RELATION BETWEEN ACROBATIC ELEMENTS KNOWLEDGE AND ALPINE SKIING PARALLEL TURNS AMONG PHYSICAL EDUCATION STUDENTS

Edin Mujanović, Almir Atiković, Amra Nožinović Mujanović

University of Tuzla, Faculty of Physical education and Sport, Bosnia and Herzegovina

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Abstract

The main aim of this study was to determine the correlation of motor knowledge of acrobatic elements with successful performance of parallel turns in alpine skiing. An additional aim was to determine whether there is a difference between groups divided on the basis of knowledge of alpine skiing. The research was conducted on a sample of 27 students enrolled in the third year of study at the Faculty of Sport, by the chronological age of 21-23 years. The sample of variables consisted of 14 variables to assess knowledge of acrobatic elements and one variable to assess the performance of the ski element parallel turns. The results indicate a statistically significant correlation between some acrobatic elements (e.g. with roll forward r= .438) with performance of parallel turns at the level of significance (p<0.05). Students, who have acquired the technique of acrobatic elements on the higher level or on the level of stabilization and automation with minor mistakes, achieve better results when learning the element of skiing technique – parallel turns. Based on the analysis of results we can conclude that some elements of acrobatics and skiing can interconnect according to the requirements for the motor abilities required for successful performance of acrobatic elements and we can say that the learning of acrobatic elements on higher level have a positive influence on the learning of element of alpine ski technique.

Keywords*: motor knowledge, acrobatics, skiing, students.*

INTRODUCTION

Skiing belongs to the activities which take place in specific conditions of the outside environment, and the success in Alpine disciplines is primarily dependent on the level of adopted specific motor knowledge of alpine skiing (Franjko, 2007; Cigrovski, Matković & Prlenda, 2009), but also on the level of motor abilities of speed, strength, coordination, balance and functional abilities of aerobic and anaerobic endurance (Andersen, Montgomery & Turcotte, 1990; Klika & Malina, 1997; Reid, Johnson, Kipp, Albert & White, 1997; Dolenec & Žvan, 2001; Mujanović, 2005; Cigrovski, 2007; Mujanović & Krsmanović, 2008; Cigrovski, Matković & Matković, 2008). Skiing as a sport sets the great physical and mental efforts in front of the skiers, requiring from them exceptional agility, coordination, strength and endurance, since the winner in competitive skiing today is decided by only of a one-hundredth of a second (Cigrovski & Matković, 2003).

All-round development of young athletes implies the use of various sports contents, and will create good conditions for future specialization in a particular sport, which also applies to alpine skiing. The reason for this approach is the fact that none of the sports branch ensures overall development of the organism of a young athlete. Therefore, fitness training of most young athletes contains elements of different basic sports such as gymnastics, athletics or swimming (Kostelić, 2005; Franjko, 2007; Živčić & Krističević, 2008). In addition to basic motor abilities for success in alpine skiing significant role have cognitive and psychological factors which for success have an equal or greater significance (Axtell et al., 1997; Neumayr et al., 2003).

Sport gymnastics is classified in the group of conventional sports, considering that the aesthetic component and acyclic movement are based on strict rules of the Code of Points (FIG, 2013). Because of the structural complexity of movements in sport gymnastics, great attention is given to the execution of the basic acrobatics that later evolves into more complex and more difficult elements (Živčić, Furjan Mandić and Horvatin Fučkar, 2007). Due to this, training must be directed towards the achievement of a model execution, toward maintaining and improving it over a long period of time (Sands, W.M.A. et al., 1999). The importance of acrobatics in sport gymnastics is evident in the quantity of the elements performed in gymnastics compositions. Acrobatic elements are important in the procedure of teaching gymnastics elements on other apparatuses (Karascony and Čuk, 2005). Acrobatics is acyclic sport characterized by a great diversity of movement and with its many and varied elements have a very positive impact on the development of the overall coordination of movement (Bolkovič & Kristan, 1998). According to Živčić & Krističević, (2008) acrobatics is acyclic sport that encompasses a large number of various simple and complex static and dynamic elements with precisely defined technique, which can be interconnected and combined. Acrobatic elements have a significant influence on the ability to move the body in space, which improves overall coordinative motor ability of the entire body and its parts. Also, very accurate and fast work and alternating activation of individual muscles and muscle groups, acrobatics develop all forms of strength, where the explosive strength is the most important (Živčić, 2007; Cigrovski & Matković, 2007). When athlete performs certain acrobatic elements, the range of motion in certain joints and joint systems is very important, as well as an aesthetic component, which is manifested through the accuracy of the position of the body and body parts. Therefore, the acrobatics requires but also affects on the development of flexibility as one of the essential motor abilities. The most significant characteristic of acrobatics is the specific strength of the upper body, required for the performance of most acrobatic elements.

Acrobatics is very widespread in all sports branches. It should be noted that many sports use acrobatic elements for easier mastering of certain specific movements (Kostelić, 2005). Therefore, it is not uncommon that wrestlers, judo players and in general martial art athletes, track and field athletes such as high and pool vault jumpers, skiers, snowboarders and other athletes practicing acrobatics elements for easier and more successful mastering of certain jumps, falls, throws, turns and also their significant influence on development of coordination abilities. Also, acrobatic elements are an integral part of some sports, such as diving, acrobatic rock 'n' roll, skydiving, ice skating, acrobatic skiing, etc. Planning of training for alpine skiers need to be based on all-round preparation (Kostelić, 2005), keeping in mind that tests to assess the explosive strength (jumps) have the highest predictive value for success in alpine skiing (Bosco, 1997; Žvan & Lešnik, 2000). The aim of this study is to determine the correlation of acrobatic skills with performance of ski technique element, parallel turns, at students of the third year of the Faculty of Sport. Knowledge about the different factors that may improve skiing performance might help to prevent injury and improve the level of specific motor knowledge of alpine skiing with the means of gymnastics-acrobatics.

METHODS

The test sample included 27 male students enrolled in the third year of study at the Faculty of Sport, by the chronological age of 21-23 years. Students who participated were healthy, without those excused from physical education for health reasons, and they all gave their written consent to participate in testing. All students were regularly involved in the subjects of acrobatics and skiing with lectures and exercise for one semester and none of the examinees had practice the acrobatics or skiing before. The study was approved by the ethics committee of the Faculty of Sport. The teaching process of the subject sports gymnastics that takes place in the winter semester of the third year of university studies contains exercises in gymnastics hall: the basic elements of acrobatics and jumps on a mini trampoline, for 30 hours during the semester and lectures for 45 hours during the semester.

In determining the level of motor knowledge of acrobatic elements, the examinees were evaluated in fourteen elements as follows: RF = Roll forward, HRF = Handstand roll forward, RD = Roll dive, RB = Roll backward, RBH = Roll backward to handstand, TCLR = Two cartwheels on left side following right side, ROB = Round off backward, ROF = Round off forward, FS = Front scale, SSS = Supported shoulder stand, SJ = Straight jump, TJ = Tucked jump, PSJ = Pike straddle jump, SJT = Straight jump with turn 360^0. In determining the level of specific motor knowledge of alpine skiing the examinees were evaluated in performance in one element of ski technique PT= Parallel turns.

The acrobatic tests, with description of movements and certain mistakes, were used by authors (Novak, Kovač & Čuk, 2008; Krističević, Živčić, Cigrovski, Simović & Rački, 2010; Živčić Marković & Breslauer, 2011; Kovač, 2012). Description of movements during performance of parallel turns and common mistakes are explained by the authors (Jurković & Jurković, 2005; Mujanović, 2005; Cigrovski, 2007; Weller, 2007-13). The analytical method of assessment is used.

Evaluation of motor knowledge of acrobatic elements was carried out at gym hall with set-up of six mats placed one behind the other touching along shorter side. Each mat was 2m long and 1m wide with height/thickness of 6cm. All jumps were performed on mini trampolines were set-up was with 15m for run with 2 mats placed behind the mini trampoline (for safety reasons), where each mat was 2.5m long and 2m wide with height/thickness of 20cm.

Specific motor knowledge of alpine skiing, parallel turns, was evaluated on the slope of an incline 15^o-16^o (blue track in Mariborsko pohorje ski resort). Set-up of the slope was with 10m of width and 30m of length and marked by safety fence. Criteria with measurement scale and description of standards that are based on the quality of execution for acrobatic tests and ski test are presented in (Table 1). All students who participated in this study were subjected to testing under the same conditions.

The data was collected during evaluation. Evaluation of ski technique element was carried out with the students during the morning hours between 09:00 and 10:00 and after that in the afternoon hours between 14:00 and 15:00 the examinees participated in evaluations of motor knowledge of acrobatic elements. After warming up, the test task was explained and demonstrated to the students; following that students performed the task three times under the same conditions. Performances of the task were evaluated with the unique protocol by three examiners who are familiar with the way of the assessment. The examiners had to fulfil the following conditions: they had to have a University degree in Physical education and sport and to have the theoretical and practical knowledge of alpine skiing and acrobatic elements. Examiners in this study are professors with years of experience of work in various sports clubs and Faculty of physical education and sport. Before the assessment, they carefully read the description of task and criteria (Table 1). Afterwards, they independently assessed all performances. Only better performance of performed ski element and acrobatic elements was used in the analysis. After evaluation of better performance, we calculated the final grade for each examinee in each task as the arithmetic average of the ratings assigned by the three examiners. For evaluation, they used points from 0 to 5 point measuring scale, according to the criteria, where grade 5 is the highest/best. Kovač (2012) conclude that with appropriate criteria, sufficiently precise for the evaluator, every PE teacher who is well prepared for the evaluation could objectively and reliably evaluate different motor skills, and according to stated the assumption is that the examiners in this study with respect to theoretical and practical knowledge have a high level of objectivity and reliability.

Also authors Majerič, Kovač, Dežman & Strel (2005) conclude that the analytical method of assessment is most appropriate for testing and evaluating at the end of the entire athletics programme when students have already mastered the test exercise and their knowledge has already been tested, which is also the case in this study.

Data obtained in this study were analyzed using a software system for data. We used standard statistical procedures to determine the basic descriptive parameters of variables. Hypothesis that a variable is normally distributed was checked with the Skewness and Kurtosis coefficients. Spearman's rank correlation coefficient as a nonparametric measure of statistical dependence between two variables was used to determine values of correlation coefficients between acrobatic elements and skiing element. In order to determine whether there are differences between the groups, based on knowledge of skiing, we used Mann Whitney U test as a non-parametric test because a certain number of examinees have a higher value than others.

RESULTS AND DISCUSSION

Comparing the basic descriptive parameters (Table 2.), it is noted that the majority of measured motor knowledge of acrobatic elements show grades of arithmetic mean in the zone of medium values 1.802–4.136, with a standard deviation from .745 to 1.114. For skiing element PT arithmetic mean is 2.543, with a standard deviation .907. Results for Skewness and Kurtosis are in the acceptable range. Reliability of examiners is tested by Intraclass correlation coefficients (ICC) analysis and we can see high values of ICC in range of .778 - .951. According to the values of ICC we can say that there is a high reliability of examiners in this study.

Analyzing the results of other authors (Delaš Kalinski, Surjan Bilac & Atiković, 2012) for acrobatic knowledge on specific apparatuses, it can be seen that the lowest mean values on vault were achieved for the elements Squat vault and Squat vault with ½ turn (mean=3.87) and on the floor exercises for SSS =3.94, RB=3.77 and RD=3.98. Mean values of grades for specific apparatuses (vault, uneven bars, beam, floor and rings) are within the range of school grade “very good” (Uneven bars=4.06; Vault=4.09; Rings=4.14; Balance beam=4.20; Floor=4.23). Authors Cigrovski, Matković & Matković (2010) in their research came to a result where the two groups of ski beginners, for the demonstration of knowledge of alpine skiing in parallel turns after having conducted two different programs, obtained average grades 3.20 with a standard deviation .76 for the first group and 2.85 with a standard deviation .77 for the second group.

Table 1. *Criteria for knowledge evaluation.*

Measurement scale (points)	Description of standards - Skiing	Description of standards - Acrobatics
5	Student performs skiing element, with self confidence, without technical and aesthetic mistakes.	Student performs acrobatic element independently, with reliability, without technical and aesthetic mistakes.
4	Student performs skiing element with lack of self confidence and with discontinuous pushing of lower extremity joints onward and in the direction of new turn.	Student performs acrobatic element independently, but not with complete reliability; during the execution he/she makes small technical or aesthetic mistakes.
3	Student performs skiing element, with lack of self confidence, and with inappropriate load of skies at the beginning of the turn, and discontinued pushing of lower extremity joints onward, and in the direction of new turn.	Student performs acrobatic element independently, but not with complete reliability; during the execution he/she makes one large technical mistake and several small aesthetic mistakes; or several small technical and aesthetic mistakes.
2	Student performs skiing element without self confidence, with no moves along the longitudinal axis, with inappropriate load on skies at the beginning of the turn and without pushing of lower extremity joints onward and in the direction of new turn.	Student performs acrobatic element independently, but not reliably; execution includes large technical and aesthetic mistakes.
1	Student performs skiing element and makes all listed technical mistakes.	Student performs acrobatic element in easier conditions or environment (down the slope, over the shoulder, into kneeling or straddle position, with help).
0	Student is unable to perform skiing element. He moves down the slope but does not keep the skies in parallel; has uneven connection of turns; tempo of performance is too slow without appropriate closure of the turn.	Student cannot perform acrobatic element or does not execute all part of element.

Table 2. *Descriptive parameters of acrobatic and ski elements.*

Valid N27	Mean	Min	Max	Std. Deviation	Skewness	Kurtosis	Intraclass Correlation
SSS	4.136	1.667	5.000	.921	-.968	.492	.897
TCLR	2.346	1.000	4.333	.903	.183	-.936	.891
HRF	2.457	1.000	4.000	.921	-.157	-1.210	.864
RBH	1.914	1.000	4.333	.972	1.332	1.239	.897
ROB	2.222	1.000	4.667	1.054	.410	-.774	.936
ROF	1.802	1.000	4.667	1.079	1.183	.475	.951
SJ	3.691	2.333	5.000	.745	.235	-.911	.841
TJ	3.482	2.333	5.000	.759	.522	-.706	.778
PSJ	3.494	2.000	5.000	.997	-.255	-1.318	.884
SJT	2.457	1.000	4.000	1.114	-.035	-1.572	.943
FS	2.852	1.667	5.000	.781	.622	.727	.825
RF	3.531	2.000	5.000	.775	-.137	-.618	.838
RB	3.062	1.333	4.333	.857	-.192	-1.065	.881
RD	2.741	1.000	4.333	.770	-.151	.148	.813
PT	2.543	1.000	4.000	.907	-.122	-.979	.940

Test distribution is significant at the .01 level (2-tailed).

Table 3. *Spearman's rank correlation coefficient of results obtained for performance of acrobatic elements and ski element.*

Spearman's rho	SSS	TCLR	HRF	RBH	ROB	ROF	SJ	TJ	PSJ	SJT	FS	RF	RB	RD
PT	.351	.402*	.176	.397*	.333	.362	-.252	.145	.117	-.002	.229	.433*	.430*	.406*
Sig. 2-tailed	.073	.038	.380	.040	.090	.064	.204	.472	.561	.990	.251	.024	.025	.036

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 4. *The results of two groups in the arithmetic mean ranks.*

	GRUPA	N	Mean Rank	Sum of Ranks		GRUPA	N	Mean Rank	Sum of Ranks
SSS	1	12	11.33	136.00	PSJ	1	12	10.46	125.50
	2	15	16.13	242.00		2	15	16.83	252.50
	Total	27				Total	27		
TCLR	1	12	11.17	134.00	SJT	1	12	12.46	149.50
	2	15	16.27	244.00		2	15	15.23	228.50
	Total	27				Total	27		
HRF	1	12	11.88	142.50	FS	1	12	11.38	136.50
	2	15	15.70	235.50		2	15	16.10	241.50
	Total	27				Total	27		
RBH	1	12	10.71	128.50	RF	1	12	9.63	115.50
	2	15	16.63	249.50		2	15	17.50	262.50
	Total	27				Total	27		
ROB	1	12	12.17	146.00	RB	1	12	10.17	122.00
	2	15	15.47	232.00		2	15	17.07	256.00
	Total	27				Total	27		
ROF	1	12	11.04	132.50	RD	1	12	10.38	124.50
	2	15	16.37	245.50		2	15	16.90	253.50
	Total	27				Total	27		
SJ	1	12	14.38	172.50	PT	1	12	6.50	78.00
	2	15	13.70	205.50		2	15	20.00	300.00
	Total	27				Total	27		
TJ	1	12	11.46	137.50					
	2	15	16.03	240.50					
	Total	27							

Table 5. *Significance of differences between groups.*

Elements	Test Statistics				
	Mann-Whitney U Test	Wilcoxon W	Z	Asymp. Sig. (2-tailed)	Exact Sig. [2*(1-tailed Sig.)]
SSS	58.000	136.000	-1.613	.107	.126[a]
TCLR	56.000	134.000	-1.678	.093	.103[a]
HRF	64.500	142.500	-1.256	.209	.217[a]
RBH	50.500	128.500	-1.956	.050	.053[a]
ROB	68.000	146.000	-1.086	.278	.300[a]
ROF	54.500	132.500	-1.869	.062	.083[a]
SJ	85.500	205.500	-.223	823	.829[a]
TJ	59.500	137.500	-1.511	.131	.139[a]
PSJ	47.500	125.500	-2.093	.036	.037[a]
SJT	71.500	149.500	-.911	.362	.373[a]
FS	58.500	136.500	-1.563	118	.126[a]
RF	37.500	115.500	-2.588	.010	.009[a]
RB	44.000	122.000	-2.279	.023	.025[a]
RD	46.500	124.500	-2.162	.031	.032[a]
PT	.000	78.000	-4.420	.000	.000[a]

The descriptive statistical parameters have shown that the students' scores for motor knowledge of acrobatic elements and specific motor knowledge of alpine skiing are in range of medium values. This indicates that their knowledge acquired during the duration of semester is without the complete movement structure so therefore they need to spend more instructional themes in acrobatic elements and alpine skiing element to overcome the elements at a higher level in order to reduce the number of errors during the performance at minimum to get higher scores. We can say that exercise has an important role in students' training because it effectively changes the properties and developing skills which would directly provide higher scores and also help in health promotion as an irreplaceable factor in all human activities.

The elements of acrobatics and alpine skiing can be correlated considering similar demands in terms of motor abilities, which are required for their successful performance, such as coordination, agility, orientation in space, compatibility in movement of certain body parts and the whole body, then static strength of the upper body, legs, arms and shoulders (Cigrovski & Matković, 2003; Cigrovski et al., 2008). In (Table 3) we can see coefficients of Spearman's rho correlation between acrobatic elements and ski element. Statistically significant correlation, at ($p<0.05$) level of significance, with specific motor knowledge of alpine skiing – parallel turns achieved variables RBH (r: .397), TCLR (r: .402), RD (r: .406), RB (r: .430), RF (r: .433).

Similar results of the research of correlation of acrobatic knowledge and result in specific motor knowledge of alpine skiing were confirmed by the authors (Krističević et al., 2010), where the same variables achieved high values of correlation coefficients: RF (r: 0.64;

$p<0.01$), RB (r: 0.58; $p<0.01$), RD (r: 0.65; $p<0.01$), TCLR (r: 0.63; $p<0.01$). On the basis of the correlation analysis we assume that learning acrobatic elements have a positive influence on the mastering of certain elements in alpine skiing. In addition to the direct correlation of motor knowledge of acrobatic elements with specific motor knowledge of alpine skiing during the implementation of acrobatic elements in fitness training we indirectly influence on the development of motor abilities, depending on the load level, the duration of training and the frequency of such training.

According to grades that we got for the performance of element of ski technique PT = parallel turns, based on the value of the mean (2.543) examinees were divided into two categories in order to determine whether there is the differences in knowledge of examinees in each category of specific motor knowledge of alpine skiing. This variable we named GROUP and the first category (1) consists of below-average examinees (score lower than 2.543) while the second category (2) consists of above-average examinees (score higher than 2.543).

Results of the Mann Whitney U test (Table 5.) have shown that the examinees differ on a statistically significant level in variables RBH $p=.050$, PSJ $p=.036$, RF $p=.010$, RB $p=.023$, RD $p=.031$, PT $p=.000$. If we look at the results of the Mean Rank (Table 4.) in these variables we see that the differences are in favor of second category (2), whose values for the performance of element of ski technique PT= parallel turns are defined as above-average. Based on this we can say that for greater succes in specific motor knowledge of alpine skiing – parallel turns it is necessary to have a higher level of motor knowledge of acrobatic elements.

Within a similar research, a group of authors (Živčić, 2007; Krističević et al., 2010) obtained the results showing that for the successful performance in one group of acrobatic elements (RF, RB, RD) is required coordination while the second group of acrobatic elements RBH is defined by the strength of arms, shoulders and the static strength of the upper body and for the successful performance in the third group of acrobatic elements PSJ is required strength of the legs and it can be assumed that this is based primarily according to the motor abilities required for successful performance of these elements.

In his research Mujanović (2005) got the results of the canonical analysis where it is isolated only one significant and positive pair of canonical factors (Canonicl R .73) that explains correlation of motor abilities and success in performing elements of technique in alpine skiing at the level of significance ($p\leq0.05$). It is also clearly noticeable that the largest projection of the vector of manifest variables to assess the motor abilities has an explosive strength of legs with correlation coefficient .577 and .582.

Cigrovski, Božić & Prlenda, (2012) in their research state that taking into account obtained results, it is possible to emphasize agility and static strength to contribute the most in learning the specific motor knowledge of alpine skiing – parallel turns.

Parallel turns are based primarily on the circular movements and movement along the vertical axis. In order to facilitate the change of direction a skier used accentuated movements vertically with intensive extension and flexion of the knee joint which resulting in unloading the tails of skis in the same rhythm from one to another direction. Also a very important element in the execution of parallel turns is properly co-ordinated performance of movement. Accordingly to described movements necessary to perform element of ski technique parallel turns, we can say that the acrobatic elements RB, RD and RF have the greatest significance on the statistical level and that they are more important for success in the execution of skiing than the acrobatic element RBH which is on the verge of statistical significance ($p=.050$). It is probably so because the main part of the acrobatic element RBH performs on the hands and it is less important for skiing, while for the performance of acrobatic elements RB, RD and RF is necessary coordination of the whole body with the take-off that must be parallel with the exact dosage of strength and direction which coincides with the movement during the performance of the specific motor knowledge of alpine skiing – parallel turns which results in unloading the tails of skis and setting of skiers shoulder axis in the direction of the new turn.

The dynamic structure of motion required during skiing activity of the whole body, but at the same time we must emphasize primarily normal leg action, i.e. cycle of stretching and bending for modulation of external forces in order to keep carved turn or dynamic equilibrium (Mester, 1997). Therefore it is essential to choose exercises for developing strength of the lower extremities among which is a statistically significant acrobatic element PSJ and for whose performance is primarily important explosive strength of the legs which is for skiers necessary for intensive extension and flexion of the knee joint and transition to the next turn. Also during the performance of PSJ athletes performed straddle shape during flights. This movement in skiing can occur in unwanted situations where there is a need to spread the legs to maintain balance.

Consequently it can be said that the some elements of acrobatics and skiing can interconnect according to the requirements for the motor abilities required for successful performance of acrobatic elements and we can say that the learning of acrobatic elements on higher level have a positive influence on the learning of element of alpine ski technique. Also, it can be said that the level of knowledge of acrobatic elements future skiers should adopt on the level of automation which is characterized by coordinating harmonization of movement that form the structure of a particular movement, which indirectly affects the development of motor abilities all in order to facilitate the acquisition of specific motor knowledge of alpine skiing.

CONCLUSION

The analysis of the results in this research has shown correlation between the level of knowledge in acrobatics and the level of specific motor knowledge of alpine skiing – parallel turns at students beginners in skiing. Correlation indicates that the students, who have acquired the technique of acrobatic elements on the higher level or on the level of stabilization and automation with minor mistakes, achieve better results when learning the element of skiing technique – parallel turns what is confirmed by Mann Whitney U test. We can say that the obtained results should be taken as a guide for skiing teachers when developing plans for beginner skiers as important fact to include some elements of acrobatics in the dry land training program for beginner skiers for a proper body preparation prior to skiing course. In fact, the versatile alpine skier can influence development and improvement of his motor abilities using a variety of exercises and tasks that are used in other sports. Based on the obtained results it can be assumed that learning of acrobatic elements, as additional training in skiing, can have a positive influence on the success of the performance of elements in alpine skiing – parallel turns. Whether this will be so or will alpine ski beginners learn alpine skiing better when they implement elements of acrobatic in their training we need to conduct an experiment with acrobatic training as the intervention and change in ski performance as the outcome.

As we can see this research confirms some findings of previous researches and we can say that acrobatics through applied exercises can develop certain motor abilities that are correlated with specific motor knowledge of alpine skiing – parallel turns.

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Corresponding author:

Almir Atiković
University of Tuzla, Faculty of Physical education and Sport,
Bosnia and Herzegovina

E-mail: almir.atikovic@untz.ba