

The course of judo competition created by gold medallists of the World Championships 2015 in Astana

Authors' Contribution:

- ✓ A Study Design
- 📁 B Data Collection
- 📊 C Statistical Analysis
- 📄 D Manuscript Preparation
- 📁 E Funds Collection

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Abstract

Background & Study Aim:

Characteristic features of technical-tactical preparedness of athletes who won the World Judo Championships are model values to estimate the starting effectiveness. The analysis of the manner the top athletes win during one of the most important sports events may acknowledge reference values. The aim of this study is knowledge about ways of contests leading to a victory only by gold medallists of the World Judo Championships (i.e. the athletes who won all the fights).

Material & Methods:

The research material is based on the gold medallists fight analysis of the World Judo Championships 2015 in Astana (Kazakhstan). The data provided by moving-image material was studied, and among other, the graphic registration of fights (covered only the gold medallists contests, 41 in total). Statistical reliability of the data received from two coaches was evaluated by the PQStat ver.1.4.4 software. The following variables were calculated: attack efficiency (Ea), fight effectiveness (Sa) of the World Judo Championships winners and their opponents. We also presented one-minute "image" of the fight and a fight as a step within the course of the World Judo Championships.

Results:

The World Judo Championships gold medallists are characterised by significant offensive possibilities in the attack demonstrated both by the number of ippons and their art of defence possibility, also shown in a little number of effective actions of their opponents. The dominant attack is the "forward" (in judo jargon) technique. The way the contest is exercised indicates the exploratory character of the 1 minute of the fight, the decisive character of the 2 minute and maintaining concentration and endurance up to the end.

Conclusions:

Disclosed observation data (the specificity of the ways of fighting by the judo world champions), according to the authors, can be explained by a two-stage approach to competition combined with the principle of saving power in qualifications and re-mobilisation during the finales fights.

Keywords:

attack efficiency • directions of attacks • the effectiveness of actions • fight effectiveness • fight structure

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Fight structure – qualitative and quantitative presentation of executed techniques in the function of time (minute distribution).

The effectiveness of actions – the effect of the executed action (technique) in scores.

Directions of attacks – description of the side of executing attacks according to methodology; backwards: when the opponent is deflecting on the hills; forward attack: when the opponent is deflecting on his toes, situational attack: when the direction of attack cannot be determined ambiguously (including counterattack).

Tactics – plural noun the art of finding and implementing means to achieve immediate or short-term aims [16].

Tactics – decisions and actions of players in the contest to gain an advantage over the opposing players [17].

Technique – noun a way of performing an action [16].

Technique – specific procedures to move one's body to perform the task that needs to be accomplished [17].

Ippon – one point. Achieved through the execution of a valid technique on the opponent [18].

Semi-final – noun either of two matches or games, the winners of which will play each other in the final round of competition [16].

Repechage – way hold elimination.

Ne-waza (prone techniques), a related concept is that of **katame-waza** (grappling techniques) – judo techniques executed from a horizontal posture: **osaekomi-waza** (pinning techniques), **shime-waza** (strangle technique), **kansetsu-waza** (joint holds).

INTRODUCTION

Characteristic features of technical-tactical preparedness of athletes who won the World Championships are model values to estimate the starting effectiveness. The analysed indexes allow finding rational directions of efficient preparation for sports competitions [1].

Judo competitions have been observed for many years. The data obtained in such a way permits to work out, among others, an individual technical-tactical profile of the Olympic medallists [2], characteristics of the judo fight and presentation of factors affecting the final contest results including weight categories [3], defining the technical profile of *nage-waza* (throwing techniques) in a group of judoka of different sports levels [4], or carrying out a discriminant analysis among T-T (technical-tactical) systems used by winning and losing athletes during high-level judo competition [5].

The World Championships 2015 in Astana were for many athletes, the most important test before the Olympic games 2016 in Rio de Janeiro. The victory opened the doors to the athletes to become favourites in the Olympics. The World Championships were held in the capital of Kazakhstan, Astana, between 24-29.08.2015, 426 male athletes from 113 countries participated in the competitions. Three gold medals won Japanese representatives, two from Korea and one went to Kazakhstan and France. The winners fought in 41 fights in the men's 60 kg, 66 kg, 73 kg, 81 kg, 90 kg and 100 kg categories and each of them had to defeat 6 opponents. Only in the heaviest category, over 100kg, the winner defeated five opponents. Twenty of these fights were finished before the regular time, 17 when the referee awarded points for effective attacks and 4 by the referee's decision for warning the opponents.

The aim of this study is knowledge about ways of contests leading to a victory only by gold medallists of the World Judo Championships (i.e. the athletes who won all the fights).

MATERIAL AND METHODS

Material

The research material was the judo fights of the gold medallists of the Worlds Championships 2015 in Astana (Kazakhstan). The data provided

by moving-image material was studied. The analysis covered only 41 gold medallists' fights – for 6 fights in each weight category (4 qualification rounds, semi-final and final for each of the gold medallists 60-, 66-, 73-, 81-, 90-, 100 kg) and 5 fights of a gold medallist over the men's 100 kg. The latter had his first qualification fight in the 2 round of the competitions.

In the text, the World Championships gold medallists are referred to as "champions" and their opponents as "opponents".

Procedures

The fights were registered by the entitled person from the Polish Judo Association. Recording and playback included all the functions for detailed analysis of the fight. The course of the fight was documented in the form of standard Excel sheet by two coaches independently [6].

Working separately, the coaches used the same standard hardware to read video recording (video frame, close-up, slow, rewind, 32-inch screen, screen resolution-1280/960).

The purpose of the recording was to accept or not the attacks from the vertical posture (*nage-waza/tachi-waza*) forward, backward and situational, their recorded numbers, time of execution, point value of the attack, number and time of warnings and number, time and point value of actions in horizontal posture (*ne-waza/katame-waza*).

Statistical reliability of the data received from two coaches was evaluated by the PQStat ver.1.4.4 software. The Cohen-Kapp index (for non-weighted data) was 82.4%. Registration and analysis of the judo fight are based on the methodology developed and outlined in previous reports [7, 8].

Attacks are defined as follows: attacks forwards – with a deflection on the toes and the judoka is forced to defence to recover balance or is thrown on the tatami; attacks backwards – with a deflection on the heels and the judoka is forced to defence to recover balance or is thrown on the tatami. The situational attack is defined as one in which it is not possible to determine the direction of the opponent's swing, and he is forced to defence activity in order to regain balance, or he is thrown on the tatami. The counter throw was included in the concept of situational

attack. Ways to execute techniques, spelling and terminology used in the video registration were adopted from Kokodan Judo [9, 10].

For the analysis were collected: scoring forwards, backwards and situational attacks; not scoring forwards, backwards and situational attacks; time of scoring attack execution and a number of points, time of not scoring attack; number, time and score of the action in a horizontal posture.

Calculated indexes: attack efficiency (*Ea*), fight effectiveness (*Sa*). The efficiency index was calculated according to the formula:

$$Ea = \left(\frac{I_0}{I_1 + I_0} \right) \times 100 \quad \text{Eq. 1}$$

Where: *I*₀ number of scoring attacks; *I*₁ - the number of not scoring attacks

The effectiveness index was calculated according to the formula:

$$Sa = \left(\frac{S_0}{L_w} \right) \quad \text{Eq. 2}$$

Where: *S*₀ sum of scores gained in forwards, backwards and situational attacks and actions in horizontal posture during all fights; *L*_w number of all analysed fights.

The authors claimed that the analysis of the actions in a horizontal posture (5 scoring actions), the referee's decisions (1 disqualification) and

scoring attacks executed on the gold medallists (2 attacks) should only be carried out as a case study and it goes beyond the merit of this study.

Statistical analysis

The statistical data was evaluated by the "Statistica"7.0, Excel 2007, PQStat ver.1.4.4 software (statistical reliability of video recording by coaches).

RESULTS

There was a significant number of fights completed before the regular time by ippon, which is nearly half of the winning fights. The most common way to win in such a way was a forwards attack from the vertical posture or a combined victory of different actions (Table 1).

The *Ea* index was calculated only for actions in a vertical posture. Variability of actions in horizontal posture does not allow to make a clear decision which is executing a certain action (Table 2).

The "champions" significantly prefer forwards attacks (with a slight option in the reverse direction) thanks to which won the highest number of points. The backwards attacks brought approximately 4-times lower scores and can be considered as actions supporting the fight; and situational attacks and actions in a horizontal posture (*ne waza*) were occasionally executed (Table 3, Figure 1).

The way of fight indicates the exploratory character of the 1 minute, the decisive nature of the 2 minute of the fight and maintaining concentration and endurance until the end of the fight (Table 4).

The lowest score "champions" had in the first minute of the fight, while the highest one in

Nage-waza (throwing techniques), a related concept is that of **tachi-waza** (see glossary) – judo techniques executed from a vertical posture: **te-waza** (hand throwing techniques), **koshi-waza** (hip throwing techniques), and **ashi-waza** (leg throwing techniques) and including also **sutemi-waza** (sacrifice techniques – which is divided into two subgroups: **ma-sutemi** i.e. forward sacrifice projections; **yoko-sutemi** i.e. side sacrifice projections).

Tachi-waza – jūdō throwing techniques executed from a standing position. These include **te-waza** (hand techniques), **koshi-waza** (hip techniques), and **ashi-waza** (foot and leg techniques) [18].

Tatami – traditional straw mats used in **jūdō** and **aikidō** training halls [18].

Table 1. Basic research data - all the fights of "champions" won by different ways.

Total number of fights	A number of fights finished by ippon:						
	total	forwards attack	backwards attack	situational attacks	complex way	the referee's warning	in horizontal posture
41	18	7	1	1	7	1	1
	Proportion (%)						
100	43.90	17.07	2.44	2.44	17.07	2.44	2.44

Table 2. Calculation values of data for “champions” and “opponents” in a vertical posture.

Judo athletes	E_a	S_a	I_1	I_0	S_0	L_w
“champions”	11.87*	9.44*	386	52*	387*	41
“opponents”	0.005*	0.35*	422	2*	14*	41

*statistically significant differences in the same columns of the Table.

Table 3. A total number of effective attacks and scores depending on the type of the executed action by “champions”.

Forwards effective attacks		Backwards effective attacks		Situational effective attacks		Effective attacks in a horizontal posture	
total number	score	total number	score	total number	score	total number	score
40	273	11	70	1	10	5	34

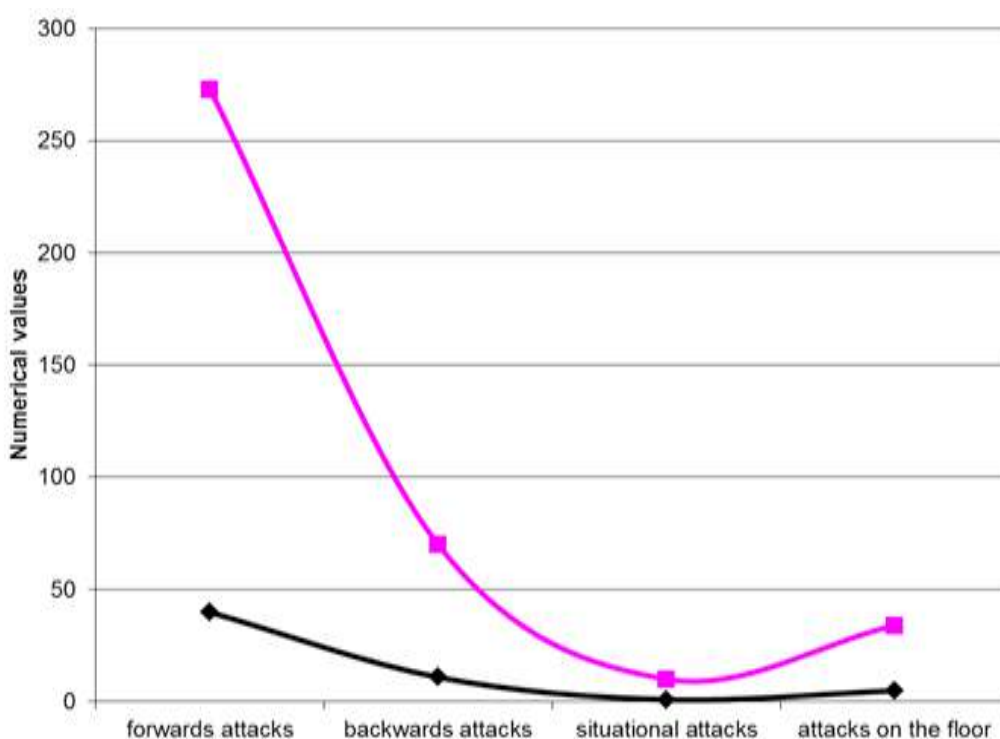


Figure 1. Numerical values of actions and points achieved by the “champions” depending on the type of action (black: number of scored attacks; purple: achieved score).

the second minute (Figure 2). A clear difference between the scores indicates that this may be the chosen strategy of the fight. On the 1 to 3 stages of qualification rounds, (where the winner of the 3 round is assured of repechage and at least 7 places) drop of the score is observed (Figure 3).

DISCUSSION

The gold medallists of the World Judo Championships fight both efficiently and effectively as nearly half of the fights (43.9%) was finished ahead of time. It favours, of course, the media image of judo. This is consistent with the image of the fight recorded by other authors in conjunction with the dominance

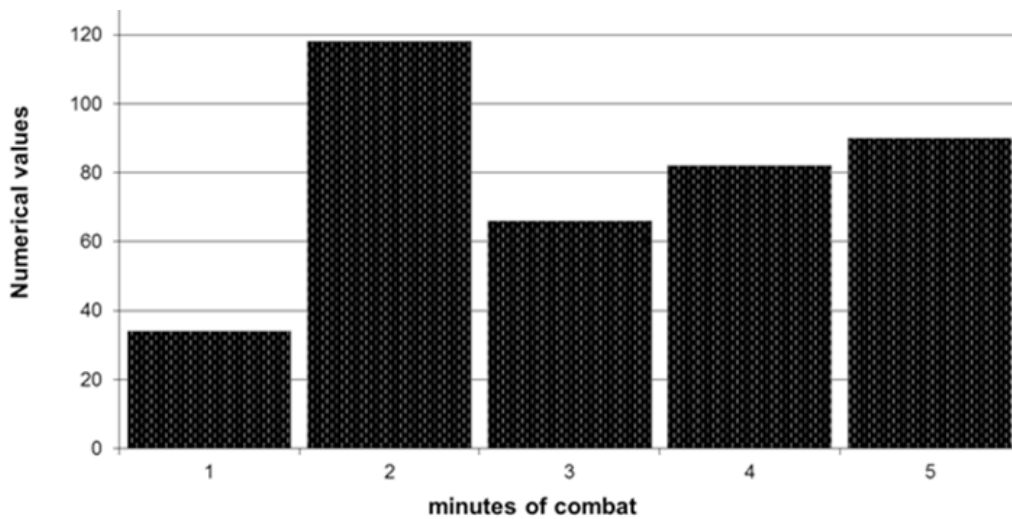


Figure 2. Score as a minute function of the fight.

Table 4. The qualitative figures (number of points, number of scoring attacks, quality indexes of scoring attacks – Qa) of “champions” fights in a minute and stage base functions in the World Championships competitions.

A number of:	Round				Semi-final	Final
	1	2	3	4		
points	75	71	65	79	61	36
scoring attacks	10	9	10	13	9	6
	Minute					
	1	2	3	4	5	
points	34	118	66	82	90	
scoring attacks	6	17	9	12	13	

of fight in a vertical posture [11]. This result is significantly different from the observations regarding the medallists of, e.g. Polish Judo Championships [12]. Pujso et al. [13] in his research already signalled the issue of the lowest score in the first minute of a fight. Similar results of a fight during the Olympic Games in Beijing describes Witkowski et al. [3].

Findings presented in Table 2 show that the indexes of efficiency (Ea) and effectiveness (Sa) in the gold medalists are significantly higher than in their opponents. It is worth mentioning that only 2 actions of the opponents gave them points. In future, in the further analysis, we can apply a contrast index of effectiveness (Ea), as the index of defence effectiveness (Ea_1). Table 1 shows that almost half of the fights won by ippon (17.07%) was finished by the forward's attack and the same

number of victories was achieved by way of different actions (17.07%).

The gold medalists forwards attacks are dominant, and the backwards attacks are supporting in the fight. Situational attacks and actions in horizontal posture are sporadic. It is interesting to remind the fundamental research of Franchini and Sterkowicz [14] in this field from the years 1995-1999. They manifest the 3 minute of a fight as generating the highest score; by “champions” it is the 2 minute. They note the declining number of final solutions in horizontal posture – currently trace numbers; emphasise increasing importance of the referee's penalties and suggest changing directions in judo regulations towards the increasing role of fights in horizontal posture – what has not occurred yet. The authors mentioned above feature the essential presence of

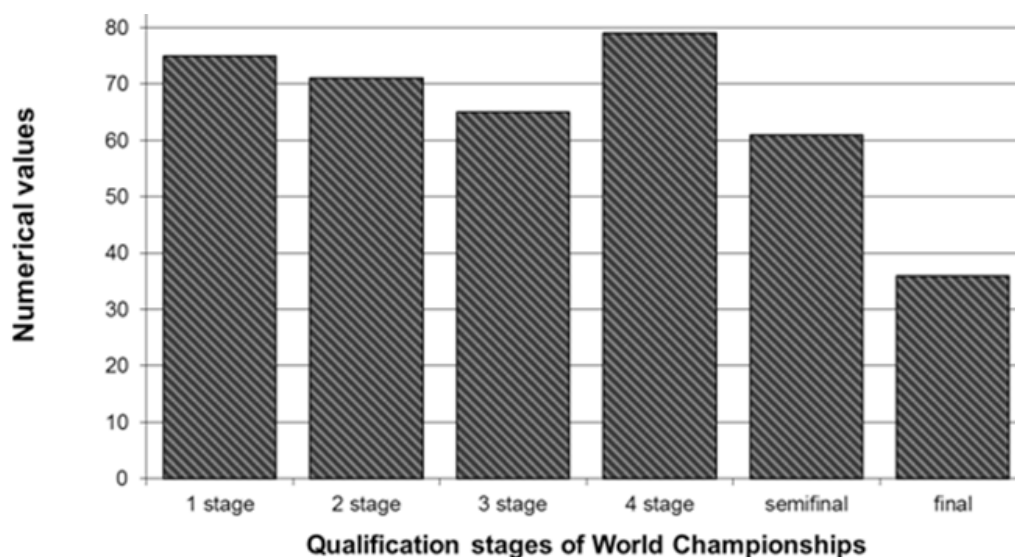


Figure 3. The score depends on the stage of the World Judo Championships.

so-called one's own/situational techniques, not included in the classical Kodokan – at present, such actions executed by 'champions' and their opponents were not found [14]. The research conducted in 2005-2008, which underlies the important role of counter throws (about 28%) and suggests undertaking activity by coaches in this sphere was not confirmed by a contemporary picture of fights presented by "champions" [15].

A minute by minute analysis of the fight presented from the achieving points perspective (Figure 2) shows the lowest score in the first minute of the fight. This may be the result of the exploratory character of the first minute of the fight. The highest score is won by the gold medallists in the second minute what may indicate offensive actions in this minute and decisive nature of this stage of the fight.

A drop of points in the 3 minute and systematic increase in 4 and 5 minutes suggest good endurance preparation and maintaining concentration, which leads to the maintenance of the acquired advantage and use of the opponents' mistakes.

Findings in results (Table 1) and their graphics visualisation (Figure 3) informed that in the next steps of qualifications the gold medallists gain fewer points – what seems to be understandable because of more demanding opponents.

This regularity is observed for the first 3 qualifying rounds – that is until ensuring the least repechage. Then the increase of the score in the 4 round takes place, to decrease systematically in semi-finals and finals. This situation is again explainable by a higher class of the opponents.

According to the authors, this phenomenon can be explained by a two-stage approach to competition combined with the principle of saving power in qualifications and re-mobilisation in the fights "for everything".

CONCLUSIONS

The competition created by the gold medallists of the World Championships is characterised by the strength of both their offensive capabilities in an attack numbered by victories ahead of time and defence expressed by the low number of effective actions executed by their opponents.

Disclosed observation data (the specificity of the ways of fighting by the judo world champions), according to the authors, can be explained by a two-stage approach to competition combined with the principle of saving power in qualifications and re-mobilisation during the finales fights.

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