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Maintaining a stable body balance during rotational movements and its influence on the indicators of the throwing workability of wrestlers

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Abstract

Purpose: The purpose of this research is to study the influence of vestibulosomatic stability on the efficiency of throwing workability of belt wrestlers, when they perform techniques on the right and on the left.

Methods: The studies used pedagogical tests specially developed and approved by the Belt Wrestling Federation of Uzbekistan. The research was conducted in September 2017 and June 2018 and involved qualified belt wrestlers-students in the weight categories of 61-66 and 67-73 kg, the number of which was distributed to 15 people in each weight category.

Results: Actual level of volume and intensity of dummy throws over the thigh and over the chest, obtained when testing the wrestlers in a state of relative rest or without preliminary short-term load, significantly decreased when the corresponding methods of throws were performed against the background of the aftereffect of the dosed rotational load. Such a consequence of the influence of the rotational load on the volume and intensity of the throws is the result of insufficient development of the receptor mechanisms of the vestibular analyzer.

Conclusion: In order to come up with a specific or more accurate conclusion on this issue, it is necessary to continue and expand the range of research regarding the study of the volume and intensity of serial throws of an opponent (or a dummy both with an inconvenient side and in a convenient direction against the background of the aftereffect of short-term rotational acts without a load and with a load.

Keywords: Belt wrestling, throws, balance, body rotation, volume, intensity, stability, vestibular analyzer.

Introduction

In the process of human life, and especially in sports activities, coordination and accuracy of almost all movements are associated with the stability of maintaining both static and dynamic balance of the body. There are also opinions that maintaining a stable balance, the level of development of which depends on the functionality of the vestibular analyzer, can have a corresponding effect on the qualitative and quantitative indicators (technique, tactics, speed, etc.) of the movements performed [V.I. Lyakh, 2006; p. 133-144; A.S. Nazarenko, A.S. Chinkin, 2015, pp. 78-85; A.A. Pulatov, 2015, pp. 215-218; F.A.Pulatov, 2019, R.30-33]. It should be considered that maintaining a stable body balance is also important in the types of wrestling. Some authors believe that, in comparison with the usual conditions of standing and movement in space, the conditions of a wrestling match make increased demands on the balance function of wrestlers. [C. Perrot, D. Devitere, P. Perrin, 1998, P. 119-135]. They think that this is due to the constant and mutual interaction of athletes, the desire to unbalance the opponent and transfer him to the supine position. This leads to the conclusion that a high ability to regulate body balance in a single combat is an important component of a successful result in a wrestling match. Based on this, it can be assumed that the insufficient development of the ability to maintain a stable body balance among wrestlers can negatively affect the effectiveness of the throwing workability of wrestlers. The studies used the following pedagogical tests, recognized by the state unitary enterprise "IP CONSULTING CENTER" of the Intellectual Property Agency under the Ministry of Justice of the Republic of Uzbekistan as "Intellectual Property":

- determination of the duration of maintaining dynamic balance during the rotation of the body to the left in the position of a 90º forward bend with a dummy on the shoulders;
- the same - during the rotation of the body to the right;
- the same - during the rotation of the body to the left in the position of tilting back;
- the same - during the rotation of the body to the right;
- determination of the volume of dummy throws over the thigh in 10 seconds;
- the same - over the chest;
- determination of the duration of 10 throws of the dummy over the thigh;
- the same - over the chest.

Belt wrestlers with a weight category of 61-66 kg and 67-73 kg, studying and engaged in groups of sports and pedagogical improvement at the Uzbek state university of physical education and sport were involved in testing. The studies involved 15 wrestlers from each of these weight categories, and they were tested 3 times – n=15x3=45.

Methods

The following pedagogical tests, specially developed and approved by the Belt Wrestling Federation of Uzbekistan, were used in the study.

- lifting and throwing a dummy using the right knee the maximum number of times in 10 seconds (Figure 1);
- lifting and throwing the dummy with the right knee 10 times for a time;
- throwing a dummy over the chest to the left the maximum number of times in 10 seconds (Figure 2);
- throwing a dummy over the chest to the left 10 times for a time;

These tests were initially carried out without preloading, and then after loading in the form of 10-fold rotations of the body in a convenient direction, holding the dummy on the shoulder and leaning forward 90 degrees (Figure 3).

The research was conducted in September 2017 and June 2018 and involved qualified belt wrestlers-students in the weight categories of 61-66 and 67-73 kg, the number of which was distributed to 15 people in each weight category. To ensure the reliability of the study results, the tests were repeated 4 times (n = 60 + 60) at 10:00 a.m. on non-training days or between days in the same standardized conditions.

Results and discussion

The results of the study carried out within the framework of the proposed goal showed that the duration of maintaining dynamic balance during body rotation to the left (convenient side for right-sided) in a 90º forward bend with a dummy on the shoulders of wrestlers in the 61-66 kg weight category averaged 33, 4±3.56



Figure 1. lifting and throwing a dummy using the right knee. *Note: the weight of the dummy is 50 kg, after each test is completed, a 5-minute break is given.*



Figure 2. Throwing a dummy over the chest to the left. *Note: the weight of the dummy is 50 kg, after each test is completed, a 5-minute break is given.*



Figure 3. Rotations of the body in a convenient direction, holding the dummy on the shoulder and leaning forward 90 degrees. *Note: the weight of the dummy is 50 kg, after each test is completed, a 5-minute break is given.*

sec., while for wrestlers in the weight category 67-73 kg it was slightly more (2.1 sec.), and amounted to 35.5±3.65 sec. And when performing the same test during rotation of the body to the right (inconvenient side for right-sided), the studied indicators were 22.3±2.13 and 23.7±2.26 sec. respectively (Table 1).

Table 1. Indicators of the duration of maintaining dynamic balance during rotation of the body in a tilt position forward and backward with a dummy on the shoulders of belt wrestlers. *Note: the weight of the dummy is 50 kg; only right-handed wrestlers were involved in testing.*

Pedagogical tests	Weight categories		Difference of indicators
	61-66 kg n=15x3=45	67-73 kg n=15x3=45	
The duration of maintaining dynamic balance during the rotation of the body to the left in the forward tilt position by 90º with a dummy on the shoulders (sec.)	33,4±3,56	35,5±3,65	2,1
The duration of maintaining dynamic balance during the rotation of the body to the right in the forward tilt position by 90º with a dummy on the shoulders (sec.)	22,3±2,13	23,7±2,26	1,4
The duration of maintaining dynamic balance during the rotation of the body to the left in a backward tilt position with a dummy on the chest (sec.)	18,3±1,92	19,5±2,06	1,2
The duration of maintaining dynamic balance during the rotation of the body to the right in a backward tilt position with a dummy on the chest (sec.)	13,7±1,48	15,3±1,67	1,6

During the rotation of the body to the left in a backward tilt position with a dummy on the chest, the duration of maintaining dynamic balance was significantly reduced and amounted to 18.3 ± 1.92 and 19.5 ± 2.06 seconds, respectively. And the duration of maintaining dynamic balance when rotating the body to the right or to an inconvenient side in a backward tilt with a dummy on the chest for wrestlers in the 61-66 kg weight category decreased to 13.7 ± 1.48 seconds, and for wrestlers in the 67-73 kg weight category - to 15.3 ± 1.67 sec. It can be seen that in wrestlers of both weight categories, when rotating the body with a dummy to the inconvenient side, the duration of maintaining the dynamic balance is characterized by a pronounced tendency to decrease in comparison with the data obtained after rotating the body to the convenient - right side.

At the same time, the indicators of the duration of maintaining dynamic balance in wrestlers in the 67-73 kg weight category were relatively longer than in wrestlers in the 61-66 kg weight category, which, obviously, was due to the weight of the dummy - 50 kg. Consider-

Table 1. Indicators of the volume and duration of serial throws among belt wrestlers at rest and after a dosed rotational load. *Note: the weight of the dummy is 50 kg; only right-handed wrestlers were involved in testing.*

Pedagogical tests	Weight categories		Difference of indicators
	61-66 kg n-15x3-45	67-73 kg n-15x3-45	
In a state of "rest"			
Dummy throws over the thigh in 10 seconds (number)	5,17±0,59	5,79±0,66	0,62
Dummy throws over the chest in 10 seconds (number)	5,09±0,48	5,28±0,59	0,19
Duration of 10 dummy throws over the thigh (sec.)	24,7±3,03	25,9±3,12	1,2
Duration of 10 dummy throws over the chest (sec.)	26,8±3,35	27,5±3,37	0,7
After 10-fold rotation of the body in a convenient direction with a dummy on the shoulders			
Dummy throws over the thigh in 10 seconds (number)	3,05±0,37	3,12±0,38	0,7
Dummy throws over the chest in 10 seconds (number)	3,01±0,31	3,03±0,27	0,2
Duration of 10 dummy throws over the thigh (sec.)	26,3±3,45	27,5±3,48	1,2
Duration of 10 dummy throws over the chest (sec.)	27,4±3,72	28,2±3,86	0,8

ing that in belt wrestling, the duration of one fight lasts up to 4 minutes, it can be assumed that such a level of stability in maintaining balance can have a negative impact on both the technique and tactics of the implementation of techniques, and the parameters of the special working capacity of wrestlers (volume and intensity of throws).

Studies have shown that under normal conditions or in a state of "rest" without preloading, the number of dummy throws over the thigh in 10 seconds for wrestlers in the 61-66 kg weight category was 5.17±0.59 times, and for wrestlers in the 67- 73 kg - 5.79±0.66 times (Table 2). The number of dummy throws over the chest in 10 seconds turned out to be slightly less and amounted to 5.09±0.48 and 5.28±0.59 times, respectively. The duration of 10 dummy throws over the thigh for wrestlers in the 61-66 kg weight category was 24.7±3.03 seconds, and for wrestlers in the 67-73 kg weight category - 25.9±3.12 seconds. It can be seen that the difference between the indices of dummy throws over the thigh in 10 seconds in wrestlers of both weight categories turned out to be noticeably greater (0.62) than similar data on the volume of dummy throws over the chest (0.19). This, apparently, is due to the relative difficulty of performing a dummy throwing technique over the chest.

And the fact that the number of throws of the dummy over the thigh and over the chest seemed to be less for wrestlers of the 61-66 kg weight category is explained by the weight of the dummy - 50 kg. The volume (in 10 seconds) and intensity (10 throws for a time) of dummy throws both over the thigh and over the chest of wrestlers of both weight categories significantly worsened under the influence of 10-fold rotational movement of the body to the convenient left side with the dummy on the shoulders. So, for example, the number of throws over the thigh in 10 seconds for wrestlers of the weight category 61-66 kg was 3.05±0.37 times, and for wrestlers of the weight category 67-73 kg - it turned out to be equal to 3.12±0.38 times. The dummy's throws over the chest were 3.01±0.31 and 3.03±0.27 times, respectively.

Despite a noticeable decrease in the volume of dummy throws over the thigh and over the chest in 10 seconds, the duration of 10 throws with the same techniques increased significantly in wrestlers of both weight categories. In particular, for wrestlers in the 61-66 kg weight category, the time for performing 10 dummy throws over the thigh was 26.3 ± 3.45 seconds, while their volume of execution in 10 seconds was 3.05 ± 0.37 times. And for wrestlers in the weight category of 67-73 kg, these indicators were - 27.5 ± 3.48 seconds and 3.03

± 0.27 times, respectively.

The duration of 10 throws of the dummy over the chest in the first group of wrestlers was 27.4 ± 3.72 seconds, and the volume - 3.01±0.31 times, and for the wrestlers of the second group these values were 28.2±3.86 seconds and 3.03±0.27 times, respectively. As you can see, the difference between the given indicators of dummy throws on the volume and for the time turned out to be insignificant, which, apparently, is associated with the effect of a short-term rotational load on the receptors of the vestibular analyzer, after which there was a certain leveling of the factors of the weight category and the weight of the dummy due to the appearance forced mobilization reaction in the examined wrestlers.

Conclusion

From the above analysis of the research results, it can be stated that the actual level of volume and intensity of dummy throws over the thigh and over the chest, obtained when testing the wrestlers in a state of relative rest or without preliminary short-term load, significantly decreased when the corresponding methods of throws were performed against the background of the aftereffect of the dosed rotational load. Such a consequence of the influence of the rotational load on the volume and intensity of the throws is the result of insufficient development of the receptor mechanisms of the vestibular analyzer, which regulates the function of maintaining balance in different body positions, including during movements.

However, in order to come up with a specific or more accurate conclusion on this issue, it is necessary to continue and expand the range of research regarding the study of the volume and intensity of serial throws of an opponent (or a dummy both with an inconvenient side and in a convenient direction against the background of the aftereffect of short-term rotational acts without a load and with a load.

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