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SKI RACING AS A MEANS OF INCREASING PHYSICAL ACTIVITY AMONG HEARING IMPAIRED PUPILS AT SCHOOL

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Abstract. The article examines the pedagogical feasibility of using ski races as a means of increasing the physical activity of students with hearing impairments in general secondary education institutions. The work uses analysis and generalization of scientific and methodological literature on adaptive physical education and inclusive education, as well as pedagogical observation, analysis of school documentation, and interviews with physical education teachers. It has been established that the organization of ski racing within physical education lessons, taking into account the psychophysical characteristics of students with hearing impairments, the use of visual teaching aids, and the step-by-step mastery of technique contributes to an increase in the level of physical activity and student engagement in classes. It was concluded that it is advisable to integrate ski racing into the variable part of physical education curricula. Prospects for further research are related to the quantitative assessment of the impact of ski racing on the indicators of motor fitness and functional status of students with hearing impairments.

Key words: ski racing, students, hearing impairment, physical activity, physical education, general education schools.

Introduction. Physical activity is a key factor in the motor development, health, and social adaptation of children and adolescents. It is particularly important for students with hearing impairments, as it combines motor development with the formation of communication and social skills. However, numerous studies indicate a systematic decline in physical activity among this category of schoolchildren, which is due to limited access to various types of physical activity, difficulties in learning traditional forms of educational material, and insufficient adaptation of physical education lessons (Roland et al., 2016; Marschark & Spencer, 2019; Troianovska, 2025; Nosko & Troianovska, 2025).

In global scientific literature, cyclic types of physical activity are considered an effective means of developing endurance, coordination, and overall physical performance in schoolchildren. Particular attention is paid to the use of winter sports, in particular cross-country skiing, which combines aerobic exercise, outdoor activities, and the ability to adapt the intensity of the exercise to the individual characteristics of students (Biewener & Roberts, 2018; Janssen & LeBlanc, 2019). Despite this, the issue of introducing cross-country skiing into the systematic physical education practice of students with hearing impairments remains understudied, especially in the context of organizing physical education classes in general secondary education institutions.

The relevance of the study is determined by the need to develop methodologically sound approaches to increasing the physical activity of students with hearing impairments, which will contribute to their motor development, social integration, and the formation of sustained motivation for systematic physical exercise.

Research objectives:

– to analyze the current state of the problem of physical activity among students with hearing impairments in global and domestic scientific literature.

– To determine the pedagogical possibilities of ski racing as a cyclical type of physical activity for students with hearing impairments.

– To investigate organizational and methodological approaches to the introduction of ski racing into the structure of physical education lessons.

– To develop recommendations for optimizing the organization and methodology of ski racing in physical education lessons.

Purpose of the study is to theoretically substantiate and determine the pedagogical feasibility of using ski races as a means of increasing the level of physical activity of students with hearing impairments in general secondary education institutions.

To achieve the stated goal of the study, a set of interrelated research **methods** was used:

Theoretical methods, in particular, analysis, synthesis, generalization, and systematization of scientific and methodological literature on adaptive physical culture, inclusive education, physical education, and the use of winter sports in the educational process. This made it possible to determine the pedagogical possibilities of ski racing and justify its relevance in working with students with hearing impairments.

Empirical methods, namely pedagogical observation of students' learning activities in physical education classes, discussions with physical education teachers, and analysis of school documentation (curricula, calendar and thematic planning, individual educational trajectories of students).

Results. In the process of theoretical analysis of scientific and methodological literature (Baikina, Kret & Sylantiev, 2002; Hurinovych, 2006; Troianovska & Lazarenko, 2025), it was found that the effectiveness of physical education for students with hearing impairments largely depends on the rational organization of physical education classes and the selection of types of physical activity that provide an optimal level of physical exertion, correspond to the age and psychophysical characteristics of schoolchildren, and contribute to increasing their physical activity. In this context, cross-country skiing is considered a useful tool that combines health benefits, accessibility, and the ability to adapt to the conditions of an inclusive educational environment.

An analysis of pedagogical approaches to organizing ski training has made it possible to identify the main structural components of a physical education lesson with elements of ski racing. These include a preparatory part aimed at general and specific warm-up of muscle groups, a main part in which skiing techniques are taught and improved, and a final part that ensures a gradual reduction in physical activity and recovery of the students' bodies. This structuring of the lesson contributes to increasing the motor density of the classes and creates conditions for the targeted development of motor skills.

Particular attention was paid to organizing the learning process taking into account the specific educational needs of students with hearing impairments. During the ski race in physical education class, visual cues, demonstration materials, and sign language were used to ensure a clear understanding of the tasks and the sequence of movements. Step-by-step instruction in skiing technique allowed students to gradually develop motor skills and reduce the risk of mistakes and injuries.

Pedagogical observation of physical education lessons using ski races showed that clear planning of the distance, determination of the start and finish points, and rational distribution of students into subgroups contribute to the orderliness of the educational process and increase the level of physical activity. Organizing movement along the distance, taking into account the individual pace of exercise performance, allowed each student to work in a comfortable mode, which had a positive effect on the total amount of physical work performed.

During the implementation of ski races as part of physical education lessons, special attention was paid to compliance with safety requirements (Troianovska, 2018). Before the start of classes, safety instructions were given, sports equipment was checked for serviceability, and equipment was checked for suitability for weather conditions. This approach helped to foster a responsible attitude toward physical exercise among students and created the conditions for stable learning activities.

Discussions with physical education teachers helped identify the pedagogical conditions under which organizing ski races in class is most effective. These include systematic training, gradually increasing the difficulty of training tasks, taking into account the physical fitness level of students, and using an individualized approach. Teachers also noted that the inclusion of competitive elements in the lesson helps to increase students' interest in the classes and encourages them to participate more actively in the learning process.

Analysis of educational programs and calendar-thematic planning confirmed the possibility of integrating ski racing into physical education lessons as a variable module. The generalization of theoretical provisions and the results of pedagogical observation made it possible to justify the pedagogical expediency of organizing ski races in physical education lessons as an effective means of increasing the level of physical activity of students with hearing impairments in general secondary education institutions.

Discussion. The results obtained indicate that the use of ski races in physical education lessons has significant pedagogical potential for increasing the physical activity of students with hearing impairments. The key aspect is not so much the type of physical activity itself as the specifics of its organization in the educational environment. A clear structure of classes, a step-by-step approach to learning, and reliance on visual channels of perception create conditions for active student involvement and reduce barriers to the perception of educational material (Zasenko & Kolupaieva, 2002).

The mechanism of the positive impact of ski racing on physical activity is probably related to the combination of the cyclical nature of the load and the possibility of individually adjusting the intensity. This approach allows students to work at their own pace, which reduces physical and emotional stress and at the same time contributes to the accumulation of sufficient physical activity during the lesson. An additional factor is the involvement of large muscle groups, which stimulates the development of general endurance and has a positive effect on the functional state of the body.

An important result is the establishment of the role of organizational conditions for ski racing in ensuring the effectiveness of training. The use of visual cues, clear demarcation of the training space, and regulation of movement along the distance contribute to increasing students' independence and reducing their dependence on verbal instructions. This is consistent with research in the field of adaptive physical education, which emphasizes the priority of visual-motor teaching methods for people with hearing impairments (Troianovska, 2025).

A comparison of the conclusions obtained with the data of other researchers confirms their consistency with the results of studies in which cyclic types of motor activity are considered an effective means of increasing motor activity and forming stable motivation for physical exercise in the context of inclusive education. At the same time, a distinctive feature of the study is its focus on the organization of ski races within the framework of physical education classes, which allows them to be considered not as an additional, but as an integrated component of the educational process.

From a practical point of view, the results of the study give grounds to recommend wider introduction of ski racing into the variable part of physical education programs for students with hearing impairments. It is advisable to develop methodological recommendations for teachers on organizing distances, dosing loads, and using visual means of controlling motor activity. This approach will contribute to increasing the effectiveness of lessons and creating a safe and accessible educational environment.

Based on the results of the study and our own practical experience, practical recommendations were developed aimed at improving the organization and content of the educational process (physical education/adaptive physical education classes) for students with hearing impairments.

Practical recommendations:

– *Integration of ski racing into the educational process.* It is recommended to include ski racing in the variable component of the physical education curriculum for students with hearing impairments as an effective means of increasing physical activity in the winter period.

– *Adaptation of physical education lessons.* During classes, it is advisable to ensure a clear lesson structure with step-by-step mastery of skiing techniques and a gradual increase in the volume and intensity of physical activity, taking into account the individual abilities of students.

– *Use of visual teaching aids.* It is recommended to use demonstrations of movements, signal gestures, instruction cards, and video materials to explain the teaching material, which contributes to a better understanding of the tasks by students with hearing impairments.

– *Ensuring safe conditions for classes.* The organization of ski races should include thorough preparation of the training site, monitoring of the technical condition of equipment, and compliance with safety rules, taking into account the peculiarities of signal perception by students with hearing impairments.

– *Differentiation of educational tasks.* It is advisable to use distances and exercise speeds of varying complexity, which allows students with different levels of physical fitness to be actively involved and promotes positive motivation.

– *Improving the professional competence of teachers.* It is recommended to organize methodological events and advanced training courses for physical education teachers on adaptive physical education and the specifics of working with students with hearing impairments.

– *Monitoring students' physical activity.* It is advisable to carry out systematic pedagogical observation of the level of physical activity and functional state of students in order to correct the content and organization of classes.

Prospects for further research are related to an in-depth study of the impact of ski racing on individual indicators of physical fitness and the psycho-emotional state of students with hearing impairments, as well as a comparative analysis of the effectiveness of various winter types of physical activity in general secondary education institutions. This will broaden scientific understanding of the possibilities of adaptive physical education and optimize physical education practices in an inclusive environment.

Conclusion. The study found that ski races are a pedagogically appropriate and effective means of increasing the physical activity of students with hearing impairments in general secondary education institutions. Their use in physical education lessons is consistent with the objectives of adaptive physical education and the principles of inclusive education, ensuring accessibility and variability of physical activity.

It has been proven that the effectiveness of ski racing is largely determined by the organization of the educational process. A clear lesson structure, step-by-step teaching of skiing techniques, the use of visual control tools, and the possibility of individual physical activity dosing create conditions for active student participation in educational activities and an increase in overall physical activity.

It has been established that the inclusion of ski racing in physical education lessons contributes to the formation of a positive attitude among students with hearing impairments towards physical exercise and increases their motivation to engage in regular physical activity. This allows us to consider ski racing not only as a means of physical development, but also as an important component of social adaptation in the educational environment.

The conclusions confirm the possibility of integrating ski racing into existing physical education curricula as a variable module without disrupting their logic and structure. This expands the methodological tools available to physical education teachers and contributes to improving the quality of physical education and health work with students with hearing impairments.

Thus, the goal set in the study has been achieved, and the conclusions formulated confirm the relevance and practical significance of using ski racing as a means of increasing the physical activity of students with hearing impairments in general secondary education institutions.

References:

1. Roland, L., Fischer, C., Tran, K., Rachakonda, T., Kallogjeri, D., & Lieu, J. E. C. (2016). Quality of Life in Children with Hearing Impairment: Systematic Review and Meta-analysis [Yakist zhyttia ditei z porushenniamy slukhu: systematychnyi ohliad i meta-analiz]. Otolaryngology–Head and Neck Surgery, 155(2), 208–219. doi:10.1177/0194599816640485 [in English].
2. Marschark, M., & Spencer, P. E. (2019). Oxford Handbook of Deaf Studies, Language, and Education [Oksfordskyi dovidnyk iz doslidzhen hlukhoty, movy ta osvity] (Vol. 1, 2nd ed.). Oxford University Press [in English].
3. Troianovska, M. (2025). Rukhova diyalnist yak chynnyk sotsializatsiyi uchniv z porushennyam slukhu v umovakh inklyuzyvnoyi osvity [Physical activity as a factor in the socialization of students with hearing impairments in inclusive education settings]. Physical Activity, Health and Sport, 2, 164–168 doi:10.32718/pahs2025.02.24 [in Ukrainian].
4. Nosko, M., & Troianovska, M. (2025). Porivnyalnyi analiz biomekhanichnykh parametriv rivnovahy uchniv 7-8 rokiv iz porushennyam slukhu pid chas zanyat fizychnoyi kultury [Comparative analysis of biomechanical parameters of balance of 7-8 years old pupils with hearing impairment during physical education classes]. Visnyk Chernihivskoho natsionalnoho pedahohichnoho universytetu imeni T. H. Shevchenka. Series: Pedahohichni nauky, 31(187), 82–90 doi:10.58407/visnik.253114 [in Ukrainian].
5. Biewener, A. A., & Roberts, T. J. (2018). Muscle and tendon contributions to force, work, and elastic energy savings: a comparative perspective [Vnesok miaziv i sukhozhyl u sylu, robotu ta zberezhennia elastychnoi enerhii: porivnialna perspektyva]. Exercise and Sport Sciences Reviews, 28(3), 99–107 doi:10.1097/00003677-200007000-00003 [in English].
6. Janssen, I., & LeBlanc, A. G. (2019). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth [Systematychnyi ohliad korysti dlia zdorovia vid rukhovoi aktyvnosti ta fizychnoi pidhotovlenosti ditei shkilnoho viku ta molodi]. International Journal of Behavioral Nutrition and Physical Activity, 7(40) doi:10.1186/1479-5868-7-40 [in English].
7. Baikina, N. H., Kret, Ya. V., & Sylantiev, D. O. (2002). Metodyka vykladannia fizychnoi kultury ta sportu invalidiv [Methods of teaching physical culture and sports for persons with disabilities]. Zaporizhzhia, 86 [in Ukrainian].
8. Hurinovych, Kh. E. (2006). Fizychnyy stan hlukhykh ditey molodshoho shkilnoho viku ta yoho korektsiya zasobamy fizychnoho vykhovannya [Physical condition of deaf children of primary school age and its correction by means of physical education] (PhD Thesis). Lviv, 180 [in Ukrainian].
9. Troianovska, M., & Lazarenko, M. (2025). Osoblyvosti roboty z uchnyamy z porushennyam slukhu na urotsi fizychnoyi kul′tury [Peculiarities of working with students with hearing impairment in physical education class]. Scientific Journal of the National Pedagogical Dragomanov University. Series 15: Scientific and pedagogical problems of physical culture (physical culture and sports), 3К(188), 316–320 doi:10.31392/UDU-nc.series15.2025.03к(188).75 [in Ukrainian].
10. Troianovska, M. M. (2018). Teoretychni aspekty provedennya zanyat fizychnoyi kultury z uchnyamy z osoblyvymy osvitnimy potrebamy v umovakh inklyuzyvnoyi osvity [Theoretical aspects of physical education classes with students with special educational needs in inclusive education]. Visnyk Chernihivskoho natsionalnoho pedahohichnoho universytetu imeni T. H. Shevchenka. Series: Pedahohichni nauky, 154(2), 166–169 doi:10.5281/zenodo.1402283 [in Ukrainian].
11. Zasenko, V., & Kolupaieva, A. (2002). Shlyakhy intehratsiyi ditey z porushennyamy slukhu u suspil′stvo [Ways to integrate children with hearing impairments into society]. Civic education and socialization of children with hearing impairments: Collection of scientific and methodological materials. Kyiv, 48–50 [in Ukrainian].
12. Troianovska, M. (2025). Osoblyvosti psykhichnoho rozvytku uchniv z porushennyam slukhu ta yikhniy vplyv na stan rukhovoyi aktyvnosti [Features of mental development of students with hearing impairments and their impact on motor activity]. Olympic and Paralympic sports, 2, 138–141 doi:10.32782/ops2025.02.21 [in Ukrainian].