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The instructive - educational model for 4-6 years old alpine skiers. Selection and physical training

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Abstract

Background: In alpine skiing, physical training can start at an early age, from 4 to 6 years old, an age that can play an important role in the further development of future athletes. Specific movements of physical exercise, such as walking, running, jumping, throwing, climbing, swimming, dancing, skiing, etc., can be performed by preschoolers without excessive physical stress, developing their skills and gradually preparing them for performance. This stage of childhood offers the best opportunities for acquiring new motor skills. The scientific approach started from the finding that, although the ski training of children is possible and recommended at preschool age, however, following the analysis of the literature, a lack of teaching methodology for this age group can be found, both at the national and international level.

Aim: The paper aims to propose an educational model specific to this age group, which can be used in teaching the discipline of alpine skiing, in sports clubs and associations or instructor associations.

Methods: The study is based on the modeling method, applied to the physical training activity, also considering the psychomotor features specific to the preschool child. The proposed methodology contains tests and testing standards aiming the general physical training of the children.

Results: The objectives pursued by applying this model consist in forming or developing both general and specific motor qualities, as well as educating the coordinative capacities. By applying this instructive-educational model in the physical training of preschooler children, an increase of their sports performance was demonstrated, which is verified by the results obtained at national competitions, intended for the specific categories of their age.

Conclusions: The model of the alpine skier for this age must consider the particularities specific to the age, and the learning methods must be adequate, rational and flexible, to ensure an easy learning, assimilable to playing activities.

Key words: physical training, selection in skiing, preschooler, teaching methodology

Rezumat

Fundamentare: În schiul alpin, pregătirea fizică poate începe la o vârstă fragedă, 4-6 ani, vârstă care poate juca un rol important în dezvoltarea ulterioară a viitorilor sportivi. Mișcările specifice ale exercițiului fizic, cum ar fi mersul, alergarea, săriturile, aruncarea, cățărarea, înotul, dansul, schiul, etc. pot fi efectuate de către preșcolari, fără efort fizic excesiv, contribuind la dezvoltarea aptitudinilor și la pregătirea lor graduală pentru performanță. Această perioadă a copilăriei oferă cele mai bune oportunități pentru dobândirea noilor abilități motorii. Cu toate că pregătirea sportivă în schi este posibilă și chiar recomandată la vârsta preșcolară, în urma analizei literaturii de specialitate se poate observa o lipsă a unei metodologii de predare pentru această perioadă, fapt constatat atât la nivel național cât și internațional.

Scop: Lucrarea propune un model educativ specific acestui grup de vârstă, model ce poate fi utilizat în predarea disciplinei schiului alpin în cadrul cluburilor și asociațiilor sportive sau a asociațiilor de monitori.

Metode: Studiul are la bază metoda modelării, aplicată activității de pregătire fizică, ținând cont de caracteristicile psihomotorii ale copilului preșcolar. Metodologia propusă conține probe și norme de control ce urmăresc pregătirea fizică generală a copiilor.

Rezultate: Obiectivele urmărite prin aplicarea modelului constau în formarea sau dezvoltarea calităților motrice generale și specifice și în educarea capacităților coordinative. Prin aplicarea modelului în pregătirea fizică a copiilor preșcolari, s-a demonstrat o creștere a performanțelor sportive, verificată prin rezultatele obținute la competițiile naționale organizate pentru categoria lor de vârstă.

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Concluzii: Modelul schiorului alpin pentru această vârstă trebuie să ia în considerare particularitățile specifice vârstei, iar metodele de învățare trebuie să fie adecvate, raționale și flexibile, pentru a asigura o învățare ușoară, asimilabilă jocului.

Cuvinte cheie: pregătire fizică, selecția în schi, preșcolar, metodologie de învățare

Introduction

Along with a diet rich in vitamins and minerals, the harmonious development of children largely depends on movement [1]. Specialized studies highlight that a higher level of physical activity at preschool and school-age is associated with several important, long-term benefits, in health, mental, emotional, social, and cognitive areas, even lifelong [2 - 4].

Thus, the integration of physical activity in the child's life becomes vital, contributing to the formation of the foundations of a healthy and active lifestyle. The early introduction of sports activities to children, since preschool age, helps maximizing its potential for the development of motor skills and control, while enriching the field of knowledge and cognitive activities.

These findings are proven by specialized scientific papers, which demonstrate that physical activity has beneficial effects on cognitive development, attention, working memory, school behavior and discipline, and educational achievement among children and youth [5-7]. Motor skills in young children are, among others, considered to be linked with various health outcomes such as adiposity, self-esteem, cardiorespiratory fitness, and cognition [2]. Hence, developing and implementing effective interventions to improve young children's motor skills have become a priority.

It is assumed that there is a close correlation between motor and cognitive skills, both based on several common processes, such as sequencing, monitoring and planning.

At preschool age, the advantages of physical activity are formed due to the development of physical exercise in new conditions, through new ways of interaction with the environment, and represent a significant contribution of educational activity in shaping the character of the child, the future young individual, and, later, the adult. Based on the above statements, three main directions can be identified leading to child's development through involvement in sports activities: strengthening health, education, and regular exercise. For the coach or teacher, understanding the basic characteristics of this age underlies the scientific approach of designing learning methods and organizing sports activities in groups of children. For the parent, understanding the three directions helps to inform him and to

choose the right activities or sports, so that the child grows and develops in a warm and affective environment [8, 9, 10].

In the case of skiing, the instructional process aims the ability to maintain balance in sliding and the overall execution of specific movements. At the age of 4-6, the training aims to adapt to the specific environment in which the activity takes place and to form a wide range of skiing skills, the main support of which must be balancing in sliding, given that alpine skiing movements are not natural movements. For this age group, we cannot talk about training, but we are talking about the development of an instructive educational process of learning through play and application courses. At this stage, the desire and pleasure of movement must be instilled to the children by the drive systems.

Internationally, especially in sports involving complex coordination, the early training of motor skills is a modern, long-discussed approach. It was concluded that those motor qualities acquired at an early age, by correct methods, most often persist throughout life [11, 12]. At the same time, athletes develop superior control skills and flexibility in their use. Figure skating or gymnastics are classic examples of sports that require complex coordination, being well known that athletes who started training at the age of 3-6 years were able to achieve the highest performance.

The scientific justification for this phenomenon can be deduced from the work of the famous Soviet neurophysiologist Nikolai Aleksandrovich Bernstein, one of the pioneers in the field of motor control and motor learning, "On the construction of the movement" [13, 14].

Bernstein argued that the early training of children and formation of sports skills contribute to building a solid foundation for motor skills, which will later serve them in achieving control and obtaining new motor skills necessary for performance.

The motivation for choosing the topic was our desire to identify ways to streamline alpine skiing activities. The scientific approach started from the finding that although the ski training of children is already possible at preschool age, the analysis of scientific literature has shown a lack of methodology for this age group, both nationally and internationally. Moreover, in some papers opposing

views are presented on the methodology of developing the discipline of teaching skiing at this age. The proposed instructive-educative model for 4-6 age young skiers considers both dry land physical training and training on snow. This paper presents the model for the selection and physical training process on dry land (both indoor and outdoor).

Materials and methods

The modeling method is not new. It has been applied since ancient times and continues to be used by each of us on various occasions, without often knowing that we do it. The experiment, i.e. the scientific research, tries to replace a complex system of causes with a simple system, in which one or several causes vary over time. In this way, it is possible to research the complex phenomenon by modeling it. Modeling physical capacity is a sport-specific problem and can be solved using the means with which it usually operates. The obtained model cannot be considered as something ideal, unchangeable, but it is susceptible to continuous improvement, and evolution.

This continuous evolution of the model must be considered necessary, as many of the causes influencing a phenomenon which cannot yet be known, either because there are no measurement methods or the solution for integrating the data obtained in the modeling technique has not been found. Thus, there are continuously created premises for highlighting new factors that can have a decisive influence on the evolution of a phenomenon and on the improvement of modeling, implicitly.

In the modeling process, it is normal for the means of training to be considered as causes that influence - essentially and importantly - the level of physical training. Using many possibilities, i.e. exercises and training means, we will have many chances of success. Modeling refers to the organization and development of the athletes' performance in such a way that their level and content are as close as possible and even exceed the levels considered maximum at the given time. Modeling is usually done in the transition phase so that the coach can retrospectively and critically analyze the previous year's model, and reconsider whether the objectives, tests, and standards, training content,

reaching peak form, and other training parameters have been established and properly achieved. The coach must objectively select the training methods and means that will materialize in the new model, eliminating those that have proven ineffective.

Table I presents the morphofunctional indices with gender specificity that are taken into consideration in the implementation of the operational model of the alpine skier aged between 4 and 6 years.

Table I. Specific morphofunctional indices (indicative somatic parameters - mean values)

BOYS		
Age (years)	Height (cm)	Weight (Kg)
4	104	17.2
5	110	19.5
6	116	21.5
GIRLS		
Age (years)	Height (cm)	Weight (Kg)
4	103	16.8
5	109	19.0
6	115	21.1

The objectives of the first stage of training consist of the education/development of the general motor skills and education of the coordinative capacity, respectively.

In establishing the training model for young, preschool skiers, all specific aspects must be highlighted: psychological training, technical training, and last but not least, physical training.

Psychological training aims at educating the attention, balance, the mobility of the processes of arousal and inhibition, improving the activity of analyzers and mental education, respectively (formation of discipline, responsibility, orientation towards sports, etc.).

The technical training aims at the ability to maintain balance in sliding and the overall execution of specific movements. At the age of 4-6, the training aims to adapt to the specific environment in which the activity takes place and to form a wide range of skiing skills, the main support of which must be balancing in sliding, given that alpine skiing movements are not natural movements.

The correct position on the skis is favored by the following working conditions:

- Age-appropriate material and equipment;

- Appropriate terrain and speed to challenge and help movements;
- Use of auxiliary methodical aids: landforms (varied terrains), ski poles, cones, gym bench, trellises, stairs, roller skates, balls, colored sprays, etc.;
- Other auxiliary materials: stopwatches, safety nets, walky-talkies, etc.

Physical training aims at educating both the basic physical skills (speed, strength, endurance, coordination) and physical training by gradually engaging muscle groups and chains, required by the execution of the technique.

The main groups of means used in the design of the training model for skiers at preschool age can be classified, according to the specifics of physical training, in:

- Groups of means regarding the general physical training: walking, running, sports gymnastics, cycling. At this stage of learning, on dry land training, the volume of these exercises will be over 60-70% of the total volume of the means used.
- Groups of means based on the use of exercises close to the specificity of skiing. The aim is to strengthen the joints and the muscles. These exercises include walking/running on various terrain, starting from different positions, winding on inclined terrain, obstacle races, balance walking and running, stair exercises, gymnastics, trampoline, trellis, dry slalom, balancing on roller skates. At this stage of preparation, in the phase of dry land work, with physical training objectives, the volume of these means will be 30-40% of the total execution. In the annual training cycle, the frequency of these means will increase in the stages from October to November.

Tests and control standards

At the age of 4-6 years, both girls and boys must obtain a total score of at least 200 points in all 5 general physical training tests: 5m shuttle run, long jump on the spot, vertical jump, jump with 360° right / left turn and applicative route. The results obtained following these tests represent the indicative parameters of the general physical training. The objectives of physical training aim to improve the general tonicity of the muscles, the

education/balanced development of the basic motor skills, and the improvement of the general state of health.

Shuttle run test. Two circles are drawn on the floor/asphalt, with a 5-meter distance between them. In a circle, 3 cones/objects are placed that the athlete must replace individually in the empty circle. The start is taken at the audio signal from the empty circle, and the timer starts when the foot rises from the floor/ asphalt and stops when the athlete has placed the last cone/object in a circle. The travel speed is tracked, and the achieved times are marked in seconds.

Long jump from the spot (standing long jumps): Draw a ruler on the floor/asphalt, with the marking expressed in cm. The athlete puts the tips of the sneakers on the starting line without stepping on it, feet apart at shoulder level, brings his/her arms up at ear level, to prepare the momentum. He/she pulls the arms down and back at the same time as bending the knees and pulling the heels forward strongly. Out of two jumps, the best is scored. It is measured in cm when the first segment of the body is put down. This exercise aims to test the explosive force of the lower limb muscles (horizontal expansion).

Vertical jumps (high jump from the spot): The athlete sits facing the wall/panel, raises his hand on the wall/panel, and marks the highest point represented by the tip of the middle finger.

The athlete performs a high jump with the maximum height, with the middle finger touching the wall. The difference between the two markings on the wall, expressed in centimeters, is measured. The explosive force of the lower limbs is followed (expansion height or vertical expansion).

360-degree jumps to the right and left: a circle divided into 4 is drawn on the floor or a hard surface. From the standing position, legs apart at shoulder level, the athlete performs a jump back to the right and a jump back to the left. The performed rotation is expressed in degrees and the landing point is also recorded. The coordination skills are pursued.

Applicative route: Winding run between 5 poles/ cones, placed in line, arranged at 1 m between them, 5 jumps from two to two legs in 5 spaces of the ladder, passing under an obstacle with a height of

30 cm, crossing over an obstacle with a height of 30 cm, walking on the wide side of the gym bench. The start is given at the audio signal, the stopwatch starts when the athlete touches the bar with his/her foot. The coordination capacities are pursued. The tests and control standards for general physical training are held at the beginning and the end of the year, the standards being included in the tables corresponding to the age group. The tests and control standards aiming at the specific training are held in standardized conditions, at the beginning and end of the training stages, having specific training objectives, following the dynamics of the established scales. Depending on the initial level and final requirements of the stage, the level of the standards to be achieved will be established annually. The hierarchy of the

indicators used in the model is presented in Figure 1.

Result and discussions

General physical training should create the background for further specific training. It is necessary to use exercises and exercise structures that address all muscle groups and major body functions. The quantification of the results obtained by applying the operational model to preschool children is done by supporting the tests and control standards, and scoring them according to a preset score, specific to the athlete's age and gender. Tables II-IV show the indicative scores that children must obtain at the age of 4, 5, and 6 years.

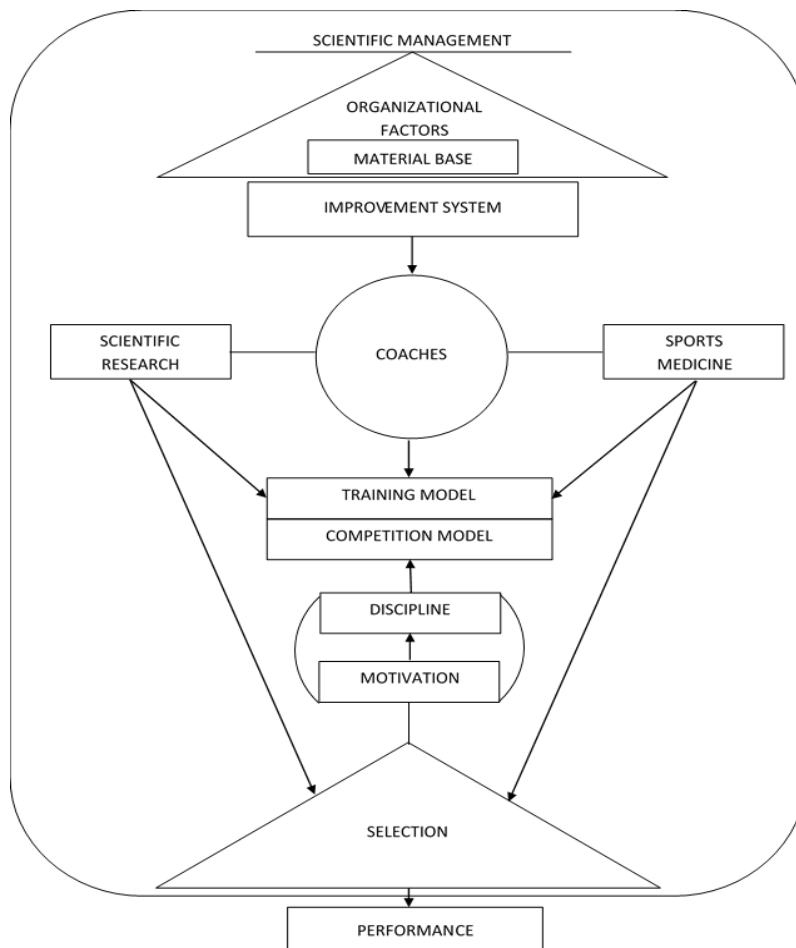


Figure 1. Hierarchy of the indicators used in the model

Table II. Scoring table for 4 years old skiers

Points	Standing long jumps		Vertical jumps		Shuttle run		Applicative route		360° lateral jumps	
	m	F	M	f	m	f	m	f	m	f
100	128 cm	125 cm	25 cm	20 cm	15 s	16 s	19 s	20.50 s	270	
90	118 cm	115 cm	22 cm	17 cm	15.50 s	16.50 s	19.50 s	21 s	250	
80	108 cm	105 cm	19 cm	14 cm	16 s	17 s	21 s	21.50 s	230	
70	98 cm	95 cm	16 cm	11 cm	16.50 s	17.50 s	21.50 s	22 s	210	
60	88 cm	85 cm	13 cm	8 cm	17 s	18 s	22 s	22.50 s	190	
50	78 cm	75 cm	10 cm	5 cm	17.50 s	18.50 s	22.50 s	23 s	170	
40	68 cm	65 cm	7 cm	3 cm	18 s	19 s	23 s	23.50 s	150	
30	58 cm	55 cm	4 cm	0	18.50 s	19.50 s	23.50 s	24 s	130	
20	48 cm	45 cm	1 cm	0	19 s	20 s	24 s	24.50 s	110	
10	38 cm	35 cm	0	0	19.50 s	20.50 s	24.50 s	25 s	90	

Table III. Scoring table for 5 years old skiers

Points	Standing long jumps		Vertical jumps		Shuttle run		Applicative route		360° lateral jumps	
	m	F	M	f	M	f	m	f	m	f
100	138 cm	135 cm	30 cm	25 cm	13 s	14 s	16.50 s	18 s	300	
90	128 cm	125 cm	27 cm	23 cm	13.50 s	14.50 s	17 s	18.50 s	270	
80	118 cm	115 cm	24 cm	20 cm	14 s	15 s	17.50 s	19 s	240	
70	108 cm	105 cm	21 cm	17 cm	14.50 s	15.50 s	18 s	19.50 s	210	
60	98 cm	95 cm	18 cm	14 cm	15 s	16 s	18.50 s	20 s	180	
50	88 cm	85 cm	15 cm	11 cm	15.50 s	16.50 s	19 sec	20.50 s	150	
40	78 cm	75 cm	12 cm	8 cm	16 s	17 s	19.50 s	21 s	120	
30	68 cm	65 cm	9 cm	5 cm	16.50 s	17.50 s	21 s	21.50 s	90	
20	58 cm	55 cm	6 cm	3 cm	17 s	18 s	21.50 s	22 s	60	
10	48 cm	45 cm	3 cm	0 cm	17.50 s	18.50 s	22 s	22.50 s	30	

Table IV. Scoring table for 6 years old skiers

Points	Standing long jumps		Vertical jumps		Shuttle run		Applicative route		360° lateral jumps	
	m	F	M	F	m	f	m	f	m	f
100	148 cm	145 cm	35 cm	30 cm	12 s	13 s	15 s	16.50 s	360	360
90	138 cm	135 cm	32 cm	27 cm	12.50 s	13.50 s	15.50s	17 s	330	
80	128 cm	125 cm	29 cm	24 cm	13 s	14 s	16 s	17.50 s	300	
70	118 cm	115 cm	26 cm	21 cm	13.50 s	14.50 s	16.50 s	18 s	270	
60	108 cm	105 cm	23 cm	18 cm	14 s	15 s	17 s	18.50 s	240	
50	98 cm	95 cm	20 cm	15 cm	14.50 s	15.50 s	17.50 s	19 s	210	
40	88 cm	85 cm	17 cm	12 cm	15 s	16 s	18 s	19.50 s	180	
30	78 cm	75 cm	14 cm	9 cm	15.50 s	16.50 s	18.50 s	20 s	150	
20	68 cm	65 cm	11 cm	6 cm	16 s	17 s	19 s	20.50 s	120	
10	58 cm	55 cm	8 cm	3 cm	16.50 s	17.50 s	19.50 s	21 s	90	

However, for this age group, tests and control rules need only to be benchmarks for monitoring the evolution and progress of children. Moreover, it is known that, at preschool age, there are large differences in motor manifestation between children living in the country and those living in the city.

Following the 17 years of experience gained by working mostly with beginner athletes aged 4 to 6, in the school sports club, we felt the lack of a training model for this category and we decided to apply several tests and control rules to students. Thus, for the last 5 years, the tests and control standards mentioned above were used exclusively. The young athletes who managed to obtain over 200 points in these control tests are those who nowadays have a good physical training, and whose results at the national competitions have not failed to appear, being evidenced by the participation in the competitions from the Romanian Ski Biathlon Federation competition calendar, intended for their age categories.

Conclusions

The learning methods for skiing at this age category, aim at the formation of specific skills of movement, of balancing in sliding, and of a minimum baggage of technical mechanisms necessary for the detour and stop maneuvers.

The alpine skier model must include tests and control rules aimed at the general physical training of preschoolers. The tests and control standards proposed in this instructive-educative model aim at the specific physical training of the students, close to the specific effort on the snow.

The tests and control standards applied entitle us to believe that we are on the right way in establishing them. We are just at the beginning. Future studies, through the scientific approach we undertake in the doctoral internship, will direct us to other methods and means for selecting control tests, but also for improving the level of standards to be applied, to complete the alpine skier model at preschool age.

The system of tests and control rules must be flexible, lively, to withstand periodic improvements,

depending on the specificity of future generations and of course, on their motor baggage.

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