

**ANALYSIS OF COMPETITIVE ACTIVITY OF HIGHLY QUALIFIED  
WRESTLERS**

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**Purpose:** to analyze the competitive activity of highly qualified Greco-Roman wrestlers.

**Material and methods:** analysis of scientific and methodological information and Internet sources; generalization of best practices; video-computer analysis of the competitive activity of highly qualified wrestlers; methods of mathematical statistics. A specialized computer program "Martial Arts Video Analysis" was used to analyze the fights. A total of 30 final fights (fight for the first and third places) of highly qualified Greco-Roman wrestlers at the 2020 World Cup were analyzed.

**Results:** based on the analysis of scientific and methodological information, Internet sources, and generalization of leading practical experience, it was found that successful training of wrestlers of any level is impossible without careful consideration of major trends in wrestling, which can be established with sufficient accuracy when analyzing the structural components of competitive activity of the world's leading athletes. It has been established that at the 2020 World Cup, the winning wrestlers have a larger technical and tactical arsenal (10 holds) than those

who lost (5 holds). The analysis of indicators of competitive activity allowed to determine that the wrestlers-winners and those who lost the number of technical and tactical actions, their effectiveness, the interval of attack decreases in the second period. The efficiency of the reception of the winning wrestlers in the second period (69,5 %) is higher than in the first one (61,8 %), and those who lost in the first period (12,2 %) are better than in the second (8,7 %). This is due to the fact that at the end of the fight the loser carries out many unsuccessful attacks in order to win back.

**Conclusions:** the analysis of competitive activity showed that the largest number of times during the fight, the winning wrestlers perform in the ground - turn over (0,72 times), in the rack - dumping (0,32 times), and those who lose held in the ground – countermeasures (0,06 times), in the rack – dumping (0,24 times). A significant number of points wrestlers-winners receive at the beginning of the fight by increasing the number of different technical and tactical actions and the effectiveness of their implementation.

**Keywords:** Greco-Roman wrestling, indicators, technical actions, competitive activity, highly qualified athletes, computer program.

## **Introduction**

An analysis of recent publications allows to confirm that in recent years the quality of scientific research in martial arts has increased significantly. This is due to the expansion of communication opportunities, both in person and online in various scientific conferences, meetings, communication platforms ResearchGate, LinkedIn, social networks, access to videos of official championships, World and Europe Cups, as well as the possibilities of modern computer technology.

Researchers, in order to increase the efficiency of the training process, study various aspects of martial arts in competitions. Thus, N. V. Boychenko, R. I. Belyaninov (2017) analyzed the indicators of competitive activity in wrestling, mainly in terms of strategy and tactics. V. I. Shandrygos, V. V. Yaremenko, R. V. Pervachuk (2018) studied the results of participation of wrestlers from different

countries in the 2018 European Championship after changes in the rules of competition to increase the number of weight categories. Researchers G. O. Ogar, V. D. Sereda (2019) made a comparative analysis of the intensity of competitive fights based on the study of materials of the world and Ukrainian championships among cadets in 2019. Experts P. Bartik, N. Boychenko, M. Kurylenko (2014) recommend, in order to objectively determine changes in the parameters of technical and tactical skills of wrestlers, there should be recording and transcribing of their competitive fights.

To study the level of showing the parameters of competitive activity, experts use different means, namely: pedagogical observation, analysis of competition protocols of different levels, expert evaluation of combat operations, video-computer analysis of both biomechanics of movements and various actions in a duel [5, 11, 15, 16].

In our opinion, the most effective means of assessing competitive activity is video-computer analysis. Viewing video clips of combat situations at competitions allows us to identify a particular action, conditions, and evaluation of its implementation more accurately.

*Connection of work with scientific programs, plans, and themes.* The study was conducted under the research topic of the Kharkiv State Academy of Physical Culture «Optimization of the training process in martial arts» (state registration number 0121U112873).

**Purpose** of the study is to analyze the competitive activity of highly qualified Greco-Roman wrestlers.

### **Material and Methods of research**

The following methods were used in the study: analysis of scientific and methodological information and Internet sources; generalization of best practices; video-computer analysis of the competitive activity of highly qualified wrestlers; methods of mathematical statistics.

To analyze the fights, a specialized computer program «Martial Arts Video Analysis» was used, which was developed at the Department of Martial Arts with the

support of specialists from the Department of Informatics and Biomechanics of Kharkiv State Academy of Physical Culture [9]. You can get acquainted in detail with the work of this program in the AppStore (Martial Arts Video Analysis). Based on the viewing of video fragments of combat situations at competitions, the program allows to identify and record the technical and tactical action, time, and evaluation of its implementation, to carry out an analytical review of the results.

A total of 30 final fights (fight for the first and third places) of highly qualified Greco-Roman wrestlers at the 2020 World Cup were analyzed.

### **Results of the research**

Based on the analysis of scientific and methodological information, Internet sources, and generalization of leading practical experience, it was found that successful training of wrestlers of any level is impossible without careful consideration of major trends in wrestling, which can be established with sufficient accuracy in analyzing the structural components of leading athletes of the world [1, 10, 14, 15].

Analysis of the competitive activity of highly qualified wrestlers with the help of a specialized computer program «Martial Arts Video Analysis», allowed us to obtain the following results. It has been established that the winners of the 2020 World Cup have a larger technical and tactical arsenal (10 holds) than those who lost (5 holds). The analysis of competitive activity showed that the largest number of times during the fight the wrestlers-winners perform: in the parterre - turn over (0.72 times), the effectiveness of this action is 100 % and it brings 1.44 points; in the rack - dumping (0.32 times), the effectiveness of this action is 100 % and it brings 0.62 points. Those who lost the greatest number of times during the fight perform: in the parterre - countermeasures (0.06 times), the effectiveness of this action is 100 % and it brings 0.10 points; in a rack - dumping (0,24 times), but the efficiency of this hold makes only 14 % and it brings 0,06 points (Table. 1).

The analysis of indicators of competitive activity allowed to determine that the winning fighters and those who lost the number of technical and tactical actions, their effectiveness, the interval of attack decreases in the second period. The efficiency of

the hold of the winning wrestlers in the second period (69.5 %) is higher than in the first one (61.8 %), and those who lost in the first period (12.2 %) are better than in the second (8.7 %). This is due to the fact that at the end of the fight the loser carries out many unsuccessful attacks in order to win back (Table 2).

*Table 1*

**Analysis of technical and tactical training of highly qualified Greco-Roman wrestlers at the 2020 World Cup (WC) (n=30)**

| №               | Technical and tactical actions      | Winner |      |     | Those who lost |      |     |
|-----------------|-------------------------------------|--------|------|-----|----------------|------|-----|
|                 |                                     | 1      | 2    | 3   | 1              | 2    | 3   |
| <b>Parterre</b> |                                     |        |      |     |                |      |     |
| 1               | Turnovers                           | 0,72   | 1,44 | 100 | 0,04           | 0,06 | 100 |
| 2               | Turnover with grip of hand and head | 0,10   | 0,20 | 100 | -              | -    | -   |
| 3               | Reverse belt turnover               | 0,06   | 0,14 | 100 | -              | -    | -   |
| 4               | Back belt throws                    | 0,34   | 0,68 | 100 | -              | -    | -   |
| 5               | Reverse belt throws                 | 0,04   | 0,06 | 100 | -              | -    | -   |
| 6               | Countermeasures                     | 0,06   | 0,06 | 100 | 0,06           | 0,10 | 100 |
| <b>Rack</b>     |                                     |        |      |     |                |      |     |
| 7               | Takedowns in parterre               | 0,20   | 0,34 | 83  | 0,06           | 0,06 | 100 |
| 8               | Back arch throws                    | 0,18   | 0,68 | 80  | -              | -    | -   |
| 9               | Knocking over                       | 0,32   | 0,62 | 100 | 0,24           | 0,06 | 14  |
| 10              | Pushing out of mat                  | 0,24   | 0,24 | 100 | 0,20           | 0,20 | 100 |

*Note: 1 - the average value of technical and tactical actions for all fights (number of TTD); 2 - the average value of points scored for technical and tactical actions for all fights (points); 3 - efficiency of technical and tactical action (%).*

*Table 2*

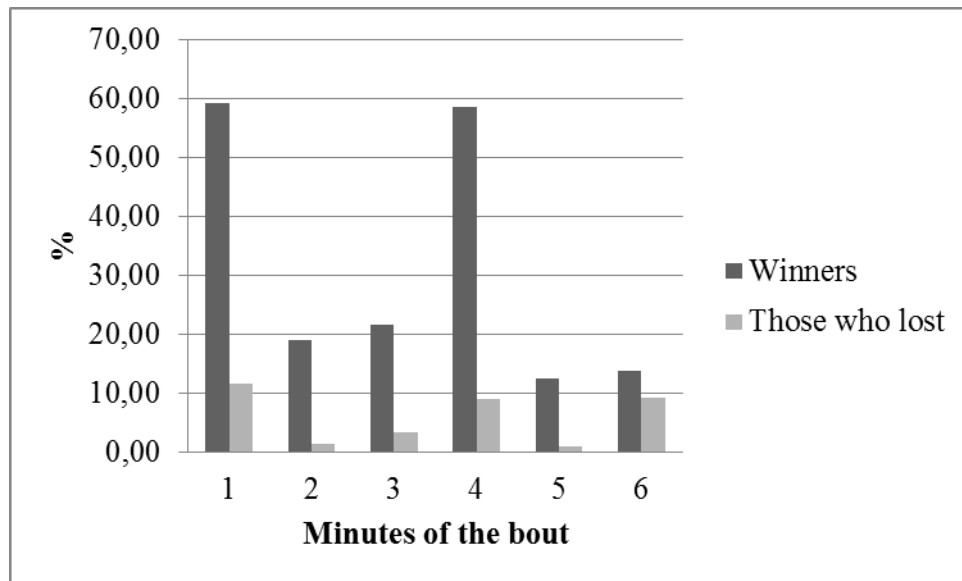
**Indicators of competitive activity of highly qualified Greco-Roman wrestlers at the 2020 World Cup (WC) (n=30)**

| № | Indicators              | Winner    |           |                 | Those who lost |            |                 |
|---|-------------------------|-----------|-----------|-----------------|----------------|------------|-----------------|
|   |                         | 1 period  | 2 period  | For two periods | 1 period       | 2 period   | For two periods |
| 1 | TTD*, number of times   | 3,8±0,43  | 3,2±0,46  | 3,5±0,32        | 1,9±0,24       | 1,8±0,20   | 1,8±0,16        |
| 2 | Results rating, point   | 3,5±0,48  | 3,0±0,37  | 3,3±0,31        | 0,4±0,17       | 0,3±0,16   | 0,4±0,12        |
| 3 | Interval of the bout, s | 17,3±2,64 | 37,3±9,17 | 26,9±4,82       | 19,9±5,07      | 38,9±10,55 | 29,1±5,86       |
| 4 | Effectiveness, %        | 61,8±4,15 | 69,5±5,50 | 65,5±3,45       | 12,2±4,59      | 8,7±3,59   | 10,5±2,95       |

*Note: TTD - technical and tactical actions*

It was found that the winning fighters and those who lost the effectiveness of the attack during the fight in the first minute of the first and second period is the

highest. This is due to the fact that each of the fighters at the beginning of each period tries to gain an advantage and then keep it (Fig. 1).



**Fig. 1** Dynamics of effectiveness of the attack in the clashes of winners and losers

The analysis of the variety of technical actions by periods shows a decrease in the number and efficiency of their performance both in the winning wrestlers and in the losers (Table 3). In our opinion, this is due to the peculiarities of the use of the arsenal of technical and tactical actions.

*Table 3*

**Variety of technical actions and their effectiveness at the 2020 World Cup (WC)  
(n=30)**

| Periods         | Winners                    |                  | Those who lost             |                  |
|-----------------|----------------------------|------------------|----------------------------|------------------|
|                 | Variety of actions, number | Effectiveness, % | Variety of actions, number | Effectiveness, % |
| 1 period        | 1,8±0,17                   | 100,0±0,0        | 0,3±0,11                   | 23,3±7,72        |
| 2 period        | 1,7±0,16                   | 96,2±3,51        | 0,2±0,12                   | 17,9±7,24        |
| For two periods | 1,8±0,12                   | 98,2±1,71        | 0,3±0,08                   | 20,7±5,32        |

**Conclusions / Discussion**

The analysis of performances at competitions is given great importance: by means of the analysis of competitive activity indicators of technical and tactical

readiness of highly skilled judokas were determined (Boychenko N.V., etc., 2020), the methodology of the training system of difficult technical and tactical actions in freestyle wrestling is developed (Kashevko V. A., 2008), tracked the performances of judo athletes of different ages (Julio U., and et. al., 2011). Based on the performance of athletes at the 2017 World Championship, a comparative analysis of the strongest and Ukrainian Greco-Roman wrestlers (Radchenko Y., et al., 2018) was carried out, similar studies were conducted in freestyle wrestling (Boyko V. F., et al., 2014) and women's wrestling (Latyshev M. V., et al., 2019).

It has been established that at the 2020 World Cup, the winning wrestlers have a larger technical and tactical arsenal (10 holds) than those who lost (5 holds). The analysis of competitive activity showed that the greatest number of times during the fight the wrestlers-winners perform in the ground - turn over (0.72 times), in the rack - dumping (0.32 times), and those who lose spend in the ground - countermeasures (0.06 times), in the rack - dumping (0.24 times). A significant number of points wrestlers-winners receive at the beginning of the fight by increasing the number of different technical and tactical actions and the effectiveness of their implementation.

The analysis of indicators of competitive activity allowed to determine that the winning fighters and those who lost the number of technical and tactical actions, their effectiveness, the interval of attack decreases in the second period. The efficiency of the hold of the winning wrestlers in the second period (69.5 %) is higher than in the first one (61.8 %), and those who lost in the first period (12.2 %) are better than in the second (8.7 %). This is due to the fact that at the end of the fight the loser carries out many unsuccessful attacks in order to win back.

**Prospects for further research** will be aimed at analyzing the competitive activity of athletes in other martial arts.

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