ANALYSIS OF THE EFFECT OF TECHNIQUE-RELATED PLYOMETRIC EXERCISES ON THE MOTORIC PROPERTIES OF WRESTLERS

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ABSTRACT

The aim of this study is to analyze the effect of 8-week technique-related plyometric training on the body fat percentage, back strength, grip strength, vertical jump, aerobic and anaerobic power of wrestlers. Total 37 randomly chosen athletes, 17 in training group and 20 in the control, who do regular training two hours a day and five days a week, participated in the study voluntarily. The measurements were taken before and after 8-week training. While evaluating pre and post-training measurement results, student t test was done in dependent groups and ($p > 0.05$) was accepted as significant.

While statistically significant difference was seen between the wrestlers' pre and post-training body fat percentage, vertical jump, right hand grip, left hand grip, back strength and Max VO_2 values in the training group ($p<0.05$), no significant difference was seen between wingate anaerobic power and capacity values ($p>0.05$)

Key Words: Motoric Properties, Plyometric, Wrestling, Exercises

TEKNİKLE BAĞLANTILI PLİOMETRİK EGZERSİZLERİN GÜREŞÇİLERDE BAZI MOTORİK PARAMETRELERE ETKİSİNİN İNCELENMESİ

ÖZET

Bu çalışmanın amacı, güreşçilere uygulanan 8 haftalık teknikle bağlantılı pliometrik antrenman programının vücut yağ yüzdesi, sırt kuvveti, el kavrama kuvveti, dikey sıçrama, aerobik ve anaerobik güçleri üzerine etkisinin incelenmesidir. Çalışmaya, günde iki saat haftada 5 gün olmak üzere düzenli antrenman yapan rastgele seçilmiş 17 sporcu denek, 20 sporcu kontrol grubu olmak üzere toplam 37 güreşçi gönüllü olarak katıldı. Ölçümler 8 haftalık antrenman öncesi ve sonrası alınmıştır. Antrenman öncesi ve sonrası ölçüm sonuçlarının değerlendirilmesinde bağımlı gruplarda student t testi uygulandı ve ($p > 0.05$) değeri anlamlı kabul edildi.

Denek grubu güreşçilerin çalışma öncesi ve sonrası vücut yağ yüzdesi, dikey sıçrama, sağ el kavrama, sol el kavrama, sırt kuvveti ve Max VO2 değerleri arasında istatistiksel olarak anlamlı farka rastlanırken ($p<0.05$). Wingate anaerobik güç ve kapasiteleri değerleri arasında anlamlı farka rastlanmamıştır ($p > 0.05$).

Anahtar kelime: Motorik özellikler,Pliometrik,Güreş,Egzersiz

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INTRODUCTION

Wrestling is one of the most common individualistic sports in the world. coordination is crucial in wrestling. In weight sports, a balanced and harmonious body development is vital (Başaran, 1989). Wrestling requires unity of several functional properties. Some of the important factors in performance are muscular strength, rapid reaction time, agility, neuromuscular coordination, a perfect static and dynamic balance and high anaerobic and aerobic capacity. The aim and content of wrestling trainings should be to develop these properties (Çeker, 1996). Strength as a biomotoric feature is important in both defense and attack in the act of a technique and react against a technique and counter-attack (Cicioğlu et al 2007). Strength is one of the most important motoric properties in success. It is an important factor especially in such individualistic sports as wresting (Taşkıran, 1990). To be successful and to achieve high levels in certain sports like shot put, wrestling and weight lifting, absolute and relative strength is required**.** In various sports, especially in those where endurance or high training scopes are crucial, the final elimination should be based not only on the training quality of the athlete but also on the recovery competence of the athlete body between training times. For wrestlers, Dragan (1979) defines the scale of coordination, reaction time, high aerobic and anaerobic capacity, tactical intelligence, wide shoulder-diameter and long arms (Bompa, 1998). In a study conducted by Filiz (2003), it was seen that when body weight of the wrestlers increase, their body fat percentage increases as well. Moreover, the body type of Turkish wrestlers was found to be mostly endo-mezomorf. In a study in 1984 on the wrestlers in the Turkish national team using Heath-carter method, it was determined that Turkish wrestlers are generally endo-mesomorphic. Body-fat ratio of wrestlers is low as in long-distance runners (about 5%). The average value determined in wrestlers was about 7%. It was also determined that body-fat ratio increases as the weight category rises (Akgün, 1992). Another important point for athletes is the body fat they can bear without affecting their performance. Especially in weight sports, generally weight loss is required to achieve the desired weight before weigh-in. this weight is determined at an adequate time before the event and if the body composition of the athlete can be determined, it is accepted that an important step has been taken in weight adjustment (Kaplan, 1997). Considering the principle of applying techniques rapidly in wrestling, the importance of aerobic capacity is indispensable. In the contest stage of many sports events, anaerobic capacity is emphasized. Therefore, aerobic training should also be included into the training program to sustain a successful productivity in cases when aerobic capacity is an important component of the training (Gökdemir, 2000). Chu defines plyometric training as a training involving exercise and practices that are a mixture of speed and strength and boost strength or reactive explosive action (Bompa, 1998). In exercises used in plyometric exercises, functions like body weight and gravity are generally in the foreground. Exercises involving plyometric exercises include consecutive jumps (in situ and on foot), hops (short and long duration), skips (short and long duration) and depth jumps (Foran, 2001). Speed is a very important motor property in wrestlers both in applying their techniques and in defending themselves from the component's techniques. There are many speed exercises to develop this technique and one of the major ones is plyometric training. There are limited numbers of studies on the effects of technique-related plyometric training on

the motor properties of athletes. However, literature review shows that programs containing plyometric exercises are developed and their effects are researched (Baktaal, 2008).

In this study, it was aimed to determine the effects of 8-week technique-related plyometric training on the body fat percentage, back strength, grip strength, vertical jump, aerobic and anaerobic power of wrestlers.

MATERIAL & METHOD

The characteristics of the participants were determined as follows: average age of the training group is 21.29 ± 2.28 years, while it is 21.45 ± 1.73 years in the control group; average height of the training group is 171.55 ± 6.16 cm., while it is 176.95 ± 7.10 cm. in the control group, and average body weight of the training group is 72.34 ± 10.24 kg, while it is 71.76 ± 8.08 kg in the control group. Total 37 athletes, 17 in training group and 20 in the control, who do regular training two hours a day and five days a week, participated in the study voluntarily.

Measurement Methods: The participants' height, weight, body fat, back strength, right and left hand grip strength, vertical jump, aerobic and anaerobic capacity values and Max VO2 capacities were measured before the study. The same measurements were retaken after the 8-week training program.

Training program	
Warm-up	25-30 sec
Training Time	120 min
Session Time	20 sec
Pace	Explosive
Resting	60 sec
Set Number	4
Resting between Sets	3 min
Relaxing Exercises	10-15 min
Control Group Program 1	
Station 1	Rope climbing
Station 2	Abdominal crunch
Station 3	Dips on parallel bar
Station 4	Jump to the right and left sides on a gymnastic bench at 30 cm height
Station 5	Hyper extension
Station 6	Pull up in a pull up machine
Station 7	Jackknife move
Station 8	Medicine ball throwing
Training Group Program 2	
Station 1	Hip throw
Station 2	Cross - buttock
Station 3	Leg tackle
Station 4	Fireman' s lift
Station 5	Crotch lift on flattened position
Station 6	Takedown by duck under
Station 7	Shoulder throw
Station 8	Piolet

Body Composition Measurements

Height measurement of the athletes in the study was done using stadiometer (Holtain Ltd. U.K.) mounted on the wall with ± 1 mm sensitivity and their body weight measurement was done using bascule (Tanita HD 358 Japan) with ± 100 g sensitivity. Skinfold thickness of the participants was measured at 4 regions (Biceps min, Triceps min, Subscapula min, Suprailiac min) with ± 0.2 mm error margin as suggested by Harrison et al. (1988) using calliper (Holtain Ltd., U.K.). All the measurements were taken at the right side of the body twice and their means were regarded as the final result. Body density was determined according to the equity obtained by Durnin and Womersley (1974) for males. Body fat percentages were determined according to Siri's (1956) formula.

Performance Measurements

Grip Strength: The grip strength of both right and left hands was measured using a digital hand dynamometer (TKK 5401, Takei Scientific Instruments, Japan) in a standing position with the shoulder adducted and elbow in full extension. The subjects were asked to squeeze the dynamometer with as much force as possible with both dominant and non-dominant hands. The maximum values obtained during the three trials from each hand were used for further statistical

Back Strength: Isometric back strength of the subjects was measured with a digital back dynamometer (TKK 5402, Takei Scientific Instruments, Japan). Back strength was measured with the subjects standing in a slightly forward-bent position. Three attempts were made by all subjects with the best score registered

VO_2 max Measurements: VO_2 max measurements of the participants were estimated upon 20 m shuttle run test. The athletes ran a distance of 20 m and back. Running speed was checked using a tape that gave a signal at certain intervals. The athletes adjusted their speed on their own so as to be at the other line when they heard the second signal. If an athlete missed a signal but still could catch up with the second signal, he continued the test. If an athlete missed two signals successively, the test ended. During the evaluation of VO_2 max, 20 metre test level form was used (Tamer, 2000).

Jumping Measurements: The squat tests were performed on a force platform (Newtest Powertimer, Finland). The squat jump started from a half-squat position with a knee angle of 90°. Subjects were asked to jump as high as possible. The jump was repeated two times, and the better performance was recorded

Wingate Test: Anaerobic power and capacity output were measured by the 30 s Wingate test (Monark 894 E Peak Bike, Sweden). Prior to the Wingate test a 5 min warm-up was performed at a standardized workload 1 kg of resistance at 60-70 RPM. Seat and handlebar adjustment was made for each subject. The test was started after the external resistance was adjusted to 7,5 % of each subject's body mass. Subjects were asked to reach a maximal pace of unloaded sprinting as fast as possible. When the pedal speed reached 150 rev / min, the weight basket automatically fell down and the test was started. The subjects were instructed to pedal as fast as possible from the onset of the test. The athletes were encouraged verbally during the test to maintain a high frequency. The following variables were registered from the Wingate test: Absolute Anaerobic Power (Wt), Absolute Anaerobic Capacity (Wt), Relative Anaerobic Power (Wt/kg) and Relative Anaerobic Capacity (Wt/kg)

Statistical Analyses: While comparing the pre-study exercise performances of the athletes in both groups, dependent t-test was used in dependent groups at α =

0.05 significance level, whereas paired t-test was used at iterative measurements at α = 0.05 significance level while comparing pre and post-study exercise performances of both groups.

FINDINGS

Table 1 shows physical characteristics of training and control group wrestlers prior to the study. While no significance difference was found between the average age 21.29±2.28 years, body weight 72.34 ± 10.24 kg and body fat percentages % 14.17 ± 2.45 of the training group wrestlers and the average age 21.45±1.73 years, body weight (71.76 ± 8.08 kg) and body fat percentage (% 15.15 ± 3.17) of the control group wrestlers ($p > 0.05$), height average (176.95 ± 7.10 cm) of the control group wrestlers was found significantly higher than height average (171.55 ± 6.16 cm) of the training group wrestlers ($p < 0.05$)

Table 1. Physical characteristics of training and control groups

Variables	Training Group mean ± sd	Control Group mean ± sd	t
Age (years)	21.29 ±2.28	21.45 ± 1.73	-0.236
Height (cm)	171.55 ± 6.16	176.95 ± 7.10	-2.448*
Body Mass (kg)	72.34 ± 10.24	71.76 ± 8.08	0.191
Body Fat Percentage (%)	14.17 ± 2.45	15.15 ± 3.17	-1.034

*p<.05

Table 2 shows the performance values of the training and control group wrestlers prior to the study. While no significant difference was observed between vertical jump, right grip strength, left grip strength, back strength, wingate anaerobic power and capacity averages of the wrestlers in both groups ($p > 0.05$), pre-study Max VO_2 values of the training group wrestlers were found significantly higher than those of the control group wrestlers ($p < 0.05$).

Table 2. Pre-study exercise performances of training and control group wrestlers.

Variables	Training Group mean ± sd	Control Group mean ± sd	t
Vertical Jump (kg)	54.05 ± 7.41	53.05 ± 7.72	0.403
Right Grip Strength (kg)	44.37 ± 5.85	46.42 ± 6.08	-1.039
Left Grip Strength (kg)	44.26 ± 6.61	44.15 ± 5.51	0.058
Back Strength (kg)	130.70 ± 22.20	122.32 ± 22.95	1.123
Absolute wingate anaerobic power (w)	797.05 ± 147.46	763.00 ± 93.24	0.853
Relative wingate anaerobic power (w/kg)	11.00 ± 1.14	10.67 ± 1.21	0.837
Absolute wingate anaerobic capacity (w)	556.88 ± 73.62	562.84 ± 76.98	-0.239
Relative wingate anaerobic capacity (w/kg)	7.71 ± 0.59	7.83 ± 0.56	-0.239
Max VO_2 (ml.min-1.kg-1)	46.08 ± 4.52	42.83 ± 4.35	2.227*

*p<.05

Table 3 shows the pre and post-study performance values of the training and control group wrestlers. While a significant difference was seen between pre and post-study vertical jump, right grip strength, left grip strength, back strength and Max VO_2 values of the training group wrestlers ($p<0.05$), no significant difference was found between their wingate anaerobic power and capacity values ($p > 0.05$). No significant difference was found between all performance values, except for left grip strength, of the control group wrestlers as a result of pre-test and post-test measurements ($p>0.05$).

Table 3. Pre and post-study exercise performances of training and control group wrestlers.

	Pre-test	Post-test	t
	Mean±SD	Mean±SD	
Training Group			
Body Fat Percentage	14.17±2.45	11.52±2.49	9.251*
Vertical Jump (kg)	54.05 ± 7.41	57.58 ± 6.35	-3.417*
Right Grip Strength (kg)	44.37 ± 5.85	46.95 ± 6.94	-2.786*
Left Grip Strength (kg)	44.26 ± 6.61	46.74 ± 6.14	-2.504*
Back Strength (kg)	130.70 ± 22.20	139.35 ± 22.59	-3.587*
Absolute wingate anaerobic power (w)	797.05 ± 147.46	801.50 ± 149.61	-0.233
Relative wingate anaerobic power (w/kg)	11.00 ± 1.14	11.05 ± 1.39	-0.199
Absolute wingate anaerobic capacity (w)	556.88 ± 73.62	560.07 ± 86.50	-0.297
Relative wingate anaerobic capacity (w/kg)	7.83 ± 0.59	7.85 ± 0.62	-0.120
Max VO_2 ($ml.min^{-1}.kg^{-1}$)	46.08 ± 4.52	49.60 ± 3.58	-5.571*
Control Group			
Body Fat Percentage (%)	15.15 ± 3.17	15.29 ± 2.92	-984
Vertical Jump (kg)	53.05 ± 7.72	51.15 ± 7.79	1,243
Right Grip Strength (kg)	46.42 ± 6.08	46.59 ± 6.29	-0.198
Left Grip Strength (kg)	44.15 ± 5.51	46.46 ± 5.26	-2.523*
Back Strength (kg)	122.32 ± 22.95	125.32 ± 33.94	-0.509
Absolute wingate anaerobic power (w)	763.00 ± 93.24	767.25 ± 90.96	-0.310
Relative wingate anaerobic power (w/kg)	10.67 ± 1.21	10.65 ± 1.35	0.119
Absolute wingate anaerobic capacity (w)	562.84 ± 76.98	539.40 ± 60.81	1.892
Relative wingate anaerobic capacity (w/kg)	7.71 ± 0.59	7.56 ± 0.62	1,952
Max VO_2 ($ml.min^{-1}.kg^{-1}$)	42.83 ± 4.35	42.93 ± 4.37	-1

*p<,05

DISCUSSION & CONCLUSION

The characteristics of the participants were determined as follows: average age of the training group is 21.29 ± 2.28 years, while it is 21.45 ± 1.73 years in the control group; average height of the training group is 171.55 ± 6.16 cm., while it is 176.95 ± 7.10 cm. in the control group, and average body weight of the training group is 72.34 ± 10.24 kg, while it is 71.76 ± 8.08 kg in the control group.

(Aydos et al., 2004) in their study on 66 male wrestlers with age average of 19,53±1,61 years, determined the height of the wrestlers 1,73±0,07cm and their body weight 76,77±14,41kg, which shows parallelism with the data of this study. Pre-study body fat percentage of the training group wrestlers was % 14.17±2.45mm and that of the control group wrestlers was % 15.15±3.17mm, while post-study body fat percentages were %11.52±2.49mm and %15.29±2.92mm respectively. The difference wasn't statistically significant ($p > 0.05$).

In the literature, the body fat percentage of wrestlers is said to be supposed to be between 5% and 9%. Elite wrestlers have lesser body fat percentage than high school and university wrestlers. The body fat percentage recommended by American Medical Association for wrestlers is min. 7% and max. 10%. Some

researchers measured the average fat rate of 10 elite wrestlers of Etibank Sas Free Style Wrestling Team as 7.92% (Taşkıran, 1990). Some others measured the body fat rate of 35 Canadian candidate Olympic wrestlers as 11.8% (Kaplan, 1997). (Doğu et al., 1994) in his study about body fat measurements of elite Turkish wrestlers, found the following about the subjects: their average age 23.36±2.05 years, average body weight X=80.5 kg±17.4, subcutaneous fat thickness arithmetic mean abdominal 13.04±10.3mm, triceps 8.55±4.99mm, biceps 3.59±1.05mm, subscapular 11.86±5.5mm, suprailiac 16.50±8.2mm, femur 11.32±5.96mm, chest 5.36±2.8mm, and the total of the seven regions 7.3±25.1mm**.**In their study**,** Yüksel,O. et al. (2006), found the body fat percentage of 15-17 aged young basketballers 14.51±3.78mm.(Kelly, JM. et al., 1978) found the body fat rate of college wrestlers 8.36 % during the contest time**.** In their study on college wrestlers, (Schmidt, WD et al., 2005), measured their body fat prior to, during and after the event 11.6±3.9, 10.5±3.0 and 12.0±3.4mm respectively**.**

During pre-study measurements of the training and control group wrestlers, right grip strength of the control group was found 44.37±5.85% and left grip strength was found 44.26±6.61%, while right grip strength of the control group was found 46.42±6.08% and left grip strength was found 44.15±5.51%. During post-study measurements of the training and control group wrestlers, right grip strength of the control group was determined 46.95±6.95% and left grip strength was determined 46.74±6.14%, whereas right grip strength of the control group was determined 46.59±6.29% and left grip strength was determined 46.46±5.26%. The difference wasn't statistically significant ($p > 0.05$).

(Baykuş, 1989) found the following values for grip strength of Free Style 18.88±0.93, years old Free Style National Team wrestlers: 43.2kg, for right grip in free style and 38.8kg for left grip. (Kutlu, 1995) determined the following grip strengths for Cadet National Team: 35.90±8.73 in free style and 33.54 in Greco-Roman. In their research**,** (Kılıç et al., 1994) found the following for 14-16 age group wrestlers' grip strength: 38.44kg for right grip strength and 38.59kg for left grip strength**.** (Harmancı,H. et al. 2007) found the right hand grip strength of the male handballers playing at university teams 49.92 kg and their left hand grip strength 45.93 kg, while they found the right hand grip strength of the male volleyballers 45.66 and their left hand grip strength 41.46kg,(Aydos and Koç, 2003) found right grip strength of 17-18 age group Greco-Roman National Young Team wrestlers 40.51kg and their left grip strength 39.51kg. The right and left grip strength means of these various studies show parallelism with the values of this study**.**

Pre and post-study back strengths of the wrestlers in the training and control groups of the study were determined as follows: pre-study back strength of the training group was %130.70±22.20 while it was %122.32±22.95 for the control group and post-study back strength of the training group was %139.35±22.59 while it was %125.32±33.94 for the control group. The difference between measurement results wasn't found statistically significant ($p > 0.05$).

(Aydos et al., 2004), in their study on individual and team athletes, found back strength 94.9±21,44kg**,** while (Şenel et al., 2009), in their study on wrestlers, found the wrestlers' back strength 163.71 ±40.32kg. Literature review shows that some of the values in the studies on wrestlers show parallelism with those in this study; however, the values in some studies are low. The difference can be said to arise from the training process**.**

Pre and post-study vertical jump strengths of the wrestlers in the training and control groups of the study were determined as follows: pre-study vertical jump strength of the training group was %54.05±7.41cm while it was %53.05±7.72cm for the control group and post-study vertical jump strength of the training group was %57.58±6.35 cm while it was %51.15±7.79cm for the control group. The difference between measurement results wasn't found statistically significant ($p > 0.05$).(Aydos and Kürkçü, 1997) found the vertical jump of high school athletes in 17-18 age groups 46.45±7.38kg**.** (Aydos and Koç, 2003) determined the vertical jump of Greco-Roman National Young Team wrestlers of 17-18 age group 44.44cm. (Kılınç et al.2012) found a squat variable on pre-test as 122.0 ± 18kg and that on post-test as 128.7±21.3kg.(Şentürk, A. et al. 2006) found the vertical jump of handballers 56.70±8.10cm.Considering these findings, it can be said that the reason why the values of the training group in this study were high might have resulted from plyometric training**.**

Post-study aerobic strength development of the wrestlers in the training and control groups of the study were determined as follows: pre-study aerobic capacity values of the training group was %46.08±4.52 ml/kg/min while it was %42.83±4.35) ml/kg/ min. for the control group and post-study aerobic capacity values of the training group was %49.60±3.58 ml/kg/ min. while it was %42.93±4.37 ml/kg/ min. for the control group. The difference between pre and post-study aerobic capacity values of the training group wrestlers was found statistically significant ($P<0,05$).

Some researchers measured max. oxygen consumption of American Olympic Free Style wrestlers and, finding the mean as 61.1 ml/kg/ min., stated that there is a high level of relation between aerobic capacity and success in wrestling. Scientists tested 49 Canadian Free Style wrestlers and found their max. oxygen consumption mean as 61.8 ml/kg/ min. (Kaplan, 1997). Another researcher measured max. oxygen consumption (Max VO_2) of wrestlers of Free style and Greco-Roman National Teams and found Max VO_2 mean of the Free Style team as 48.01 ml/kg/ min and Max VO_2 mean of the Greco-Roman team as 43.57 ml/kg/ min. (Baykuş, 1989). A high aerobic capacity is turned into positive anaerobic capacity. If an athlete improves his aerobic capacity, anaerobic capacity will improve too because that athlete will be perform his activity longer before reaching O_2 deprivation and will get over O_2 deprivation more quickly. Anaerobic capacity is an important component of many sports branches. Most of both individual and team sports achieve the highest level of technical and tactical behaviours by improving aerobic capacity. Therefore, aerobic endurance should be an improvement task for the majority of the athletes (Bompa, 1998).

Post-study peak power (Absolute wingate anaerobic power) development of the wrestlers in the training and control groups of the study were determined as follows: pre-study peak power values of the training group was %797.05±147.46 wat while it was %763.00±93.24 wat for the control group and post-study peak power values of the training group was %801.50±149.61 wat while it was %767.25± 90.96 wat for the control group ($p > 0.05$).

Pre-study relative peak power (Relative wingate anaerobic power) values of the training group was found %11.00±1.14 wat while it was found %10.67±1.21 wat for the control group and post-study relative peak power values of the training group was found %11.05±1.39 wat while it was found 10.65±1.35% wat for the control group ($p > 0.05$).

Pre-study absolute wingate anaerobic capacity values of the training group was found %556.88±73.62 wat while it was

found %562.84±76.98 wat for the control group and post-study absolute wingate anaerobic capacity values of the training group was found %560.07± 86.50 wat while it was found %539.40 ± 60.81 wat for the control group ($p > 0.05$).

Pre-study relative wingate anaerobic capacity values of the training group was found %7.83±0.59 wat while it was found %7.71± 0.59 wat for the control group and post-study absolute wingate anaerobic capacity values of the training group was found %7.85 ± 0.62 wat while it was found %7.56 ± 0.62 wat for the control group ($p > 0.05$). no significant difference was found between the measurement results ($p > 0.05$).

(Ersoy, 2012), in terms of post-training peak power development of athletes, determined the pre-training peak power values of the training group athletes 851,94±158 wat while he found it 922,73±169 wat after training and the increase was found statistically significant**.** (Ersoy, 2012), determined the pre-training relative peak power values of the training group athletes 10,60±0,76 wat while he found it 11,73±1,32 wat after training and the increase was found statistically significant**.** (Ersoy, 2012), in terms of absolute wingate anaerobic capacity development of athletes, determined the pre-training absolute wingate anaerobic capacity of the training group athletes 621,31±112,39 wat while he found it 649,23±119,69 wat after training and the increase was found statistically significant**.** (Ersoy, 2012), determined the pre-training relative wingate anaerobic capacity values of the training group athletes 7,87±0,38 wat while he found it 8,22±0,44 wat after training and the increase was found statistically significant**.** (Demirkan et al., 2012), in their study on young elite wrestlers, determined Leg peak power (W) 1206±258, Leg average power (W) 611±144, Arm peak power (W) 838±225 and Arm average power (W) 439±110. (Horswill et al., 1989) assert that there are significant differences between elite and non-elite wrestlers, who are at the same age, weight and sport age, in terms of arm anaerobic power values (376±20 - 331±22) and leg anaerobic power values (540±25 -467±29) respectively and put forward that maximum relative anaerobic power value is the biggest matter that differentiates successful wrestlers from less successful ones**.**

As a result, it was determined that a technique-related plyometric training program conducted on wrestlers for 8 weeks developed their motoric properties and decreased their body fat percentage. It is thought that this effect arose from the more effective participation of the athletes in the training process. It is thought that determining a training method on the strength of these findings in terms of efficiency will contribute to increasing their performance and success. It is also thought that in order to determine the efficiency of plyometric training programs better, it is suggested to apply them to a greater number of athletes.

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