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COMPARISON OF THE EFFECTS OF HIGH LEVEL TECHNICAL STRIKES OF TAEKWONDO ATHLETES ON THE ELECTRONIC HEAD GEAR BEFORE AND AFTER TRAINING

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ABSTRACT

This study aimed at investigating the change in taekwondo athletes' performance as a result of the training with electronic head gears in order to develop their high level technical skills. The research sample consisted of 30 licensed male taekwondo athletes who were in the age range of 10-13 years and trained in a private gym. Four high-level strike techniques were identified for the development of their technical skills, and they were applied an eight-week taekwondo training program including two hours of practice per day three days a week. IBM SPSS 21.0 software was used to analyze the research data. Descriptive statistics were used to determine the distributions of the data. Pearson's correlation analysis was used to examine inter-variable relations, and ANOVA (post-hoc Tukey) analysis was used to determine the differences between the research groups. The results were presented as means (X) and standard deviations (SS). The p values of less than 0.05 were considered statistically significant. A significant difference between the groups was determined in the final test measurements, but no statistically significant difference was found in the first test. The practice with electronic head gears system was found to have a positive effect on the performance of athletes who performed the technical strikes in the training program.

Key Words: Academician, Mobbing, Organizational Justice, Students

INTRODUCTION

Taekwondo is a Korean, defensive martial art that is performed with bare hands and feet, requiring high-level nerve-muscle coordination to stop the opponent's strong blows or defeat the opponent (Lewis, 1996; Mark, 1984; Kim et all., 2015; Koh and Watkinson, 2002; Akinlar and Topal, 2011). Although taekwondo has a long historical background dating back to before the Common Era (Tel, 2008) it was added to the official competitions as a new Olympic martial arts sport at the 2000 Sydney Olympic Games (Kazemi and Pieter,2004; Gupta, 2011) and this has led to an increased interest in this sport among children and young people. In the following years, developments, including changes in the taekwondo scoring system, reduction in size of the ring and conversion of its shape from a square to an octagon, acceleration of the sport with the ten-second-rule, increasing the score values for head techniques, introduction of coaches' right to object to scores and penalties, and changes in the game rules regarding penalties, have all led this sport, which forces athletes to be active, to be faster and fairer (Moenig,2015). Thus, taekwondo coaches and athletes have sought new ways of training to achieve high performance (Kim et all.,2011; WTF, 2016).

Participation in taekwondo competitions has been increasing because taekwondo is an Olympic branch and has a lot of licensed athletes both in Turkey and the world. This leads to new quests in competition systems. Along with this, it is very important to be able to get an immediate response to the application (Cooper and Storer, 2001), objectively evaluate the athletes' performance and achieve an unbiased, fair result at the end of the evaluation (Sevinç,2016). As in all sports, there are also many analytical methods in taekwondo to determine qualitative and quantitative data for performance follow-up, create a training program according to the athletes' abilities and allow coaches to better supervise athletes (Bayraktar and Kurtoğlu,2004) and detect and improve their deficiencies.

The World Taekwondo Federation has decided to use an electronic system to assess scores and penalties of taekwondo athletes during matches in order to make more objective evaluations and produce fairer results. This was first tried at the European Youth Championship organized in Sweden in 2013 and subsequently, at other tournaments (Chi,2005; Moenig,2015; Tasika,2013; Song et. all.,2010; Song et. all.,2010; Chi, 2008). Body protectors equipped with electronic sensors provide more accurate and reliable scoring and enable coaches and athletes to develop strategies related to attacks and counterattacks

(Leveaux,2010; Tornello et.all.,2014), determine the techniques to be used in competition (İmamoğlu, and bayram,2010) and receive a fair and unbiased results in competition (Del Vecchio et.all.,2011; Tornello et.all.,2014; Schwartz,1994).

The technical combinations applied by the athletes in taekwondo competitions are evaluated by referees. In other words, referees decide whether the applied technique is correct and sufficient for receiving a score. However, the electronic system determines whether the score is given correctly with a performance of the right technique (Sevinç,2016). The electronic system eliminates questionable situations in competition and allows the performance of athletes and coaches to be evaluated objectively (Ko et. all.,2013; Partridge et.all.,2005).

During competition, an electronic head gear and a foot protector with a sensor are used for scoring (Figure 1). The sensors in the electronic head gear and on the upper side of foot protector automatically transmit the score to the scoreboard when they receive sufficiently strong pressure together with correct technique. Otherwise, no score is generated (Del Vecchio et.all.,2011; Partridge et.all.,2005).

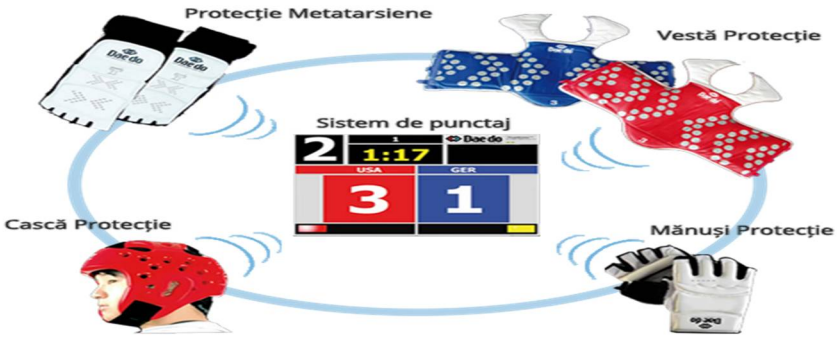

Figure 1 Electronic head gear and other electronic equipment

In addition, the pressure (strike intensity) on the head gear varies, allowing the athlete receive a score according to each category and weight. These pressure settings are reported to all countries by the World Taekwondo Federation. Thus, all competition criteria are equal for all taekwondo athletes around the world (Sevinç,2016).

This study investigates the change in the performance of the taekwondo athletes as a result of the training with the electronic head gears in order to ensure adaptation to the new system and the development of high level technical skills, as well as determining differences in athletes' performance before and after the training. By measuring the effect of this new electronic system, this study is expected to contribute to the literature, which contains a limited number of studies of this topic.

MATERIALS AND METHODS

The research sample consisted of 30 licensed male taekwondo athletes who were in the age range of 10-13 years, regularly trained in a private gym and participated voluntarily in the research. They were randomly divided into two groups, including 15 athletes each in the control and experimental groups. Before the training program, the athletes were informed of the relevant technical data and filled out consent forms. Four taekwondo techniques were selected from the high-level techniques in order to develop their technical skills. The scoring of these techniques was based on the score values determined by The World Taekwondo Federation (Table 1).

Table 1. Technicals and Points

	Technicals	**Point**
Technicals	Front turning kick	3 point
	Axe kick	3 point
	360 turning kick	4 point
	Reverse kick	4 point

Athletes are allowed five strikes with each foot in each technique. Taking into account the participants' weights and categories, the mean pressure was set at 9 bar. If the correct strike was not made, no score was registered by the electronic system. If the athlete was unable to hit towards the opponent's head line, a penalty score was applied. Although the time limit was not taken as a constraint, the participants' scores on each technique and the time to complete the technique were obtained from the electronic system and then evaluated accordingly (Sevinç,2016).

After obtaining measurements from the control and experimental groups, the researcher, a taekwondo trainer, prepared and applied an 8-week training program consisting of daily two-hour exercise three days a week. The mistakes made by the athletes for each technique were determined by keeping observation notes.

As a result of these observations, the trainer provided the athletes with the following feedback: when applying axe kick technique, the fingers should be fully extended forward during full strike and the sensor in the middle of the foot sole should be in contact with the head gear; however, when applying 360 turning kick technique, the athletes should pay attention to the point they at which lost their balance and at which phase they should apply the technique after rotation, and should also hit with the sensor just above the foot. The athletes were also recommended that the sensor in the middle of the foot sole or on the heel should contact with the head gear in the reverse kick technique. They were also told to pay attention to the angle of the ankle during the strike, to extend the fingers forward and to adjust the angle of the hips properly. Regarding front turning kick technique, it was shown which points of the upper part of the foot should correspond to the head gear, and it was suggested that the hips should be turned completely in the direction of the strike. In addition, the athletes were trained about all the technical arrangements particular to taekwondo, and shown practically how their body angles and feet angle should be adjusted when applying techniques. The feedback process was continued throughout the program to ensure that the athletes broke the habits they had acquired before using the electronic system. After eight weeks, an additional measurement was obtained from the athletes performing technical training with the electronic head gears system. Then the development of the athletes was evaluated by comparing the first and final measurements.

The data were collected using a performance chart generated by the researcher. The scores by the athletes from the right and left strikes applied for each technique and the completion time for each technique were obtained from the electronic system and recorded on the performance charts designed for each of the 15 athletes. In addition, the strikes that the athletes did not score when applying a technique and the situations that required the athletes to be penalized in accordance with the taekwondo rules were recorded as penalty scores (half penalty scores) on the same performance charts.

IBM SPSS 21.0 software was used to analyze the data. Descriptive statistics were used to determine distributions of the data. Pearson's correlation analysis was used to examine inter-variable relations, and ANOVA (post-hoc Tukey) analysis was used to determine the differences between groups. The results were presented as means (X) and standard deviations (SS). The p values of less than 0.05 were considered statistically significant.

RESULTS

A table of the reasons for not receiving scores in the electronic head gear system after the practice of four high level technical strikes by the participants is shown below.

Table 2. Reasons why participants did not score in technical strikes

Failure to find adequate pressure during the practice of strikes
Failure to hit with the upper side of foot in the practice of Front turning kick- techniques
Failure to extend fingertips completely during strikes in the practice of Axe kick- techniques
Failure to strike properly and effectively in the practice of twist Front turning kick- techniques because of not achieving strike balance

The athletes got low scores for: failure to find adequate pressure during the practice of strikes, inappropriate hit of the upper side of the foot to the head gear, failure to extend fingertips completely during strikes in the practice Axe kick techniques, failure to set the sensor in the middle of the foot as the hit point, failure to ensure body balance and proper footwork in twisting techniques and failure to hit right on the target with the upper side of the foot (Table 2).

Table 3. Comparison of Intergroup Variables

Variables	First Measurement		Last Measurement		Control Group		F	P
	X	SS	X	SS	X	SS		
Front turning kick	17,7000[a]	3,11563	18,2333[a]	3,25613	23,8333[b]	5,67786	9,886	0
Penalty	,9667[a]	1,10948	1,0333[a]	1,20218	,3000[a]	0,49281	2,535	0,091
Time	15,6667[a]	2,87021	15,9333[a]	3,34806	15,3333[a]	3,57904	0,126	0,882
Total Points	18,6667[a]	3,37357	19,2667[a]	3,41147	24,1333[b]	5,60442	7,431	0,002
Axe kick	15,7000[a]	3,49387	16,3667[a]	3,87974	21,0000[b]	3,92792	8,785	0,001
Penalty	1,3000[b]	1,03164	,8333[ab]	0,67259	,4000[a]	0,68661	4,586	0,016
Time	21,2667[a]	5,81623	20,5333[a]	5,1251	18,0667[a]	4,44758	1,576	0,219
Total Points	17,0000[a]	3,87298	17,2000[a]	3,83964	21,4000[b]	4,06729	6,002	0,005
360 Tuning kick	20,5667[a]	4,10951	20,9333[a]	4,14844	26,6667[b]	5,12928	8,718	0,001
Penalty	1,8333[b]	1,27709	1,1333[ab]	0,83381	,5333[a]	0,69351	6,786	0,003
Time	27,4000[a]	5,81623	26,8667[a]	6,44611	23,8667[a]	5,65517	1,521	0,23
Total Points	22,4000[a]	3,64104	22,0667[a]	3,9364	27,2000[b]	5,49285	6,301	0,004
Reverse kick	12,8667[a]	8,76573	13,8000[a]	9,5259	22,1000[b]	8,06492	4,998	0,011
Penalty	1,8000[b]	1,26491	1,4000[ab]	0,82808	,8333[a]	0,67259	3,877	0,028
Time	29,0667[a]	8,09291	28,8000[a]	8,09291	24,6667[a]	7,9072	1,357	0,268
Total Points	14,6667[a]	8,64099	15,2000[a]	9,22109	22,9333[b]	8,20685	4,242	0,021

[a,b,] The difference between the groups with different letters on the same line is significant

Table 3 shows that no significant difference was found between the groups according to the variables of penalty, front turning kick time, axe kick time, twist front turning kick time and front turning kick time. No significant difference was found between groups 1 and 2, while a statistically significant difference was found in group 3, according to the values of the variables, Score, T, Score2, T2, Score3, T3, Score4 and T4. No significant differences were found between groups 1 and 2 or between groups 2 and 3, while a statistically significant difference was found between groups 1 and 3, according to the values of the variables, Penalty2, Penalty3 and Penalty4 ($p<0.05$)

		Grup	Point	Penalty	T	Time	Point2	Penalty2	T2	Time2	Point3	Penalty3	T3	Time3	Point4	Penalty4	T4	Time4
Group	PC	1	,466**	-0,27	,511**	-0,043	,417**	-,423**	,499**	-0,252	,401**	-,494**	,483**	-0,241	,366*	-,393**	,398**	-0,22
	S		0,001	0,073	0	0,78	0,004	0,004	0	0,095	0,006	0,001	0,001	0,111	0,013	0,008	0,007	0,147
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Point	PC	,466**	1	-0,01	,979**	-,445**	,442**	-0,177	,473**	-,510**	,374*	-0,234	,403**	-,587**	,565**	-,373*	,590**	-,518**
	S	0,001		0,946	0	0,002	0,002	0,244	0,001	0	0,011	0,122	0,006	0	0	0,012	0	0
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Penalty	PC	-0,27	-0,01	1	-0,216	-0,272	0,006	0,193	-0,033	0,051	-0,258	0,236	-0,293	0,048	0,169	0,068	0,158	-0,087
	S	0,073	0,946		0,154	0,071	0,971	0,203	0,829	0,739	0,087	0,119	0,051	0,756	0,266	0,656	0,301	0,572
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Front kick	PC	,511**	,979**	-0,216	1	-,379*	,430**	-0,213	,469**	-,509**	,418**	-0,277	,454**	-,583**	,517**	-,378*	,544**	-,488**
	S	0	0	0,154		0,01	0,003	0,16	0,001	0	0,004	0,066	0,002	0	0	0,01	0	0,001
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Time	PC	-0,043	-,445**	-0,272	-,379*	1	-,352*	-0,129	-,323*	,480**	-0,057	-0,002	-0,053	,511**	-0,284	0,115	-0,289	,549**
	S	0,78	0,002	0,071	0,01		0,018	0,399	0,03	0,001	0,71	0,989	0,727	0	0,059	0,452	0,054	0
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Point2	PC	,417**	,442**	0,006	,430**	-,352*	1	0,058	,980**	-0,193	,387**	-0,084	,384**	-,296*	,691**	-,366*	,712**	-,322*
	S	0,004	0,002	0,971	0,003	0,018		0,706	0	0,203	0,009	0,583	0,009	0,048	0	0,013	0	0,031
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Penalty 2	PC	-,423**	-0,177	0,193	-0,213	-0,129	0,058	1	-0,143	0,127	-0,272	,492**	-,360*	0,074	-0,113	0,227	-0,134	0,088
	S	0,004	0,244	0,203	0,16	0,399	0,706		0,35	0,406	0,071	0,001	0,015	0,629	0,458	0,134	0,379	0,566
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Axe kick	PC	,499**	,473**	-0,033	,469**	-,323*	,980**	-0,143	1	-0,217	,438**	-0,182	,452**	-,308*	,708**	-,409**	,733**	-,337*
	S	0	0,001	0,829	0,001	0,03	0	0,35		0,152	0,003	0,232	0,002	0,039	0	0,005	0	0,024
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Time2	PC	-0,252	-,510**	0,051	-,509**	,480**	-0,193	0,127	-0,217	1	-0,202	0,257	-0,245	,793**	-0,146	0,174	-0,16	,735**
	S	0,095	0	0,739	0	0,001	0,203	0,406	0,152		0,183	0,089	0,105	0	0,34	0,254	0,293	0
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Point3	PC	,401**	,374*	-0,258	,418**	-0,057	,387**	-0,272	,438**	-0,202	1	-0,153	,979**	-,384**	0,247	-0,164	0,258	-0,149
	S	0,006	0,011	0,087	0,004	0,71	0,009	0,071	0,003	0,183		0,315	0	0,009	0,102	0,281	0,087	0,327
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Penalty 3	PC	-,494**	-0,234	0,236	-0,277	-0,002	-0,084	,492**	-0,182	0,257	-0,153	1	-,353*	0,242	-0,117	0,142	-0,129	0,055
	S	0,001	0,122	0,119	0,066	0,989	0,583	0,001	0,232	0,089	0,315		0,017	0,109	0,445	0,351	0,4	0,721
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45

		Grup	Point	Penalty	T	Time	Point2	Penalty2	T2	Time2	Point3	Penalty3	T3	Time3	Point4	Penalty4	T4	Time4
360 t. kick	PC	,483**	,403**	-0,293	,454**	-0,053	,384**	-,360*	,452**	-0,245	,979**	-,353*	1	-,414**	0,258	-0,185	0,271	-0,153
	S	0,001	0,006	0,051	0,002	0,727	0,009	0,015	0,002	0,105	0	0,017		0,005	0,087	0,223	0,072	0,316
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Time3	PC	-0,241	-,587**	0,048	-,583**	,511**	-,296*	0,074	-,308*	,793**	-,384**	0,242	-,414**	1	-0,285	0,11	-0,289	,783**
	S	0,111	0	0,756	0	0	0,048	0,629	0,039	0	0,009	0,109	0,005		0,058	0,471	0,054	0
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Point4	PC	,366*	,565**	0,169	,517**	-0,284	,691**	-0,113	,708**	-0,146	0,247	-0,117	0,258	-0,285	1	-0,199	,995**	-,365*
	S	0,013	0	0,266	0	0,059	0	0,458	0	0,34	0,102	0,445	0,087	0,058		0,191	0	0,014
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Penalty 4	PC	-,393**	-,373*	0,068	-,378*	0,115	-,366*	0,227	-,409**	0,174	-0,164	0,142	-0,185	0,11	-0,199	1	-,300*	0,213
	S	0,008	0,012	0,656	0,01	0,452	0,013	0,134	0,005	0,254	0,281	0,351	0,223	0,471	0,191		0,046	0,161
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Reverse kick	PC	,398**	,590**	0,158	,544**	-0,289	,712**	-0,134	,733**	-0,16	0,258	-0,129	0,271	-0,289	,995**	-,300*	1	-,378*
	S	0,007	0	0,301	0	0,054	0	0,379	0	0,293	0,087	0,4	0,072	0,054	0	0,046		0,011
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45
Time4	PC	-0,22	-,518**	-0,087	-,488**	,549**	-,322*	0,088	-,337*	,735**	-0,149	0,055	-0,153	,783**	-,365*	0,213	-,378*	1
	S	0,147	0	0,572	0,001	0	0,031	0,566	0,024	0	0,327	0,721	0,316	0	0,014	0,161	0,011	
	N	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45	45

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4 shows that the relationship between the group variable and the variables, Score, T, Score2, Penalty2, T2, Score3, Penalty3, T3, Penalty4 and T4, was significant at the 0.01 level, while the relationship between the group variable and the Score4 variable was significant at the 0.05 level. The relationship between the score variable and the variables, Group, T, Time, Score2, T2, Time2, T3, Time3, Score4, T4 and Time4, was found to be significant at the 0.01 level, while the relationship between the score variable and the variables, Score3 and Penalty4, was found to be significant at the 0.05 level. The relationship between the T variable and the variables, Group, Score, Score2, T2, Time2, Score3, T3, Time3, Score4, T4 and Time4, was found to be significant at the 0.01 level, while the relationship between the T variable and the Penalty4 variable was found to be significant at the 0.05 level. The relationship between the Time variable and the variables, Time2, Time3 and Time4, was found to be significant at the 0.01 level, while the relationship between the Time variable and the variables, T, Score2 and T2, was found to be significant at the 0.05 level. The relationship between the Score2 variable and the variables, Group, Score, T, T2, Score3, T3, Score4 and T4, was found to be significant at the 0.01 level, while the relationship between the Score2 variable and the variables, Time, Time3, Penalty4 and Time4, was found to be significant at the 0.05 level. The relationship between the Penalty2 variable and the variables, Group and Penalty2, was found to be significant at the 0.01 level, while the relationship between the Penalty2 variable and the T3 variable was found to be significant at the 0.05 level. The relationship between the T2 variable and the variables, Group, Score, T, Score2, Score3, T3, Score4 and T4, was found to be significant at the 0.01 level, while the relationship between the T2 variable and the variables, Time, Time3 and Time4, was found to be significant at 0.05 level. The relationship between the Time variable and the variables, Score, T, Time, Time3 and Time4, was found to be significant at the 0.01 level. The relationship between the Score3 variable and the variables, Group, T, Score2, T2, T3 and Time3, was found to be significant at the 0.01 level, while the relationship between the Score3 variable and the Score variable was found to be significant at the 0.05 level. The relationship between the Penalty3 variable and the variables, Group and Group2, was found to be significant at the 0.01 level, while the relationship between the Penalty3 variable and the T3 variable was found to be significant at the 0.05 level. The relationship between the T3 variable and the variables, Group, Score, T, Score2, T2 and Score3, was found to be significant at the 0.01 level, while the relationship between the T3 variable and the variables,

Penalty2 and Penalty3, was found to be significant at the 0.05 level. The relationship between the Time3 variable and the variables, Score, T, Time, Time2, Score3, T3 and Time4, was found to be significant at the 0.01 level, while the relationship between the Time3 variable and the variables, Score2 and T2, was found to be significant at the 0.05 level. The relationship between the Score4 variable and the variables, Score, T, Score2, T2 and T4, was found to be significant at the 0.01 level, while the relationship between the Score4 variable and the variables, Group and Time4, was found to be significant at the 0.05 level. The relationship between the Penalty4 variable and the variables, Group and T2, was found to be significant at the 0.01 level, while the relationship between the Penalty4 variable and the variables, Score, T, Score2 and T4, was found to be significant at the 0.05 level. The relationship between the T4 variable and the variables, Group, Score, T, Score2, T2 and Score4, was found to be significant at the 0.01 level, while the relationship between the T4 variable and the variables, Penalty4 and Time4, was found to be significant at the 0.05 level. The relationship between the Time4 variable and the variables, Score, T, Time, Time2 and Time3, was found to be significant at the 0.01 level, while the relationship between the Time4 variable and the variables, Score2, T2, Score4 and T4, was found to be significant at the 0.05 level.

DISCUSSION AND CONCLUSION

This study investigated the changes in athletes' performance as a result of the training with an electronic head gear, the development of their technical skills and the functionality of the electronic system. A total of 30 licensed athletes in the age range of 10-13 years participated in the study and were divided into control and experimental groups each with 15 athletes. The data were collected using a performance chart created by the researcher.

The literature review determined that, although there are many studies on the use of electronic systems, but no previous studies of the effect of use of the electronic head gears on athletes' performance.

Partridge et al. (2005) conducted a study of wireless sensor scoring and training system for martial sports and emphasized that this system developed training techniques. In this way, coaches and sports scientists can acquire objective information about athletes' physical performance abilities and have the opportunity to reshape their workouts, motivate

the athletes during training and provide them with objective feedback (Ball et.all.,2011; Kim et.all.,2011). In another study, Song et al. (2010) reported that the electronic system used by taekwondo coaches improved athletes' training techniques and affected their performance. Working with the electronic system improves athletes' technical skills, enables them to learn the correct use of techniques and improves foot control. Song et al. (2010) evaluated the effects of the electronic system and user satisfaction and emphasized that, according to feedback from ten people, the users were generally satisfied with it. Since the electronic head gear is an objective system scoring is equally and fair (Tasika,2013; Song et. all.,2010; Song et.all.,2010; Chi, 2008).

As a result of the examination of the measurements taken during this present study, it was found that there were significant relationships between the research variables. Moreover, considering first-test and final-test measurements in the control group, a significant increase of the final-test scores was observed in the total score variables. A significant difference was found between the groups. A significant difference between the first-test and the final test scores was determined in the penalty variables, and the penalty rate was higher in the first measurements. In conclusion, some technical strikes that were applied with electronic head gears had higher failure rates than the pre-application failure rate, and this may be related to the athletes' warm-up and adaptation process. The significant increase in the scores of the post-application technical strikes disprove the effects of the predicted level of fatigue. Therefore, technical strike applications after training mean additional strength in power training, such that the training flow and concentration can continue for a longer period of time. The applications performed with the electronic head gears can increase the athletes' scores in competition, and training with electronic head gears will create a positive infrastructure for athletes to achieve technical and tactical superiority.

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