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TECHNOLOGY FOR IMPROVING FLEXIBILITY IN STUDENTS THROUGH GYMNASTICS EXERCISES

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Annotation

This article presents the development and scientific substantiation of a pedagogical technology aimed at improving flexibility in students through gymnastics exercises. The relevance of the study is determined by the need to find effective methods for developing flexibility within the modern physical education system. A pedagogical experiment was conducted involving control and experimental groups. The training program included systematic application of static, dynamic, and PNF (proprioceptive neuromuscular facilitation) stretching exercises. The results demonstrated a statistically significant improvement in flexibility indicators in the experimental group ($p < 0.05$). These findings confirm the effectiveness of the proposed technology. The results of the study can be applied in improving physical education processes in higher education institutions.

Keywords

flexibility, gymnastics, physical qualities, students, pedagogical technology, stretching exercises, PNF, physical education.

ТЕХНОЛОГИЯ СОВЕРШЕНСТВОВАНИЯ ГИБКОСТИ У СТУДЕНТОВ СРЕДСТВАМИ ГИМНАСТИЧЕСКИХ УПРАЖНЕНИЙ

Аннотация

В данной статье разработана и научно обоснована педагогическая технология совершенствования гибкости у студентов средствами гимнастических упражнений. Актуальность исследования обусловлена необходимостью поиска эффективных методов развития гибкости в системе физического воспитания. В ходе исследования был проведён педагогический эксперимент с участием контрольной и экспериментальной групп. В тренировочном процессе применялись статические, динамические и PNF (проприоцептивная нейромышечная фасилитация) упражнения на растяжку. Полученные результаты показали статистически значимое улучшение показателей гибкости у студентов экспериментальной группы ($p<0.05$). Это подтверждает эффективность предложенной технологии. Результаты

исследования могут быть использованы в практике физического воспитания студентов.

Ключевые слова

гибкость, гимнастика, физические качества, студенты, педагогическая технология, растяжка, PNF, физическое воспитание.

GIMNASTIKA SPORT TURI ORQALI TALABALARDA EGILUVCHANLIK JISMONIY SIFATINI TAKOMILLASHTIRISH TEXNOLOGIYASI

Annotatsiya

Mazkur maqolada talabalarda egiluvchanlik jismoniy sifatini gimnastika mashqlari vositasida takomillashtirishning pedagogik texnologiyasi ishlab chiqilgan va ilmiy asoslangan. Tadqiqotning dolzarbligi zamonaviy jismoniy tarbiya tizimida egiluvchanlikni rivojlantirishning samarali usullariga bo‘lgan ehtiyoj bilan belgilanadi. Tadqiqot jarayonida nazorat va tajriba guruhlari ishtirokida pedagogik tajriba o‘tkazildi. Mashg‘ulotlarda statik, dinamik va PNF (proprioseptiv neyromuskulyar fasilitatsiya) cho‘zilish mashqlari tizimli qo‘llanildi. Natijalar shuni ko‘rsatdiki, tajriba guruhida egiluvchanlik ko‘rsatkichlari sezilarli darajada oshdi ($p<0.05$). Bu esa ishlab chiqilgan texnologiyaning samaradorligini tasdiqlaydi. Tadqiqot natijalari oliy ta’lim muassasalarida jismoniy tarbiya jarayonini takomillashtirishda muhim ahamiyatga ega.

Kalit so‘zlar

egiluvchanlik, gimnastika, jismoniy sifatlar, talabalar, pedagogik texnologiya, cho‘zilish mashqlari, PNF, jismoniy tarbiya.

INTRODUCTION

In modern higher education, the development of students’ physical qualities is considered an essential component of comprehensive professional and personal formation. Among these qualities, flexibility plays a crucial role in ensuring effective motor activity, preventing injuries, and maintaining overall musculoskeletal health. Flexibility is defined as the ability of joints to move through a full range of motion, which directly affects movement efficiency, posture, and coordination (Alter, 2004). However, recent studies indicate that the level of flexibility among university students tends to be insufficient due to sedentary lifestyles and limited physical activity (Behm & Chaouachi, 2011).

Gymnastics is widely recognized as one of the most effective means for developing flexibility because it incorporates a variety of stretching exercises that

systematically influence muscles, tendons, and ligaments. The use of static, dynamic, and proprioceptive neuromuscular facilitation (PNF) stretching techniques allows for gradual and safe improvement of flexibility indicators (Bompa & Haff, 2009). Moreover, gymnastics exercises contribute not only to physical development but also to the enhancement of coordination, balance, and neuromuscular control, which are essential for students' overall physical fitness (Platonov, 2015).

Despite the acknowledged benefits of gymnastics, there is still a lack of scientifically grounded pedagogical technologies aimed at systematically improving flexibility in students within higher education settings. Traditional teaching methods often fail to consider individual characteristics, training load dosage, and the sequence of exercise implementation. Therefore, the development of an effective and structured pedagogical approach remains a relevant scientific and practical issue.

The aim of this study is to develop and scientifically substantiate a technology for improving flexibility in students through gymnastics exercises. The research focuses on designing a structured training program, determining optimal exercise methods, and experimentally verifying their effectiveness in the educational process.

METODS

This study employed a quasi-experimental research design to evaluate the effectiveness of a gymnastics-based pedagogical technology for improving flexibility in university students. The participants consisted of 48 undergraduate students (aged 18–22 years), who were randomly assigned into two groups: an experimental group (n=24) and a control group (n=24). All participants were medically cleared and engaged in regular physical education classes.

The experimental group followed a специально разработанная гимнастическая программа, while the control group continued traditional physical education activities without a targeted flexibility intervention. The duration of the experiment was 10 weeks, with training sessions conducted three times per week, each lasting 60 minutes. The structure of each session included a warm-up (10–15 minutes), a main part focused on flexibility development (30–35 minutes), and a cool-down phase (10 minutes).

The flexibility training program incorporated a комплекс упражнений, including static stretching, dynamic stretching, and proprioceptive neuromuscular facilitation (PNF) techniques. Exercises targeted major muscle groups such as the hamstrings, hip flexors, shoulder girdle, and spinal muscles. The load was

progressively increased by adjusting the duration, intensity, and complexity of the exercises, taking into account individual student characteristics.

To assess flexibility, standardized tests were administered before and after the intervention. These included the sit-and-reach test for lower back and hamstring flexibility, a shoulder flexibility test, and a spinal mobility test. All measurements were conducted under consistent conditions to ensure reliability.

Statistical analysis was performed using descriptive statistics and inferential methods. Mean values (M) and standard deviations (SD) were calculated, and the significance of differences between groups was determined using Student's t-test. A significance level of $p < 0.05$ was adopted to evaluate the effectiveness of the intervention (Thomas & Nelson, 2001).

RESULTS

The results of the study demonstrated a positive impact of the proposed gymnastics-based pedagogical technology on the development of flexibility in university students. At the beginning of the experiment, no statistically significant differences were observed between the control and experimental groups in any of the measured indicators ($p > 0.05$), indicating that both groups had similar baseline levels of flexibility.

After the 10-week intervention, notable improvements were recorded in the experimental group compared to the control group. In the sit-and-reach test, which assesses hamstring and lower back flexibility, the experimental group showed an increase from an average of 11.2 ± 2.3 cm to 18.6 ± 2.7 cm, whereas the control group improved only slightly from 10.9 ± 2.5 cm to 12.4 ± 2.6 cm. The difference between groups after the experiment was statistically significant ($p < 0.05$).

Similarly, in the shoulder flexibility test, the experimental group demonstrated a significant enhancement, with performance scores improving by approximately 28%, while the control group showed only minimal changes (about 8%). Improvements were also observed in spinal mobility, where the experimental group achieved a 30–35% increase in range of motion, indicating better functional flexibility of the позвоночник.

Statistical analysis using Student's t-test confirmed that the observed improvements in the experimental group were significant across all measured parameters ($p < 0.05$). In contrast, the control group did not show statistically meaningful progress in most indicators.

These findings suggest that the systematic application of gymnastics exercises, including static, dynamic, and PNF stretching methods, significantly enhances flexibility in students. The results confirm the effectiveness of the developed

pedagogical technology and highlight its practical value for improving physical education programs in higher education institutions.

DISCUSSION

The findings of this study confirm that the application of a structured gymnastics-based pedagogical technology significantly improves flexibility in university students. The observed positive changes in the experimental group can be explained by the комплексное воздействие систематических упражнений на мышцы, связки и суставы, что способствует увеличению амплитуды движений и повышению эластичности тканей. These results are consistent with previous studies, which emphasize that regular stretching exercises, especially when applied progressively and systematically, lead to significant improvements in flexibility (Alter, 2004; Behm & Chaouachi, 2011).

One of the key factors contributing to the effectiveness of the proposed technology is the integration of different types of stretching exercises, including static, dynamic, and PNF methods. Each of these approaches has a specific physiological mechanism: static stretching promotes muscle relaxation, dynamic stretching enhances neuromuscular activation, and PNF techniques facilitate deeper muscle elongation through reflex mechanisms (Bompa & Haff, 2009). The combination of these methods ensures a more comprehensive development of flexibility compared to traditional approaches, which often rely on limited exercise types.

Furthermore, the gradual increase in training load and the consideration of individual student characteristics played an important role in achieving positive outcomes. This aligns with modern pedagogical principles that emphasize individualization and adaptation in physical education (Platonov, 2015). The structured organization of training sessions, including proper warm-up and cool-down phases, also contributed to injury prevention and improved training efficiency.

However, the study has certain limitations. The sample size was relatively small, and the duration of the experiment was limited to 10 weeks. Future research should involve larger participant groups and longer intervention periods to validate and expand upon these findings.

Overall, the results highlight the practical importance of implementing scientifically grounded gymnastics-based technologies in higher education to enhance students' physical qualities, particularly flexibility.

CONCLUSION

The present study aimed to develop and scientifically substantiate a pedagogical technology for improving flexibility in university students through

gymnastics exercises. The results obtained during the experimental research clearly demonstrate that the systematic and methodologically grounded use of gymnastics-based training significantly enhances flexibility indicators in students.

The experimental group, which followed the специально разработанная программа, showed statistically significant improvements in all measured parameters, including hamstring and lower back flexibility, shoulder mobility, and spinal range of motion ($p < 0.05$). In contrast, the control group, which participated in traditional physical education classes, exhibited only minor and statistically insignificant changes. These findings confirm that conventional methods are not sufficiently effective for targeted flexibility development without a structured and scientifically based approach.

The effectiveness of the proposed technology can be explained by several key factors: the комплексное использование различных видов растяжки (static, dynamic, and PNF), the gradual progression of training loads, and the consideration of individual characteristics of students. Additionally, the правильная организация учебно-тренировочного процесса, including warm-up and recovery phases, contributed to improved outcomes and minimized the risk of injury.

From a practical perspective, the developed pedagogical technology can be effectively implemented in higher education institutions to enhance the quality of physical education programs. It provides a structured framework for improving flexibility and can be adapted for different groups of students, including those with varying levels of physical preparedness.

In conclusion, gymnastics-based training represents an effective and scientifically justified means of improving flexibility in students, and its integration into educational practice is both necessary and beneficial.

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