

Effect of changes in the sports regulations on the fight of taekwondo female players on the example of Beijing Olympic Tournaments 2008 and London 2012

Artur Kruszewski^(A,B,C,D), Stanisław Kuźmicki^(A,D), Alicja Podchul^(A,B,C,D), Marek Kruszewski^(C,D)
Józef Piłsudski University of Physical Education in Warsaw, Poland

Key words: martial arts, taekwondo, fight structure, Olympic Games

Summary

Introduction. The rapid development of the World's Olympic Taekwondo began with the introduction of this discipline to the programme of the Olympic Games. In its Olympic form, taekwondo fight is based on the rivalry of two players in a direct challenge, mainly to strike a specific blow at an opponent. All over the world the most popular Taekwondo discipline is Kyourugi – sports fight. The main objective of undertaken studies was to determine the effect of changes in sports regulations of taekwondo on the range of technical activities used by female athletes.

Material and methods. In the study it was analyzed a total of 48 fights (84 players) in two Olympic taekwondo tournaments: Beijing – 2008 and London – 2012. There were observed 6 fights in each weight category (-49 kg, -57 kg, -67kg, over 67kg), 24 fights in each tournament. It was used the method of secondary direct analysis.

Results. It was observed an increase in number of technical activities taken in upper zone – olgul (attack on an opponent's head) and a decrease in number of technical activities in lower zone – montong (attack on an opponent's trunk).

Conclusions. The changes in the sports regulations have changed the range of technical activities used by female athletes in attack and counterattack. The players more often realized actions in the counterattack. In both analyzed tournaments it was found that a greater number of technical activities were taken towards a trunk (zone montong) than towards a head (zone olgul). However, it should be noted the significant statistical increase of technical activities towards olgul between the tournament in Beijing and the tournament in London ($p < 0.05$).

Introduction

Sports fight analysis is a common element of observation of players' behavior during tournament fights. It represents only a fraction of the research area, carried out by many other authors. Many researchers point to the relation between selected factors and fight results in taekwondo, they point out many factors, such as morphological [1,2,3], psychological [4], biomechanical [5,6,7,8] and physiological [9,10,11].

The dynamic development of martial arts in Western society is associated with a wide spectrum of their impact on physical and spiritual development. They are recommended for young people as exercise which may reduce aggression and anxiety, and improve their social behavior like respect for ethical standards.

The fast development of the world's Olympic Taekwondo began with the introduction this discipline to the program of the Olympic Games. In its Olympic form taekwondo fight is based

on the rivalry of two players in a direct fight, relying mainly on a specific blow to the opponent. In the world the most often practiced Taekwondo discipline is Kyourugi- sports fight. In the past few years the specificity, regulations and a form of fighting has changed several times. There were created some regulations of sportsmanship, which determines all allowed body space to perform punches and blows. During the fight, the athlete performs many combinations composed of several elements such as kicks towards the head and trunk, the body punches, blocks, dodge, spinning and leaping variations. Therefore, it was introduced to wear compulsory protectors of trunk, groin, head and limbs in order to increase the safety of players. In the fight of taekwondo competitors mainly leg techniques. The athlete improves them for many years and combines the various combinations consisting of a number of techniques; a combination of techniques on the trunk and on the head, after rebounding, after rotation, using the front leg or the back one. Implementation of a technique depends on the length between

fighters in other words on distance. Punches of the body are rarely used by athletes because they are weaker and less scored by the judges. Players used hand techniques mostly in the form of blocks or in fighting [12].

Undertaking this subject, the authors created the following research questions:

1. Is the change of sports rules, and in particular how to score (increase scores value of technical activities used in fights) resulted in an increase in the number of techniques and scored points?
2. Which areas of the attack were most commonly used during the fights of the Olympic taekwondo tournament in Beijing 2008 and during the tournament in London 2012?

Material and methods

In the study there were analyzed 48 fights (84 people) of the Olympic taekwondo tournament Beijing 2008 and London 2012. There were observed 6 fights of each weight category (-49 kg, -57 kg, -67kg, over 67kg), 24 fights in each tournament. None of the analyzed fights did not end up before the end of time, there has been no knockout or loss on negative points. The material of research was the official recording of registered fights during both tournaments. All scored points were recorded continuously using a computer-drawn blackboard and considering the penalty spot, the current time and a round of the fight. As the research material were also used the sports rules of taekwondo competitions between 2008-2012.

Information about the fight structure was collected in a specially designed observation sheet. A secondary analysis

using the direct observation of the sheet beside descriptive methods and surveys is one of the most frequently used in sports practice. Observation which was conducted concerned offensive and defensive actions, efficiency and types of various technical elements. Combining the concept of building a sheet of objective observation with the film technique gave the possibility of a very precise analysis of the fighting.

Collected material was analyzed in a statistical manner by taking the chi-square test to estimate the assessment of effectiveness, Student's t-test to determine the significance of differences in mean punctual values. To calculate the relationship between the number of effective actions in attack and counterattack, it was used properly calculated ratio Wa-k.

Wa-k = the number of successful attacks / number of successful counterattacks

The rate of effective actions towards the trunk (montog zone) and towards the head (zone olgul) of a rival (Wm-o) was calculated in a similar way.

Wm-of = the number of successful attacks in the area of montog / number of successful attacks in the area of olgul.

Results

Development of technology and adaptation of technical and tactical preparation of athletes to new sports relations appeared in increasing of a total number of effective techniques performed during the Olympic tournament in London 2012. The increase in the average number of actions performed in a fight between the tournament in Beijing in 2008 ($X = 3.271$) and the tournament in London 2012 ($X = 4.146$) was significantly statistical $p < 0.05$.

Table 1. The main differences of obligatory sports regulations during the Olympics in Beijing in 2008 and the Olympics in London in 2012

	I.O in Beijing	I.O in London
The size of the mat	10m x 10m	8m x 8m
Number of Judges	4	3
Type of trunk and feet protectors	Ordinary	Electronic - equipped with sensors
Method of scoring points	Indirect-judges admit points using electronic pads	Automatic- registration and verification points - by an electronic system Indirect-judges using pads score competitors only in a situation when a player performs a rotary kick, hits his fist on the trunk or well-aimed hits the head
The number of points given for a well-aimed hit of the head	2	3
Number of points given for a well-aimed hit of the head using rotary technique	2	4
Number of points given for a well-aimed hit in hogo using rotational technique	1	2
Number of points given for a spectacular hit in hogo using hand technique	0	1
Recording a result of the fight after giving a negative point	the score of a player who performed an offense is left unchanged	from the score of a player who performed an offense one point is taken away
Scores Recording	points are recorded by judges by means of electronic devices connected to the electronic board	points are recorded automatically by an electronic system that connects hogo and a computer by means of bluetooth network and the computer is connected to a monitor which displays the result of the fight.
Type of a protest	written, lodged after the fight at the head judge of the tournament. The protest did not affect the result. The protest is resolved in time.	Video replay, lodged during the fight using the card in the colour which matches with a Hoga of the player. The protest may have an impact on result of a current fight. The result of the protest is immediate.

Table 2. Number of effective techniques performed in all weight categories of female fighters during the Olympic Games in Beijing in 2008 and the Olympics in London in 2012

	The sum	X	SD
I.O the Beijing 2008	157	3,271	±1,449
I.O in London 2012	199	4,146*	±3,435

* statistically significant difference between the tournaments for $p < 0.05$

Table 3. Number of effective techniques of attack and counterattack during the Olympic Games in Beijing in 2008 and the Olympics in London in 2012

	I.O Beijing 2008		I.O the London 2012	
	attack	counterattack	attack	counterattack
Sum	64	93	86	113
W a-k	0,68		0,76	
X	1,333	1,937	1,792	2,354
SD	±1,049	±1,124	±2,017	±2,301

Table 4. Number of effective techniques in montong zone (trunk zone) and olgul (head zone) during the Olympic Games in Beijing in 2008 and the Olympics in London in 2012

	I.O in Beijing		I.O in London	
	Mon tog	Olgul	Mon tog	Olgul
Sum	123	28	137	51
W m-o	0,22		0,37	
X	2,562	0,583	2,854	1,062*
SD	2,362	0,544	3,236	1,441

* Statistically significant difference between tournaments for technical activities in the zone of olgul at $p < 0.05$.

Analyzing collected research material differentiating technical activities performed in the attack and counterattack should be noted that there has been an increase in such activities between the Olympic tournaments 2008-2012 (increase in the ratio W a-k). However, the differences were not statistically significant.

The changes in sports regulations which increase the number of technical points scored for the execution of technical activities towards the opponent's head (zone olgul) resulted in a marked increase in this type of activities. The increase of activities towards the opponent's head from 0.583 to 1.062 average in a fight turned out to be statistically significant $p < 0.05$. It was observed that increase in technical activities in the zone of opponent's trunk was not statistically significant. However, there was a marked increase in the rate in W m-o.

Discussion

Changes in regulations made by the World Taekwondo Federation, aimed at increasing the attractiveness and simplify the rules in order to be understood by an average viewer, reflected in the fighting of taekwondo. During the fights at the tournament in London female athletes performed more attacks, scoring more points. The results may suggest that one of the major changes in the rules of the fight, having the largest effect on the fight structure was to introduce 3 points for well-aimed kicking an opponent's head. Female players aware of getting even 4 points (in case of rotational technique) using only one technique, much more often used kicks to the head ($p < 0.05$).

The increase of using technical activities towards an opponent's head was also observed by Kruszewski and others

[13]. Analyzing the technical actions used by taekwondo athletes during the Olympic tournament in Sydney 2000 and Athens 2004, the authors find statistically significant increase in activity towards the opponent's head ($p < 0.001$). Falling kicks (naeyro chagi) and rotary-circular (dwi dollyo chagi) ones which are „high” techniques performed only at a head were more often performed at the tournament in Athens [14].

Taking the range of activities in attack and counterattack used by athletes into consideration, it should be noted that there is the increase in the number of activities taking into account both offensive and defensive actions. It is worth noting that despite the similar amount of activities carried out effectively, the counterattack actions were significantly more likely to be used. This may suggest that female athletes led the fight with a focus on the counterattack, which is less comprehensive and at the same time brings a bigger chance of scoring more points.

Conclusions

The changes in sports regulations did not have an effect on changes of actions performed by female competitors in attack and counterattack. It was confirmed that the players' actions are concentrated on waiting when an opponent's attack begins and then performing an effective counterattack. We can assume that female competitors are afraid to take a risk in an open fight with opponents, looking for a chance to get a victory mainly through actions in the counterattack. An important element in their technical-tactical preparation turned out to be an ability to perform an effective action towards the rivals' head. This study confirmed the tendency of increasing the number of blows towards the opponent's head, especially with using rotary techniques which were scored by 4 points.

References

1. Kazemi M, Casella C, Perri G. 2004 olympic taekwondo athlete profile. *Journal of the Canadian Chiropractic Association* 2009; 53(2): 144-52.
2. Pieter W. Talent Detection In Taekwondo Practitioners. *Journal of Asian Martial Arts* 2010; 19(3): 9-29.
3. Miller J, Bujak Z, Miller M. Sports result vs. general physical fitness level of junior taekwondo athletes. *Journal of Combat Sports and Martial Arts* 2011; 2(1): 39-44.
4. Szczuka E, Tomaszewski W, Szafraniec R, Postawa A. Electrodermal activity of the skin assessed using Ryodoraku method after a single training session in taekwondo competitors. *Journal of Combat Sports and Martial Arts* 2012; 2: 79-85.
5. Wąsik J. Structure of movement of a turning technique used in the event of special techniques in Taekwon-do ITF. *Archives of Budo* 2009; 5: 111-5.
6. Wąsik J. The structure of the roundhouse kick on the example of a European Champion of taekwon-do. *Archives of Budo* 2010; 6: 211-6.
7. Santos VG, Franchini E, Lima-Silva AE. Relationship between attack and skipping in Taekwondo contests. *Journal of Strength & Conditioning Research* 2011; 25(6): 1743-51.
8. Tornello F, Capranica L, Chiodo S, Minganti C, Tessitore A. Time-motion analysis of youth Olympic Taekwondo combats. *Journal of Strength & Conditioning Research* 2013; 27(1): 223-8.
9. Toskovic N, Blessing D, Williford H. Physiologic profile of recreational Male and female novice and experienced taekwondo practitioners. *Journal of Sports Medicine and Physical Fitness* 2004; 44: 164-72.
10. Marković G, Mišigoj-Durašković M, Tminić S. Fitness profile of elite Croatian Taekwondo athletes. *Collegium Antropologicum* 2005; 29: 93-9.
11. Kazemi M, Waalen J, Morgan C, White A. Combat sports Special Issue Research article. A profile of Olympic taekwondo competitors. *Journal of Sports Science and Medicine CSSI* 2006: 114-21.
12. Casolino E, Lupo C, Cortis C, et al. Technical and tactical analysis of youth taekwondo performance. *Journal of Strength & Conditioning Research* 2012; 26(6): 1489-95.
13. Kruszewski A, Jagiełło W, Pyzel W. The effectiveness of used techniques in a taekwondo fight in the olympic Tournament In Sydney 2000 and Athens 2004. *Wellness and prosperity In different phases of life*. Red. Grażyna Olchowiak; Lublin 2009.
14. Pyciarz T. Analysis of sport fight structure In taekwondo Turing the olimpic In Beijing In 2008 and senior World Championships in 2009 in terms of technical skills after regulation amendments and implementation of the electronic system of score recording. *Journal of Combat Sports and Martial Arts* 2011; 2: 109-15.

Address for correspondence:

Artur Kruszewski
Józef Piłsudski University of Physical Education in Warsaw
ul. Marymoncka 34 01-813 Warsaw, Poland
e-mail: artur.kruszewski@awf.edu.pl

Received: 13.06.2014

Accepted: 21.08.2014