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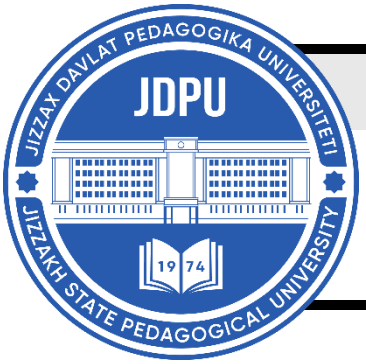

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RATE OF INCREASE OF RAPID AND MAXIMUM DYNAMIC STRENGTH ENDURANCE IN VERTICAL DIRECTION UNDER CONCENTRIC–ECCENTRIC MODES IN SKILLED WRESTLERS DURING ONE MICROCYCLE

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ABOUT ARTICLE

Key words: skilled wrestlers, vertical direction, rapid strength, maximum strength, dynamic strength, endurance, growth, concentric, eccentric modes.

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Abstract: This article analyzes the rate of increase during one microcycle in skilled wrestlers practicing certain types of wrestling in the volume of exercises performed in the vertical direction under concentric–eccentric modes: pull-ups on a bar (within 10 seconds and as many as possible) and lifting and lowering a 60 kg mannequin from the ground to the chest (within 10 seconds and as much as possible).

Introduction. In sports theory and practice, the logical essence of strength qualities that "bring movements to action," their content, and the fact that they are defined according to the specific purpose of each performed movement and named differently are well established in fundamental research [Yu.V. Verkhoshansky, 2021, pp. 53–140; L.P. Matveev, 2021, pp. 260–361; V.N. Platonov, 2019, pp. 268–356; E. Harman, 2008, pp. 65–92; J.M. Sheppard, N.T. Triplett, 2016, pp. 439–470; V.M. Zatsiorsky, 2019, pp. 43–149]. In particular, movements executed with rapid strength can be classified—depending on their purpose, direction, volume, and other characteristics—into types such as explosive strength, starting strength, rapid dynamic strength, and endurance of rapid dynamic strength. These types of strength are important not only in various sports (tennis, volleyball, football, etc.) but also in wrestling. For example, in wrestling, explosive and rapid strength, as well as endurance of rapid dynamic strength, play

specific roles when applying techniques such as pushing, pulling, or lifting and throwing the opponent to disrupt their balance.

In studying these named strength qualities, we selected tests based on V.N. Platonov's recommendations [2019, p. 351] and considered their correspondence or similarity to the coordination of technical methods used in wrestling. The results of these studies are presented in Table 2. In the groups of skilled wrestlers involved in the study, endurance of rapid dynamic strength in the vertical direction under concentric–eccentric modes was evaluated using pull-ups on a bar for 10 seconds (max repetitions) and lifting and lowering a 60 kg mannequin from the ground to the chest within 10 seconds (as many times as possible). Maximum dynamic strength endurance was assessed using pull-ups on the bar to failure (max repetitions) and lifting and lowering the 60 kg mannequin from the ground to the chest to failure.

The purpose of the study was to determine the rate of growth of rapid and maximum dynamic strength endurance under different conditions in the vertical direction under concentric–eccentric modes during one microcycle in skilled wrestlers.

The tests employed were designed to evaluate the strength of the arm flexors and the spinal-pelvic-hip joint flexor-extensor muscles: pull-ups on a bar for 10 seconds (max repetitions) and lifting and lowering a 60 kg mannequin from the ground to the chest for 10 seconds (max repetitions).

Results and Discussion. The study showed that at the beginning of the microcycle, the number of pull-ups on the bar for 10 seconds was: 6.67 ± 1.03 in skilled belt wrestlers, 5.13 ± 0.89 in ethnic wrestlers, 4.87 ± 0.79 in Greco-Roman wrestlers, and 5.78 ± 0.95 in freestyle wrestlers (Table 2). By the end of the microcycle, these values increased to 7.25 ± 1.09, 6.17 ± 0.96, 5.03 ± 0.88, and 6.33 ± 1.02, respectively. Comparative analysis indicates that the strength indicators observed at the beginning of the microcycle increased to varying degrees by its end (Figure 3). The diagrams show that in all groups of skilled wrestlers involved in the study, endurance of rapid and maximum dynamic strength, measured by pull-ups for 10 seconds (1) and to failure (2), increased only at a very slow rate by the end of the microcycle. This suggests that in traditional training with these wrestlers, insufficient attention is given to the development of the specific strength qualities under discussion using appropriate exercises.

Table

Rate of growth of rapid and maximum dynamic strength endurance in skilled wrestlers in the vertical direction under concentric–eccentric modes during one microcycle, ((X) ± δ)

No.	Tests	Belt Wrestlers n=29×2=58	Ethnic Wrestlers n=26×2=52	Greco-Roman Wrestlers n=25×2=50	Freestyle Wrestlers n=23×2=46
1	Max pull-ups on the bar in 10 sec (reps)	6.67 ± 1.03 → 7.25 ± 1.09	5.13 ± 0.89 → 6.17 ± 0.96	4.87 ± 0.79 → 5.03 ± 0.88	5.78 ± 0.95 → 6.33 ± 1.02
2	Max pull-ups on the bar to failure (reps)	15.72 ± 1.79 → 16.56 ± 1.89	14.35 ± 1.31 → 15.21 ± 1.67	15.47 ± 1.81 → 16.39 ± 1.95	13.88 ± 1.22 → 14.71 ± 1.42
3	Lifting and lowering 60 kg mannequin from ground to chest in 10 sec (reps)	7.03 ± 1.12 → 8.12 ± 1.01	5.79 ± 0.82 → 6.03 ± 0.95	6.14 ± 0.72 → 7.10 ± 0.88	6.04 ± 0.93 → 7.08 ± 1.02
4	Lifting and lowering 60 kg mannequin from ground to chest to failure (reps)	16.13 ± 1.77 → 17.71 ± 1.93	15.22 ± 1.57 → 16.12 ± 1.85	16.04 ± 1.69 → 17.15 ± 1.87	14.87 ± 1.29 → 15.52 ± 1.74

Note: MCY – microcycle of the training year; in the figure – at the start of the microcycle; in the text – at the end of the microcycle. During tests 3–4, the participant lifts the mannequin to the chest while leaning the torso backward to the maximum extent, then lowers it to the ground. Only wrestlers weighing 68–73 kg were involved in the study, and the results were not analyzed according to weight categories.

Long-term observations, objective interviews with coaches, and published scientific sources on wrestling indicate that in traditional training of skilled wrestlers, the exercises used to develop explosive and maximal strength endurance often do not match the coordination characteristics of actual competition techniques. In other words, such exercises are frequently performed with different weights, for example, using various mannequins or specialized simulators. Even if these exercises are somewhat specialized, insufficient emphasis is placed on applying them in vertical or horizontal directions under concentric and eccentric regimes.

Wrestler Type Pull-ups in 10 sec (max) Pull-ups Maximum (as many as possible)

Belt Wrestlers 6.67 ± 1.03 7.25 ± 1.09

Ethnic Wrestlers 5.13 ± 0.89 6.17 ± 0.96

Greco-Roman Wrestlers 4.87 ± 0.79 5.03 ± 0.88

Freestyle Wrestlers 5.78 ± 0.95 6.33 ± 1.02

- Pull-ups in 10 sec = number of pull-ups performed within 10 seconds.
- Pull-ups Maximum = maximum number of pull-ups performed.

Figure 1. Diagrams reflecting the rate of improvement by the end of the academic year (AY) in pull-up tests on the bar for qualified wrestlers practicing different wrestling styles.

According to our research, when a 60 kg mannequin was placed upright on the tatami, the number of times it could be lifted to chest level and lowered within 10 seconds did not exceed 6–7 repetitions in almost all groups of qualified wrestlers, and by the end of the AY, the increase in these values was minimal. For example, in qualified belt wrestlers, the number of repetitions in this 10-second test at the beginning of the AY was 7.03 ± 1.12, and by the end of the AY, it increased only to 8.12 ± 1.01. In qualified ethnowrestlers, the corresponding values were 5.79 ± 0.82 and 6.03 ± 0.95; in Greco-Roman wrestlers – 6.14 ± 0.72 and 7.10 ± 0.88; and in freestyle wrestlers – 6.04 ± 0.93 and 7.08 ± 1.02.

However, when performing the test of lifting the mannequin to chest level as many times as possible, the values were as follows: belt wrestlers – 16.13 ± 1.77 and 17.01 ± 1.93 repetitions; ethnowrestlers – 15.22 ± 1.57 and 16.12 ± 1.85; Greco-Roman wrestlers – 16.04 ± 1.69 and 18.15 ± 1.87; and freestyle wrestlers – 14.87 ± 1.29 and 15.52 ± 1.74 repetitions.

It is evident that both the rapid dynamic strength endurance recorded in the 10-second lift test of the 60 kg mannequin from the ground to chest level, and the maximal dynamic strength endurance determined in the “lift the mannequin as many times as possible” test, first of all, did not manifest at a level characteristic of highly skilled wrestlers. Secondly, the strength indicators recorded at the beginning of the AY increased very slowly by the end of the AY (Figure 2).

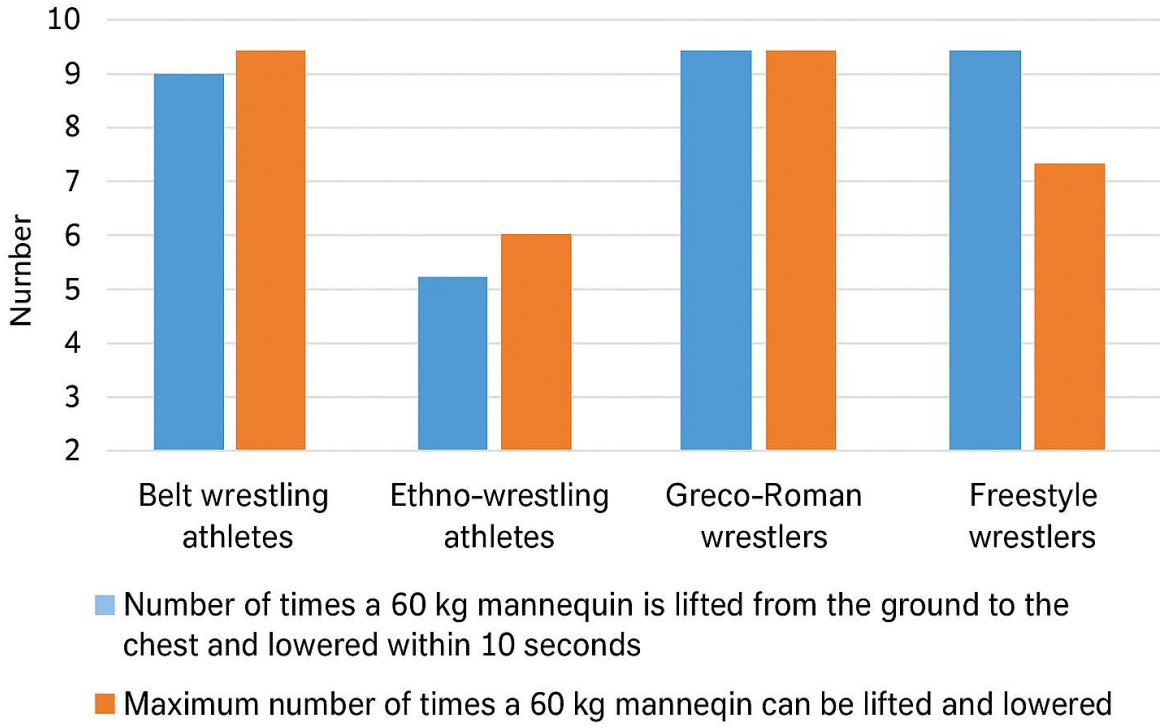

Figure 2. Diagrams reflecting the absolute rate of improvement by the end of the academic year (AY) in the 10-second and maximal chest-lift tests with a 60 kg mannequin in qualified wrestlers of various wrestling styles, based on measurements taken at the beginning of the AY.

Of course, the results of tests used to assess the rapid and maximal dynamic strength endurance of muscles responsible for flexion and extension of the arms and trunk-pelvis joints in the vertical direction under concentric-eccentric modes can, first of all, be considered objective. Secondly, the fact that such strength qualities, which are of critical practical importance, are sufficiently developed in the groups of qualified wrestlers participating in the study, yet increase at a slow pace even by the end of the AY, calls for a reconsideration of the content of ongoing practical training and the exercises applied.

The point is that each sport has its own movement techniques, coordination, and directions that require specific types of strength. In some sports, maximal and rapid strength predominance is crucial; in others, dynamic strength endurance; and in yet others, all types of strength need to be proportionally developed. It has also been proven that both overdevelopment and insufficient development of strength qualities can negatively affect the movement technique and coordination specific to each sport, hindering the skilled execution of certain technical-tactical methods [N.V. Platonov, 2019, pp. 271–273].

However, it is also important to note that in all sports, including all wrestling styles, the leading types of strength required for skillful execution of sports techniques naturally demand other strength qualities during competition. In wrestling, the rapid and maximal dynamic strength endurance demonstrated in the vertical direction under concentric-eccentric modes can be assessed reliably using pull-up tests on the bar within a set time or by lifting a 60 kg mannequin from the ground to chest level as many times as possible. These tests are not only practically significant for obtaining reliable results, but also demonstrate that such tests can be used in training as specialized exercises.

Regardless of the type of strength exhibited in the vertical concentric mode (maximal strength, rapid strength, explosive strength, etc.), each is aimed at overcoming resistance. In contrast, strength exhibited in the eccentric mode is characterized by braking, tolerating, or slowing down a movement or resisting an external load. Strength in the isometric mode means maintaining resistance or weight in a static position (muscles contract without changing length). Strength in the plyometric mode serves to resist a load falling from above. Strength in the ballistic mode involves reaching maximal force concentration at the end of throwing a load.

It should be emphasized that various types of strength demonstrated in different vertical modes may participate to varying degrees in performing a combination of several technical elements during training or competition, or may be expended in executing specific movement elements. Based on the interpreted data and reflections, it can be concluded that an athlete, including wrestlers, should have a broad reserve of each type of strength demonstrated in concentric and eccentric modes across various directions (vertical, horizontal, diagonal). However, in developing these qualities, a differential approach considering the specific movement techniques and coordination is necessary, and particularly important is the creative-intellectual improvisation in their application. In other words, having a rich reserve in all types of strength allows the athlete to apply technical-tactical methods in non-standard ways.

References:

1. Абдуллаев Ш.А. Ёш курашчиларни тайёрлашнинг илмий-услубий асослари. / Ўқув-услубий қўлланма. Т., 2012, Б.32-35.

2. Абдурасулова Г.Б. Ёш қиличбозларнинг ёшга оид ҳаракат потенциясининг динамикаси. .: “Фан-спортга”, Т., 2016, № 3., Б.3-8.

3. Алиев И.Б. Кураш билан шуғулланувчи талаба-спортчиларни машғулот юкламаларининг оптимал нисбатлари. / Пед.фан.номзодлик дисс., Т., 2012. – 30 б.

4. Акрамов А., Умаров Х. Методика оценки и модельные характеристики статокинетической помехоустойчивости юных футболистов// Таълим. Тошкент, 2003.- №5.- 50-53.