

The effectiveness of the use of strikes based on the analysis of competitive activity students of rus "GTSOLIFK" in taekwondo WTF at the Moscow 2023 championship

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Abstract

Objective of the study was to identify the effectiveness of the use of strikes based on the analysis of the competitive activity of students of RUS "GTSOLIFK" in taekwondo WTF at the Moscow Championship 2023. Methods and structure of the study. To assess the technical actions, a video analysis of 13 competitive matches of the 2023 Moscow Championship was conducted. To assess the number of strikes, a video analysis of competitive duels was conducted. The final number of blows for the duel was made up of: single blows, blows performed in fencing, as well as from blows that consisted in a series.

Results and conclusions. As a result of video analysis of competitive duels, the percentage of strikes performed during the duel was revealed. The most frequently performed blow is dolio-chagi with the near leg to the body (30.4%); the most effective blows are: hurio-chagi to the head (0.167%) and a hand blow (0.148%). It was also revealed that men strike more blows per round and are 2 times more effective than women.

Keywords: taekwondo, video analysis, students, efficiency, punches.

Introduction. RUS "GTSOLIFK" is the leading sports university in Russia. The percentage of strokes performed at competitions largely determines the training of student athletes in WTF taekwondo.

Therefore, it was interesting to study the number of punches performed and their effectiveness among students studying at the RUS "GTSOLIFK" in each round and in the duel as a whole. 13 competitive matches of the 2023 Moscow Championship were analyzed.

Objective of the study was to identify the effectiveness of the use of strikes based on the analysis of the competitive activity of students of RUS "GTSOLIFK" in taekwondo WTF at the Moscow Championship 2023.

Methods and structure of the study. In accordance with these rules for the sport of taekwondo [1], each round in a duel is evaluated separately and does not affect the result of other rounds. In this regard, the

athlete's training system is being rebuilt, as well as the number of strikes per round and the percentage of strikes performed are changing.

To assess the number of strikes, a video analysis of competitive duels was conducted. The final number of blows for the duel was made up of: single blows, blows performed in fencing, as well as from blows that consisted in a series.

Results of the study and their discussion. As a result of the analysis, the most frequently performed blows were identified (Table 1).

The most common blow inflicted was dolio-chagi with the near leg to the body, its percentage ratio to the number of all blows was 30.4% ($p < 0.05$). In turn, it is worth noting that athletes hit the body with the far leg twice less often than with the near leg (17.5%).

The second most popular use of blows is yop-chagi. Its percentage ratio to the total number of strokes is 24.8% ($p < 0.05$).

**Table 1** Percentage ratio and effectiveness of executed strikes

Impact name		Average value, number of strokes	Minimum, number of strokes	Maximum, number of strokes	Standard deviation	Percentage ratio, %	Effectiveness, %
Dolio-chagi in the body	Front	10.3	3	17	4.01	30.4	0.029
	Rear	5.92	0	11	2.85	17.5	0.046
Dolio-chagi in the head	Front	1.78	0	7	1.57	5.3	0.091
	Rear	0.59	0	3	0.8	1.7	0.091
Nerio-chagi	Front	1.43	0	5	1.5	4.2	0.075
	Rear	0.14	0	1	0.35	0.4	0
Nerio-chagi from clinch		1	0	3	1	3.0	0.135
Yop-chagi		8.4	0	21	4.43	24.8	0.042
Dwit-chagi	Body	0.54	0	4	1.02	1.6	0.15
	Head	0	0	0	0	0.0	0
Hurio-chagi	Body	0.08	0	1	0.28	0.2	0
	Head	0.16	0	2	0.44	0.5	0.167
Hurio-chagi front	Body	0.11	0	3	0.52	0.3	0
	Head	0.03	0	1	0.16	0.1	0
Hand strike		2.19	0	7	1.75	6.5	0.148
Dolio-chagi from clinch		1.16	0	6	1.54	3.4	0.07

In early analyses of competitive activity [2], the largest number of blows fell on yop-chagi. These indicators can be directly related to the qualification of athletes, since in this study the analysis of competitive duels was carried out among highly qualified athletes.

Also, using Fischer's F-test, it was revealed that the round number and the biomechanics of the stroke directly affect the quantitative indicator of strokes in the round.

The calculation of the impact efficiency was carried out according to the formula (Fig. 1):

$$\frac{\text{Number of hits}}{\text{Total number of hits}} \times 100\%$$

Figure 1 Formula for calculating the effectiveness of strikes

If we consider the most effective blows, then the leading blow in efficiency is hurio-chagi to the head. This blow was made only by some athletes and in most cases it was counted.

In second place in terms of efficiency is a hand strike. This blow is evaluated by the judges, unlike others, which are evaluated using an electronic system.

Tables 2 and 3 present data on the effectiveness of the use of blows among men and women. According to the data obtained, it is possible to draw conclusions about the difference in quantitative indicators of strikes among men and women, as well as differences in the effectiveness of strikes.

On average, men land more punches per round than women. Also, men are on average 2 times more effective at performing punches in a competitive duel than women.

Table 2 The effectiveness of strokes in women

Weight category	Round number	Number of strokes per round	Efficiency per round, %	Number of blows per duel	Efficiency per duel, %
57 kg	1	33	0	92	0,033
	2	29	0,07		
	3	30	0,03		
57 kg	1	33	0,03	66	0,06
	2	33	0,09		
73+ kg	1	34	0,02	92	0,01
	2	29	0		
	3	29	0,01		
Average value		31,25	0,031		

Table 3 The effectiveness of blows in men

Weight category	Round number	Number of strokes per round	Efficiency per round, %	Number of blows per duel	Efficiency per duel, %
58 kg	1	32	0,06	62	0,045
	2	30	0,03		
	1	35	0	65	0,015
	2	30	0,03		
63 kg	1	24	0,25	68	0,18
	2	44	0,11		
	1	30	0,07	109	0,057
	2	37	0,03		
	3	42	0,07		
68 kg	1	42	0,12	72	0,16
	2	30	0,2		
	1	21	0,05	48	0,045
	2	27	0,04		
74 kg	1	38	0	75	0,04
	2	37	0,08		
80 kg	1	34	0,15	66	0,14
	2	32	0,13		
	1	33	0	120	0,02
	2	43	0,05		
	3	44	0		
	1	34	0,06	101	0,04
	2	30	0,03		
	3	37	0,03		
Average value		34,17	0,07		

Conclusions. As a result of video analysis of competitive duels, the most frequently used punches among taekwondo students were identified. The most commonly used blow is a dolio-chagi with a near foot to the body, the number of blows inflicted by which amounted to 30.4% ($p < 0.05$) relative to the total number of blows. Then yop-chagi and dolio-chagi with the far foot in the body — 24.8% and 17.5%, respectively. The most uncommon blow among taekwondo students is a 0% blow to the head ($p < 0.05$).

It was also revealed that men strike more blows per round and are 2 times more effective than women.

The results of this study have important practical implications for the compilation of training methods in taekwondo WTF.

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