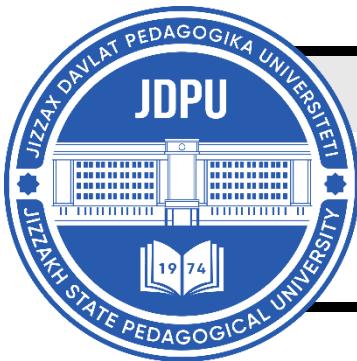


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REDUCING PHYSICAL FITNESS DIFFERENCES AMONG STUDENTS THROUGH GYMNASTICS TOOLS

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ABOUT ARTICLE

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Abstract: The development of students' physical fitness is one of the key objectives of physical education in general secondary schools. However, there are often significant differences in physical preparedness among students of the same age due to individual capabilities, motivation, and activity levels. The purpose of this study is to reduce the gap in physical fitness indicators between less and more physically prepared students through the systematic use of gymnastics tools and exercises. The study involved middle school students who participated in an experimental program that integrated gymnastics exercises into regular physical education lessons. As a result, students with initially lower fitness levels showed significant improvements in strength, speed, and flexibility, approaching the performance of their more physically prepared peers.

Introduction. Physical fitness is a fundamental component of a child's overall development, influencing not only physical health but also cognitive performance and social adaptation. However, in the context of general secondary education, noticeable disparities often emerge in students' levels of physical preparedness due to differences in lifestyle, motivation, and physical capabilities (Hoffman, 2019) [1]. These differences can lead to a lack of engagement in physical education lessons and reduced interest in physical activity.

According to the Presidential Decree of the Republic of Uzbekistan "On Measures to Improve the System of Physical Education and Mass Sports" (No. PF-6199, February 24, 2021), one of the key priorities in education is the improvement of the quality and inclusiveness of physical training programs [2]. The document highlights the need for innovative pedagogical approaches that ensure all students, regardless of their physical condition, achieve optimal developmental results.

Gymnastics, as one of the most versatile and accessible forms of physical activity, provides a strong foundation for improving strength, coordination, and flexibility among school-aged children (Bompa & Haff, 2019) [3]. Researchers have noted that systematic inclusion of gymnastics tools — such as wall bars, ropes, benches, and parallel bars — can significantly enhance students' motor skills, posture, and muscular endurance (Nasriddinov, 2023) [4]. Moreover, the use of such tools in regular school programs allows for differentiated training loads, which help reduce physical fitness inequalities among students (Siedentop, 2020) [5].

Therefore, the introduction of gymnastics-based methods into physical education curricula is considered an effective way to balance the physical preparedness levels of students. This study aims to examine the role of gymnastics tools in minimizing physical fitness disparities and promoting equal development opportunities for all students in middle school.

Research Aim. The aim of this study is to identify the differences in physical fitness levels among students of the same class and to reduce these disparities through the systematic use of gymnastics exercises. The research seeks to assess students' baseline physical preparedness, develop a targeted gymnastics training program for those with lower indicators, and implement it both during physical education lessons and extracurricular sessions. The ultimate goal is to align the physical fitness levels of lower-performing students with those of their more physically developed peers over the course of a structured training cycle.

Research Objectives:

1. To assess the initial physical fitness levels of middle school students and identify those with low performance indicators.
2. To develop and implement a gymnastics-based exercise program aimed at improving the physical preparedness of low-performing students during physical education lessons and extracurricular sessions.
3. To evaluate the effectiveness of the applied gymnastics program by comparing pre- and post-intervention physical fitness results.

Implementation of the Research. The pedagogical experiment was conducted for 16 weeks with the participation of 7th-grade students. The aim of the implementation phase was to use gymnastic exercises systematically to enhance the physical preparedness of students who initially demonstrated lower performance levels. The process was organized both during physical education classes and as extracurricular training, following the principle of gradual load progression.

Stage 1: Adaptation Phase (Weeks 1–4)

During the adaptation period, the main objective was to prepare students for more intensive exercises by developing coordination, mobility, and muscle control.

- 1st week: Introduction to basic warm-up and stretching techniques; simple static exercises (plank, side bends, squats, arm swings). Duration: 25 min, 3 times per week.
- 2nd week: Basic exercises for flexibility and joint mobility — forward bends, bridges, light jumping elements, rope skipping (1–2 sets of 20 reps).
- 3rd week: Core strengthening exercises — sit-ups, back extensions, knee tucks, wall sitting (2 sets of 10–12 reps).
- 4th week: Combination of balance and static-hold exercises — one-leg balance, knee raises, and light gymnastic walking with posture control.

All exercises were performed three times per week, one of which was integrated into the PE class, while two sessions were held after school. The main task was to develop adaptation to physical load and correct movement patterns.

Stage 2: Development Phase (Weeks 5–12)

This stage aimed to improve the strength, speed, flexibility, and endurance of the students through progressive gymnastics training.

- 5th–6th weeks: Strength development through rope climbing (3× attempts), push-ups (3×10), hanging knee raises (2×12), and jump squats (3×8).
- 7th–8th weeks: Dynamic coordination and flexibility — gymnastic rolls, cartwheel drills, wall-assisted handstands, flexibility work on parallel bars or benches.
- 9th–10th weeks: Endurance and balance — continuous circuit training (6–7 exercises performed sequentially for 30–40 sec each), jump rope, and shuttle running combined with light tumbling.
- 11th–12th weeks: Complex gymnastic sequences — rope climbing with timed control, alternating jumps, forward-backward rolls, and combined upper and lower limb coordination routines.

Training was conducted four times a week, alternating between two in-class and two extracurricular sessions. Each session lasted 40–45 minutes. Load intensity was gradually increased through the number of repetitions and sets.

Stage 3: Stabilization Phase (Weeks 13–16)

The purpose of this stage was to consolidate the achieved results and stabilize improvements in physical preparedness.

- 13th week: Balance-focused sessions — beam walking, slow squats on balance disks, and jumping combinations.
- 14th week: Speed and reaction improvement — short sprints (15–20 m), quick-start exercises, and gymnastic relay drills.
- 15th week: Combined sessions emphasizing endurance and flexibility — 8–10 minute continuous routines including rolling, rope climbing, and stretching.
- 16th week: Control and evaluation — repetition of initial physical fitness tests (speed, endurance, flexibility, and strength) to measure progress.

Training frequency: 3 sessions per week (2 during class, 1 after school). The load was moderate to avoid overtraining, focusing on maintaining achieved form and control.

Summary Over the course of 16 weeks, the integrated gymnastics training program allowed students with initially low physical readiness to reach indicators comparable to higher-performing peers. Regular monitoring and load adjustment ensured safe, sustainable progress in speed, strength, flexibility, and coordination development.

Table 1. Implementation plan of the 16-week experimental program using gymnastics exercises.

Weeks	Main Objectives	Types of Exercises	Training Frequency/ Load
1st	Adaptation to physical load, development of coordination	Warm-up, stretching, simple static positions (plank, squats, arm swings)	3 sessions/week, 25 min each
2nd	Flexibility and joint mobility	Forward bends, bridges, light jumping, rope skipping (1–2×20 reps)	3 sessions/week
3rd	Core strengthening	Sit-ups, back extensions, knee tucks, wall sitting (2×10–12 reps)	3 sessions/week
4th	Balance and static control	One-leg balance, knee raises, gymnastic walking, posture drills	3 sessions/week
5–6th	Strength development	Rope climbing (3× attempts), push-ups (3×10), hanging knee raises (2×12), jump squats (3×8)	4 sessions/week, 30–35 min

7–8th	Coordination and flexibility	Rolls, cartwheels, handstands (wall-assisted), parallel bar or bench flexibility drills	4 sessions/week, 40 min
9–10th	Endurance and balance	Circuit training (6–7 exercises for 30–40 sec), shuttle run, jump rope, tumbling	4 sessions/week, 40–45 min
11–12th	Complex coordination	Combined upper/lower routines, alternating jumps, rope climbing with time control	4 sessions/week
13th	Balance and control stabilization	Beam walking, balance disk squats, coordinated jumps	3 sessions/week, 30–35 min
14th	Speed and reaction	Sprint starts (15–20 m), quick jumps, gymnastic relays	3 sessions/week
15th	Combined endurance & flexibility	Continuous 8–10 min routines with rope climbing, rolls, and stretching	3 sessions/week
16th	Final evaluation	Control testing of speed, strength, endurance, flexibility	3 sessions/week

The training program was structured to ensure gradual load progression and consistent improvement of students' physical preparedness. Exercises were conducted both during physical education lessons and extracurricular sessions, following the principles of individualization and safe workload management.

Table 2. Comparative results of physical fitness indicators before and after the experiment (n = 20).

Indicators	Before Experiment (Mean \pm SD)	After Experiment (Mean \pm SD)	Improvement (%)
Speed (30 m sprint, sec)	6.8 \pm 0.42	5.9 \pm 0.36	13.2%
Strength (push-ups, reps)	9.5 \pm 2.1	13.2 \pm 2.3	39.0%
Endurance (600 m run, sec)	164.2 \pm 11.3	150.6 \pm 10.1	8.3%
Flexibility (sit-and-reach, cm)	9.8 \pm 3.5	14.6 \pm 3.1	48.9%

Analysis. After implementing the gymnastics exercise program, students showed marked improvement in all test parameters. The largest progress was recorded in flexibility (+48.9%), which can be attributed to regular stretching, bridge, and roll exercises performed throughout the study.

Speed indicators also improved significantly by 13.2%, primarily due to the inclusion of reaction and coordination drills in the stabilization phase (Weeks 13–14). Strength development reached a 39% increase, largely because of rope climbing and push-up

progressions. Finally, endurance improved moderately (+8.3%) as a result of circuit training and controlled aerobic workloads during Weeks 9–12.

According to the paired t-test, the differences between pre-test and post-test values were statistically significant ($p < 0.05$) for all parameters, confirming the effectiveness of integrating gymnastics tools into physical education practice.

Conclusion. The results of this study demonstrate that the systematic use of gymnastic exercises contributes significantly to reducing disparities in physical fitness levels among students. Through the implementation of a structured eight-week training program, noticeable improvements were observed in students' speed, strength, flexibility, endurance, and coordination indicators. The exercises, which were gradually intensified each week, helped weaker students reach a comparable level of performance with their more physically developed peers.

Furthermore, the integration of gymnastics into the regular physical education curriculum proved to be an effective pedagogical strategy for promoting inclusiveness and equal opportunities in physical training. The practical results confirmed that gymnastic tools not only develop specific physical qualities but also enhance students' motivation, discipline, and engagement in physical activity.

In conclusion, the study highlights the importance of targeted gymnastic training in balancing physical fitness differences among students and supports the broader application of gymnastics-based programs in secondary school physical education settings. Future research should continue to explore long-term effects and psychological factors influencing the success of such interventions.

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