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A COMPARISON OF THE REACTION TIMES OF ELITE MALE TAEKWONDO AND KICKBOXING ATHLETES

Sezen ÇİMEN POLAT¹, Onur AKMAN¹, Özlem ORHAN¹

¹Gazi University, Faculty of Sports Sciences

ABSTRACT

This study was conducted to compare the reaction times of elite male taekwondo and kickboxing athletes. A total of 44 athletes, 23 male taekwondo practitioners (age: 17.1±0.4, body weight: 59.9±1.89 kg, height: 171.9±1.96 cm) and 21 male kickboxers (age:16.9±0.34, body weight: 67.2±2.06 kg, height: 175.6±2.16 cm), participated in the study. Two reaction time tests -visual and auditory (dominant hand) reaction tests- were administered to the subjects. Each test was performed three times and the best result was recorded. The data was analyzed using SPSS 23.0 package program. In the study, Shapiro-Wilk test was performed to determine if the numerical variables were normally distributed, and Mann Whitney U test was performed to see if there is any difference

between the groups. $p<0.05$ value was considered statistically significant

When the right hand visual reaction, left hand visual reaction and auditory reaction time of the dominant hand in the kickboxing and taekwondo groups were examined at the end of the study, it was found that there was no statistically significant difference between right hand visual reaction and left hand visual reaction parameters between the groups while there was a statistically significant difference in auditory reaction time of dominant hand, when the confidence interval was 95% ($p<0.05$). In conclusion, we can say that the auditory reaction time of the taekwondo athletes was faster compared to the kickboxing athlete.

Key Words: Kickbox, Taekwondo, Reaction time

INTRODUCTION

Performance in combat sports depends on strength, speed, tactics and skill level in the high level. Sudden and rapid displacement in such sports, combination of hands and feet with the same skill, or defense and attack at the same moment in a very fast and powerful attack towards him are factors related to reaction time (10, 14). For this reason, visual reaction time is seen as one of the important elements in fight sports (13). The reaction time is defined as the time between an unexpected and sudden emergence and this stimulus response (9). The Reaction time can vary depending on age, training status, and the level of central and peripheral fatigue (3). Kickboks ve Taekwondo dövüş sporları içindedir. Kick Boxing is a fighting action that is a combination of punch, kick, knee and clinch movements. It has seven different fighting styles (Semi Contact, Light Contact, Full Contact, Low Kick, K-1 Contact, Musical Form, Aero Kick Boks). In order to win in kick-boxing matches, the athlete must make quick attacks and at the same time he must react quickly to counter attack. Therefore, the athlete must have quick or short time to move. Taekwondo is a defense art that has been independently developed in Korea and gained international contemporary qualities. The main feature of Taekwondo is that it is a competition sport involving defense techniques against the opponent (12). Studies have shown that Taekwondo is effective in reducing body fat, increasing flexibility (7) and improving reaction time (14). The getting to score in an offensive or defensive enforcement in combat sports, substantially depends on the speed of movement, joint mobility and reaction time (14). When the researches on the combat sports are examined, it is seen that they are mostly concentrated in branches such as taekwondo, karate, boxing and judo. However, there seems to be a limited number of studies on the Kick Boxing branch. In addition, there are few studies the number of comparisons in combat sports (16). The aim of this study, which was carried out by considering reaction time as an important parameter in combat sports is to compare the reaction times of kickboxing and taekwondo athletes at the elite level.

METHOD

This study was conducted on a total of 44 male athletes in elite level taekwondo (n = 23) and kick boxing (n = 21) branches in Ankara. Measurements were taken at İsmet İraz and Şefik Tetik Sports Hall. The subjects were informed before the measurements and were informed about the measurements to be made. A "voluntary consent form" has been signed for their participation in voluntary work.

Reaction Time Measurement

Two separate reaction times, visual and auditory (dominant hand), were performed with the New Test 2000 reaction meter. Each test was performed three times and the best time was recorded.

Statistical Analysis

Analysis of the data was done in SPSS 23.0 package program. The Shapiro-Wilk test was used to determine whether the distribution of numerical variables was normally distributed, and the Mann Whitney U test was used to determine whether there was any difference between the groups. Statistically significant level of was accepted as $p < 0.05$.

RESULTS

Table 1. Comparison of Age Values

	Branchs	Mean ±SS
Age (year)	Kickboxing (n=21)	16.9±0.34
	Taekwondo (n=23)	17.1±0.4

Table 2. Comparison of Body Length and Body Weight Values

Parameters	Group	Mean±SS	<i>p</i>
Height (cm)	Kickboxing (n=21)	175.6±2.16	0.32
	Taekwondo (n=23)	171.9±1.96	
Body Weight(kg)	Kickboxing (n=21)	67.2±2.06	0.02*
	Tekvando (n=23)	59.9±1.89	

p<0.05*

As a result of comparing the height and body weight of kick boxing and taekwondo group, a statistically significant difference was found in the body weight (kg) parameter ($p < 0.05$), while no statistically significant difference was found in the height length (cm) parameter (Table 2).

Table 3. The Comparison of Values of Visual Reaction Right Hand, Visual Reaction Left Hand, Auditory Reaction Dominant Hand

Parameters	Group	Mean ±SS	<i>p</i>
Visual Reaction Right Hand (mls)	Kickboxing (n=21)	222±6.96	0.41
	Tekvando (n=23)	217.1±6.35	
Visual Reaction Left Hand (mls)	Kickboxing (n=21)	208.2±5.27	0.29
	Tekvando (n=23)	201.3±4.39	
Auditory Reaction Dominant Hand (mls)	Kickboxing (n=21)	200.1±4.65	0.04*
	Tekvando (n=23)	185.7±5.06	

p<0.05*

When Table 3 is examined, it is seen that Kickboxing and taekwondo group compare visual reaction right hand, visual reaction left hand and auditory reaction dominant hand values. There was no statistically significant difference between left hand and right hand and visual left hand parameters. However, statistically significant difference was found in auditory reaction dominant hand parameters ($p < 0.05$).

DISCUSSION AND CONCLUSION

The visual and auditory reactions of Kickboxing and Taekwondo national athletes were compared in the study. As a result of the study, there was no significant difference between the height of the kick boxing and taekwondo group and the visual reaction parameters of right and left hand, but statistically significant difference was found in the dominant hand auditory reaction parameters ($p < 0.05$). Success in combat sports includes technique, tactics, speed, strength, coordination and reaction. Reaction time can be effective in gaining points as an attack or defense. Especially in the branches where sudden movements like kick boxing and taekwondo are made and it is necessary to make a quick decision (15,18) Heller et al., 1998 found the reaction time values of 19 male elite taekwondo (age = 20.9 ± 2.2 years) against SESE as 196 ± 16.4 ms. Bilgin et al., found elite kickboxing reaction times in their study in 2014; right hand visual $197,26 \pm 28,80$ ms, left hand visual $185,61 \pm 28,52$ ms, right hand auditory $174,39 \pm 28,02$ ms and left hand auditory $173,04 \pm 37,99$ ms. When the auditory reaction values of taekwondo and kick boxers are examined, it is seen that auditory reaction values are better than visual reaction values. O'Donovan et al., indicate that it is possible to improve the reaction time by stimulating studies and that visual and auditory reaction times are important in the fight sports. Dundar stated that the reaction time could be improved by 0,12 ms with training. Again, Çolakoğlu et al., 1993 report that the time of reaction can be shortened by long-term physical training (6). It is stated that the combat athletes have a good level of neurotransmission rates and neuromuscular coordination. These athletes are constantly, quickly and suddenly displaced, and quick decision-making affects reaction times positively (1). In a study on 58 active athletes dealing with combat sports such as boxing, karate, judo and aikido, the right hand visual reaction times ($1/100$ s) $19,85 \pm 2,00$, left hand visual reaction times $19,38 \pm$

2,50, the auditory right hand (dominant hand) reaction was found to be $15,68 \pm 2,12$, and the auditory left hand reaction times to be $15,48 \pm 2,05$. In the combat sports, athletes use various defense and offensive techniques using the upper and lower limbs in a fast and effective manner. Çakıroğlu and Sökmen observed that in a study they conducted in 2012, the 12-week judo technical training had positive effects of reaction time on boys 8-10 years of age. In another study, it was found that there was a significant difference in the comparison between left and right hand reaction time measurement values of taekwondo gyorugi, mean age of 22.2 ± 3.82 years, and taekwondo poomsae, 22.4 ± 2.59 years, respectively ($p < 0,01$). At the same time, the gyorugi athletes' reaction times were shorter than those of the poomsae athletes in both hands. It is thought that this difference is caused by the attack in taekwondo sport, defense and counter-attacks being answered by eye-muscle coordination (8). In the study of 91 male athletes who are engaged in combat sports and whose right hand is dominant and their age is $22,89 \pm 5,37$, the right hand visual reaction times of the kick boks are $188,20 \pm 28,58$ and the left hand visual reaction times are $188,66 \pm 27,25$ and dominant hand auditory reaction times were found to be 158.20 ± 26.65 . In the same study, the mean age of the right hand visual reaction was 187.40 ± 16.23 , the mean visual acuity of the left hand was 186.00 ± 15.63 , 25 and the dominant hand auditory reaction time was $145.20 \pm 17,41$ (5). These values were found to be shorter than the reaction times obtained in the research. It can be saying that this difference may be due to differences in duration and scope of training. When the investigations are examined, it can be said that the reaction time is an important parameter for both taekwondo and Kickboxing. In a research pointed out that taekwondo and kick boxing athletes have similar coordination in their work (16,17). When taekwondo and Kickboxing athletes are compared, it is considered that auditory reaction times are better because of the structure and characteristic features of the taekwondo branch and the use of more auditory stimuli. Asia et al., 2013, found that Taekwondo responded more quickly to visual auditory stimuli in their study of visual and auditory reaction times on taekwondo. For this reason, they emphasized that the auditory reaction may be better because they use external stimuli when driving or defending against opponents. As a result, it can be said that the reaction in fight sports is important for performance. However, it can be seen that the answer to the question of whether visual or auditory

reaction is more prominent in the fight sports is not clear. The reaction times of Kickboxing and taekwondo were compared in this study, considering that the work being done is low and the work to be done in different branches may be beneficial to coaches and athletes.

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