Future of Alpine Skiing Schools-gender related programs

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A B S T R A C T

Gender differences in anthropological characteristics may influence success in adopting skiing skill if different teaching methods are applied. This study aimed to determine the difference between the level of adopted skiing skill for female and male ski-beginners applying 2 different teaching programs. 126 subjects (30 females; 96 males), average age 23,3±1,6 years participated in 7 days ski-school. Within the male and female group ski-teaching was carried out using 2 different methods: combination method [CM], which implies using of snowplough and parallel ski technique, and direct method [DM], where only parallel ski technique is used. Following the learning process, subjects were tested through 7 elements of skiing technique. For female subjects no difference between two teaching models was recorded, while CM appeared to be more efficient for males in elements traversing to the right (p=0,03), short turn (p<0,05) and parallel turn (p=0,01). Through factor analysis 7 main components were extracted, the first being defined as total skiing knowledge [TSK]. TSK was then compared to two programs carried out on males and females. Difference was determined in the level of TSK for male who learned through CM in comparison to the participants who were learning through the DM (p=0,01), while no difference in the same variable was determined for female. These findings lead to conclusion that using CM in men achieved better results compared to the DM. For the practice, it means that it is not necessary to separate male and female while forming ski groups for beginner skiers, since females will advance the same, regardless of the learning method.

Key words: learning methods, beginner skiers, females, gender diferences.

Introduction

In order to enable children and young people to involve in sports systematically in primary and secondary schools, school sport clubs are formed. Students can choose a sport in their schools and then become involved in trainings and competitions of different level, from school competitions to national competitions. Within every club, all activities of school sports are carried out within the extracurricular program of physical and health culture. In every school sports club several sections are active, and where conditions exist, it is possible to organize skiing section, too. In the winter camps, both children and adolescents can learn and excel their skiing. Such programs last for six or seven days, during which students who are beginners in skiing learn how to maneuver skies, while the others are perfecting their skiing technique, all with the goal of controlled and safe mastering of different skiing terrains[1,2]. As instructors possibly use different teaching methods depending on their knowledge in those winter camps, different efficiency can be expected, depending on teaching method used in the process[3,4]. Nevertheless, the progress of every skiing novice does not depend entirely on learning program, but on the conditions for learning and on the abilities of those who learn, too[5,6,7]. Didactic tools used in teaching, different skiing equipment that participants own and skiing terrains on which skiing knowledge is learnt present the conditions of the learning process. In skiing schools organized and carried out during winter camps, three different programs are usually used, through which ski beginners are taught. One of the teaching programs consists entirely of elements of parallel ski technique. Such an approach teaches the skiers immediately to make parallel turns, so that method is called direct way of learning. The other teaching approach uses the elements of snow plough technique as well as the elements of parallel ski technique, and this method is called traditional or conventional way of learning, while combining the two mentioned methods brings out the third, combination approach to passing the ski knowledge[8]. All three approaches described above are set logically so that every learnt element of ski technique represents starting position for further upgrading of ski knowledge, and all with the goal of mastering different kind of turns. Which of the mentioned ways to use depends on the choice of teacher who teaches alpine skiing, but depends also on conditions in which skiing is learnt. Besides the program through which teacher is teaching, it is extremely important to recognize student's possibilities and abilities, and according to that, choose convenient ski terrain, adjust pace of teaching and use suitable methodic training for learning of ski technique. Also, during teaching, it is necessary to respect differences in anthropological characteristics between boys and girls, respectfully, male and female. Namely, it is possible to expect their various reactions to the one teaching program, and by this, in the end, different levels of skiing knowledge acquired[9]. Having in mind evident differences between them, the goal of this research is set, and it is to determine whether it is necessary to separate male and female students during teaching alpine skiing.

Materials and Metods

The research included 96 male and 30 female participants, average age 23,3±1,6 years; 22,3±0,6 years for female and

24,5±1,1 years for male participants. All participants were prior the investigation in detail informed of the study protocol and had the opportunity to decide weather or not to participate. None of the participants had previous experience of independent learning of alpine skiing, nor attended alpine skiing school prior to the research. Participants were randomly assigned into two equal groups considering the number of males and females, which were learning skiing knowledge through two different methods. One group (consisting of 15 female and 46 male participants) was learning alpine skiing through direct way, which implies using only parallel ski technique. The participants of the other group (consisting of 15 female and 50 male participants) were learning through combination method, using parallel as well as snow plough ski technique.

The participants of both programs had the same conditions during learning, considering: the size of the group (10 participants pro group), 4 hours of learning and 2 hours of training daily, ski equipment, ski terrains, quality and education level of the teachers and duration of the program (seven days). Each day of skiing school, regardless of the applied learning method (CM or DM), was unified according to period of warming up in general (10 minutes), skiing warming up (20 minutes), time necessary for the teacher to explain certain task, exercise or element of ski technique (up to 3 minutes), and number of repetitions of specific exercises and elements of ski technique. At the end of the program, participants were joined together into one group and had to demonstrate seven elements of ski technique, which they had been learning during seven days learning process. On the basis of grades given by the independent exa-

miners, the level of ski knowledge for every participant was determined. The evaluation was given through five-grade scale, in which one represents the lowest, and five the highest level of the knowledge demonstrated. The participants were evaluated on elements of ski technique: traversing left, traversing right, uphill turn to the left, uphill turn to the right, basic turn, parallel turn and short turn.

To determine statistically significant difference between two groups of participants concerning the method of learning ski knowledge applied, one-way variance analysis (ANOVA) was used. Eventual existence of difference was determined by Fisher test. Obtained data was processed by factor analysis too, with the aim of isolating components that represent skiing knowledge. In order to determine statistical significance of differences between the two learning programs applied, considering the obtained main components of skiing knowledge, Student t-test was used. The level of statistical significance (p) was considered significant if it was below or equal to 0,05.

Results

In order to determine the difference between the two applied programs for alpine skiing learning with male and female participants in this research, means and standard deviations of grades given for demonstration of ski technique elements were first calculated.

TABLE 1
BASIC DESCRIPTIVE STATISTIC PARAMETERS GRADES FOR SKI TECHNIQUE ELEMENTS FOR FEMALE AND MALE PARTICIPANTS APPLYING THE TWO LEARNING PROGRAMS AND RESULTS OF THE ONE-WAY VARIANCE ANALYSIS

Ski technique elements	Female participants					Male participants				
	Combination program		Direct program		ANOVA	Combination program		Direct program		ANOVA
	M	SD	M	SD	p	M	SD	M	SD	p
Traversing to the right	3,43	0,66	3,38	0,74	0,84	3,54	0,70	3,22	0,68	**0,03**
Traversing to the left	3,16	0,69	3,04	0,64	0,61	3,47	0,83	3,35	0,68	0,44
Uphill turn to the right	3,26	1,08	2,92	0,92	0,36	3,19	0,70	2,94	0,64	0,07
Uphill turn to the left	3,40	1,07	2,84	0,94	0,14	3,25	0,67	3,02	0,73	0,11
Basic turn	2,87	0,99	2,75	0,65	0,70	3,01	0,86	2,69	0,78	0,06
Short turn	2,71	1,13	2,57	0,62	0,68	2,89	0,73	2,39	0,89	**0,00**
Parallel turn	3,07	0,82	2,85	0,91	0,48	3,24	0,74	2,85	0,73	**0,01**

Legend: M - arithmetic mean, SD - standard deviation

Results presented in Table 1 show that mean values of female participants grades for evaluated ski technique elements are higher if combination program is applied compared to the mean values of grades of female participants that used direct program to learn ski knowledge. In the same way it is possible to notice that mean values of male participants grades are higher for all seven ski technique elements for ski beginners that learned applying combination program which consists of snow plough and parallel ski technique compared to the mean grades when direct program is applied, which consists entirely of parallel ski technique elements. In order to determine whether the difference in mean grades shown in Table 1 is statistically significant or not, results of one-way variance analysis were analyzed, and they show existence of statistically signifi-

cant differences between male, but not female participants in the two learning programs applied (see Table 1).

It was determined that for female participants averagely higher grades for applying combination program weren't statistically significant compared to the lower grades achieved using direct learning program. On the other hand, for male participants statistically significant difference was determined in the level of knowledge achieved for the elements: traversing to the right (p=0,03), short turn (p<0,05) and parallel turn (p=0,01). The mentioned statistically significant difference was gained in favor of the combination program, which consists of the snow plough ski technique as well as the parallel ski technique.

TABLE 2
RESULTS OF THE FACTOR ANALYSIS

Main components	Female participants				Male participants			
	Combination program		Direct program		Combination program		Direct program	
	λ	%	λ	%	λ	%	λ	%
1	**4,51**	**64,44**	**4,76**	**67,97**	**4,36**	**62,29**	**3,96**	**56,50**
2	**1,27**	**18,18**	**1,08**	**15,43**	0,93	13,29	**1,08**	**15,50**
3	0,68	9,66	0,64	9,18	0,69	9,81	0,71	10,20
4	0,28	4,06	0,24	3,41	0,44	6,30	0,58	8,22
5	0,14	1,94	0,19	2,66	0,30	4,23	0,27	3,87
6	0,08	1,11	0,06	0,84	0,20	2,84	0,25	3,56
7	0,04	0,62	0,04	0,51	0,09	1,25	0,15	2,16

Legend: λ - Eigen values; % - percent of described variance

Using the factor analysis matrix of main components on the basis of achieved grades for male and female participants on seven ski technique elements was calculated. Through the insight into the Eigen values for females, and applying GK (Guttman-Kaiser) criterion, two statistically significant main components are separated (λ=4,51; λ=1,27) in combination program, and two statistically significant main components (λ=4,76; λ=1,08) in direct program, that explain 82,62%, respectfully 83,4% of total variance. Using GK criterion for males also, one statistically significant main component (λ=4,36) in combination learning program, and two statistically significant main components (λ=3,96; λ=1,08) in direct program of ski knowledge acquisition were detected. Through those main components in total 62,29%, respectfully 72,03% of total variance was explained. Concerning the subject and the way the participants used for evaluation in this research, it can be concluded that joint contribution of the first, respectively first two main components is the skiing knowledge. Namely, with the shown share statistically significant first, respectfully first two main components explain the results in evaluation of acquired ski knowledge in seven analyzed elements of ski technique. On the basis of their joint contribution it can be concluded that those main components participate to a large degree in the variance of all the results (82,62% and 83,40% for females and 62,29% and 72,03% for males). Concerning the achieved results and the way the examiners used for evaluation of ski knowledge in participants, it can be concluded that first main component represents total ski knowledge, while the other main component represents achieved level of specific ski movements. To compare total knowledge in alpine skiing in females and males who acquired ski knowledge using two different learning programs, in further analysis calculated results for the first significant main component were used. There were no statistically significant differences in acquired ski technique knowledge for female participant if two learning methods were compared (p=0,40). On the other hand, when results were analyzed for male participants, there was a statistically significant difference in acquired ski technique knowledge while using two learning programs (p=0,01).

It can be concluded that between females that were learning alpine skiing using two different learning programs no significant difference in level of acquired ski knowledge appeared, while with males statistically significant difference between the two ski learning methods was detected. Determined significant difference in the level of ski knowledge in male participants is assigned to the combination program, by which ski beginners were acquiring the knowledge using snow plough and parallel ski technique, which is shown in Table 1.

Discusion and Conclusion

Precondition for acquiring ski technique are very specific body movements that skier must learn regardless of different programs that are applied in the ski schools. Specific movements mentioned are participating in different ratio in performing all kind of turns[10,11]. Good ski teacher should know physical laws that occur when skier performs certain ski movement. Elementary knowledge on biomechanics of skiing and knowledge of the forces that affect the skier during performing the turns, represent baseline for understanding of ski movements, and with it make the process of teaching easier. Mentioned knowledge will enable ski teachers to discern what teaching approach will lead to better results for a specific student[12]. To teach beginners ski movements, teachers are trying to find the best way of transferring knowledge. Problem is not only in recognizing the most efficient program for teaching of alpine skiing, but in applying the most adequate program for certain students. Ski teachers meet with mentioned problems in their work on everyday basis, because ski beginners react differently on the same learning program. There are many factors that define efficiency of ski knowledge acquisition, such as: previous sports experience, level of motor, functional and cognitive abilities, motivation and expectations of students and conditions in which the process of ski knowledge transfer is taking place[13,14]. One of the factors that can affect the level of acquired ski knowledge in ski beginners is sex. Because of the differences between males and females, first in motor abilities and probably in psychological characteristics as self-confidence and fear, it is possible that skiing beginners, male compared to female, are reacting differently to the same ski learning program[9]. In this research two different learning programs were applied with the aim of determining the differences in the level of acquired ski knowledge in female and male participants. Combination program is traditional and implies that ski beginners do their first turns using snow plough ski technique, while in direct program ski beginners are performing first turns in parallel ski technique[8]. Positive sides of snow plough ski technique, which is the part of combination program, is that it enables the skier to take better control of the speed and to have better stability on the skis compared to the position of skier moving on skis in parallel ski position. Namely, stability of skier depends on: size of the stand fast surface, height of the gravity center above the stand fast surface, position of gravity center above stand fast surface and the level of ski knowledge[15]. Since this research is carried out on ski beginners, whose level of ski knowledge is very low, every other mentioned conditions of good stability of skier will be achievable more easily applying snow plough technique. On the other hand, the goal of every program of alpine skiing teaching is to teach the skiers to master

skiing slope applying elements of parallel skiing technique, which is the basic concept of the direct method of skiing knowledge acquisition. By that teaching program skiers are performing turns in parallel skiing technique from the very beginning, and in the combination approach they use parallel technique only after they completely master the turn using snow plough ski technique. The results of this research showed that female participants did not learn ski technique significantly different by neither combination nor direct learning program. However, with males it is determined that absence of the snow plough ski technique represents downside since using the combination program they learnt significantly more compared to the participants who were learning through direct program. Learning through CM, i.e. not excluding the snow plough technique improves the beginners' stability and balance and helps in speed control, so in addition to beginners skills and general gender inborn differences in motor abilities, can be an indispensible

phase of learning[16,17]. It can be concluded that because of the efficiency of ski knowledge acquisition process it is not necessary to separate female and male participants because females will not acquire less ski knowledge through program that proved to be more efficient for males. Namely, if female and male participants are learning ski knowledge as a part or the same group and through the program that proved to be efficient for males, they will progress equally well as if they are learning separately either by combination or by direct program. In the future researches it would be good to repeat the experiment with the different participant sample that would be of some other age. In that case results of this research could be compared with the results of research acquired on the sample from other population and that would definitely give even better insight into necessity of separating females and males during ski knowledge acquisition.

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BUDUĆNOST ŠKOLA ALPSKOG SKIJANJA - PROGRAMI ORJENTISANI NA RODNE RAZLIKE

S A Ž E T A K

Rodne razlike u antropološkim osobinama mogu uticati na uspjeh u usvajanju vještine skijanja ako se primjenjuju različiti metodi nastave. Ova studija je imala za cilj da utvrdi razliku između nivoa usvojene vještine skijanja kod početnika ženskog i muškog pola koji su pratili dva različita nastavna programa. Studija je obuhvatila 126 ispitanika (30 ženskog i 96 muškog pola), prosječne starosti 23,3 ±1,6 godina. Oni su učestvovali u sedmo-dnevnoj školi skijanja. U okviru grupnog nastave skijanja za žene i muškarce primijenjena su dva različita metoda: metod kombinovanja [CM], koji je podrazumijevao korišćenje pluga i paralelne tehnike skijanja, i direktni metod [DM], kod kojeg je korišćena, isključivo paralelna tehnika skijanja. Nakon završetka nastave, ispitanici su testirani kroz sedam tehničkih elemenata skijanja. Kod ispitanika ženskog pola se pojavila razlika kod oba modela nastave, dok se metod kombinovanja pokazao kao efikasniji za ispitanike muškog pola kod sljedećih tehnički elemenata: zaokret udesno (p=0,03), kratki zaokret (p<0,05) i paralelni zaokret (p=0,01). Dalje je faktorskom analizom izolovano sedam glavnih komponenti, prije svega ukupno skijaško znanje [TSK] koje je, zatim upoređeno sa dva primijenjena programa koji su izvedeni sa muškarcima i ženama. Razlika je utvrđena na nivou ukupnog skijaškog znanja u korist muškaraca koji su obučavani metodom kombinovanja, u odnosu na ispitanike koji su obučavani direktnom metodom (p=0,01), dok razlike na kod ženske populacije nije bilo. Ovi nalazi upućuju na zaključak da je korišćenje metoda kombinovanja kod muškaraca dovelo do boljih rezultata u odnosu na direktni metod. Kada je praktična primjena ovih znanja u pitanju, to bi trebalo da znači da nije neophodno da se odvajaju muškarci i žene prilikom formiranja grupa u školi skijanja za početnike, budući da će žene napredovati bez obzira na metod obučavanja.

Ključne riječi: metodi obučavanja, početnici, žene, rodna raznolikost.