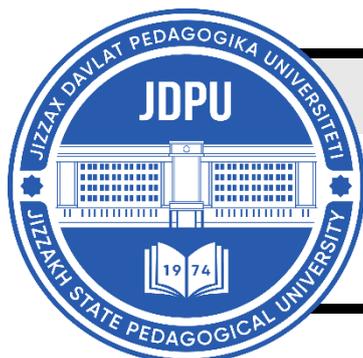


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METHODOLOGICAL JOURNAL****MENTAL ENLIGHTENMENT SCIENTIFIC –  
METHODOLOGICAL JOURNAL**<http://mentaljournal-jspu.uz/index.php/mesmj/index>**RESEARCH ON THE DEVELOPMENT OF STRENGTH  
ENDURANCE AT THE EDUCATIONAL AND TRAINING STAGE OF  
GYMNASTS' TRAINING****G. M. Khasanova***Uzbek State University of Physical Culture and Sports**Chirchik, Uzbekistan**E-mail: [Gala-GIMFIG@yandex.ru](mailto:Gala-GIMFIG@yandex.ru)***ABOUT ARTICLE**

**Key words:** artistic gymnastics, physical qualities, endurance, strength endurance, speed, agility, technical training, choreographic training, concentric method, isometric method.

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**Abstract:** The presented article is devoted to the problem of development of strength endurance at the educational and training stage of preparation of gymnasts. The definition of strength endurance is given in detail. A set of exercises for development and improvement, as well as control of power endurance is proposed.

**INTRODUCTION.**

Artistic gymnastics is one of the most popular sports. Gymnastics is a complex coordination sport that allows you to master good physical, technical and choreographic preparedness, be brave, restrained, hardworking, and have willpower. An unlimited number of modern and exciting exercises make gymnastics classes popular and attractive. Children involved in artistic gymnastics must have a high level of development of such physical qualities as strength, speed, agility, joint mobility and endurance [2,4,5].

Such physical qualities as strength and endurance are very important in training sports gymnastics, performing complex movements in terms of coordination, on different gymnastic apparatus for a certain time, is physically difficult for an untrained person [1,3,15]. One of such physical qualities that helps to achieve high results is strength endurance, which allows maintaining sufficiently high strength indicators for a long time [6,12]. According to V.N. Platonov, the level of strength endurance is manifested in the athlete's ability to overcome fatigue, in achieving a large number of repetitions of

movements or prolonged application of force in conditions of counteraction to external resistance [9,10].

Of great importance for success in complex coordination sports such as gymnastics is a high level of coordination abilities, strength and endurance in general [11,13].

According to leading experts in the field of artistic gymnastics, in recent years the main trends in the development of gymnastics disciplines are characterized by a significant increase in competitive activity and an increase in the intensity of training, which is associated with increased international competition. This emphasizes the importance of developing strong and reliable performance skills in gymnasts. Confident execution of complex technical elements and competitive combinations requires the development of key physical qualities and a high level of endurance [13,14].

#### **MATERIALS AND METHODS**

Therefore, **the aim of the study** is to find means of developing and improving the strength endurance of gymnasts at the educational and training stage of preparation.

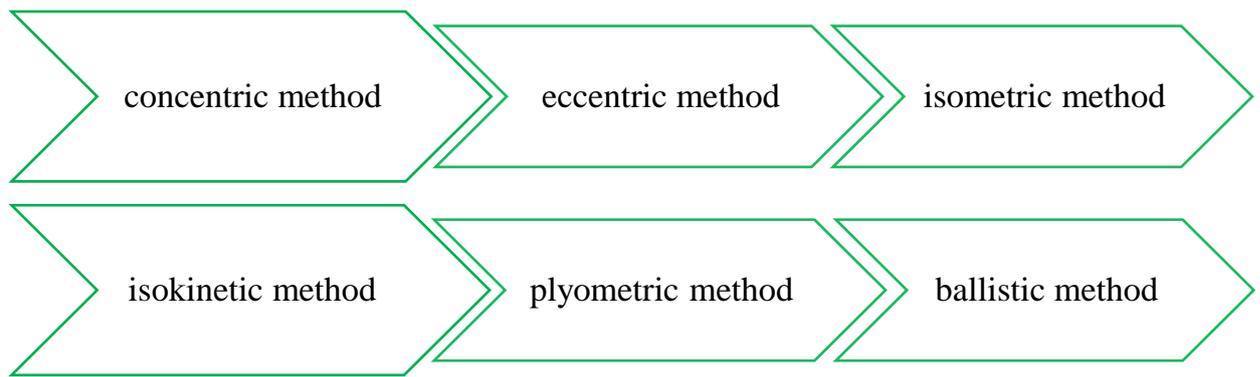
**The task of the study** is to develop and experimentally substantiate a set of special exercises for the development of strength endurance at the educational and training stage of gymnasts' preparation.

**To solve the set tasks the following methods were used:** study of scientific and methodological literature; pedagogical observations; testing; mathematical processing of the obtained data.

#### **RESULT AND DISCUSSION**

**Organization and results of the study.** The studies were conducted on the basis of IOEUGGM and the sports club "OCAQ". Athletes of the first-year training group participated in the observation.

Throughout the entire training process, the integral volume of work is undoubtedly large and requires very intensive training. Therefore, one of the main criteria for the success of gymnasts is not only high-quality, but also rapid mastery of the program material. A high level of physical fitness is one of the criteria that contributes to the high-quality mastery of competitive combinations [1,2,5]. In the process of developing strength training, a number of methods are used that allow you to maximize the level of training (Fig. 1):



**Figure 1. Methods used in strength training [4]**

According to many literary sources, strength endurance as the ability to perform work for a long time that requires a significant manifestation of strength depends on the level of development of maximum and speed strength, the capabilities of energy supply systems, the balance of actions of all components that establish the degree of development of this quality in a certain activity. Taking into account the means used in the development of strength endurance, it is possible to distinguish a general and auxiliary nature.

Dynamic exercises and weighted exercises were used to develop strength endurance.

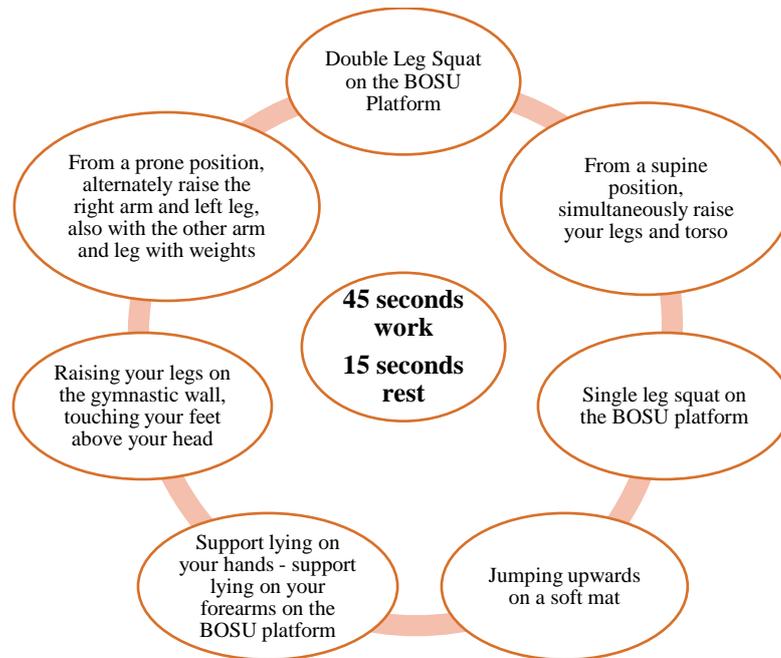
According to the information presented in the materials of special literature, a set of exercises was developed that promotes the development and further improvement of gymnasts' strength endurance.

List of exercises for assessing gymnasts' strength endurance:

1. Push-ups from a prone position
2. Squats with a load (partner)
3. Raising legs and torso from a supine position
4. Handstand
5. Hanging on bent arms - angle up to 80<sup>0</sup>-90<sup>0</sup>

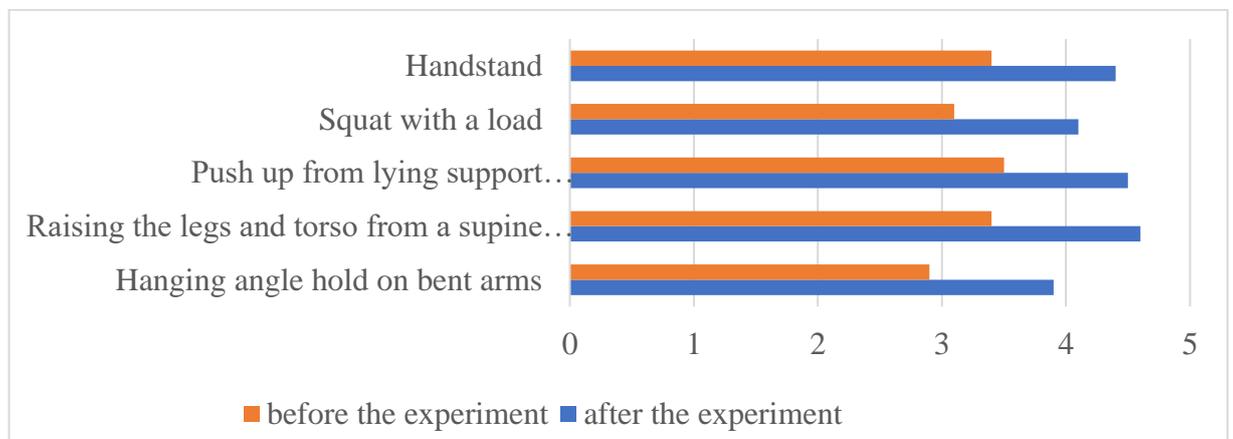
Each exercise was assessed on a five-point scale.

According to preliminary studies, the strength endurance indicators are low (Fig. 3). Based on pedagogical observations, we have identified the most pronounced physical exercises that contribute to the development of strength endurance.

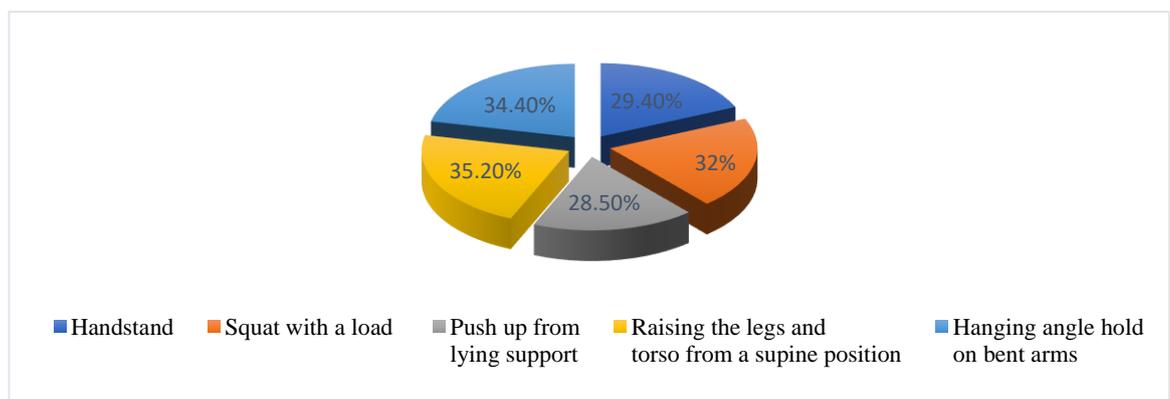


**Figure 2. A set of exercises for the development of strength endurance**

The exercises were conducted at the end of the main part of the training session, using the method of circuit training according to the program 45 sec. 15 sec rest, two circuits and separately for each task (Fig. 2). The productivity of the applied complex increases with the use of dynamic and spatio-temporal characteristics of movements [7,8,13].



**Figure 3. Dynamics of strength endurance results of gymnasts**



**Figure 4. Results of the increase in the power endurance of gymnasts (%)**

The results obtained after the introduction of the complex of exercises for the development of strength endurance showed improvements in the physical quality under study. According to the assessment table of control standards, the results obtained were converted into points accepted in gymnastics.

Thus, the greatest increase in strength endurance indicators is observed in all the proposed exercises.

At the final stage of the research, the following results were obtained, the average score of which varied between 4.0 points to 4.5 points out of a possible maximum of 5 points (Fig. 4).

The increase in indicators is observed in the control exercise "Handstand", the holding time was recorded, the result increased by 29.4%; a similar picture is observed in other indicators of the gymnasts' physical fitness, in the control exercise "Squat with a load" the increase in indicators was 32.3%; in the exercise "Push-ups from a lying position" 28.5%; in the exercise "Raising legs and torso from a supine position" the result increased by 35.2% and a similar result is observed in the control exercise "Hanging angle on bent arms" (on the bars) where the increase in the result varies within 34.4%.

The results obtained during the pedagogical experiment indicate the beneficial effect of the proposed set of exercises that promote the development of strength endurance, as well as the use of the circular method, which in turn promotes the development of significant physical quality in the process of gymnasts' training sessions.

### **CONCLUSION.**

Based on the data obtained during the pedagogical study, it was established that the use of special exercises, various methods and approaches, as well as regular monitoring of the development of strength endurance have a positive effect on the level of this physical quality. This, in turn, contributes to the development of more complex gymnastic elements and combinations, as well as the formation of competitive competition combinations.

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