

## INFLUENCE OF STRENGTH-BUILDING ACTIVITIES ON COMPETITIVE RESULTS OF ATHLETES IN Workout

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### Abstract

Relevance of the investigation is caused by regularities of the origin and development of Workout as one of the directions of strength gymnastics, to achieve results in which the level of the development of strength qualities plays an important role. Analysis of the up-to-date studies on Workout development points out the need to draw attention to peculiarities in the organization and methods of providing training sessions. The necessary physical preparation and high sports results can be achieved by taking in consideration all factors and the rational structure of training process. **The purpose of investigation** – to work out a method of strength training in Workout and to check it up in competition activities. **Results of investigation.** A modern trend of strength-building acrobatics «Street workout» appeared as the variety of bodybuilding and is based on gymnastic exercises. Workout – English-American term is translated as «training» and composed of the complex of physical exercises directed to the improvement of strength, strength endurance and body shape. Therefore, exercises in speed-and-strength moves and methods of static and isometric exercises are used in special training. The trainings that are provided in different regimens and give significant results are considered as special methods of the development of strength, in which the variety of the regulations of tension in different regimens of their work, namely, isometric, concentric, eccentric, is of great importance. The article claims that the most effective ways and methods of strength development in Workout are varieties of exercises «Finger-tip push-up» (press-ups), method of isometric and static tensions, Tabat's protocol. The analysis of our experimental findings has proven that the developed methods of strength training of athletes-workouters provide the most significant increase in the results of control exercises «Horizontal backward hang», «Muscle-up on horizontal bar», «Push-ups from the floor» and «Arm balance». In the process of the investigation, a direct correlation between strength preparedness and the results of competitions in the exercise «Chest Dips with additional weight»; between strength preparedness and the final results of competitions in Workout was established. The obtained data are confirmed by the results of sportsmen's participation in regional competitions in Street Workout.

**Key words:** workout, strength, competitions, isometric exercises, push-ups, Tabat's protocol.

**Ірина Маляренко, Юрій Ромаскевич, Ольга Кольцова, Катерина Юськів. Вплив силової підготовки на змагальний результат спортсменів у Workout.** Актуальність дослідження зумовлена закономірностями виникнення та розвитку Workout як одного з напрямів силової гімнастики, у якому для досягнення результатів важливу роль відіграє рівень розвитку силових якостей. Аналіз передових досліджень із розвитку Workout указує на потребу звернути увагу на особливості організації та методики проведення тренувальних занять. Тільки з урахуванням усіх факторів і раціональної побудови структури тренувального процесу можна досягти необхідної фізичної підготовки та високих спортивних результатів. **Мета дослідження** – розробити методику силової підготовки у Workout і перевірити її ефективність у змагальній діяльності. **Результати дослідження.** Сучасний напрям силової акробатики «Street workout» виник як різновид атлетичної гімнастики й ґрунтується на гімнастичних вправах. Workout – англо-американський термін, перекладається як «тренування» та складається з комплексу фізичних вправ, спрямованих на вдосконалення сили, силової витривалості й форми тіла. Тому в спеціальній підготовці використовують вправи, де застосовують швидкісно-силові рухи та методи статичних й ізометричних вправ. Тренування, що проводяться в різних режимах і дають вагомий результат, правомірно вважати спеціальними методами розвитку сили, у яких потрібно урізноманітнювати регуляцію напруги в різних режимах їхньої роботи: ізометричному, концентричному, ексцентричному. У статті зазначено, що найбільш ефективними засобами й методами розвитку сили у Workout є різновиди вправи «Згинання та розгинання рук в упорі лежачи» (віджимання), метод ізометричних і статичних напруг, протокол Табата. Аналіз власних експериментальних даних дав підставу визначити, що розроблена методика силової підготовки спортсменів-воркаутців дає найбільш значимі прирости результату у контрольних вправах «Горизонтальний вис ззаду», «Підйом силою на поперечені», «Віджимання від підлоги» та «Стійка на руках». У процесі дослідження встановлено прямий кореляційний зв'язок між силовою підготовленістю та результатами змагань у вправі «Віджимання на брусах із додатковою вагою»; силовою підготовленістю й підсумковими результатами змагань із Workout. Отримані дані підтверджуються результатами виступів спортсменів на обласних змаганнях із Street Workout.

**Ключові слова:** воркаут, сила, змагання, ізометричні вправи, віджимання, протокол Табата.

**Ирина Маляренко, Юрий Ромаскевич, Ольга Кольцова, Екатерина Юськив. Влияние силовой подготовки на соревновательный результат спортсменов в Workout.** Актуальность исследования обусловлена закономерностями возникновения и развития Workout как одного из направлений силовой гимнастики, в котором для достижения результатов важную роль играет уровень развития силовых качеств. Анализ передовых исследований по развитию Workout указывает на необходимость обратить внимание на особенности организации и методики проведения тренировочных занятий. Только с учетом всех факторов и рационального построения структуры тренировочного процесса можно достичь необходимой физической подготовки и высоких спортивных результатов. **Цель исследования** – разработать методику силовой подготовки в Workout и проверить ее эффективность в соревновательной деятельности. **Результаты исследования.** Современное направление силовой акробатики «Street workout» возникло как разновидность атлетической гимнастики и базируется на гимнастических упражнениях. Workout – англо-американский термин, что переводится как «тренировка» и состоит из комплекса физических упражнений, направленных на совершенствование силы, силовой выносливости и формы тела. Исходя из этого, в специальной подготовке используют упражнения, где выполняются скоростно-силовые движения и используются методы статических и изометрических упражнений. Тренировки, проводимые в различных режимах, дают весомые результаты, а поэтому их правомерно считать специальными методами развития силы, в которых необходимо разнообразить регуляцию напряжения в различных режимах их работы: изометрическом, концентрическом, эксцентричном. В статье указывается, что наиболее эффективные средства и методы развития силы в Workout – разновидности упражнения «Сгибание и разгибание рук в упоре лежа» (отжимание), метод изометрических и статических напряжений, протокол Табата. Анализ собственных экспериментальных данных дал основание определить, что разработанная методика силовой подготовки спортсменов-воркаутцев дает наиболее значимые приросты результата в контрольных упражнениях «Горизонтальный вис сзади», «Подъем силой на перекладине», «Отжимание от пола» и «Стойка на руках». В процессе исследования установлена прямая корреляционная связь между силовой подготовленностью и результатами соревнований в упражнении «Отжимание на брусьях с дополнительным весом»; силовой подготовленностью и итоговыми результатами соревнований по Workout. Полученные данные подтверждаются результатами выступлений спортсменов на областных соревнованиях по Street Workout.

**Ключевые слова:** воркаут, сила, соревнование, изометрические упражнения, отжимание, протокол Табата.

**Introduction.** Modern reality of technogenic environment causes the acute need in renovation of physical and spiritual strength that a human being loses in the process of labor activities and everyday communication. Recreation as an activity is directed to the realization of the needs in renovation and development of physical and spiritual strength of a man, his intellectual perfection.

A contradiction in the system of values in modern socio-cultural situation leads to the fact that young people lose the ability to withstand the influence of negative tendencies that have already formed in the system of youth permissibility. In this connection, it seems particularly timely to study new needs and values that are being formed within permissibility and its separate types, to determine the role and place of permissibility in the life of modern youth.

The actualization of the problems of youth permissibility is caused by the fact that young generation in accordance with its socio-cultural needs, devotes spare time mostly, to communication in the companies of youth, groups of the same age, where a peculiar young sub-culture is being formed that has its own impact on the formation of young personality.

A. Abdulkarimov, С. Guskov, О. Kirilenko, А. Rodionov state that the most important function of sport is health-improvement, recreation and culture. The problem to engage youth in sport as the most effective way to change alarming tendency of decreasing the level of motor activity and health is urgent at present, because only 5-8% of children leave secondary school without health problems in Ukraine.

Sport includes various social forms. It exists as a certain activity connected with body practices; as a game coordinated by rules; as an entertaining show; and as a variety of professional human activities.

*Strength gymnastics* – Workout proposes a complex of physical exercises, directed to the improvement of strength, endurance and body shape. In addition, it is based on physical exercises, gymnastics, strength exercises, acrobatics and therefore it is like a spectacular display. The up-to-date workout promotes a healthy way of life, struggle with drug addiction, alcoholism, smoking, computer addiction, etc. As the alternative to the above listed, the youth is given training. Thus, our investigation is rather actual [3].

**Purpose of investigation** – to work out a method of strength training in Workout and to check up its effectiveness at the competitions.

**Material and Methods of Investigation.** The investigation was carried out with athletes aged 15–17, who were engaged in Workout. 13 participants took part in it. A pedagogical experiment lasted from 2015 to 2017. In the course of the investigation, the following methods were used: *theoretical* – analysis of research-

and-methodical literature on the problem of the investigation; generalization of theoretical and empirical data; *empirical* – diagnostic (pedagogical monitoring, pedagogical experiment, method of control tests); *methods of mathematic statistics* – for interpretation and processing the results of the investigation.

**Results of Investigation. Discussion.** Nowadays, the desire of young men and girls to become strong and harmoniously developed is natural, but it can be achieved only by the way of systematic physical exercises and sport. The popularity of body-building among teenagers, young men and girls facilitates harmonious development of the whole body, proportions and musculature, formation of proper posture, strength and agility, flexibility and other physical and moral-volitional qualities..

L. Eiuunz defines a «body-building» as the system of exercises with regulated support directed to comprehensive physical training and formation of outward body shape; strengthening joints, tendons and ligaments; increase in functional abilities of people who are engaged in recreation exercises, etc [1].

L. Dvorkin, L. Eiuunz and others note that there are many exercises in athletic sports, which are different in their motion structure, ways of performance and energy supply. They can be used to make up complexes to solve a lot of health-improvement, cultural and educational tasks. In addition, each exercise depending on the method of its application can be multifunctional [1; 4].

Research of scientists [2; 5] allows to state that the fundamental principle of physical training is strength-building activities. One of the most important physical qualities in athletic sports is strength.

Non-traditional methods of strength development are isometric exercises. A. Smirnov states that unlike the method of static training, method of isometric tensions is intended for a development of maximal strength abilities [6].

Investigators of the method of isometric tensions (A. Smirnov, I. Zakirov and V. Pluzhnick, V. Tsymbalyuk et al.) are based on the fact that the strength is manifested according to the value of resistance: the greater the resistance is, the greater the efforts to overcome it are. The resistance that is impossible to overcome with a muscular effort is considered to be the greatest. Under conditions, when possibility of motion is excluded, a sportsman must gradually, with a strong-willed effort, bring the tension to maximal and hold it for 5–6 sec.

A. Smirnov singles out the following advantages of isometric exercises:

- possibility to achieve a maximal muscular contraction in contrast to isotonic exercise, also known as strength training;
- training occurs much faster; it is necessary to hold the position for each exercise from 6 to 8 seconds and to make 5–10 sets in the exercise.
- it is possible to increase strength values [6].

Thus, with the help of isometric exercises, an athlete is able to work on each part of his body with a high quality wasting a minute or so.

But, there are certain shortcomings in this method: decrease in muscular endurance, uniformity of exercise performance, and increase in arterial pressure. Therefore, in the process of athletes training for Workout, one should use this method in complex with other generally adopted methods.

On the basis of the analysis of scientific-and-methodical literature, pedagogical monitoring, questioning leading specialists, we have worked out a special complex of physical exercises, aiming at the development of strength qualities for the athletes engaged in Workout, including different types of push-ups; isometric exercise: «angle on the sticks with a drawn tight braid», «airplane on the floor», «heaving exercises with counteraction», «Parallel bar dips with counter action»; static exercises: backward hang, front hang, horizontal with feet apart, free front balance on bent hands, bent suspension, arm balance.

Verification of effectiveness of this method was carried out during regional competitions in Workout (Kherson city, 01.06.2017).

#### ***Method of Strength-Building Activities in Workout***

Strength-building activities of workouters were performed according to the following directions

- development of dynamic strength;
- development of static strength;
- development of strength endurance;
- development of flexibility;

In the process of the development of strength qualities, we took into account the following methodical issues:

- presence of complex exercises of the dynamic and static nature;
- taking into account one's own strength in determination of the amount of loading in one set;
- duration of static exercises makes up 10–30 seconds, with tension that is gradually increases to a maximal;
- complex of strength exercises is included in the second part of training.

### ***Push-ups as the Basic Way of Strength Development in Workout***

The problem of use of physical exercises – «stoop and stretch in prone position» (hereinafter, push-ups) is deeply studied by scientists L. Matveev, V. Platonov, T. Krutsevich, A. Ter-Ovanesyan et al. They note that stoop and stretch in prone position (push-ups) is the basic exercise that is done from a facedown position, and directed to the development of human strength. It is useful for support of joints mobility and tonicity of shoulder girdle muscles (triceps, brachial and deltoid muscles), all muscles of the thorax and trunk as a whole.

Push-ups are one of the main directions of training in Workout. They are used to develop strength, endurance, rapidity, dexterity and other physical qualities as well as basic elements in competitions, where their variability depends on sportsman's creative approach, understanding and level of physical training [3].

In sports push-ups are most often used in a preparatory part during a warming-up, since it permits to warm all groups of muscles and to get the organism ready for the more heavy loads.

According to variations of push-ups, in the process of workouters' training, we distinguish the following types of them: basic push-ups with one's own weight; complex coordination push-ups; push-ups with additional outfitting; plyometric push-ups. In accordance with the above types, we have developed a classification of push-ups that is used in the process of workouters' strength-building activities.

1. *Basic push-ups with one's own weight* – they are generally available, basic moves that do not require auxiliary equipment or other auxiliary means while performing exercises and can be accompanied by additional change of grip and its configuration and width.

2. *Complex coordination push-ups* – directed to the development of not only strength, but rapidity as well. Push-ups are performed with a complex-coordination complication that may be an arm balance, acrobatic element as well as balance elements.

3. *Push-ups with additional outfitting* help to vary the technique of exercise performance and to increase the depth of motion. For example, the use of some objects above the floor (benches, chairs), wall, weights and auxiliary objects.

4. *Plyometric push-ups* (from English word «plyometrics»– multiply, grow) – effective exercises that include rapid, explosive muscular body moves (jumps). They include many explosive body movements that not only improve muscular coordination, but functions of nervous system as well. In order to activate different groups of muscles, hands can be placed in various positions (a wide placement of arms increases the load and engages muscles of the external part of the chest; a narrow arrangement – shifts the accent to the internal part of thoracic muscles). In push-ups, one can turn hands with fingers to the middle or outwards. Different variants of support enable to develop various groups of muscles [4; 21].

#### ***Isometric Exercises that Were Used in the Process of the Workouters' Strength-Building Activities***

*Angle on the sticks with a braid* – a braid is drawn tight between two long sticks and a sportsman performs the angle with straight arms, trying to lift legs as higher as possible.

*Airplane on the floor* – an athlete lying in the facedown position with straight arms tries to press on the support. In doing so, the arms are a little wider than shoulders. Bring a tension to a maximum using not only the muscles of arms but dorsal muscles should also participate. This posture is kept from 5 to 10 sec. While performing this exercise breathing is moderate. The number of sets is 5–10. The period of rest is no more than 10 sec.

*Heaving exercises with a counteraction* – an athlete hanging on the horizontal bar performs heaving exercises, in so doing he is kept by the legs not giving him to perform the exercise completely. This exercise can also be performed with bent elbows where the angle is 90°.

*Parallel bar Dips with a counteraction* – an athlete standing on bent arms in support on parallel bars, angle 90°, tries to straighten his elbows. In this case, a counteraction is performed with his opponent.

#### ***Static Exercises that Were Used in the Process of the Workouters' Strength-Building Activities***

*Backward hang* – horizontal hang, in which the body is a horizontal backward position.

*Front hang* – horizontal hang, in which the body is in the horizontal position.

*Horizontal (feet apart)* – the trunk is in the horizontal position on straight arms.

*Horizontal support on bent arms* – the trunk is in the horizontal position on bent arms.

*Hang on bent arms* – a hang on horizontal bar on bent arms, where the angle makes up 90°.

*Arm balance* – a vertical position of an athlete is upside down, in which he supports himself with straight arms on the floor or gymnastic apparatus.

### Scheme of Workouters' Trainings According to Tabat's Protocol

While developing this method of training, we have used Tabat's method. Trainings in accordance with Tabat's protocol consists of three phases:

- Warming-up (5 min.) is necessary to warm up muscles and to prepare for intensive performance of exercises.
- Cycle of exercises according to Tabat's protocol – 8 sets by 20 seconds, interval for rest – 10 sec. In this regime of work for 20 seconds of active phase, first, ATP-mechanisms of energy supply start to act and by the end of the phase glycolytic mechanisms are connected.
- Final part (2 min.) – brisk walking, gradually reducing tempo.

According to the above mentioned, we have developed a scheme of trainings for workouters in accordance with Tabat's protocol. The basic difference of the method, we have developed, is that after each exercise, which is performed with maximal intensity for 20 sec, one more exercise has to be done for 10 sec as slowly as possible. Thus, we develop not only strength endurance but slow dynamic force as well, that substantially affects the development of maximal strength. The duration of such training is 4 min (6 sets by 20 seconds of intensive performance of the exercise and by 10 seconds of slow performance of each exercise).

The effectiveness of the method is understood as final impact on the development of physical qualities of sportsmen that was verified with the help of output and final testing according to the existing methods and normative requirements.

The average obtained results of testing and changes in these indices and their increase are given in table 1. It is noted that in the course of conducting the first and second testing and the generalization of the data received, we have used the same methods of processing and analyzing the obtained results.

As it is evident from the results given in table 1, the greatest increase in strength was observed with the exercise «Horizontal backward hang» (65 %). The second place by the result of increase took the test «Muscle-up on horizontal bar» (25 %). Rather high indices of increase were made in testing of «Push-ups from the floor» (21,1 %) and «Arm balance» (20,6 %). Somewhat lower indices were done in other tests however; it is worthy to note that changes in the results were also positive.

Table 1

#### Results of Investigation of Workouters' Strength-Building Activities

No	Test	I test		II test		Increase			P
		Result	Score	Result	Score	Result	Score	%	
1	Angle, <i>sec</i>	17±11,3	6,6	18±8,7	7,6	+1	+1	5,6	P□0,05 t = 1,01
2	Horizontal backward hang, <i>sec</i>	4,27±2,51	1,8	12,2±7,1	5,9	+7,93	+4,1	65	P□0,01 t = 3,74
3	Horizontal feet apart, <i>sec</i>	8,7±4,05	7,7	9,41±3,21	8,5	+0,71	+0,8	7,5	P□0,05 t = 0,91
4	Arm balance, <i>sec</i>	11,2±9,5	5,7±	14,1±9,95	6,1	+2,9	+0,4	20,6	P□0,01 t = 3,20
5	Horizontal front hang, <i>sec</i>	3±1,41	1,4	3,7±1,6	1,8	+0,7	+0,4	9	P□0,05 t = 2,51
6	Muscle-up on horizontal bar, <i>times</i>	6±1,9	3,5	8±2,4	4,1	+2	+0,6	25	P□0,01 t = 4,52
7	Parallel bar dips, <i>times</i>	34±6,88	6,8	37±5,56	7,5	+3	+0,7	8,1	P□0,05 t = 2,69
8	Heaving exercises, <i>times</i>	16±3,5	5,5	18±3,55	6,2	+2	+0,7	11,1	P□0,01 t = 3,87
9	Pushups, <i>times</i>	60±8,72	6	76±10,33	7,6	+16	+1,6	21,1	P□0,01 t = 6,35

To carry out a more detailed analysis of individual results of workouters' strength-building activities, we made use of a battery of tests, according to which a sportsman received a final sum of scores by nine indices. Changes of workouters' individual results in the course of pedagogical experiment are given in table 2.

Table 2

**Changes of Individual Results of Workouters's Strength-Building Activities in the Course of Pedagogical Experiment**

Test	Number of the Beginner (by Protocol)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
1 test	64,2	32,8	47,6	38	33,8	45,5	50,8	54,9	56,8	25,4	50,2	51,6	48,1
2 test	72,1	44,9	63,6	57,3	43,9	50,8	56,9	69	61,5	33,5	59,2	63,6	51,5
Increase	+7,9	+12,1	+16	+19,3	+10,1	+5,3	+6,1	+14,1	+4,7	+8,1	+9	+12	+3,4

The analysis of the results allowed to determine the individual level of workouters' strength-building activities according to a battery of tests.

After the implementation of the developed method of strength-building activities, the sportsmen's indices and their rating in the group, relative to the results obtained, somewhat changed. This proves the effectiveness of the application of the developed method of strength-building activities with the use of Tabat's protocol, various push-ups, static and isometric exercises in the system of workouters' training.

To exert the influence of the level of strength-building activities on the result received in competitions, we have analyzed the indices of performances of the sportsmen-workouters during regional competitions in Street Workout (Kherson, 01.06.2017).

Competing, the sportsmen participated in two types of exercises freestyle and parallel bar dips with additional loads (45 % of sportsman's bodyweight). For each exercise, the sportsmen received a certain number of scores that were later summed up in order to determine the absolute winner of competitions. It should be pointed out that in the estimation of the exercise «Freestyle», the technique of performance of static, dynamic, complex-coordination and additional (according to sportsman's choice) exercises were taken into account. The analysis of results of the competitions showed that the winners of the competitions became sportsmen from Kherson who were trained in accordance with the elaborated method. We should like to underline that out of 13 sportsmen of the group, 10 sportsmen by the results of competitions were placed among the best ten in various forms of the program.

To determine the correlation between the level of strength-building activities and the results of performance in competitions in Workout, a correlation analysis was carried out between these indices. Significant direct correlations were found out between:

- strength-building activities and results of competitions in the exercise «Chest Dips with additional weight» ( $r = 0,75$ );
- strength-building activities and final results of competitions in Workout ( $r = 0,72$ ).

The average direct correlation was determined between:

- strength-building activities and results of competitions in the exercise «Freestyle» ( $r = 0,39$ ).

Summing up the results of the testing, competitions and correlation analysis, we can state that the developed method can be recommended for training workouters for competitions of different levels.

**Conclusions and Perspectives of Further Investigations.** We have established that the most effective means and methods of strength development in Workout are varieties of the exercise «Bending and extension of arms in (push-ups), method of isometric and static strains, Tabat's protocol».

Analyzing the results of strength-building activities with the use of the developed method, we have confirmed that the most significant increases in the result are received in control exercises «Horizontal backward hang» – 65 % ( $P < 0,01$ ); «Muscle-up on horizontal bar» – 25 % ( $P < 0,01$ ); «Push-ups from the floor» – 21,1 % ( $P < 0,05$ ) and «Arm balance» – 20,6 % of previous result ( $P < 0,01$ ).

In the process of the investigation, the direct correlation between strength-building activities and the results of competitions in the exercise «Chest Dips with additional weight»; between strength-building activities and final results of competitions in Workout was established.

Perspectives of further investigations lie in the determination of the most significant components of strength-building training for further improving the Workout sports training system.

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