Investigation of the Effects of 8 Week Technical Explosive Strength Training Programme on Physical Property Technical Skills of Wrestlers

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Abstract

The purpose of this study is to investigate the effect of an 8 week quick strength training program related to the technique on the physical properties and technical capacities of the wrestlers. A total of 30 male wrestlers, 15 in the experimental group and in 15 control group, aged 18-25, who have been actively wrestling for 6-8 years, participated in this study. Measurements of the experimental and control group wrestlers taken before and after the training. The test results of the experimental group wrestlers, differences between the measurement values of aerobic capacity, cross-buttock, fireman's lift, shoulder throw and double arm hip throw technique foundstatistically significant (p>0.05). The differences between the body weight, hand grip and back strength of the experimental and control group wrestlers and aerobic capacity, cross-buttock, fireman's lift, shoulder throw and double arm hip throw technique application measurement values of the control group wrestlers not been significant (p>0.05). As a result, has been obtained that the training program provided improvement in the physical and physiological characteristrics of the experimental group wrestlers.

Keywords: Explosive strength, wrestling, hand grip strength, physical, physiological properties

8 Haftalık Teknik Patlayıcı Kuvvet Antrenman Programının Güreşçilerin Fiziksel Özelliklerine, Teknik Becerilerine Etkisinin İncelenmesi

Özet

Bu çalışmanın amacı; 8 haftalık teknikle bağlantılı çabuk kuvvet antrenman programının güreşçilerin fiziksel özellikleri ve teknik kapasiteleri üzerine etkisinin araştırılması. Çalışmaya, aktif olarak 6-8 yıl güreş yapan, 18-25 yaşları arasında, 15'i deney, 15'i kontrol grubu olmak üzere toplam 30 erkek sporcu gönüllü olarak katıldı. Deney ve kontrol grubu güreşçilerin ölçümleri çalışma öncesi ve çalışma sonrası alındı.
Test sonuçları deney grubu güreşçilerde antrenman programına bağlı olarak aerobik kapasite, kafakol, danabağı, tekkol ve çipe tekniği uygulama ölçüm değerleri arasındaki farklar istatistiksel açıdan anlamlı bulunurken, deney ve kontrol grubu güreşçilerin vücut ağırlığı, el kavrama ve sırt kuvveti ile kontrol grubu güreşçilerin aerobik kapasite, kafakol, danabağı, tekkol ve çipe tekniği uygulama ölçüm değerleri arasındaki farklar istatistiksel açıdan anlamlı bulunmamıştır (p>0,05). Sonuç olarak yapılan antrenman ve antrenman program deney grubu güreşçilerin fiziksel ve fizyolojik özelliklerinde gelişim sağlandığı görülmüştür.

Anahtar Kelimeler: Çabuk Kuvvet, Güreş, El Kavrama Kuvveti, Fiziksel, Fizyolojik Özellik

INTRODUCTION

The reason for the significant increase in the performance of the athletes can be shown as the presence of superior ability as early as possible as well as the best training of talented athletes. A wrestler has to use his strength while pushing, pulling, lifting, turn and oppose his movements (22). While applying wrestling techniques, especially back strength, hand grip strength and leg strength gain importance. Knowing the effect of the physiological and physical characteristics of athletes on success has

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led scientists working on training science to research on sports (7). Wrestling is a sport that requires complete performance. A uniform physical structure cannot be considered in such a branch (15). In order to be successful in wrestling, which is a very difficult branch, it is necessary to ensure the maximum development of physiological characteristics as well as all motoric features. Wrestlers' body structure, shape, type and ratio of limbs to each other are effective in their performance (9). Strength is one of the most important motoric features for sportive success (19). Strength is an important factor for success, especially in individual sports such as wrestling (21). In wrestling, which is one of the most common individual sports in the world, coordination, high aerobic and anaerobic power, and tactical intelligence are extremely important in success (5,23). The training methods to be used in a sport branch depend on the energy systems that play a role in that sport branch. In wrestling, the share of both anaerobic alactacid and anaerobic lactic acid mechanism is very high (10). Anaerobic capacity is extremely important for branches that require short-term explosive power (8). In exercises that continue at a maximum level of approximately 2-3 minutes, energy is the more provided based on this way and is formed together with ATP, ATP-PC and lactic acid system. The most used energy system in wrestling is the ATP-CP-LA system.

This energy path is very important as wrestling match consists of two 3-minute periods. In wrestling, important features such as physical and physiological parameters, hand grip strength, back strength, aerobic capacity, cross-buttock, fireman's lift, shoulder throw and double arm hip technique need to investigate. Body composition, physical and physiological characteristics, which are thought to be effective on all styles of wrestling, are of great importance in determining high-level athletes.

METHOD

A total of 30 male wrestlers, 15 in the experimental group and in 15 control group, aged 18-25, who have been actively wrestling for 6-8 years, and have achieved national degrees, voluntarily participated in this study. The first measurements of the wrestlers were made before the training program started, and the second measurements were made after the 8-week training program area and laboratory tests were applied to determine the physiological and technical capacities of the wrestlers. The t-test was applied to the dependent groups to determine the differences between the

experimental and control group wrestlers with the SPSS program, and the p<0.05 value was considered significant. Both groups were subject to normal daily training programs. In addition to normal training, a quick power strength training program related to the technique has been applied to the experimental group wrestlers. Our research was carried out with the decision of the ethics committee dated 30.03.2022 and numbered 2022/03.

Measurement Methods:

Height Measurement: The heights of the wrestlers participating in the study were measured with a Holtain Limited (Holtain Ltd. U.K.) brand height measuring device while standing in an upright position with bare feet, the heels were together and the head was upright, the caliper sliding on the scale was adjusted and read by touching the subject's head.

Body Weight Measurement: The body weight measurements of the wrestlers participating in the measurement were weighed with an Angel brand electronic scale (Accuracy 0.01 kg), provided that only shorts and t-shirts were worn on them.

Hand Grip Strength Measurement: The hand dynamometer was adjusted according to the subject's hand measurements. The wrestlers tried to tighten the dynamometer with all their strength with their right and left hands. The best score was recorded after two trials (10).

Back Strength Test: Athletes placed their hands on the back and leg dynamometer bench with their knees bent. Athletes grabbed the dynamometer stick with both hands and pulled it vertically upwards as much as possible. The test was repeated twice and the best value was recorded in kg (20)

20 m Shuttle Run Test: A mp3 player was used for the shuttle run test, with signal intervals increasing by 0.5 km/h per minute. Participants in the study were asked to touch the line at the end of 20 m at each signal. When the signal came, the test was ended for the wrestler who could not reach the lines one meter in front of the lines determining 20 m twice in a row, (18).

Technical Test : Cross- buttock, fireman's lift, shoulder throw, double arm hip throw test .Athletes was told to do the techniques by holding for 30 seconds, and the techniques that were done correctly during this time were counted and saved.

Statistical Method

SPSS program was used to organize the data and perform statistical tests. In the evaluation of the data obtained, t-test was applied for two independent groups to determine the differences between the experimental and control group wrestlers. The standard deviations and averages of the measurements taken from the wrestlers were analyzed and evaluated. The significance level of the results has been accepted at the p<0.05 level.

Training Program Applied to Experimental and Control Group Wrestlers

The experimental group wrestlers were given quick strength training three days technical related quick power training a week on Monday, Wednesday and Friday, and on Tuesdays, Thursdays and Saturdays, jumping, push-ups, sit-ups, piolet, rope climbing, paired squats, pull-ups and somersaults in the wrestling hall were performed. İntensity were made at 75-100%, duration 25-30 sec, rest 60-90 sec, tempo explosive. Control group wrestlers had six days a week doing jumps, push-ups, sit-ups, piolet, rope climbing, paired squats, pull-ups in the pull-ups and somersaults. Quick-strength training was applied such that the loading was 75-100%, the duration was 25-30 seconds, the rest was 60-90 seconds, the tempo was explosive.

RESULTS

Table 1. Physical and Physiological Measurement Values of Subject Group Wrestlers

Parameters	Pre-exercise Test	Post-exercise Test	P
Body weight (kg)	83.21±18.06	78.26±16.92	,431
Right hand grip strength (kg)	47.94±8.79	53.78±7.87	,057
Left hand grip strength (kg)	44.56±6.45	50.31±7.15	,023
Back strength (kg)	161.43±44.39	188.73 ± 49.90	,192
20 m Shuttle Run Test	40.52±4.60	44.72±3.13	,005
Cross-buttock 30 sec	11.93±1.52	14.06±1.76	,001
Fireman's lift 30 sec	11.37±1.31	13.37±1.70	,001
Shoulder throw 30 sec	11.62±1.20	13.18±1.64	,005
Double arm hip throw 30 sec	10.93±1.12	13.50±1.67	,000
(p<0,01)			

Table 2. Physical and Physiological Measurement Values of Control Group Wrestlers

Parameters	Pre-exercise Test	Post-exercise Test	P
Body weight (kg)	78.53±10.15	77.82±9.80	,832
Right hand grip strength (kg)	45.56±6.37	45.75±6.42	,928
Left hand grip strength (kg)	43.89±5.47	44.03±5.49	,938
Back strength (kg)	169.51±31.74	170.03 ± 31.67	,961
20 m Shuttle Run Test	41.40±3.33	41.30±3.40	,934
Cross- buttock 30 sec	12.05±2.38	12.77±2.69	,400
Fireman's lift 30 sec	11.11±1.49	11.72±1.99	,305
Shoulder throw 30 sec	11.88±1.27	12.61±1,28	,101
Double arm hip throw 30 sec	11.27±1.74	12.05±2.26	,256
(p<0,01)			

DISCUSSION

The mean body weight measurement results of the wrestlers in the experimental group before the 8-week explosive strength training were 76.31±11.87kg, and 75.47±10.63kg after the 8-week explosive strength training. The mean pre-test body weight measurement results of the control group wrestlers were 78.91±8.11kg, the posttest body weight measurement results were 79.61±11.82kg. The differences between the pre-training and post-training body weight measurements of the experimental and control group wrestlers were not statistically significant (p>0.05).

Akkuş & İnal (1) measured the body weight of Selcuk University wrestlers as 74.50±21.40kg. In his study, Ocak (17) found the body weight of physical education and sports school students were 68.61±7.13 kg when they started their first grade, and 76.92±6.76 kg in the fourth grade.

The mean of the right hand grip strength measurements of the experimental group wrestlers were 44.88±8.79kg before the training, 48.72±9.34kg after the training, the right hand grip strength measurement results of the control group wrestlers were 36.22±4.70kg before the training and 43.10±24.12 kg after the training. The differences between the right hand grip strength measurement values obtained from the experimental and control group athletes before and after the training were not statistically significant (P>0.05).

The mean of the left hand grip strength measurement results of the experimental group wrestlers were 44.50±8.27kg before the training, 48.78±9.08kg after the training, and the left hand grip strength measurement results of the control group wrestlers were 35.83±4.36kg before the training and 36.02±4.46kg after the training. The differences between the left hand grip strength measurement values obtained from the experimental and control group athletes before and after the training were not statistically significant (P>0.05).

Akkuş & İnal (1) found the grip strength of wrestlers 51.96±9.49kg, the average grip strength of basketball players 49.96±3.59kg, and the grip strength of volleyball players 46.87±7.88 kg in a study they conducted on Selcuk University teams.

Aydos and Kürkçü (3), in their study, measured the right hand grip strength of the 13-18 age group of secondary school youth doing sports as 37.73±10.36kg and the left hand grip strength as 32.64±11.3kg. Ateş (2), in his study, determined the right hand grip strength values of Turkish men's national biathlon team athletes, and the left hand grip strength values of 44.7±6.83 kg and 43.8±6.02 kg. Bağcı (4) measured the right hand grip strength as 38.90±7.50 kg and the left hand grip strength as 38.45±7.32 kg in his study on wrestlers aged 12-14. These results of the research support the findings obtained in this study.

The mean back strength measurement results of the experimental group wrestlers were 161.43±44.39kg before training, 188.73±49.90 kg after training and the mean back strength measurement results of the control group were169.51±31.74kg before training and170.03±31.67 kg after training. The differences between the back strength measurement values obtained from the experimental and control group wrestlers before and after the training were not statistically significant (P>0.05).

Kalkavan et al. (11) measured the back strength of football players as 79.52±17.21kg, and the back strength of sedentaries as 64.5±14.5kg. Kaya (13) found the back strength of the wrestlers as 155.20±24.94kg in his study.

The mean maximum oxygen consumption of the wrestlers in the experimental group were 40.52±4.60 ml/kg/min before training and 44.72±3.13 ml/kg/min after training. The mean maximal oxygen consumption of the wrestlers in the control group were 41.40±3.33 ml/kg/min before training and 41.30±3.40 ml/kg/min after training. While the

differences between the measurement values of the experimental group wrestlers before and after the training were statistically significant (p<0.05), the differences between the measurement values of the control group wrestlers were not statistically significant (P>0.05).

Kutlu & Cicioğlu (16) measured the maximum oxygen consumption of National Team wrestlers as 49.69±4.02 ml/kg/min in the Stars category. Ziyagil et al. (22) measured the maximum oxygen consumption of Turkish national wrestlers as 48.84±3.77 ml/kg/min in the Stars category. Cicioğlu (6) found the maximal oxygen consumption of 12-17 age group wrestlers as 43.48±4.21 ml/kg/min.

The mean head-arm technique of the experimental group wrestlers were 11.93±1.52 before training, 14.06±1.76 after training, and the mean head-arm technique of the control group wrestlers were 12.05±2.38 before training and 12.77±2.69 after training.

The mean calf tie technique of the experimental group wrestlers were 11.37±1.31 before the training, 13.37±1.70 after the training, and the mean calf tie technique of the control group wrestlers were 11.11±1.49 before the training and 11.72±1.99 after the training.

The mean single-arm technique of the experimental group wrestlers were 11.62±1.20 before the training, 13.18±1.64 after the training, and the mean single-arm technique of the control group wrestlers were 11.88±1.27 before the training and 12.61±1.28 after the training.

The mean chipping technique of the experimental group wrestlers were 10.93±1.12 before the training, 13.50±1.67 after the training, and the mean chipping technique of the control group wrestlers were 11.27±1.74 before the training and 12.05±2.26 after the training.

While the differences between the head-arm, calf tie, single-arm and chipping techniques measurement values of the experimental group wrestlers before and after the training were statistically significant (P<0.05), the differences between the measurement values of the control group wrestlers were not statistically significant (P>0.05).

Kilic et al. (14) determined that the 10 repetitions of the head-arm technique of the 14-16 age group wrestlers were 30.63 seconds and 27.39 seconds for the calf tie technique. Kaya et al. (12) determined that

the number of applications of the one-minute single arm technique of freestyle wrestling youth national team wrestlers was 17.00±3.29, and the Greco-Roman wrestling team was 13.25±3.72. The findings obtained in this study are in parallel with the findings of the literature.

As a result, the findings obtained at the end of the 8-week explosive strength training program showed that depending on the quick strength training, the technical performances and maximal oxygen consumption capacities of the wrestlers increased.

REFERENCES

1. Akkuş H, İnal AN. Selçuk Üniversitesi Erkek Basketbol, Güreş ve Voleybol Takımlarındaki Sporcu Öğrencilerin Sırt, Pençe, Bacak Kuvvetlerinin ve Anaerobik Güçlerinin Ölçümü ve Kıyaslanması. Selçuk Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 1999: 1(1), 82-89.

2. Ateş B. Türk Milli biatlon takımı sporcularının somatotip, vücut kompozisyonu ve motorik özelliklerinin incelenmesi. CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi, 2017: 12(2), 108-116.

3. Aydos L, Kürkçü R. 13-18 Yaş Grubu Spor Yapan ve Yapmayan Orta Öğrenim Gençliğinin Fiziksel ve Fizyolojik Özelliklerinin Karşılaştırılması. Gazi Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 1997: 2, 31 - 38.

4. Bağcı O. 12-14 Yaş Arası Güreşçilerde 8 Haftalık Kuvvet Antrenmanının Bazı Fiziksel Uygunluk Parametrelerine Etkisi (YL Tezi). T.C. Selçuk Üniversitesi Sağlık Bilimleri Enstitüsü, Konya, 2016.

5. Bompa TO. Antrenman Kuram ve Yöntemi. (Çev.: İlknur Keskin-A. Burcu Tuner), 1998, Ankara, p. 39-468.

6. Cicioğlu İ. 12-17 Yaş Grubu Güreşçilerin Fiziksel ve Fizyolojik Özelliklerinin Analizi. Selçuk Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 2006: 1(2), 41-48.

7. Duyul M. Hentbol, Voleybol ve Futbol Üniversite Takımlarının Bazı Motorik ve Antropometrik Özelliklerinin Başarıya Olan Etkilerinin Karşılaştırılması (Yüksek Lisans Tezi). On Dokuz Mayıs Üniversitesi Lisansüstü Eğitim Enstitüsü, Samsun, 2005.

8. Ergen E, Demirel H, Güner R, Turnagöl H. Spor Fizyolojisi. Anadolu Üniversitesi Yayını, 1993, Eskişehir, p. 584.

9. Gökdemir K. Güreş Antrenmanının Bilimsel Temelleri. Poyraz Ofset Matbaası, 2000, Ankara, p. 1-4.

10. Günay M, Tamer K, Cicioğlu İ. Spor Fizyolojisi ve Performans Ölçümü. Gazi Kitabevi, 2006, 1. Baskı, Ankara, p. 47-51.

11. Kalkavan A, Zorba E, Ağaoğlu SA, Karakuş S, Çolak H. Farklı Spor Branşlarında Bazı Fiziksel Uygunluk Değerlerinin Sedanter Grupla Karşılaştırılması. Gazi Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 1996: 1(3), 25-35.

12. Kaya İ, Kaya M, Aydos L, Koç H. Serbest ve Grekoromen Güreş Milli Takım Sporcularının Bazı Fiziksel ve Fizyolojik Özelliklerinin araştırılması (17-20 Yaş Örneği). Atatürk Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 2011: 13(4),12 – 23.

13. Kaya İ. Investigating the Effects of Maximal Strength Training on Wrestlers' Physical, Physiological and Selected Motor Skills. Kamla-Raj Anthropologist, 2015: 20(3): 592-598.

14. Kılıç R, Sevim Y, Aydos L, Günay M. Dairesel Çabuk Kuvvet Antrenman Metodunu 14-16 Yaş Grubu Güreşçileri Bazı Motorik Özellikleri Üzerindeki Etkilerinin İncelenmesi. Hacettepe Üniversitesi Spor Bilimleri Dergisi, 1994: 5(1), 11-20.

15. Koç H. Güreşçilerde Kol ve Önkol Kaslarının Maksimum Kuvvet ve Kassal Dayanıklılığının Geliştirilmesinin Araştırılması (Doktora Tezi). Gazi Üniversitesi Sağlık Bilimleri Enstitüsü, Ankara, 1995.

16. Kutlu M, Cicioğlu İ. Türkiye Greko-Romen ve Serbest Yıldız Milli Takım Güreşçilerinin Gelişmiş Fizyolojik Özelliklerinin Analizi. Hacettepe Üniversitesi Spor Bilimleri Dergisi, 1995: 6(4), 9-17.

17. Ocak Y. The Four–Year an Investigation of Physical and Physiological Features of Students in a Physical Education and Sports Department. Eurasion Journal of Educational Research, 2016: 65, 217-238.

18. Öktem G, Şentürk A. 8 Haftalık İntensiv İnterval Antrenman Metodunun Genç Erkek Milli Karateci ve Güreşçilerde Aerobik, Anaerobik Kapasite ile Kuvvete Etkisi. International Journal of Contemporary Educational Studies (IntJCES), 2017: 3(1), 34-44.

19. Sevim Y. Antrenman Bilgisi. Nobel Yayın Dağıtım, 1. Baskı, 2002: p. 39-76, Ankara.

20. Tamer K. Sporda Fiziksel-Fizyolojik Performansın Ölçülmesi ve Değerlendirilmesi, Bağırgan Yayınevi, Ankara, 2000.

21. Taşkıran C. Etibank SAS Serbest Güreş Takımı ile ABD Serbest Güreş Milli Takımının Fiziksel ve Fizyolojik Özelliklerinin Karşılaştırılması (Yüksek Lisans Tezi). Selçuk Üniversitesi Sağlık Bilimleri Enstitüsü, 1990, Konya.

22. Ziyagil MA, Zorba E, Kutlu M, Tamer K, Torun K. Bir Yıllık antrenmanın yıldızlar kategorisindeki Serbest Stil Türk Milli Takım Güreşçilerinin Vücut Kompozisyonu ve Fizyolojik Özellikleri Üzerine Etkisi. Gazi Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 1996: 1(4), 9-16.

23. Zaccaknı L. Antropometrics And Body Composition Of Italian National Wrestlers. Europen Journal Of Sport Science, 2012: 12.