Turkish Journal of Sport and Exercise /Türk Spor ve Egzersiz Dergisi
http://dergipark.gov.tr/tsed
Year: 2020 - Volume: 22 - Issue: 3 - Pages: 360-365
DOI: 10.15314/tsed.640223

ISSN: 2147-5652

Comparison of Physical Fitness and Respiratory Parameters of Elite Wrestlers and Judokas

Ahmet KOYUNLU[1A], Önder DAĞLIOĞLU[1B], Mustafa ÖZDAL[1C]

[1] *Gaziantep University, Faculty of Sport Sciences, Gaziantep, Turkey*
Address Correspondence to Ö. Dağlıoğlu : e-mail: daglioglu@hotmail.com

(Received): 30/10/2019/ (Accepted): 26.12.2020

A:Orcid ID: 0000-0003-3758-2844- B:Orcid ID: 0000-0002-6213-9855- C:Orcid ID: 0000-0002-0286-2128

Abstract

The aim of this study was to comparison of physical fitness and respiratory parameters of wrestlers and judokas. A total of 24 athletes in the 19-21 age range, 12 male wrestlers and 12 male judoists were volunteers. Physical fitness parameters for subjects; age, body weight, height, body mass index (BMI), body fat percentage (BF%), hand grip strength, 20 m sprint tests, maxVO2, vertical jump, anaerobic power, as respiratory parameters, forced expiratory volume (FEV1), forced vital capacity (FVC), forced expiration ratio (FEV1/FVC), maximum voluntary volume (MVV) and vital capacity (VC) test measurements were performed. Independent Samples T test was used to analyze the data. In the physical fitness parameters of the groups; Age, body weight, height, BMI, BF%, 20 m sprint test, maxVO2 and vertical jumping values were not significant. The right handgrip strength values were found to be significant in favor of wrestlers. FEV1, FVC, FEV1/FVC, MVV and VC values were not significantly different between the groups. As a result of our research, it can be said that wrestlers and judoists have similar characteristics in terms of physical fitness and respiratory parameters.

Keywords: Wrestler, Judokas, Physical fitness, Respiratory.

INTRODUCTION

Achieving success in sports and preserving the success achieved is one of the most important goals of sport. Under the successes of the countries in the sportive branches, there are mostly programs based on the infrastructure of sports and the results of the scientific tests used (3, 18, 30).

Success in sport is possible through scientific methods. With the long term training program to achieve success, the athlete is expected to achieve higher levels of physical and psychological performance (16).

Wrestling and judo branches are complex sports branches. Wrestle; the courage, which requires all body parts to work together, is an activity and sports branch that requires movement time, reflex, skill, endurance and strength (2). Judo; it is an excellent live combat sport that is required by the great mental and physical skill (35).

The intertwining of defense and offensive techniques in wrestling and judo sports, the fact that the games are played in a very short period of time and the competition time is short, has increased the interest in these sports. The training, nutrition, technical tactical, physical and physiological characteristics of these two branches, which have many similar features, are important in terms of performance and condition. Sports branches are highly determinants on physical fitness and respiratory characteristics of athletes (7, 27, 28).

The reason for this is that the training plans of the branches and the studies are different. Detection of these differences will reveal the differences in

physical fitness and respiratory characteristics of wrestling and judo branches, which are seen in two identical characteristics. Wrestling and judo sports are the sports branches that require individual combat where coordination, speed, quickness, strength and endurance are of great importance. Sports branches are high-level determinants on the physical fitness and respiratory functions of the athlete. Therefore, physical fitness values and respiratory values need to be improved and need to be at the highest level. In this study, it is aimed to examine the physical fitness and respiratory parameters of wrestling and judo training which require the same physical characteristics and skills. In the light of the information obtained, the development of biomotoric characteristics of wrestling and judo athletes and suggestions for annual training programming are important.

MATERIAL and METHOD

Subjects and Research Model

In our study, 12 male wrestlers and 12 male judoists who participated in the national and international competitions in Gaziantep province and who regularly train in the 19-21 age range were selected. One measurement was done on the subjects and the measurements were recorded. In the selection of individuals, attention was paid to be close to each other in terms of age, height and body weight.

To reveal the anthropometric measurements of individuals; age, body weight, height, body fat percentage, handgrip, 20m sprint test, shuttle run test measurements and vertical jump measurements were made. FEV1, FVC, FEV1/FVC %, MVV and VC measurements were performed in the Physiology Laboratory of Gaziantep University School of Physical Education and Sports. For this study, permission was obtained from Gaziantep University Clinical Research Ethics Committee.

Data Collection

Anthropometric Measurements

The body weights of the subjects were measured with a weighing of 0.1 kg, lengths were measured by digital height measuring device. Subjects' body mass indexes (BMI) were calculated. BMI measurements were calculated by dividing the body length of the body in meters of length.

Handgrip Strength Test

Handgrip strength measurements were measured with Takei brand dynamometer. Measurements were repeated 3 times for both hands and the highest value was recorded (29).

Vertical Jump and Anaerobic Power Tests

The distance between the subjects' standing distance and the distance they touched were found in meters. Meter unit formula and Lewis nomogram were used to convert the obtained data to anaerobic power (34).

Body Fat Percentage Measurement

Body fat percentage measurement Holtain skinfold clamp type calibrator was used. The values obtained were calculated according to the Yuhasz formula and the body fat percentage of the subjects was calculated (34).

20 m Shuttle Run Test

20 m shuttle run test was used to measure the aerobic capacity of the subjects (34). According to the results, maxVO2 value was found as ml/kg/min.

20 m Sprint Test

The subjects ran the 20 m sprint test with their maximal speed. Measurements were taken with the help of a photocell. The best running rating of the two values obtained was evaluated.

Respiratory Parameter Measurements

Respiratory parameter measurements were realized by using M.E.C. Pocket Spiro USB-100 device. Information about the measurement was given to the subjects. It was said that a maximal effort was required to make the measurement results accurate. Measurements were taken when the subject was sitting. A separate mouthpiece was used for each individual. During the measurements, the subject was motivated by voice.

FVC measurement: At the time of measurement, the subject was first and foremost able to perform normal inspiration and expiration twice, and then quickly and strongly maximal inspiration followed by expiration as fast as possible. FVC, FEV1, FEV1% values were obtained by this measurement method (24).

VC measurement: When the command was given, the subject who filled his lungs completely with air by making a maximum maximal inspiration 3 times after normal breathing, completed the

measurement by expiratory expiration so that all the air in the lung was emptied as much as possible (15).

MVV measurement: When the subject felt ready, he quickly expedited and deeply inspirited and expired for 12 seconds with his device (15). The MVV value was obtained by this measurement method.

Statistical Analysis

SPSS statistical program (SPSS for Windows, version 16.0, SPSS Inc. Chicago, Illinois, USA) was used in the analysis of the data. Data were presented with mean and standard deviation. The Shapiro-Wilk test was performed to check the normal distribution before proceeding with statistical procedures. Independent Samples T test was used for comparison of bilateral groups. Statistical results were evaluated at 95% confidence interval and $p<0.05$ significance levels.

RESULT

Table 1. Comparison of physical and physiological parameters of wrestlers and judoists

Variable	Wrestlers	Judoists	df	t	p
	Mean ± SD	Mean ± SD			
Age (year)	20±1.76	20±1.54	22	0.000	1.000
Height (cm)	172.92±5.88	174.08±6.35	22	-0.467	0.645
Weight (kg)	71.41±12.10	72.33 ±16.41	22	-0.156	0.878
BMI (kg/m²)	23.75±2.71	23.82±4.94	22	-0.042	0.967
Body fat percentage (%)	12.61±4.51	11.27±3.20	22	0.842	0.409
Right handgrip strength (kg)	50.04±5.78	43.07±8.08	22	2.433	**0.024***
Left handgrip strength (kg)	46.16±5.08	41.89±6.46	22	1.798	0.086
20 m sprint (sec)	3.26±0.18	3.28±0.19	22	-0.228	0.821
Vertical jump (cm)	43.25±0.06	42.5±0.06	22	0.320	0.752
Anaerobic power (kg.m/sec)	103.94±19.27	103.06±18.23	22	0.115	0.909
MaxVO2 (ml/kg/min)	46±6.61	45.59± 8.67	22	0.130	0.898

*p<0.05

When the physical and physiological parameters of the wrestlers and judoists were compared, the right handgrip strength was significant in favor of the wrestlers ($p<0.05$). There was no statistically significant difference in terms of other physical and physiological parameters ($p>0.05$).

Table 2. Comparison of respiratory parameters of wrestlers and judoists

Variable	Wrestlers	Judoists	df	t	p
	Mean ± SD	Mean ± SD			
VC (lt)	4.42±0.63	4.39±0.74	22	0.118	0.907
FVC (lt)	4.20 ±0.51	4.37 ±0.42	22	-0.904	0.376
FEV1 (lt)	3.89±0.45	3.92±0.37	22	-0.178	0.860
FEV1/FVC (%)	92.92 ±8.12	89.75 ±6.40	22	1.061	0.300
MVV (breaths/min)	159.6 ± 84.80	137.09 ± 12.77	22	0.909	0.373

Respiratory parameters of the wrestlers and judoists were compared and no statistically significant difference was found in terms of measured lung volume and capacity ($p>0.05$).

DISCUSSION

In this study, no significance was found between the average height of wrestlers and judoists ($p>0.05$). In a study conducted by Claessens et al., The average height of the elite judoists was 1.75 m and the mean weight was 79.45 kg (4). Studies on wrestling and judoists have similarities in height and weight averages in the same age group (9, 32).

In our study, the mean height and body weight of the subjects were similar with the similar studies in the literature. According to the results obtained in our study, it is possible to say that the group consisting of subjects who compete in close range together was the reason for the lack of significance between the two groups of athletes.

In this study, no significant difference was found between the two groups in terms of BMI (p>0.05). Uzun et al., in the study of the relationship between some anthropometric properties of respiratory parameters, have found that the average BMI of the young elite wrestlers is 25.29 (36). In another study, the average BMI of male basketball players was found to be 21.94 (8). In a study of different strength training, BMI values of volleyball players were found to be 21.93 (10).

The fact that the wrestling and judo athletes who participated in our study were parallel to each other and that they had similar working characteristics, and that the two groups of volunteers were similar to each other in terms of their BMI properties, can be said to have the same value.

In this study, there was no significant difference in body fat percentage values between the two groups (p>0.05). There are many studies that show that regular and scheduled exercises reduce body fat percentage (5, 14, 19, 21, 25).

Zorba et al., found the body fat percentage was 7.39±1.24 in the study of the young men in Turkey in judo and weight class judoka in the comparison of the work of some anthropometric parameters of the wrestler (40). The average percentage of body fat percentages of Helicksan American Olympic wrestlers was 7.6 % (17).

There was no significant difference between the two groups in our study. It can be said that both sports branches are on a weight basis and athletes taking part in our research group are close to each other in both branches and that they continue their regular training and there is no significant difference between the groups.

In our study, right handgrip strength values between both groups were found to be significant in favor of wrestlers (p<0.05).

Imamoglu et al., found in male national judoists in the right handgrip strength 47.31±6.26 kg left handgrip strength 46.20±7.30 kg as (20). Fleischlag found the average handgrip strength of 42 wrestlers to be 42.27 kg (11).

According to the results of our study, it has been revealed that wrestlers are more significant in terms of right handgrip strength than judoists. It can be said that strength training applied to wrestlers is more intense, uses their right hands more, and strength training from a young age leads to a better development of right handgrip strength in wrestlers.

In our study, there was no statistically significant difference between the two groups in the average vertical jump and anaerobic power data of the athletes (p>0.05).

Ziyagil et al., wrestlers in a study they made on the weight category of the first vertical jump test wrestlers found 51.78±7.38, the average of the second wrestlers found that the average of 50.11±4.29 (39). Fox et al. stated that the average anaerobic power of male athletes between the ages of 20 and 30 was 140-145 as “moderate” value and 176-210 kg.m/sec as “good” value (12).

The values we obtained in our study were close to the good class in the classification mentioned in the literature. The use of techniques that require continuous effort and explosive force, both during judo and wrestling, can be considered as the reason for the anaerobic performance of both sports.

In our study, there was no statistically significant difference between the two groups in the average maxVO2 data of the athletes (p>0.05).

Kutlu and Cicioglu, free style stars wrestlers of the national team maxVO2 values of 48.23±3.52 grekoromen star national team wrestlers found that the maxVO2 of 51.56±4.43 (23). In a study conducted on judoists, a significant increase in maxVO2 values after aerobic exercise was determined (38).

The data in our study are in parallel with some of the results in the literature and some of them are different. In judo and wrestling branches where endurance is as important as force, the competition times are similar. The effort shown during the competition requires a very high aerobic capacity. For this reason, it is important to develop the endurance as much as the force is included in the training planning. Therefore, it can be said that endurance is given importance in both sports. The duration of the competition and the effort shown during this period can be said to be the common characteristics of both branches, which is the reason for the similarity in both branches.

In our study, no statistical significance was found in the respiratory parameters (FEV1, FVC, FEV1/FVC, MVV and VC) values of the subjects between the two groups (p>0.05).

In a study, FVC measurement values of national team wrestlers were determined 4.55±5.97 lt, FVC

measurement values of university team wrestlers were 4.93±6.45 lt (1). Shoarrott et al., measured the average of vital capacities of Canadian national wrestlers as 4.9±1.0 lt (31). Sinning, measured American and college wrestlers' VC averages of 5.06 lt (33).

Together with training, a number of lung capacities and volumes may be affected. (26). Vital capacity and forced vital capacity are the parameters that demonstrate lung function and 80% or more of the expected value is considered normal for each person according to age, height, gender and body weight (37). FEV1% below 80% indicates a problem in expiration (34). Since wrestling and judo branches are sports branches that require endurance, it can be said that the trainings will affect the breathing capacities and volumes positively. In many studies, respiratory functions were compared between athletes and sedentarys, and a positive superiority was generally seen in favor of athletes (6, 13, 22, 38). The results of our study support the literature.

CONCLUSION

As a result, there were no significant differences between wrestlers and judoists, except for right hand grip strength, in physical fitness and respiratory parameters. The reason for the similarity in physical fitness and respiratory parameters; It is thought that the sports activities and training characteristics of the group are parallel to each other. It can be said that by comparing the wrestling and judo branch, which are parallel to each other, it will be a guide to trainers and athletes in training planning in order to help improve physical fitness and respiratory functions.

ACKNOWLEDGEMENTS

This study is a part of Ahmet KOYUNLU's master thesis. We thank our Department of Physical Education and Sport in University of Gaziantep for their support in our study.

REFERENCES

1. Alpay B. Türkiye'de Serbest Güreş A Milli Takımı İle Niğde Üniversitesi Güreş Takımı Güreşçilerinin Bazı Dolaşım ve Solunum Parametrelerinin Karşılaştırılması. Niğde Üniversitesi, Sosyal Bilimler Enstitüsü, Yayımlanmamış Yüksek Lisans Tezi, Niğde, 2000.
2. Avcuoğulları C. Türkiye Güreş Ligine Katılan Kulüplerin Çalışma Şartları ve Sporcu Kaynakları, İstanbul Güreş İhtisas Kulübü Koruma Vakfı Yayınları, C Yayınları Matbaası, İstanbul, 1993; (6):125.
3. Baumgartner TA, Jackson AS. Measurement for evalution in physical education and exercise. Science, Fourth ed, Dubuque, Wm. C. Brown Publishers, 1991.
4. Cleassens A, Bennen G, Wellens R, Geldof G. Somatotype and bady structure of world top judoists. J. sports medicine, 1987; 27 (1): 105-12.
5. Daglioglu O. The effect of 8-week submaximal aerobic exercise on cardiovascular parameters and body composition in young men. International Journal of Academic Research, 2013a; 5(4): 210-216.
6. Daglioglu O. The effect of gradually increasing exercise on oxygen consumption and lactate levels in swimmers. Annals of Biological Research, 2013b; 4(10): 96-102.
7. Daglioglu O, Bilsen S, & Ozgur, B. The Effect of Aerobic Exercise on Oxidative Stress in Elite Swimmers and Sedentaries and the Investigation of Pon1 Gene Polymorphism. International Journal of Basic Sciences & Applied Research, 2013; 2(6): 548-555.
8. Dağlıoğlu Ö, Cavas L, Hazar M, Gürler S, Cavas B, & Yurdakoç K. A Comparative Study: Skin Folds, Estimated Percentage Body Fat, Total Body Fat Weight And Fat-Free Body Mass in The Female And Male Turkısh Athletes, e-Journal of New World Sciences Academy Sports Sciences, 2009; 4(4): 334-340.
9. Eroglu Y, Daglioglu O. The effect of submaximal exercise on oxidant and antioxidant mechanisms in judokas and sedentary. International Journal of Sport Studies, 2013; 3(5): 480-486.
10. Eylen M.A, Daglioglu O, & Gucenmez E. The Effects of Different Strength Training on Static and Dynamic Balance Ability of Volleyball Players. Journal of Education and Training Studies, 2017; 5(13): 13-18.
11. Fleischlag J. Weightloss, body compositıon and health of hing school wrestlers. The Physician and Sport Medicine, 1984; (1): 121-126.
12. Fox EL, Bowers RW, Foss LM. The physiological basis of physical education and athletics. Sounder scollege publishing, 1988; 62–82.
13. Gökbel H, Üçok K, Uzun K. Düzenli egzersizin solunum fonksiyonları üzerine etkisi. Turgut Özel Tıp Merkezi Dergisi, 1994; 1(3): 230-233.
14. Gücenmez E, Dağlıoğlu Ö, & Dağlıoğlu T. The Effect of Aerobic Exercise on Oxygen Consumption Capacities and Body Composition in Football Players. Atabesbd, 2017; 19(4): 136-147.
15. Günay M, Tamer K. & Cicioğlu İ. Spor Fizyolojisi ve Performans Ölçümü. Gazi Kitabevi, Ankara, 2006.
16. Günaydın G, Koç H, Cicioğlu İ. Türk Bayan Milli Takım Güreşçilerinin Fiziksel ve Fizyolojik Profilinin Belirlenmesi. Hacattepe Üniversitesi Spor Bilimleri Dergisi, Ankara, 2002; 13(1): 25-32.
17. Helicksan RD. An Evaluation of maximal aerobic capacity and Percent Body fat in United States Olympic Class Wrestlers. Unput M.A. Thesis, universty Of Wisconsin, 1977.
18. Heyward VH, Advenced Fitness asserment and exercise prescription. Second Ed.Chempaign, Human Kinetich Publishers, 1991.
19. Inan B, Daglioglu O. Examination of children's body composition and biomotoric features which attended summer football schools. Turkish Journal of Sport and Exercise, 2013; 15(2): 80-87.
20. İmamoğlu O, Ağaoğlu SA, Kishalı NF, Çebi M. Erkek Milli Judocularda Aerobik, Anaerobik Güç, Vücut Yağ Oranı, El Kavrama Kuvveti ve Vital Kapasite Aralarındaki İlişki. Atatürk Üniversitesi Beden Eğitimi ve Spor Dergisi 2001; 96-101.
21. İnce T, Daglioglu O. The Effect of The Plyometric Training Program on Sportive Performance Parameters in Young

Soccer Players. Turkish Journal of Sport and Exercise, 2018; 20(3): 184-190.
22. Kalkan MK, Daglioglu O. The Effects of 8-Week Aerobic Training Program on Respiratory and Circulatory Parameters of Female Swimmers between 12-14 Years Old. Journal of Education and Training Studies, 2018; 6(12): 202-207.
23. Kutlu M, Cicioğlu İ. Türkiye Grekoromen ve serbest yıldız milli takım güreşçilerinin gelişmiş fizyolojik özelliklerinin analizi. Hacettepe Üniversitesi Spor Bilimleri Dergisi, 1995; 6(4).
24. Miller MR, Crapo R, Hankinson J, Brusasco V, Burgos F, Casaburi R, Coates A, Enright P, Grinten CPM, Gustafsson P, Jensen R, Johnson DC, Maclntyre N, McKay R, Navajas D, Pedersen OF, Pellegrino R, Viegi G, & Wanger J. General considerations for lung function testing, Eur Respir J, 2005; 26 (1):153-161.
25. Nar D, Daglioglu O, & Kaya F. The investigation of the effects of 3-month fitness applications on body compositions in sedentaries. International Journal of Sport Studies, 2013; 3(8): 836-846.
26. Ortancıl O, Sarıkaya S, Sapmaz P, Başaran A, Özdolap S. The effect(s) of a six-week home-based exercise program on the respiratory muscle and functional status in ankylosing spondylitis. Journal of Clinical Rheumatology, 2009; 15(2): 68-70.
27. Ozdal M, Daglioglu O, & Demir T. Effect of aerobic training program on some circulatory and respiratory parameters of field hockey players. International Journal of Academic Research, 2013; 5(4).
28. Özdal M, Dağlıoğlu Ö, Demir T, & Özkul N. Effect of aerobic exercise on arterial hemoglobin oxygen saturation. Sports and Performance Research Journal, 2014; 5(1): 27-34.
29. Özer K. Fiziksel Uygunluk. Nobel Yayın Dağıtım, Ankara, 2001; 61-194.
30. Öztop M, Karalar F. 2007-2018 Yılları Arasında Türkiye'nin Sporda Dönemsel Değişimlerini İncelemeye Yönelik Bir Araştırma. International Social Sciences Studies Journal, 2019; 5(32): 1853-1863.
31. Sharrott MT. Wrestling profile Clinicsis sport Medicine, 1984; 3(1): 273-289.
32. Siders, W.A., Bolonchuk, W.W. and Lukaski, H.C. Effects of participation in a collegiate sport season on body composition. Journal of Sports Medicine and Physical Fitness, 1991; 31(4): 571-576.
33. Sinning WE. Body composition Asserment of CollageWrestlers. Medicine, Sci. Sport Exercise G, 1974, 139-145.
34. Tamer K. Sporda Fiziksel Fizyolojik Performansın Ölçülmesi ve Değerlendirilmesi. Türkerler Kitabevi, Ankara, 1995; 48-163.
35. Uysal F. Büyük Bayanlar Dünya Şampiyonasına Katılacak Judo A Milli Takımının Hazırlık Dönemi Antrenmanlarının Anaerobik Güç Ve Bazı Antropometrik Parametrelerin Üzerine Etkisinin İncelenmesi. Gazi Üniversitesi, Sağlık Bilimleri Enstitüsü, Yüksek Lisans Tezi, Ankara, 2012.
36. Uzun A, Akyüz M, Taş M. Aydos L. Genç Elit Güreşçilerde Solunum Parametrelerinin Bazı Antropometrik Özelliklerle İlişkisinin İncelenmesi. Niğde Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi; 2010; 4(1): 10-16.
37. Weinberger SE, Drazen MJ. Disturbances of respiratory function. Harrison's Principles of Internal Medicine, 1998; 1407-1419.
38. Yılmaz, T, Dağlıoğlu Ö. The Effect of Aerobic Training Program on Cardiopulmonary Parameters and Oxygen Saturation in Elite Judokas. Turkish Journal of Sport and Exercise, 2018; 20(3): 333-337.
39. Ziyagil MA, Zorba E, Eliöz M. Sıkletlerinde I. ve II. olan güreşçilerin yapısal ve fonksiyonel özelliklerinin karşılaştırılması. Spor Bilimleri Dergisi, 1994; (1): 36-46.
40. Zorba E, İmamoğlu O, Doğu G, Ziyagil MA. Genç Erkek Judocular ve Sıkletlerinde Türkiye Birincisi Olan Güreşçilerin Bazı Antropometrik Parametrelerinin Karşılaştırılması. V. Spor hekimliği kongresi, İzmir, 1995; 36.