

Comparison of anaerobic power and vertical jump measurements of taekwondo and karate athletes

Ahmet CÖNDÜ¹, Orhan Ahmet ŞENER¹, Şerife ALPA²

¹Selçuk University, Faculty of Sports Science, Department of Physical Education and Sport, Konya Turkey.

²Karatay University, Medical Faculty, Department of Anatomy, Konya, Turkey.

Abstract

This study was conducted to compare of taekwondo and karate athletes vertical jump and anaerobic power. The study sample who regularly practice, 8 karate and 8 taekwondo in total constitutes 16 male athletes. The height of the athletes who participated in the study from the walls and the ability to reach a maximum vertical jump measurement were taken. Height in cm lengths were measured by the meter, vertical jump data are recorded in the meter. The results showed a significant difference between the maximum variable branch extends the capacity of the wall of the athletes were observed ($p=0.342$). In addition, athletes in taekwondo and karate branch was found to be a significant difference in the vertical jump test ($p=0.008$). Taekwondo athletes vertical jump branches in average ($x=46.75$) than the average athlete in karate branch ($x=32.25$) were found to be high. After reviewing the studies, it was determined that in the light of the literature, and the results of the vertical jump test data of athletes, Taekwondo athletes and karate athletes were found to be higher higher than other branches of sport.

Keywords: Karate, Taekwondo, AnaerobicPower, Height Development

INTRODUCTION

Taekowndo, the Korean martial art, is character The name means "the art of kicking and punching ". Taekwondo, is one of many martial art forms originally developed over 120 centuries ago in Korea. It is the most popular martial art in the world, studied in over 140 countries and practiced by a million participants of all ages every day. Being one of many martial art forms, Taekwondo is unique by the predominant use of powerful kicking techniques (11, 8).

Karate is a poly structural acyclic sport that consists of many repetitions of short sequences (bursts techniques and hopping movements) interrupted by recovery periods. Although karate is characterized by high-intensity intermittent activities, aerobic metabolism also plays an important role in the physiological profile of an elite karate athlete. Owing to the needs of aerobic and anaerobic demands during karate training, elite-class karate athletes are usually getting mixed training combining both demands (14).

The work done by skeletal muscles during maximal and supramaximal physical activity by using anaerobic energy transfer systems is called as "anaerobic capacity". The value of this work at per

unit time is called as anaerobic power. It is important to assess physiologically the fast sprint-like activities and anaerobic power sports to evaluate anaerobic performance in sports such as weight lifting, discus throwing, 100-meter sprint running, basketball and soccer (12, 15).

Anaerobic work is the physical type of activity which means that the explosive power is revealed; a work load is performed above the anaerobic threshold value and shows itself with weariness. Anaerobic activity cannot be sustained for longer durations, because skeleton muscles work with anaerobic metabolism that is much above the steady-rate oxygen metabolism. In such a situation, the lactate level rises in the muscles and in the blood. The buffering of the accumulated lactate increases the elimination of carbon dioxide from the lungs. Due to pH decrease ($pH=6,4$), weariness occurs in the muscles.

It is extremely important to perform an anaerobic power assessment in weight lifting, standing long jump, high jump, shot put, javelin throw, speed departures, and in short-lasting, intense or sportive exercises in football, volleyball, basketball, for the purpose of increasing the

performance. In maximal activities that last less than 10 seconds, the required energy is provided by the phosphagen system. In sportive activities performed within 4 seconds like weight-lifting and serving in tennis, the muscle tissue uses the stored ATP.

The main biochemical processes in the anaerobic energy formation occur within seconds. Many studies conducted on sports focus on children and sports. Many factors motivate the participation of children and young people in sportive events. Well some genetic factors like the muscle structure and body construction may be known beforehand to a certain extent. However, there are some psychological factors that have equal importance as previously-known factors. The most important part of motivation consists of psychological factors (12). In this study, it is aimed to obtain vertical jump measurements and anaerobic power in taekwondo and karate athletes.

MATERIAL & METHOD

In this context, the purpose of the present study is to determine the motivations that make the young study population become active in Taekwondo and Karate branches, and to reveal the differences in terms of gender, age, branch and starting the sport periods. 8 Karate and 8 Taekwondo athletes; a total of 16 male sports players from Konya Metropolitan Municipality Sport Club, who did regular training, participated in the present study.

The height values of the individuals were measured and the vertical jump test was performed. The height values (cm) were measured with a sensitivity of 0.1 mm. The measurements were made without shoes or trainers and with standard sports clothes. The vertical jump test was performed as follows; the participant was asked to jump to the highest possible point with both feet in front of a platform that hung on the wall. Before the test, the maximum stretch points of the athletes were determined in front of the test platform. The difference between the jumping distance at the end of the test and the stretching distance in front of the platform was determined, and the vertical jump distance was recorded as cm. The test was repeated three times for the participants. School and wants to be in the business life as soon as possible (18).

The questionnaire consists of 17 questions and includes 6 dimensions of career perception. The

questionnaire was prepared in the form of 5-degree Likert Scale.

Marking on the form is prepared as "1=Definitely Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Definitely Agree". As mentioned above, 6 dimensions of career perception are considered for accurate evaluations of the results. 6 dimensions include "Employment and Working Conditions, Perception of the Society towards the Sector, Career Expectations, Education, Wage and Gender.

The data were evaluated by the SPSS program and Cronbach's Alpha coefficient was calculated for the reliability of the measurement. After seeing that the results are appropriate, normal distribution tests were applied to the data to see if they show normal distribution. After realizing that the normality test data obtained were in the range of appropriate values, the validity of the hypotheses was checked by performing independent sample t test from the parametric tests in the scope of the research.

INTERPRETATION of ANALYSIS & FINDINGS

The mean heights of the Taekwondo and Karate athletes who participated in the study were determined to be 167.75 cm and 164.87 cm respectively (Table 1).

Table 1. Height measurements of Taekwondo and Karate athletes

	n	Mean	Standard deviation
Taekwondo athletes	8	167.75 cm	±4.52
Karate athletes	8	164.87 cm	±10.11

Table 2. Vertical jump and anaerobic power measurements of Taekwondo and Karate athletes

	Taekwondo athletes	Karate athletes	
Vertical jump	46.75±8.69	3.25±5.77	p=0.008
Anaerobic power	132.37±27.85	94.12±1.94	p=0.001

The average values of the Taekwondo and Karate athletes in vertical jump were determined as 46.75±8.69 and 3.25±5.77. respectively. The anaerobic power comparison of Taekwondo and Karate athletes were determined as 132.37±27.85 kg/min and 94.12±16.94, respectively (Table 2). The vertical jump results of the taekwondo athletes were higher than the karate athletes. When the vertical jump results of the Taekwondo and Karate athletes were compared, it was determined that the difference between these data was significant

CONCLUSION & EVALUATION

In previous studies, when the vertical jump values were compared in individuals from the same group who did and who did not do sports, it was reported that the difference between these groups was significant. Similar results were reported in studies that were conducted to compare different sports branches at the same time. Significant increases have been found in vertical jump values of the children who do taekwondo. Moreover, significant differences have also been found in periphery and wideness values of sportsman children. When the other similar studies are examined, it is understood that vertical jump values of athletes in the same age group are different from each other (1).

In the measurements carried out in male athletes at different sports branches of the same age group, vertical jump values were found $39\pm 6,51$ cm in the ones who do sports and $27,93 \pm 5,43$ cm in the ones who do not do sports (3). In their study carried out in sedentary group and the ones who do sports at different sports branches, they found vertical jump values $30,58 \pm 5,64$ cm in footballers, $34,6\pm 7.67$ cm in basketball athletes and 23.4 ± 2.75 cm in sedentary group (16). The mentioned values were found 52.1 ± 9.61 cm in the youth national table tennis athletes. 46.62 ± 7.72 cm in the youth national badminton team. 43.7 ± 9.84 cm in 12-14 age group sprint (short distance) swimmers and 33.23 ± 3.67 cm in 12-14 age group long distance swimmers (10. 6. 13).

Vertical jump parameters were found 55.83 ± 3.35 cm in volleyball athletes. 50.44 ± 4.17 cm in footballers. 50.15 ± 5.10 cm in taekwondo ists and 52.33 ± 7.02 cm in judo is . As a result of inter-group comparison of the physical and physiological parameters of individual and team athletes. no significant difference was found in the level of vertical jump parameters. in favor of team athletes ($p<0.05$) (5). In another study, the children, who have joined physical activity for three hours a week for at least a year, and the children, who do not join physical activity, are compared and it is determined that vertical jump values are higher in the group who joins physical activity (2). In addition to this, it has been stated that football trainings alone cause more increases in maximal force in young athletes (12-15 ages) than normal development and more increases occur in maximal force and vertical jump

when resistance trainings are added to football trainings (4).

In a study over young basketball teams, the champion team and the team not ranking were compared. Accordingly, the average age of the champion team was found 14.5 ± 0.6 years and its vertical jump average was found 58.73 ± 9.47 cm, the average age of the team not ranking was found 14.5 ± 0.5 years and its vertical jump average was found 37.1 ± 4.4 cm. In accordance with these data, while vertical jump of the champion team was at very good levels, vertical jump averages of the team not ranking became very low.

Vertical jump averages of students, who took aptitude tests, were lower than the champion team and higher than the team not ranking (7). While no significant difference was found between age, height, body weight and vertical jump values in men by branches ($p>0.05$), vertical jump values of women at athletics branch were better than female students at basketball, volleyball, handball branches. The reason for this can be due to the features of athletics branch (9).

Again, in many previous studies, the leg force, flexibility and anaerobic power were measured separately or together. It was observed that the measurement results were affected by age, gender, muscle type, muscle mass, and genetics. It was also reported that the vertical jump average values were higher in successful individuals who did regular sports. In conclusion, it has been seen that anaerobic power properties of Taekwondo is ts are more developed than those of karate athletes. Significant different was found between the measurements of taekwondo is its and karate athletes who trained. It was seen that vertical jump measurement values of taekwondo is its were significantly higher than measurement values of karate athletes.

REFERENCES

1. Açıkada C. Ergen E. Bilim ve Spor. Büro-Tek Ofset Matbaacılık. Ankara, 1990.
2. Ara I, Vicente-Rodríguez G, Jimenez-Ramirez J, et al. Regular Participation in Sports is Associated with Enhanced Physical Fitness and Lower Fat Mass in Prepubertal Boys. *International Journal of Obesity and Related Metabolic Disorders*. 2004; 28(12):1585-1593.
3. Aydos L. Kürkçü R. 13-18 Yaş Grubu Spor Yapan ve Yapmayan Orta Öğrenim Gençliğinin Fiziksel ve Fizyolojik

- Özelliklerinin Karşılaştırılması. G.Ü. Beden Eğitimi ve Spor Bilimleri Dergisi, 1997; 2(2):31-38.
4. Christou M, Smilios I, Sotiropoulos K, et al. Effects of Resistance Training on the Physical Capacities of Adolescent Soccer Players. Journal of Strength and Conditioning Research, 2006; 20(4):783-791.
 5. Çelenk Ç, Çumralıgil B. Takım Sporcuları İle Ferdi Sporcuların Bazı Fiziksel Ve Fizyolojik Özelliklerinin Karşılaştırılması. Journal of Physical Education and Sport Sciences, 2005; 7(3):1-7.
 6. Çimen O, Cicioğlu İ, Günay M. Erkek ve Bayan Türk Genç Milli Masa Tenisçilerin Fiziksel ve Fizyolojik Profilleri. G.Ü. Beden Eğitimi ve Spor Bilimleri Dergisi, 1997; 2(4):7-12.
 7. Jonathan M, Euan A. A perspective on exercise, lactate, and the anaerobic threshold. Chest, 1997; 111;787-795.
 8. Kazemi M, Perri G, Soave D. A profile of 2008 Olympic Taekwondo competitors. J Can Chiropr Assoc, 2010; 54(4):243-249.
 9. Kuter M. ve Öztürk F. Türkiye Şampiyonu Bir Küçük Yıldız Basketbol Takımının Fiziksel ve Fizyolojik Profiline Dereceye Girememiş Bir Takım ile Karşılaştırılması. Spor Bilimleri II. Ulusal Kongresi Bildirileri. Spor Bilimleri ve Teknolojisi Yüksekokulu Yayını, 1992; 3:265-271. Ankara.
 10. Li L., Li K. and Ushijima H. Moderate-vigorous physical activity and body fatness in Chinese urban school children. Pediatr Int. 2007; 49(2):280-285
 11. Melhim AF. Aerobic and anaerobic power responses to the practice of taekwon-do. Br J Sports Med, 2001; 35:231-235.
 12. H Muratlı S. Çocuk ve Spor. Bağırhan Yayinevi, Ankara, 1997.
 13. Müniroğlu S., Şen P. ve Tanılkan K. Ankara'daki 12- 14 Yaş Grubu Kız Erkek Uzun Ve Kısa Mesafe Yüzücülerin Dikey Sıçrama Derecelerinin İncelenmesi. M.Ü. Spor Araştırmaları Dergisi, 2000; 4(1):21-32.
 14. Pesic S, Jakovljevic V, Djordjevic D, Cubrilo D, Zivkovic V, Jorga V, Mujovic V, Djuric D, Stojimirovic B. Exercise-induced changes in redox status of elite karate athletes. Chin J Physiol, 2012; 29;55(1):8-15.
 15. Yıldız SA. Aerobik ve Anaerobik Kapasitenin Anlamı Nedir? Solunum, 2012; 14:1-8.
 16. Zorba E, Kalkavan A, Ağaoğlu S, Karakuş S, Çolak H. Farklı Spor Branşlarında Bazı Fiziksel Uygunluk Değerlerinin Sedanter Grupla Karşılaştırılması. G.Ü. Beden Eğitimi ve Spor Bilimleri Dergisi, 1996; 1(3):25-35.