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ALPINE SKIING PHYSICAL FITNESS STANDARDS' RESEARCH FOR COMPETITORS OF AGES 12 TO 14

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ABSTRACT

This publication presents analysis of actual data regarding the development level for some of the most significant motor skills in age 12–14 alpine skiers representing a variety of Bulgarian ski clubs. Alpine skiing is a strongly athletic power-speed sport setting higher and higher requirements regarding the skiers' physical fitness. The research's **aim** is documenting the current physical state of the tested skiers' group and, based on the data, elaborating evaluation standards for their motor skills. **Methods:** For the needs of this research we used onsite testing, analytical synthetics and mathematical statistics (variation analysis, sigma methodology). **Results:** The obtained and aggregated data from the variation analysis present information in regards to the motor skills state of the persons, while the values are with average or close to the average distribution, and applying sigma methodology we derived an evaluation standards table. **Conclusions:** Motor skills evaluation standards of skiers (adolescents) could assist sports professionals in making quality estimation of the current state of their contestants. We recommend the framing and approbation into the practice of tables for all age groups aiming to achieve better quality control and training process management.

Key words: alpine skiing, physical fitness, motor skills, adolescent skiers

INTRODUCTION

The topicality of the problems related to the state of physical fitness the end motor abilities of the person are the reason for their constant in-depth study by both Bulgarian and foreign researchers. In this regard, there are many publications revealing the possibilities for improving sports training.

Modern skiing (Alpine skiing) is a complex power-speed sport. The dynamic change in its structure setts higher and higher requirements on athletes – a solid base of technical skills, physical, tactical and psychological training. An alpine skier is first and foremost an athlete in his/her sport whose body is required to work his body in sync, as a perfect mechanism in the specific conditions of the various racing disciplines in which he/she must realise his/her sporting potential.

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The studied literature sources on the state of skiing in our country do not paint a good picture: the generalised analysis that we can carry out proves that its system is still undergoing restructuring, looking for a new model for development and functioning in the conditions of the market economy of our civil society.

In the last few years, high-ranking competitions and starts of world cups for men and women have been held in Bulgaria. These events contribute to the development of winter tourism in our country, but this does not have a sufficiently positive effect on the desired progress of skiing.

We can claim that the existence of many ski schools also contributes to the economic prosperity of ski resorts and only by making amateur activities, tourism and recreation a mass phenomenon the **grassroots sport** can be promoted.

The development of children's and youth sports in our country remains in the background, as the number of children who

engage in competitive skiing (especially the number of girls) declines and, accordingly, so does the number of events included in the sports calendar.

The financial and technical resources of ski clubs are at a very low level due to the inability of clubs to support themselves. Of the 30 ski clubs developing alpine skiing in the country, only 2 have an adequate budget for year-round training of competitors, as well as modern management, including constant control and accountability. The number of qualified coaches engaged in ski clubs is also decreasing mainly due to inadequate pay and the lack of stable conditions for practising and growing in the profession. For the same reasons coaches who graduate from specialised higher education institutions are looking for other opportunities for realisation, in most cases as ski instructors mainly abroad (1).

The main components of physical fitness are physical development and physical fitness (2). Most ski clubs do not provide year-round training, and the sports and technical level of most of our young athletes is quite mediocre. The demographic factor also limits sports selection in children.

There is no functioning inverted pyramid realisation – the number of our current elite athletes is decreasing, and the main reason for this is the lack of recruited young athletes.

The main task in the work of the coaches is to establish if the alpine skiers are physically prepared for their participation in training work. Readiness for training and competition is divided into mental, technical, tactical and physical. All these components individually or in combination are important for the realisation of the athlete and for the achievement of a high sports result (3, 4).

Monitoring and evaluation are an important part of the overall training process. Assessment of motor skills through testing provide specific data on the level of training achieved – the level of motor skills and habits, the development of basic and special motor skills, and the health status of the athlete.

This form of control creates an opportunity for feedback between the athletes and the coach. Establishing the current state of physical fitness of athletes allows coaches to most accurately and correctly determine the goals and objectives, to choose the means and methods, to determine the amount of workload to achieve good results in training work. The information obtained is a sufficient motive for changes in order to improve the significant elements of the overall training process. The latter are aimed at improving the quality of the training and its optimisation (5, 6).

The ***aim*** of the study is to establish the current state of physical fitness of 12–14-year-old alpine skiers in Bulgaria.

METHODS:

In connection with the aim, we set the following ***tasks*****:**

1. To study the literature sources and the statutory documents of the Bulgarian Ski Federation.
2. To establish and analyse the level of development of the basic and special motor qualities of alpine skiers.
3. To develop standards for assessing the physical fitness of adolescent skiers.

The ***object*** of the study are 95 alpine skiers aged between 12 and 14 years from different ski clubs in Bulgaria.

The ***subject*** of the study are some processed and phenomena in the training in alpine skiing in Bulgaria.

Organisation: The study was conducted over a period of two years: 2018 and 2019.

Methods used in the research: literature research, onsite testing, mathematical statistics methods (variation analysis, sigma methodology), pedagogical observation and analysis.

RESULTS

Physical fitness is a state of a person that shows what his/her current sports level is, i.e. what are his/her motor abilities and abilities to perform motor activity in conditions of great psycho-physical load. It is a complex indicator of the general functional state and is directly dependent on the degree of development and the manifestation of the basic motor qualities, age, sex and hereditary characteristics of the individual. It can change significantly under the influence of the environment and living conditions, work and, above all, the volume, nature and direction of exercise and sports. The level of physical fitness is an indicator of the general working capacity of the organism, the basis of which is the complex development of

the motor qualities and of the motor skills necessary for their manifestation (7, 8).

Due to its characteristics, alpine skiing sets higher requirements for the motor skills of skiers. They manifest themselves in the form of a system of rationalised, purposeful, simple and complex movements and are evaluated on the basis of specific actions. According to Tsv. Zhelyazkov (2001), this transfer of the overall motor activity of the individual is possible only due to the motor qualities – strength, speed, endurance, flexibility and agility. The same motor qualities find external manifestation in the form of various combinations of time, space and effort, i.e. are materialised as special skills and habits (9).

To carry out the study, we used six tests to determine the physical fitness of 12 to 14-year-old alpine skiers:

1. "Depth of inclination" (cm);
2. "Long jump" (cm);
3. "30 m running" (sec);
4. "Figure 8's" (sec);
5. "20 jumps" (sec);
6. "600 m run" (sec).

Table 1 shows the results from the study after mathematical and statistical processing – mean values, range, standard deviation, coefficient of variation, asymmetry and excess. Together, they carry information that can be used for analysis in any subsequent study.

Table 1. *Variance analysis of the results of the study – boys*

Indicators – boys		n	min	max	R	X	S	V	As	Ex
No	Description									
1	Depth of inclination (cm)	95	-3	25	28	8.25	5.65	68.54	0.607	0.326
2	Standing long jump (cm)	95	133	228	95	186.58	20.04	10.74	-0.207	-0.627
3	30 m (sec.)	84	4.55	6.61	2.06	5.14	0.35	6.72	1.132	3.456
4	Figure 8's (sec)	87	26.65	38.88	12.23	30.76	2.55	8.28	0.972	1.209
5	20 jumps (sec)	91	5.32	9.37	4.05	6.75	0.81	11.98	0.862	0.666
6	660 m (sec.)	92	109.35	186.89	77.54	136.56	15.35	11.24	0.657*	0.51

N=95, $\alpha = 0{,}05$, $As_{0,05} = 0{,}495$, $Ex_{0,05} = 0{,}980$

In terms of five of the studied indicators we define the group as ***homogeneous***. Only by the indicator "depth of inclination" it is ***heterogeneous*** due to the large range (R = 28 cm.). The proof of the heterogeneity of the group is also registered by the values of (As) = 0.607: there is a big deviation in the minimum and maximum range of some results, with most of them concentrated around the mean value. This is indicative of gaps in training work on the development of the motor quality "flexibility" in some of the ski clubs.

Figure 1 presents graphically the mean values of the examined indicators of physical fitness.

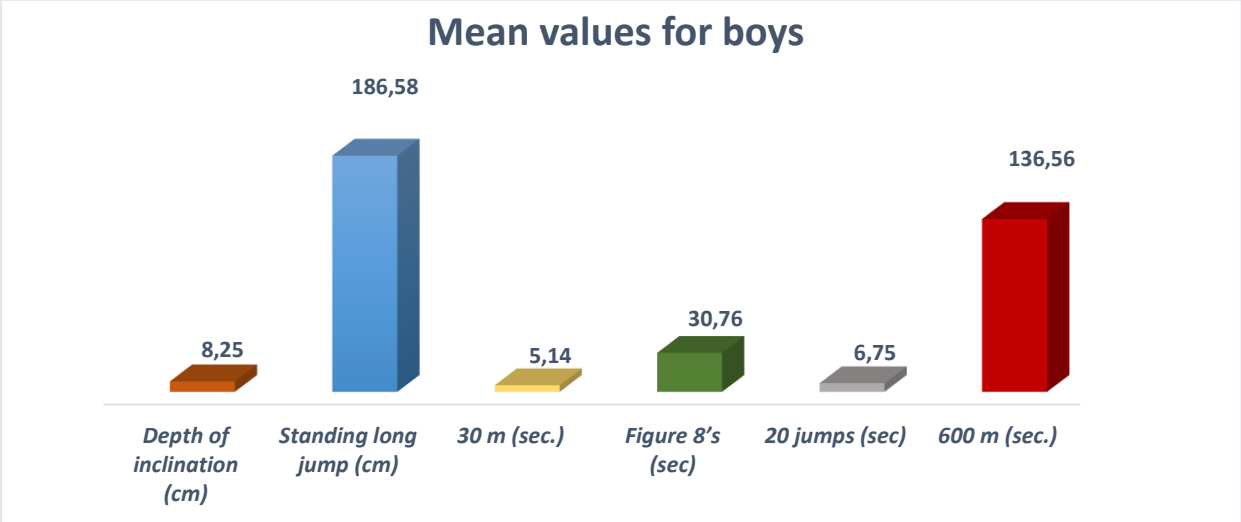

Figure 1. Mean values of the physical fitness indicators studied

In the course of the study of the specialised literature we found standard evaluation tables developed since 2012 for the needs of sports schools in Bulgaria which offer degree courses in "alpine skiing" (10). When we compared the mean values of some of the indicators we studied with the data from the standards for the evaluation of alpine skiers from sports schools, we found that the results fall into the column "good" with a small deviation.

Based on this, we can conclude that the physical fitness of the people we studied is not at the required level compared to that of elite skiers of this age group at the national level.

The properties of the normal distribution have a great application in the scientific applied activity in sports and physical education. Most often, they are based on the development of standards for evaluation of results in sports and pedagogical tests (11).

To develop evaluation standards, we used Martin's "sigma methodology" to produce evaluation tables. All studied indicators have a normal or close to normal distribution. The "sigma methodology" uses the mean (X) and the standard deviation (S). The number of levels and the boundaries are drawn using the seven-point scale of Shefko (12). **(Table 2)**

Table 2. *Standards for evaluation of physical fitness*

assessment / indicator	Very high	High	Above average	Average	Below average	Low	Very low
Depth of inclination (cm)	**> 20**	**15 – 20**	**12 – 4**	**5 – 1**	**3 – 4**	**-3 – 2**	**< -3**
Long jump (cm)	**> 227**	**208 – 227**	**198 – 207**	**177 – 197**	**167 – 176**	**146 – 166**	**< 146**
30 m run (sec)	**< 4.44**	**4.44 – 4.78**	**4.79 – 4.96**	**4.97 – 5.32**	**5.33 -5.49**	**5.50 – .84**	**> 5.84**
Figure 8's (sec)	**< 25.66**	**25.66 – 28.20**	**28.21 – 29.48**	**29.49 – 32.04**	**32.05 – 33.31**	**33.32 – 35.86**	**> 35.86**
20 jumps (sec)	**< 5.13**	**5.13 – 5.93**	**5.94 – 6.34**	**6.35 – 7.16**	**7.17 – 7.56**	**7.57 – 8.37**	**> 8.37**
600 m run (sec)	**< 105.85**	**105.85 – 121.19**	**121.20 – 128.87**	**128.88 – 144.23**	**144.24 – 151.91**	**151.9 – 167.26**	**> 167.26**

During the development we have observed all conditions for validity and standardisation of the evaluation standards based on the actually collected, studied and analysed indications of the state of the alpine skiers on the basis of a sufficiently representative sample.

CONCLUSION

- From the studied scientific and literary sources we can conclude that the information about the physical fitness of adolescent alpine skiers in Bulgaria is quite scarce. No such studied have been carried out in the last decades. In our opinion the lack of such work hinders training work adequate to modern global trends.
- In our opinion, the basic and special motor qualities of the alpine skiers of this age group are not sufficiently well developed to allow the achievement of higher results, both nationally and internationally.
- We believe that the standards developed by us for evaluation of the physical fitness would help sports professionals in the field of alpine skiing to quickly, accurately and qualitatively assess the motor abilities of their athletes aged 12–14 years.

We recommend the framing and approbation into the practice of tables for all age groups aiming to achieve better quality control and training process management.

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