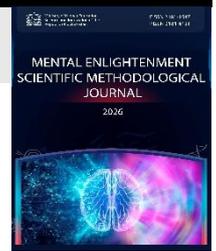


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METHODOLOGICAL JOURNAL****MENTAL ENLIGHTENMENT SCIENTIFIC –  
METHODOLOGICAL JOURNAL**<http://mentaljournal-jspu.uz/index.php/mesmj/index>**DETERMINING THE EFFECTIVENESS OF USING INNOVATIVE TOOLS IN  
DEVELOPING STRENGTH QUALITIES OF 11-13-YEAR-OLD  
STUDENTS(Preliminary Results)****O.Q. Jaqsimuratov***Uzbekistan State University of Physical Education and Sports**Independent Researcher*[jaqsimuratovoralbay672@gmail.com](mailto:jaqsimuratovoralbay672@gmail.com)*Chirchiq, Uzbekistan***ABOUT ARTICLE**

**Key words:** physical qualities, strength qualities, dynamic exercises, non-standard innovative tools, statistical analysis.

**Abstract:** This article presents the data of the analysis of the results recorded at the beginning of the pedagogical experiment on the development of strength qualities using exercises performed due to the resistance of one's own weight and the developed non-standard innovative sports equipment.

**Received:** 27.02.26**Accepted:** 01.03.26**Published:** 03.03.26**Introduction**

Worldwide, increasing attention is being paid to the development of physical education and sports, particularly mass sports, engaging all social groups in physical activity, and promoting public participation. At present, improving the physical fitness of students in general education schools is one of the most urgent issues in both the theory and practice of school physical education.

To address this problem, modern exercises using bodyweight resistance, aimed specifically at developing strength qualities, have gained worldwide popularity. These exercises help create systematic activity plans that allow students to demonstrate their abilities, and scientific research in this area is in high demand.

During this age, children's bodies undergo rapid growth and development; therefore, properly organized physical exercises provide opportunities to enhance important physical qualities such as strength and endurance. According to modern approaches, it is necessary to combine traditional methods with innovative tools to effectively develop strength. Research on using innovative tools to develop strength qualities is therefore highly relevant.

One of the important areas of physical fitness is the development of strength qualities. In modern sports and physical education systems, innovative technologies and tools are widely applied to develop strength.

#### Innovative Tools

Innovative tools are instruments developed based on modern technologies, interactive equipment, and new pedagogical methods, which help effectively develop physical qualities.

Alongside traditional physical education equipment, the use of modern sports devices, such as an innovative horizontal bar (pull-up bar), increases students' interest in physical exercises and helps organize training sessions efficiently.

The innovative horizontal bar is a device that requires dynamic movements, helping students strengthen different muscle groups, improve coordination, and develop psychological endurance through non-standard movements. Its advantage is that it requires greater activity than a traditional horizontal bar and develops active reflexes in students.

Exercises performed using the innovative bar are an important tool for effectively developing strength qualities, increasing activity levels, and promoting overall physical development. This device provides positive changes not only physically but also psychologically. With proper planning and constant supervision, it is possible to achieve significant improvements in physical development.

- The innovative bar's uprights, the diameters of the rotating surfaces, rotation mechanisms, and ergonomic placement of handles were designed according to the age characteristics of the students.

- Unlike ordinary horizontal bars, the rotating surfaces allow performing exercises in varied ways, which increases students' interest.

#### Purpose of the Study

The pedagogical experiment was conducted to determine the effectiveness of developing strength qualities of general school students using an innovative horizontal bar. Results of control and experimental groups at the beginning of the experiment were compared.

#### Objectives of the Study

- To summarize and analyze existing scientific and methodological literature on exercises performed using an innovative horizontal bar.
- To record the results of selected tests for students in control and experimental groups using the innovative horizontal bar and compare their changes during the experiment.

### Methodology

The study used literature analysis, pedagogical observation, pedagogical experiment, pedagogical testing, and mathematical-statistical methods.

#### Organization of the Study

The experiment was conducted during extracurricular physical education lessons in general schools to develop strength qualities using innovative tools. Two groups, each consisting of 30 students, were formed: a control group and an experimental group. Students were selected so that their initial fitness levels were approximately equal. Results for the selected tests were recorded at the beginning and end of the experiment and statistically analyzed.

#### Object of the Study

Extracurricular physical education activities of 11–13-year-old students in general schools.

### Results and Discussion

At the beginning of the pedagogical experiment, statistical characteristics of the results recorded in control and experimental groups for selected tests characterizing special physical fitness are presented in Table 1.

**Table 1**

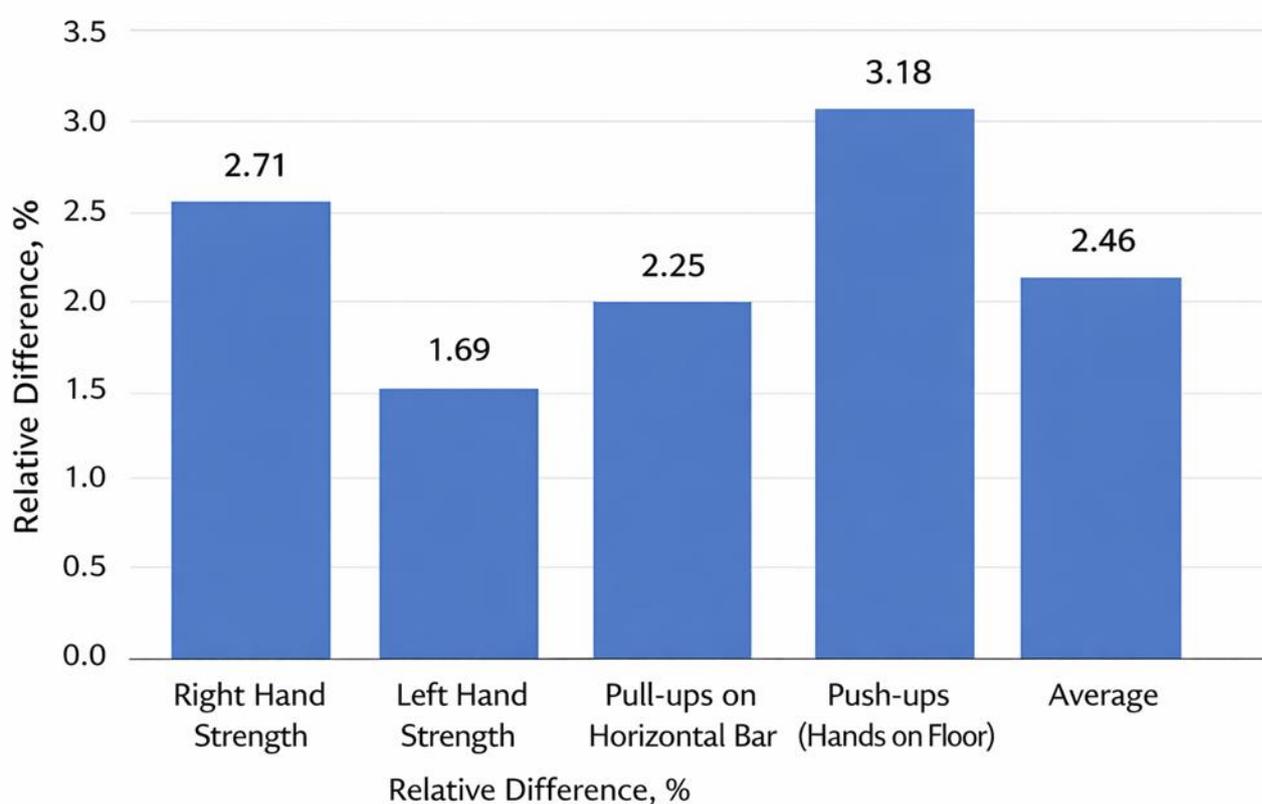
Comparison of basic statistical characteristics of results recorded at the beginning of the pedagogical experiment in control (n = 30) and experimental (n = 30) groups

Test	Experimental Group	Control Group	Absolute Diff. (AD)	Relative Diff. (RD)	t	P
	$X \pm \sigma$	V, %	$X \pm \sigma$	V, %		
1	$25.45 \pm 4.57$	17.96	$24.76 \pm 4.35$	17.57	0.69	2.71
2	$24.85 \pm 4.22$	16.98	$24.43 \pm 4.05$	16.58	0.42	1.69
3	$5.93 \pm 0.95$	15.97	$6.07 \pm 0.95$	15.59	0.13	2.25
4	$15.70 \pm 2.82$	17.98	$15.20 \pm 2.67$	17.58	0.50	3.18

Note: AD – absolute difference; RD – relative difference (in %). For convenience, tests and diagrams are as follows:

- 1 – right hand grip strength (kg);
- 2 – left hand grip strength (kg);
- 3 – pull-ups on the horizontal bar (reps);
- 4 – push-ups (reps).

Analysis of the table shows that at the beginning of the experiment, the results of the control and experimental groups did not differ significantly. For example, in Test 1 (right hand grip strength), the experimental group averaged  $25.45 \pm 4.57$  kg ( $V = 17.96\%$ ), while the control group averaged  $24.76 \pm 4.35$  kg ( $V = 17.57\%$ ). The absolute difference was 0.69 kg, and the relative difference was 2.71% (Figure 1).



**Figure 1.** Diagram showing relative differences (%) of mean values in control and experimental groups at the beginning of the pedagogical experiment

Among the tests, the smallest relative difference was in Test 2 (left hand grip strength) at 1.69%, and the largest in Test 4 (push-ups) at 3.18%, with an overall average relative difference of 2.46%.

Statistical evaluation showed that all absolute differences in mean values between control and experimental groups at the beginning of the experiment were not significant (t-values from 0.39 to 0.70, P-values from >0.4 to >0.6).

### **Conclusion**

At the beginning of the pedagogical experiment, the average relative difference between control and experimental groups was 2.46%, and absolute differences were statistically insignificant. This confirms that the pedagogical experiment was methodologically organized correctly and indicates the appropriateness of continuing the experiment.

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