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Original research article

CORRELATION OF MOTOR DIMENSIONS OF TWO GENERATIONS OF YOUNG ATHLETES IN ALPINE SKIING FROM 2001 TO 2010

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Abstract. *The dynamics of the variations of the motor status of two generations of young Alpine skiers over a ten-year period 2001-2010 was observed. The sample of participants included 58 young Alpine skiers who represented two U-14 generations (Gen1=2001/02; Gen2=2009/10) in the category of older boys in the official Alpine ski competition system of the Ski Association of Slovenia. The developed model of potential success comprised 17 motor variables, on the other hand, the criterion variable is represented by a sum of points scored according to the system of points of SAS. By using Pearson's correlation coefficients (r) we attempted to find the correlation between individual variables (Level 1) and success in competitions by individual year/generation. We determined that the trend of the number of statistically significant correlations between individual variables and the success criterion increased from 5 (Gen1; 4 variables of strength and 1 variable of coordination) to 12 (Gen2; 4 variables of strength, 2 variables of speed, 1 variable of endurance and 5 variables of basic and special coordination). The correlation between the selected sets of motor variables (Level 2) with success in competitions was calculated by using the method of multiple correlation coefficients (R). The number of multiple correlation coefficients of the motor variables sets increased from Gen1 to Gen2. The proven larger number of statistically significant correlations between measured motor abilities and competitive success is also a very important point of strategy and orientation of the National program of development of Slovenian Alpine skiing.*

Key words: *Alpine skiing, children, motor abilities, competitive success, dynamics of results.*

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INTRODUCTION

Alpine skiing with its long and successful tradition has always been one of the most important sports in Slovenia. Young competitors during the so-called golden period (1978-1992) outnumbers the current competitors five times (Bandalo, 2016; Žvan, 1983). After 1991, when Slovenia became independent and was thus able to participate and get internationally recognised in other sports (football, basketball, handball, etc.) more and more children decided for other – cheaper and more accessible – sports rather than Alpine skiing. This is the reason why the number of young competitors in Alpine skiing in Slovenia at the end of the 90's fell to approximately 300, which is 2/3 less compared to 1985 (Dekleva, 2002). One of the most important measures to stop the negative trend of reducing the number of young competitors was the introduction of new norms regarding the preparation of young Alpine skiers in the framework of the National program of competitive Alpine skiing. The basic goal of the program was the introduction of a systematic training process and monitoring the dimensions of the psychosomatic state, which is an important factor influencing success in competitive Alpine skiing (Lešnik, 1996). Over the years, the program has been supplemented and upgraded through the cooperation between Faculty of Sports and Ski Association of Slovenia (SAS) and today it represents the foundation of quality work with all categories of competitors (SAS, 2015).

Besides the topmost competition technique, equipment and numerous other conditions, specific ski conditioning preparation also plays an important role in preparing the youngest competitors (Bosco, 1997; Klika & Malina, 1997). Due to the fact that the level of quality of conditioning training in the 90's was fairly low especially in the youngest categories, an expert model of success in Alpine skiing was formed in 1996 – at a time when the number of young competitors fell the most. The model consisted of basic and special motor abilities, which – according to experts in the field of skiing and according to prior research – had an important influence on success in Alpine skiing (Lešnik, 1996; Žvan, Lešnik, & Dolenec, 1995). At the same time the expert model represented the basis for the introduction of modernised monitoring programs of conditioning training that were based on an individual's general development of motor potential with an emphasis on learning non-typical motor stereotypes (Balyi, 2001). The new model of conditioning preparation had been adopted by all Slovenian ski clubs and teams by 2000.

Two key questions rose at the time of introducing the new model of conditioning preparation. Firstly, which motor dimensions of the new model and to what extent do they influence success at competitions? And secondly, will the introduction of the new training system result in higher-quality training and thus in a higher number of motor dimensions correlated to competition success after a certain period of time?

With the help of a potential (expert) model of success on the one and competitive model (success criterion) on the other hand we were monitoring the status of motor abilities and their correlation to the success criterion in two generations (Gen1 in Gen2) of competitors during the period 2001-2010 (Bandalo, 2016). The main goal of the research was to check the effects of modernised training programs and the quality of the established model of motor variables on the basis of statistically characteristic correlations between motor variables (and their compounds on higher levels) and the criterion. Even today, they are the basis of future planning and monitoring the conditioning training of young Alpine skiers.

METHODS

The sample of participants and motor variables of the MBSMA model

A hierarchic (3-level) expert model of basic and special motor abilities (MBSMA) was formed to be used on a sample of 58 young competitors who – according to their age (13 and 14) – represented two generations of skiers (Gen1=2000/2001; N=22 and Gen2=2009/10; N=36) in the period of ten years. The data on the motor abilities of the sample was obtained by measuring the motor status of young skiers prior to the skiing season (Gen1, October 2000; Gen2, October 2009) at the Faculty of Sport in Ljubljana. The lowest level of MBSMA consists of 17 motor variables, which are combined at the second level into two sets of motor variables (OSMOT and SPMOT). The highest (third) level MBSMA combines all significant areas of motor skills (MOT) in one set (Fig 1).

Variable codes	Variable names	Levels of MBSMA		
MOT	**Motor abilities**			**Level 3**
OSMOT	**Basic motor abilities**		**Level 2**	
MMEN3SM	Standing triple jump			
MMENSDM	Standing long jump			
MSKOK10	Ten consecutive double leg jumps			
MZGIBE	Bent arm hangs with an undergrip			
MMENS20	20-metre sprint – standing start			
MHGNS20L	20-metre sprint – running start			
MT300	300-metre run	**Level 1**		
MHFNTD	Right leg tapping			
MHFNTL	Left leg tapping			
MKKRPN	Obstacle course backwards			
MGATPK	Forward bend on a bench			
MRSOSPT	Standing on both legs transversely on a balance board			
MRSOSVT	standing on both legs longitudinally on a balance board			
SPMOT	**Special motor abilities**		**Level 2**	
MMRNPK	Jumps over a bench 30 s			
MKHRVIS	Ascending and descending a bench and bars			
SKI9	Figure 8s around clubs	**Level 1**		
MKRBNR	Complex rhythmic drumming – hands/legs			

Note: For a detailed description of the variables, see (Lešnik, 1996).

Fig. 1 Model of potential success– motor abilities (Lešnik, 1996)

Criterion variable (success in competitions)

The criterion variable represents competitive success at the highest (third) degree of children competitions in Alpine skiing organised by the SAS. The scoring system at children competitions was changed in the 2011/12 season, which is the reason why the research included only the sample of 2011 participants (SAS, 2010a).

Competitive success (points; criterion variable)
- International competitions
  - Domestic competitions
    - **3rd degree competitions; Hervis cup/Gen1 and Argeta cup/Gen2**
    - 2nd degree competitions (regional competitions)
    - 1st degree competitions (interclub competitions)

Fig. 2 Model of competitive success (Bandalo, 2016)

The competitions in the category of older boys are carried out each season according to a confirmed competition calendar. As shown in Fig 2, the model of competitive success of

younger categories in Alpine skiing takes into consideration only the competitions of the highest ranks in Slovenia – the Hervis Cup (season 2001/02; 16 competitions carried out) and the Argeta Cup (season 2009/10; 15 competitions carried out). A competitor is awarded points at each competition that he/she competed at. According to SAS rules the success of participants at competitions by 2011 had been determined for top 30 competitors as follows: 1st place: 150 points, 2nd place: 135 points, 3rd place: 120 points, 4th place: 108 points … 30th place: 1 point (SAS, 2010b). The adjusted sum of rewarded points added to the objectiveness of results: points in Giant slalom (sum of three best results), points in slalom (sum of two best results) and super G (sum of two best results). Ranking level at competitions (criterion variable) for Gen1 and Gen2 is calculated on the basis of the sum of results.

Data processing

The method of calculation of Pearson's coefficients was used to calculate the correlation of individual motor variables to the criterion variable (Level 1). According to the number and correlation power we can determine the number of statistically significant correlations in Gen1 and Gen2. We can also determine which motor abilities are more and which are less correlated to the criterion. A classical multiple regression analysis was used to determine the correlation of hierarchically higher levels of variable sets of the MBSMA model (Level 2 and Level 3) to the criterion variable (Leskošek, Bohnec, & Rajković, 2002).

RESULTS

The calculations of Pearson's correlation coefficients of individual motor variables to the criterion variable are interpreted in the vertical (generations) and in the horizontal direction (variables). The correlation of results of individual motor variables MBSMA to the criterion variable is shown in Table 1.

Table 1 Correlation of individual motor variables MBSMA to the criterion variable

Model MBSMA	GenX (r)	
	Gen1 (r)	Gen2 (r)
Basic motor abilities		
MMEN3SM	**0,573***	**0,592***
MMENSDM	**0,609***	**0,547***
MSKOK10	**0,601***	**0,551***
MZGIBE	**0,557***	**0,414***
MMENS20	-0,257	**-0,358***
MHGNS20L	-0,272	**-0,448***
MT300	-0,404	**-0,443***
MHFNTD	-0,020	0,132
MHFNTL	0,188	**0,453***
MKKRPN	-0,201	**-0,396***
MGATPK	0,256	0,011
MRSOSPT	-0,016	0,286
MRSOSVT	0,176	0,309
Special motor abilities		
MMRNPK	0,243	**0,378***
MKHRVIS	-0,041	**-0,425***
SKI9	**-0,434***	**-0,69***
MKRBNR	0,179	0,13

Legend: MBSMA-Model of basic and special motor abilities; Gen1- generation of competitors in the 2001/2002 season; Gen2- generation of competitors in the 2009/2010 season; r-Pearson's coefficient of the correlation between variables and the criterion variable, **-correlation is significant at the 0.01 level (2-tailed); *-correlation is significant at the 0.05 level (2-tailed)

The correlation of individual MBSMA motor variables to the criterion variable shows that 5 (in Gen1) and 12 out of 17 (in Gen2) variables have a statistically significant correlation with the criterion variable.

Correlation of various MBSMA motor variables to the criterion variable of the sample "generation 2000/2001" (Gen1)

In Gen1 only 5 out of 17 motor variables were statistically significantly correlated to the criterion variable. Four of them were variables of strength (MMEN3SM; r = 0,573, p = 0,005, MMENSDM; r = 0,609, p = 0,003, MSKOK10; r = 0,601; p = 0,003, MZGIBE; r = 0,557, p = 0,007) and one was a variable of special coordination (SKI9; r = -0,434; p = 0,044). The variable of endurance in speed (MT300; r = -0,404; p = 0,062) was on the very borderline of statistical significance. Based on the results we can conclude that competitors with higher abilities in the single- and double-leg push-off, arm (and body) strength, closely followed by competitors with a high level of speed endurance, achieved better results in Hervis Cup (2001/02) competitions. According to the results in this generation, success at competitions was conditional to the ability of mastering quick changes in the direction of body movement in limited space. In Gen1 there was less than one third of statistically significant correlations with the criterion, which could mean (either due to a small number of participants or a poorly chosen test battery) that when establishing the motor status of young competitors in Alpine skiing we do not establish the status of relevant dimensions. Therefore we wanted to check the same conclusion with an equivalent sample (Gen2) after almost ten years since the introduction of the new way of training.

Correlation of individual motor variables MBSMA to the criterion variable of the sample "generation 2009/2010" (Gen2)

In Gen2 there were 12 variables with a statistically significant correlation to the criterion variable. Variables forming the area of basic motor abilities MBSMA power (MMEN3SM; r = 0,592, p = 0,000, MMENSDM; r = 0,547, p = 0,001, MSKOK10; r = 0,551, p = 0,000, ZGIBE; r = 0,414, p = 0,012), speed (MMENS20; r = -0,358, p = 0,032, MHGNS20L; r = 0,448, p = 0,006) and speed endurance (MT300; r = -0,443, p = 0,007) were significantly correlated to the criterion. Two other variables of coordination (MHFNTL; r = 0,453, p = 0,006 and MKKRPN; r = -0,369, p = 0,017), and three special motor abilities (MMRNPK; r = 0,378, p = 0,023, MHKRVIS; r = -0,425, p = 0,010 and SKI9; r = -0,69, p = 0,000) were also significant. Based on the results that in Gen2 over 2/3 of variables were correlated to the criterion variable we can conclude that we are moving forward to the implementation of diverse and efficient training process of younger categories of competitors in Alpine skiing. All of the variables are statistically relatively significantly correlated to the criterion variable and the calculations of balance variables (MRSOSPT; r = 0,309, p = 0,091 and MRSOSVT; r = 0,286, p = 0,067), so we can conclude that competitors from Gen2 with highly developed motor abilities mostly used in Alpine skiing were more successful in the Argeta Cup 2009/10 (Lešnik & Bandalo, 2009; Linser, 1993). The findings show that by implementing novelties in preparation of young Alpine skiers after 2000 we have achieved progress even though it almost took a decade.

The correlation between individual motor variables MBSMA and the criterion variable in the horizontal direction

The analysis of correlations of individual motor variables (horizontally) shows that the number of statistically significant correlations of individual variables in a decade grew from

5 (Gen1) to 12 (Gen2). In both generations the success was mainly influenced by variables measuring the ability of single-leg (MMEN3SM) and double-leg (MMENSDM) push-off strength and repetitive double-leg push-off strength (MSKOK10) variables MZGIBE and SKI9. The variables of speed (MMENS20, MHGNS20L) were related to the criterion variable only in Gen2. The variable of speed endurance (MT300) is highly related to success; however, it is statistically significant only in Gen2 (r = 0,443). The basic motor variables of coordination were correlated with success in competition only in Gen2 (MHFNTL; r = 0,453 and MKKRPN; r = 0,396). As regards variables of special motor skills, variable MMRNPK was related to success only in Gen2. In the last variables of motor skills only variables MKHRVIS (Gen2; r = 0,425) and SKI9 (Gen1; r = -0,434 in Gen2; r = -0,69) were statistically significantly correlated to success (Table 1).

The correlation between hierarchically higher levels of MBSMA and the criterion variable

The calculation of correlations between sets of MBSMA variables of level 2 (Table 2) shows that there are no statistically significant correlations between variable sets of motor skills OSMOT and SPMOT and the criterion variable in Gen1. The influence of OSMOT on success in Gen1 is high but not statistically significant. In Gen2, sets OSMOT (R = 0,814, p = 0,007) and SPMOT (R = 0,735, p = 0,000) were statistically significant for achieving better results at Argeta Cup competitions (2009/10).

The second set of special motor variables (SPMOT) is statistically significantly correlated to success in competitions only in Gen2 (R = 0,735, p = 0,000). The most important finding of this part of the research is that the calculation of multiple correlation coefficients (R) confirmed and hierarchically upgraded the calculations at the MBSMA level 1, especially by statistically significant coefficients of correlation of both sets of variables in Gen2. We have also confirmed that the implementation of the new training system during 2001 and 2010 resulted in a statistically significant correlation with the criterion as far as OSMOT and SPMOT are concerned. OSMOT variables show general motor potential and SPMOT are an upgraded base of motor information in individual sports (Reid, Johnson, Kipp, Albert, & White, 1997).

Table 2 Correlation of hierarchically higher levels of MBSMA to the criterion variable

MBSMA		Gen1 2001/02	Gen2 2009/10
OSMOT (2nd level MBSMA)	**R**	0,886	**0,814***
	P	0,128	**0,007**
	$R^2_{adj.}$	0,435	0,462
SPMOT (2nd level MBSMA)	**R**	0,444	**0,735***
	P	0,414	**0,000**
	$R^2_{adj.}$	0,008	0,481
MOT (3rd level MBSMA)	**R**	**0,983***	**0,902***
	P	**0,04**	**0,001**
	$R^2_{adj.}$	0,820	0,637

Legend: MBSMA - Model of basic and special motor abilities; OSMOT - basic motor abilities; SPMOT - special motor abilities; MOT-motor abilities; Gen1- generation of competitors in the 2001/2002 season; Gen2- generation of competitors in the 2009/2010 season; r - Pearson's coefficient of the correlation between variables and the criterion variable, R - coefficient of the multiple correlation between selected predictors of the space of motor variables and the criterion variable, $R^2_{adj.}$ - the share of explained variance; p - statistical significance of the multiple correlation, ** - correlation is significant at the 0.01 level (2-tailed); * - correlation is significant at the 0.05 level (2-tailed)

The results of correlation of complete set of motor variables (Level 3) to the criterion variable confirm the findings at Levels 1 and 2 of the motor variables MBSMA (Table 2). The coefficient of multiple correlation is highly and statistically significantly correlated to the criterion variable in Gen1 and Gen2 (MOT 2001/02: R = 0,983, p = 0,04 and MOT 2009/10: R = 0,902, p = 0,001). The most important finding of this part of the research is that the coefficient of multiple correlation (R) confirmed a high and statistically significant correlation of the complete set of motor variables (MOT) to success in competitions of younger categories of competitors in Alpine skiing.

DISCUSSION

Many studies so far have shown that success in sports is to a great extent dependent on the level of development of basic and special motor abilities (Bandalo & Lešnik 2009; Bandalo & Lešnik 2011; Bandalo, Žvan, & Lešnik, 2010; Geissler, Waibel, Maier, Scherr, & Wolfarth, 2012; Kapidžić, Ismaili, & Bečirović, 2010; Klika & Malina, 1997; Mildner, et al., 2012; Mujanović & Krsmanovič, 2008; Müller, Müller, Kornexl, & Raschner, 2015; Neumayr, et al., 2003; Stepinski, Zwierko, Florkiewicz,, & Debicka,, 2003), as well as on many other dimensions of the psychosomatic state of competitors, such as morphological dimensions, psychological dimensions, physiological dimensions, psychical-social status, training conditions, etc. (Emeterio & Gonzalez-Badillo, 2010; Gorski, Rosser, & Hoppeler, 2014).

The first expert models in Slovenia determining the correlation between morphological and motor dimensions on the one hand and success in Alpine skiing on the other were done in 1996. Dolenec and Lešnik determined the important correlation between variables of morphology and motor skills and their hierarchical compounds and success in competitions of young girls (Dolenec, 1996) and young boys (Lešnik, 1996) in Alpine skiing. In 1997, American scientists determined a higher share of explained variance when calculating the correlation between compounds in comparison to the correlation of individual morphological and motor variables with success in Alpine skiing. The results had a higher predictive value in comparison to similar studies performed with swimmers and speed skaters (Klika & Malina, 1997). The last extensive research was dealing with the dynamics of changes of morphological and motor status of a selected population of young Alpine skiers in the period 2001 - 2010. The sample included 163 young Alpine skiers representing (depending on their age - 13 and 14) five generations of competitive categories of older boys in Alpine skiing. A model of potential success was formed; it consisted of two compounds with seven morphological and seventeen motor variables (Bandalo, 2016).

The studies show that motor abilities are the most important factor/potential for success in sports. The findings show that an athlete without proper motor abilities in skiing or other sports practically has no chance to succeed. The goal of our research was similar – with a little difference – the study was longitudinal and it tested the same model on two different generations of the same age with an interval of 10 years. When forming the models (Dolenec, 1996; Lešnik, 1996) the main goal was to find out whether it was right. After almost ten years, it was confirmed that the program of work was planned appropriately, which was also proven by the effects of training according to the new program from 2000.

Even though less than 1/3 of all variables were correlated to success in competitions in 2001 in Gen1, the results (Table 1) show that success of both generations (Gen1 and Gen2) was mostly influenced by variables from the energy component of movement (MMENSDM,

MMEN3SM, MSKOK10…) and coordination (SKI9). We cannot ignore the fact that »related« variables are closely correlated to the criterion variable. These are the variables of various forms of strength (MMEN3SM, MMENSDM, MSKOK10, MZGIBE), speed (MMENS20, MMENS20L) and special coordination (MKHRVIS, SKI9). It is variables with high coefficient of in-born characteristics (Komi, 2003) - being highly correlated to the criterion variable - which will be an important criterion in searching for new talents and the selection of young competitors in Alpine skiing.

The research showed that the influence of variables of special motor dimensions (SPMOT) on success in Alpine skiing in younger categories (Table 2) rose significantly in the period 2001–2010. This means that a scientifically valid model of success from 1996 and the resulting implementation of diverse and specific training with an emphasis on learning new motor stereotypes in non-typical conditions was confirmed in practice.

The introduction of the new program of physical preparation of younger categories in Alpine skiing was finally justified by success at top international children competitions. In 1990 Slovenian competitors won at the most prestigious children international competition "Trofeo Topolino" in the slalom and giant slalom and it took 15 years for Slovenia to win at this competition again. After 2005 when Ilka Štuhec won "Trofeo Topolino" Slovenian competitors have regularly been achieving top results, which was our goal.

Hence, training must be planned integrally; we should know what influences success. Athletes develop continuously, as far as information and energy components are concerned, at the same time, the training of Alpine skiers must comprise learning new motor information and solving motor problems in non-typical conditions (Spitzenfeil, Niessen, Rienacker & Hartmann, 2005).

Based on our findings on correlation between motor variables and competitive successfulness there is the question of the level to which motor abilities must be developed in order to influence competitors' success to the highest extent? Based on the studies, the coefficient of genetic speed is 0,9, and the coefficient of explosive power is 0,95 (Bompa & Haff, 2009; Bosco, 1997; Enoka, 2002; Komi, 2003; Ward & Ditman, 1997; Žvan & Lešnik, 2000). Therefore, even high-quality training cannot influence the above-mentioned abilities to a great extent. Based on the results and practical experience, the preparation of young Alpine skiers in the future will have to be focused on upgrading motor stereotypes and learning new movement programs.

The goals of the training process starting in the youngest categories of competitors are set too high, which is one of the biggest problems. Due to this, the quality of training diminishes, which can result in injuries, bad techniques and tactics of skiing, attitude to training and competitions and in many other negative results related to training (Gallahue & Ozmun, 2006).

Due to long-time efforts trainers today aim mainly to improve dimensions and abilities enabling the quick and efficient solving of motor problems during skiing. The key factor in the training process is taking into consideration the development changes that happen to competitors after they are 12 years old. We must be aware of the fact that skeletal growth is much faster than muscle growth, which can result in uncoordinated movement (Bar-Or, 1996; Berk, 1997; Hauspie, Cameron, & Molinari, 2004). The consequences can be seen in the reduced ability to regulate movement (information component) as well as in basic motor abilities (Armstrong & Wellman, 1997; Malina & Bouchard, 1991; Pistotnik, 2015). In this category of competitors these abilities are the most frequent abilities which skiers need in order to become top competitors.

Even though the dimensions MBSMA have great influence on the success of young competitors, we must consider other factors influencing the success of young competitors. (Petrović, Šmitek, & Žvan, 1984). Accordingly, we must not neglect the importance of psychological factors, such as concentration, motivation (Tušak, 2003) and the need to compare with others (competitiveness).

CONCLUSION

Slovenia has got a systematic and scientifically approved model of success of younger categories of competitors in Alpine skiing. The number of variables influencing the competitive success has doubled, which means that the implementation of systematic preparing of young competitors has influenced the competition results and preparation of competitors. The latter was confirmed in our research also by the importance of correlation between higher levels of MBSMA (second and third level) and competitive success. The results thus show that the battery of chosen tests (monitoring the morphological and motor development of young competitors in Alpine skiing) was appropriate.

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KORELACIJA MOTORNIH DIMENZIJA DVE GENERACIJE MLADIH ALPSKIH SKIJAŠA OD 2001. DO 2010. GODINE

U okviru ovog istraživanja posmatrana je dinamika varijacija statusa motornih dimenzija dve generacije mladih alpskih skijaša tokom desetogodišnjeg perioda od 2001. do 2010. godine. Uzorak učesnika uključivao je 58 mladih alpskih skijaša koji su predstavljali dve U-14 generacije (Gen1 = 2001/02; Gen2 = 2009/10) u kategoriji starijih dečaka u zvaničnom alpskom skijaškom takmičenju koje organizuje skijaška asocijacija Slovenije (SAS). Razvijeni model potencijalnog uspeha obuhvata 17 motoričkih varijabli, dok kriterijumska varijabla predstavlja zbir bodova pribeleženih prema sistemu ocenjivanja SAS-a. Korišćenjem Pearsonovog koeficijenta korelacije (r) pokušali smo da nađemo korelaciju između pojedinačnih varijabli (nivo 1) i uspeha u takmičenjima po godini / generaciji. Utvrdili smo da se trend broja statistički značajnih korelacija između pojedinačnih varijabli i kriterijuma uspeha povećao sa 5 (Gen1, 4 varijable čvrstoće i 1 varijabla koordinacije) na 12 (Gen 2, 4 varijable čvrstoće, 2 varijable brzine, 1 promenljiva izdržljivosti i 5 varijabli osnovne i posebne koordinacije). Korelacija između izabranih skupova motoričkih varijabli (nivo 2) sa uspehom na takmičenjima izračunata je primenom metode višestrukih koeficijenata korelacije (R). Broj višestrukih koeficijenata korelacije promenljivih grupe motoričkih sposobnosti bio je povećan od Gen1 do Gen2. Dokazani veći broj statistički značajnih korelacija između izmerenih motoričkih sposobnosti i uspeha na takmičenju je takođe veoma važna tačka strategije i orijentacije nacionalnog programa razvoja slovenačkog alpskog skijanja.

Ključne reči: *alpsko skijanje, deca, motoričke sposobnosti, uspeh na takmičenju, dinamika rezultata*