Essentials for mutual symmetrical and asymmetrical positions of wrestlers

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Abstract

Objective of the study was to reveal the differences in symmetrical mutual positions as a method of defense and asymmetrical positions as the method of attack. Besides this, the authors analysed the efficiency of the metod in fighting conditions.

Methods and structure of the study. At the purposes of the study video recording and shorthand recording of techniques with different mutual positions of wrestlers had been used. To indicate and measure the reaction forces of the support of wrestlers, the computer complex «AMTI» was used, as well as two dynamometric platforms. The platforms allow measuring the vertical and two horizontal components of the reaction forces of the support.

Results and conclusions. Mirror and identical (symmetrical) and asymmetrical mutual arrangements of wrestlers' body parts relative to the vertical axis during mutual grips were determined. The values of support reaction force (SRF) indicators were determined during symmetrical mutual arrangement of wrestlers and during a bending throw. Thus, during symmetrical mutual arrangements, the SRF indicators were 723,9 N, and during a bending throw – 3317,8 N. Methods for maintaining symmetrical mutual arrangements during defense and their violation during the execution of techniques were tested.

Keywords: *: attack, defence, wrestling, mutual position of wrestlers, symmetry, asymmetry, technical actions.*

Introduction. In the sports training of wrestlers, in the section on basic technical training, specialists distinguish and offer for mastering various positions (wrestler's stance (low, high, middle, right, left). The wrestler's stance is interconnected with the grip used and the technique of the techniques. In the mutual positions of wrestlers in mutual grips, we took into account the principle of symmetry. Symmetry is a concept associated with harmony (ordering of diversity) and proportionality of forms. It is usually believed that an event (object) has symmetry if it remains unchanged as a result of one or another operation performed on it.

The concept of symmetry is widely known and plays a significant role in everyday life. Symmetry is the invariance (constancy) of the laws of biomechanics with respect to any changes in the shape of the trajectory of movement. The following types of symmetry are distinguished: mirror, geometric, dynamic.

Mirror symmetry. The human body has (approximately) mirror symmetry relative to the vertical axis. Many architectural structures have mirror symmetry.

Geometric symmetry is associated with the conservation of energy (some quantities are conserved in time (athlete's capabilities, actions, execution time, efforts). This does not mean that the athlete cannot change or alter his actions, but any change that occurs with the subject must be such that the named quantities remain proportionate.

Dynamic symmetry. It includes calibration, that is, a change in scale, respectively, of the athlete's capabilities, his actions, level of effort, execution time of the action.

The mutual arrangement of wrestlers in mutual grips has the following patterns: in symmetrical (mirror and identical) mutual positions, techniques are not performed. Techniques are performed in asymmetrical mutual positions. In other words, in order to per-

form a technique, it is necessary to break the symmetry relative to the vertical axis and break the balance of the support reaction forces in the «wrestler + opponent» system.

Objective of the study was to reveal the differences in symmetrical mutual positions as a method of defense and asymmetrical positions as the method of attack. Besides this, the authors analysed the efficiency of the metod in fighting conditions.

Methods and structure of the study. The hardware and software complex «AMTI» was used. To measure the support reaction forces (SRF) with different mutual positions of wrestlers in mutual grips, two dynamometric platforms of the AMTI company (USA) were used. The platform dimensions are 60×60×8 cm. The platforms allow measuring the vertical and two horizontal components of the support reaction forces. The natural frequency of the platform oscillations is 1000 Hz. The signals from the amplifiers were fed to the ADC input («L-Card», E-440) and then through the USB port to a personal computer. The software «ACTest» was used to collect and process the data.

Results of the study and discussion. A classification of the mutual positions of wrestlers in mutual grips is presented (Figure 1).

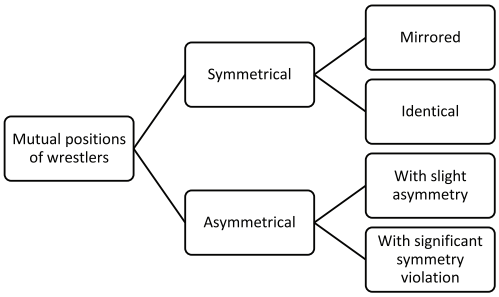

Figure 1. Classification of mutual positions of wrestlers in mutual grips

When analyzing the video recordings, not a single technique was recorded with symmetrical mutual positions of the wrestlers. The test wrestlers mastered a new method of defense by position, that is, they assumed the same position as the opponent.

Figure 3 shows the values of the support reaction forces (SRF) with symmetrical mutual positions of wrestlers in mutual grips. As can be seen from the dynamics of the SRF indicators, the convexity of the curve belonging to one wrestler is balanced by the convexity of the curve of the other wrestler.

A different picture is observed in figure 4. When performing a throw with a bend, the wrestler performing the technique has the highest values of the support reaction force, compared to similar indicators recorded for his opponent.

Table 1 and figure 2 present the indicators of the values of the support reaction forces of the wrestler with a symmetrical mutual position with the opponent and when performing a throw with a bend. When performing a throw with a bend, the support reaction force is 4,6 times higher than with a symmetrical mutual position.

Table 1. Indicators of the magnitude of the reaction forces of the wrestler's support in a symmetrical mutual position with the opponent and when performing a throw with a bend

Content	Support reaction force indicators (in newtons – H=kg*m/s²)
Symmetrical mutual positions	723,9
Carrying out a throw by bending	3317,8

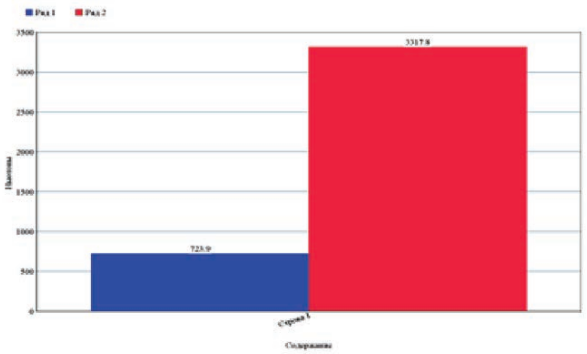

Figure 2. Indicators of the support reaction force of a wrestler in symmetrical mutual positions (row 1) and when performing a throw with a bend (row 2) (in Newtons)

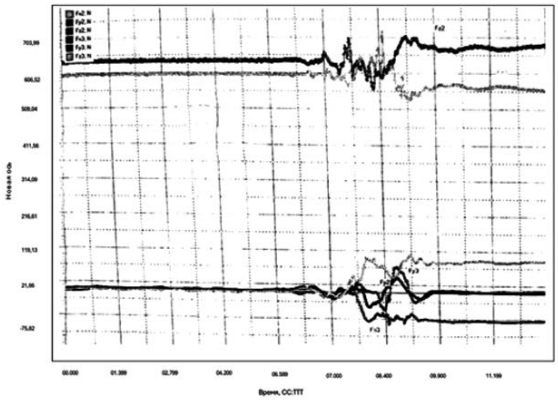

Figure 3. Indicators of the magnitude of the support reaction force (in Newtons) for symmetrical mutual positions of the wrestlers

Conclusions. Mirror and identical (symmetrical) and asymmetrical mutual arrangements of wrestlers' body parts relative to the vertical axis during mutual grips were determined. The values of support reaction force (SRF) indicators were determined during sym-

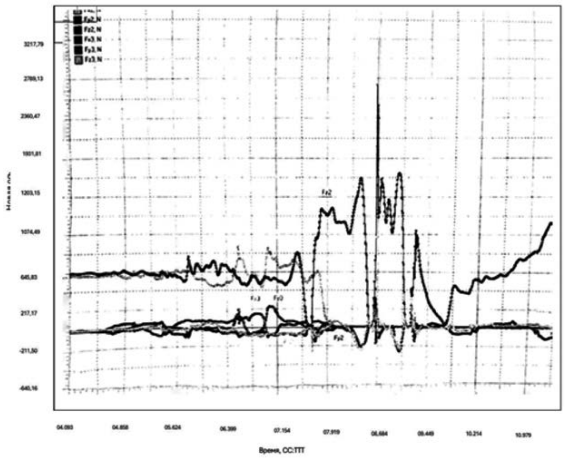

Figure 4. Indicators of the values of the support reaction force (in Newtons) when performing a deflection throw

metrical mutual arrangement of wrestlers and during a bending throw. Thus, during symmetrical mutual arrangements, the SRF indicators were 723,9 H, and during a bending throw – 3317,8 H. Methods for maintaining symmetrical mutual arrangements during defense and their violation during the execution of techniques were tested.

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