamaları=152.29±0.50 cm) karada direnç bandı+yüzme antrenmanları, kontrol grubuna ise (n=7; yaş ortalamaları=11.85±0.89 yıl; ağırlık ortalamaları=52.08±1.00 kg; boy ortalamaları=153.43±0.47 cm) sadece kulüp yüzme antrenmanları yaptırılmıştır. 8 haftalık antrenman programı öncesi ve sonrası yüzücülerin, 30 sn mekik, 30 sn şınav, 30 sn sağlık topu fırlatma, durarak uzun atlama testleri ile 25-50-200 m yüzme derecelerinin ölçüm değerleri alınmıştır. Suda ve karada uygulanan thera-band egzersizleri, sporculara haftanın 3 günü yüzme antrenmanları öncesinde uygulatılmıştır. Elde edilen verilere SPSS 22.0 paket programında tanımlayıcı istatistikler ile birlikte grup içi analizde Wilcoxon testi, gruplar arası analizde ise Mann Whitney U testi uygulanarak, anlamlılık düzeyi p<0.05 olarak alınmıştır. Araştırmada sonucunda, yüzücülerin suda ve karada yaptıkları direnç antrenmanları arasında herhangi bir gelişme gözlenmezken, hem suda hem de karada yapılan direnç antrenmanlarının kontrol grubu ile karşılaştırılmasında mekik, şınav, durarak uzun atlama ve sağlık topu fırlatma testi ölçümleri ile yüzme derecelerinde anlamlı iyileşmeler sağlandığı gözlenmiştir (p<0.05). Buradan yola çıkarak; 8 hafta süresince haftada 3 gün hem suda hem de karada uygulanan thera-band direnç antrenmanlarının 11-13 yaş grubu kız yüzücülerin yüzme performansları üzerinde olumlu etkisi olduğu söylenebilir.

Anahtar kelimeler: Yüzme, Thera-Band, Direnç, Kuvvet, Performans

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THE EFFECT ON IN WATER AND LAND THERA-BAND STUDIES ON SWIMMING PERFORMANCE

Abstract: The aim of this study was to determine the effects of 8-week thera-band training on swimming performance of 11-13-year-old age group female swimmers. Twenty-one volunteer female athletes who regularly swim in the Gebze Denizyıldızları Swimming Club participated in the study and the swimmers were randomly divided into three groups: Experimental-1, Experimental-2 and Control groups. Experimental-1 (n = 7; average age = 11.85 ± 0.89 years; average weight = 47.02 ± 7.45 kg; average height = 148.00 ± 0.84 cm) had resistance band in water + swimming training, Experimental-2 (n = 7; average age = 12.00) ± 0.81 years; average weight = 51.67 ± 7.16 kg; average height = 152.29 ± 0.50 cm) had resistance band on land + swimming training and Control group (n = 7; average age = 11.85 ± 0.89 years; average weight = 52.08 ± 1.00 kg) average height = 153.43 ± 0.47 cm) had only club swimming training. Before and after 8-week training program, test values of swimmers in terms of 30 seconds sit-up, 30 seconds push-up, 30 seconds medicine ball toss, standing long jump tests, and 25-50-200m swimming degrees were measured. Thera-band exercises in water and land were applied to athletes three days a week before swimming training. SPSS 22.0 package program included descriptive statistics, Wilcoxon test was used for intra-group analysis and Mann Whitney U test was used for intergroup analysis, and significance level was calculated as p<0.05. As a result of the study, no improvement was observed between the resistance training of the swimmers in the water and on the land, but it was observed that there were significant improvements in the degrees of swimming and sit-ups, push-ups, standing long jump and medicine ball toss test measurements in comparison of both water and land resistance training with the control group (p<0.05). From this point of view, it can be said that thera-band resistance trainings applied on both water and land three days a week for 8 weeks have a positive effect on the swimming performance of 11-13-year-old age group swimmers.

Key Words: Swimming, Resistance Band, Force, Performance

1. INTRODUCTION

Sports is very important for children both physically and psychologically. When children are introduced to sports at an early age, their development and growth will be quicker and more effective. Children get to know their environment better through sports, communicate and interact with people more quickly, increase their self-confidence. From a psychological point of view, there are many positive developments such as self-control, concentration more quickly, and desire to be more successful. Many scientific researches have shown that swimming contributes to the physical and mental development of the children, and important studies revealed that children should be promoted to swimming for their development (Sevim, 2002).

Swimming is a set of significant movements of arms and feet in order to cover a certain distance in water. Swimming, in the sports field, is defined as the ability of the athlete to cover at certain distances in a short time with freestyle, backstroke, breaststroke, butterfly stroke and mixed techniques (Hanula, 2001). According to another definition, swimming is a sports branch where all body muscles are used. Due to the fact that it is a sport against water resistance, it also makes an important contribution to muscle strength and general resistance (Bozdoğan, 2006).

Swimming is a sports branch that children should do because of the positive contribution to child development, even must be learned for children in many countries (Çelebi, 2008). Swimming is a sports branch against water resistance in the horizontal position (Acar, 2000) and therefore, the development of good strength is needed in swimming. Since conscious strength exercises play an important role in increasing performance, in addition to swimming performance, strength training is important for athletes to develop faster (Tokman, 2010).

One of the subjects always wondered in swimming is the effect of land-based training methods on swimming performance and other motoric features (Özlü, 2012). The level and method of land exercises will depend on the age and development of the swimmers (Tokman, 2010).

Strength, which is one of the basic biomotor abilities, has a sine qua non value for every sport branch (Acar, 2000), and it is defined as the strength or strain of a muscle or group of muscles against a resistance (Günay and Cicioğlu, 2001). Muscle strength increases parallel with age, and it is highest in childhood because the increase in muscle mass is highest. It is stated that the strength increases in girls up to the age of 15 and decreases from this age especially when they do not exercise (Güler et al., 2004).

In addition to the use of thera-band exercises for rehabilitation, there are resources to suggest that Thera-Band exercises can also improve sports performance. The important point is to determine the strength value for trainings and exercises, and to plan the development of the exercises. In literature, there are studies that carried out on how much elastic band is stretched and exactly how much strength is applied. The article supports the studies about how much color bands are stretched during exercise or training and how many kg of band can produce this tension (Patterson et al., 2001). In addition, according to the findings in the researches, caution is required when using the manufacturer's reference values in order to estimate the total volume and the external load intensity of thera-band exercises (Uchida et al., 2016).

Thera-Band exercises have many health and performance benefits. It is also known that thera-band exercises reduce body fat (Welling, 2015), increase basal metabolic rate, increase blood pressure and cardiovascular capacity for exercise, improve blood lipid profiles, increase glucose tolerance and insulin sensitivity, increase muscle and connective tissue cross-sectional area and increase functional capacity. Many improvements in physical function and athletic performance are associated with muscle force observed during resistance training, strength and increases in endurance and hypertrophy. The key element for effective resistance training is supervised by qualified professionals and the proper planning of program variables. Appropriate program design, that is, it is important to maximize the benefits associated with strength training using gradual overload, variability and specificity (Kramer, 2002).

In this context, the aim of this study is to determine the effects of water and land thera-band trainings on the motoric characteristics of 11-13-year-old age group swimmers as well as 25m-50m-200m freestyle swimming performances in addition to 8-week swimming training.

2. METHOD

Research Model: In the study, a unique experimental design with "pre-test-post-test" control group was used in accordance with the experimental method.

Research Group: This study was carried out with the participation of 21 volunteer female athletes who were involved in swimming branch in Gebze Denizyıldızları Swimming Club, Experimental-1 (n = 7), Experimental-2 (n = 7) and Control group (n = 7). Descriptive statistics regarding the ages, height and body weights of the athletes are given in Table 1.

Table 1. Descriptive Statistics Table of Athletes

Variables	EXPERIMENTAL-1 (n=7)			EXPERIMENTAL-2 (n=7)			CONTROL (n=7)		
	Min.	Max.	X±SS	Min.	Max.	X±SS	Min.	Max.	X±SS
Age (years)	11	13	11.86±0.9	11	13	12±0.82	11	13	11,857±0.9
Height (cm)	1.39	1.6	1.48±0.09	1.43	1.58	1.523±0.05	1.48	1.61	1.534±0.05
Weight (kg)	38.6	58.1	47.03±7.46	40.5	60.9	51.671±7.16	37.2	63.3	52.086±10.10

Research Methods: Before and after 8 weeks of training, standing long jump test, 30 seconds sit-up test, 30 seconds push-up test, 30 seconds medicine ball toss test, 25 meters freestyle swimming test, 50 meters freestyle swimming test and 200 meters freestyle swimming test was performed to Experimental-1, Experimental-2 and control group. In the framework of training programs, thera-band training was given to Experimental-1 and Experimental-2 three days a week. Experimental-1 group did this thera-band training in water, while Experimental-2 group did the same thera-band training on land. In addition, experimental groups' underwater distance was extended, and training sets were properly increased in each training session. The control group did not have any exercises except swimming trainings of the Club. Thera-band strength trainings (yellow color) were divided into land and water by increasing the number of sets every two weeks before swimming trainings.

Table 2. Training Table of Experimental-1 and Experimental-2 Thera-Band Resistance Groups' Land and Water Trainings

Week	Number of Training Days (Piece)	Training Duration (Minute)	Intensity	Repetition (Piece)	Number of Sets (Piece)	Rest Between Sets (Minute)

1.	3	30	60%	25	2	2
2.	3	30	60%	25	2	2
3.	3	40	60%	25	3	2
4.	3	40	60%	25	3	2
5.	3	50	60%	25	4	2
6.	3	50	60%	25	4	2
7.	3	60	60%	25	5	2
8.	3	60	60%	25	5	2

Table 3. 8-Week Resistance Training Movement Chart

Sequentially Applied Movements
1. Right Elbow Flexion
2. Double Arm Flexion
3. Left Arm Abduction
4. Double Arm Abduction
5. Retraction in the Frontal Plane
6. Mini Squatting
7. Right Leg External Rotation
8. Pulling Right Leg
9. Left Leg Retract
10. Step Forward

Data Collection

*Standing long jump***:** In the first stage, the athlete reached the starting line and took the position to start the test with the knees bent at 45 degrees, arms behind and feet wide open. In the second stage, the athlete jumped forward in the horizontal plane. At the end of the jump, the distance between the starting point of the athlete before the jump and the starting position from the heels after the jump was measured once with the brand "KTS" metal meter, and the value was recorded in "centimeters".

30 seconds sit-up test: The athletes were lying on the floor on the gymnastics mat in the supine position. With the arms on the chest and the knees at 45 degrees, the athlete took the start position and with the start command, the athlete raised his trunk 90 degrees above the ground and put his back on the ground as in the starting position again. In this way, the test continued for 30 seconds and when time expires, the "number" of athlete's maximum test score was recorded.

30 seconds push-up test: The athlete took the initial position on the gymnastics mat on the floor with arms wide open, shoulder wide, elbows stretched, knees in contact with the ground. With the start command, the athlete brought the trunk closer to the ground by 90 degrees and returned to the starting position. In this way, the test continued for 30 seconds and when time expires, the "number" of athlete's maximum test score was recorded.

30 seconds medicine ball toss: The athlete was positioned with his feet facing the wall in an open posture at the shoulder level. They were asked to hold the 3 kg medicine ball between the two hands at chest level and to support the legs in this position and toss the ball with the elbows straight forward and up for 30 seconds. The time is kept with the brand "CASIO HS-70" handheld stopwatch timer.

25–50–200 meters freestyle swimming test: Swimming measurements were taken in the Gebze Olympic Swimming Pool. Before the test, the athletes warmed up on land for 5 minutes and then swim in the 200m freestyle in the water and performed dynamic warming. The test which starts from the command "ready-set-go" and the moment when the athletes pushed the starting block with their feet and to the moment when the athletes touch the opposite wall, was measured with the brand "CASIO HS-70" stopwatch which has a high sensitivity (0.01 seconds) (Soydan, 2006).

Statistical Analysis of Data: The data obtained were analyzed by using descriptive statistics (mean, standard deviation and frequency) in SPSS 22.0 statistical package program, and Kruskal-Wallis ANOVA test was used for three independent groups. Because Kruskal-Wallis test showed that there was a difference between the groups, Mann-Whitney U test was used to compare two independent groups, and Wilcoxon test was used for intra-group comparisons. The p-value that was less than 0.05 was considered statistically significant.

3. RESULTS

Table 4. Intra-Group Analysis Table of Athletes Participating in the Research

Parameters	EXPERIMENTAL-1 (n=7)				EXPERIMENTAL-2 (n=7)				CONTROL (n=7)			
	Mean	SS	Z	p	Mean	SS	Z	p	Mean	SS	Z	p
Sit-Up Initial	15.29	3.99	-2.271	0.023*	18.71	3.90	-2.271	0.023*	12.57	3.41	-1.414	0.157*
Sit-Up Final	16.71	3.40			19.86	4.18			12.86	3.34		
Push-Up Initial	13.43	2.70	-2.271	0.023*	13.14	3.08	-2.121	0.034*	10.57	1.99	-1.890	0.059
Push-Up Final	14.86	2.48			14.00	2.77			11.29	2.22		
Standing Long Jump Initial	1.44	0.06	-2.070	0.038*	1.47	0.04	-2.00	0.046*	1.37	0.09	-2.041	0.041*
Standing Long Jump Final	1.45	0.06			1.48	0.05			1.38	0.09		
Medicine Ball Toss Initial	11.29	2.75	-2.236	0.025*	11.86	2.12	0.00	1.00	8.14	0.90	-1.00	0.317

Medicine Ball Toss Final	12.00	2.45			11.86	2.34			8.43	0.79	
25m Swimming (s) Initial	24.47	3.77			25.56	4.00			33.15	2.58	
25m Swimming (s) Final	23.97	3.66	-2.023	0.043*	24.88	4.11	-2.197	0.028*	33.84	2.33	-2.023	0.043*
50m Swimming (s) Initial	55.06	10.70			54.00	10.53			116.28	28.63	
50m Swimming (s) Final	53.58	9.92	-2.366	0.018*	53.11	10.49	-2.201	0.028*	111.54	30.28	-2.207	0.027*
200m Swimming (s) Initial	183.31	51.14			175.44	47.14			286.73	54.47	
200m Swimming (s) Final	179.47	49.83	-2.366	0.018*	172.31	46.62	-2.366	0.018*	267.76	67.57	-2.366	0.018*

*(p<0.05)

As shown in Table 4, the initial and final measurement intra-group analyzes of the athletes participating in the study showed that there was a statistically significant difference in all measurement parameters except the control group health ball measurement (p=0.015) (p<0 .05).

Table 5. Final Intergroup Analysis Table of Athletes Participating in the Research in terms of Sit-up, Push-up, Standing long jump, Medicine ball toss parameters

Groups	Parameters	Average	SS	Z	p
Experimental-1- Experimental-2	30 seconds sit-up	16.476	4.546	-1.731	0.084
	30 seconds push-up	13.381	2.837	-0.522	0.602
	Standing long jump	1.437	0.080	-0.967	0.334
	30 seconds medicine ball toss	10.762	2.548	-0.130	0.896
Experimental-1 - Control	30 seconds sit-up	16.476	4.546	-1.869	0.062
	30 seconds push-up	13.381	2.837	-2.256	**0.024***
	Standing long jump	1.437	0.080	-1.222	0.222
	30 seconds medicine ball toss	10.762	2.548	-2.950	**0.003***
Experimental-2 - Control	**30 seconds sit-up**	16.476	4.546	-2.374	**0.018***
	30 seconds push-up	13.381	2.837	-1.803	0.071
	Standing long jump	1.437	0.080	-2.120	**0.034***
	30 seconds medicine ball toss	10.762	2.548	-2.542	**0.011***

*(p<0.05)

As shown in Table 5, there was no statistically significant difference between Experimental-1 and Experimental-2 groups of the study groups for 30 seconds sit-up, push-up and medicine ball toss, and standing long jump parameters (p>0.05). There was statistically significant difference between Experimental-1 and control group for 30 seconds push-up (p=0.024) and 30 seconds medicine ball tossing test (p=0.003), and there was statistically significant difference between Experimental-2 and control group for 30 seconds sit-up (p=0.018), standing long jump (p=0.034) and 30 seconds medicine ball tossing test (p=0.011) (p<0.05).

Table 6. Final Measurement Intergroup Analysis of 25-50-200m Swimming Degrees of Athletes Participating in the Study

Groups	Parameters	Average	SS	Z	p
Experimental-1 - Experimental-2	25m Swimming sec	27.564	5.615	-0.831	0.406
	50m Swimming sec	72.745	33.582	-0.447	0.655
	200m Swimming sec	206.514	68.884	-0.447	0.655
Experimental-1 - Control	**25m Swimming sec**	27.564	5.615	-3.130	**0.002***
	50m Swimming sec	72.745	33.582	-3.130	**0.002***
	200m Swimming sec	206.514	68.884	-2.108	**0.035***
Experimental-2 - Control	**25m Swimming sec**	27.564	5.615	-3.134	**0.002***
	50m Swimming sec	72.745	33.582	-3.130	**0.002***
	200m Swimming sec	206.514	68.884	-2.492	**0.013***

*(p<0.05)

As shown in Table 6, no statistically significant difference was found between experimental-1 and experimental-2 groups in terms of 25m, 50m and 200m swimming degrees (p>0.05). There was a statistically significant difference between Experimental-1 and control group in terms of 25m (p=0.035), 50m (p=0.002) and 200m (p=0.035), and between Experimental-2 and control group in terms of 25m (p=0.002), 50m (p=0.002) and 200m (p=0.013) swimming degrees (p>0.05).

4. DISCUSSION

In this study, the effects of thera-band exercises applied on land and water for 8 weeks on swimmers of 11-13 year old age group on 30 seconds sit-up, 30 seconds push-up, 30 seconds medicine ball toss, standing long jump and 25m-50m-200m swimming degrees were investigated. As a result of the in-group analysis, significant differences were found in all parameters of the experimental-1 group, in all other parameters of the experimental-2 except test measurement of 30 seconds medicine ball toss group, and in all other parameters of control group except the test measurement of 30 seconds push-up and medicine ball toss (p<0.05).

When the comparisons between the groups were examined, no statistically significant difference was found between experimental-1 and experimental-2 in terms of athletes' final measurements of motoric tests and swimming degrees after 8 weeks of thera-band training (p>0.05). However, significant differences were found in 30 seconds push-up (p=0.024) and 30 seconds medicine ball toss measurements (p=0.003) between experimental-1 and control group, and 30 seconds sit-up (p=0.018) standing long jump (0.034) and 30 seconds medicine ball toss test (p=0.011) between experimental-2 and control group. In addition, there was a significant difference between experimental-1 and control group in terms of 25m swimming (p=0.002), 50m swimming (p=0.002) and 200m swimming (p=0.035) degrees, and between experimental-2 and control group in terms of 25m swimming (p=0.002), 50m swimming (p=0.002) and 200m swimming (p=0.013) degrees. Literature search was conducted in line with these results.

Selçuk and Karacan (2017) stated that basic motor skills of 11-13 year old age group athletes who have regular swimming training have better values than the control group athletes (p<0.05). As a result of the research, they reported that 12 weeks of swimming + resistance band training provided positive improvements on the performance development of 11-13 year old age group children.

Selçuk (2013) examined the effect of thera-band training on swimming performance in male swimmers between 11-13 year old age group in addition to swimming training for 12 weeks and accordingly, there were positive changes on both swimming performance development and some motoric characteristics of both groups. She reported. As seen in the literature, in the study conducted with similar age groups, it was reported that there were significant differences in swimming performances and swimming + thera-band training groups for 30 seconds sit-up, 30 seconds push-up and 25-50-200m swimming performances in parallel with this study (p<0.05). Therefore, the results obtained in the literature have the quality to support this research.

Yapıcı et al. (2016) investigated the effect of 6-week land and resistance training on isokinetic lower extremity strength performance and swimming degrees of 13-16 year old age group swimmers, and statistically significant differences were found between initial-test and final-test in terms of values of 25m underwater, 25m, 50m, 75 m and 100 m freestyle swimming (p<0.05).

Aktuğ et al. (2019) investigated the effect of thera-band exercises on swimmers' performance values for swimmers with the average age of 12 years and reported that motor skill performance values showed that significantly difference were found in terms of thera-band exercise group compared to swimming and control groups (p<0.05). They also reported that thera-band group showed significant changes on swimming values (p<0.05). Although a different training program was applied to the swimmers of the same age in the literature, it was observed that the

strength training performed similarly to this study had positive effects on the swimming degrees of the swimmers.

In the study conducted to determine the effect of 6-week land training on high school students in 14-17 year old age group on shoulder flexibility, trunk strength and 50m swimming degree, it was stated that there were statistically significant differences in the first and last measurement results of the experimental group students doing ground training compared to the control group (p<0.05) (Sawdon-Bea and Benson, 2015).

Günay (2007), 120 elite swimmers between 8-12 year old age group had a resistance band training for 12 weeks and at the end of the study reported a positive change in swimmers' 50m free swimming degrees. This research supports the study.

Atabaş (2017) reported that there was no significant change in 50m, 100 m and 1000 m freestyle swimming values as a result of the training period applied to the swimmers in his study which investigated the effect of 8 weeks of functional training on strength, flexibility and swimming performance applied to male swimmers (p>0.05). This research does not support the literature. This may be due to differences in the training content of both studies.

Özeker (2018) examined the effect of land training on strength and swimming performance in addition to swimming training to swimmers in the 10-12 year old age group and reported that land training had a positive effect on functional strength and swimming performance.

Şenol and Gülmez (2017) investigated the effect of body weight and resistance training using a functional exercise band (TRX) on swimmers' 200m free swimming transition for 8 weeks. They reported that both swimming degrees and physical performance improvements of swimmers who performed resistance studies using TRX were found to be more meaningful than bodybuilders and control groups (p<0.05).

Thera-band resistance band which was applied to wrestlers with fixed and wave method was found to be significant in anaerobic power in both groups and fixed resistance group was more significant than wave resistance group (p<0.05) (Selçuk, 2014).

5. CONCLUSION

In the study, when the results of 8-week swimming + thera-band training were evaluated, a significant improvement was observed in the measurement results between the control group and the experimental groups for 30 seconds push-up, 30 seconds sit-up, standing long jump and medicine ball toss, but there was no significant difference between experimental-1 and experimental-2 groups. no improvement. However, it was found that the training provided significant improvements on all swimming degrees. As a result, it was concluded that thera-band resistance trainings applied on both water and land three days a week for 8

weeks had a positive effect on swimming performance of 11-13 years old age group swimmers.

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