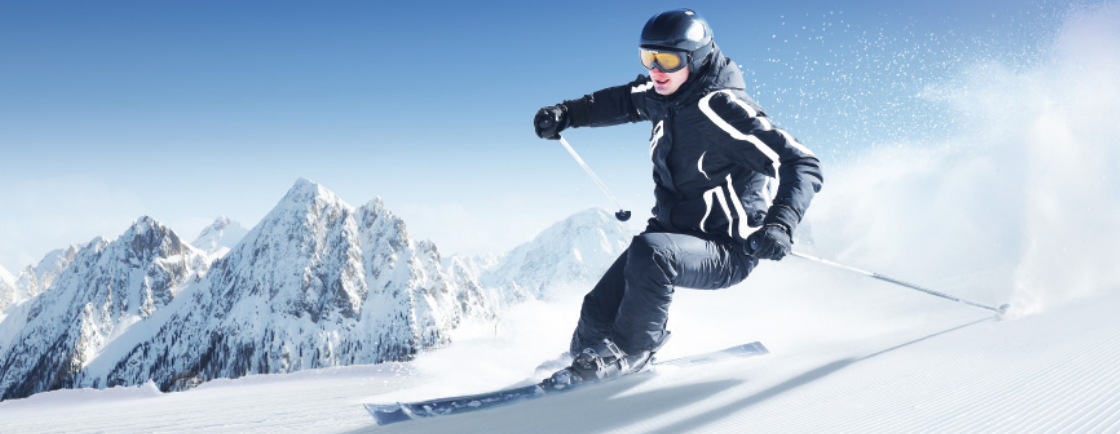
SPE BALKAN SKI
Science, Practice & Education

2nd Scientific Conference

SPE BALKAN SKI

Science, Practice & Education

BOOK OF ABSTRACT



Jahorina, 11th - 15th March, 2018.

Faculty of Sport and Physical Education,
University of Sarajevo, BiH

2nd Scientific Conference

SPE BALKAN SKI

Science, Practise & Education

(Jahorina, 11th - 15th March, 2018.)

Book of Abstracts

Jahorina, 2018.

2nd Scientific Conference

SPE BALKAN SKI

Science, Practise & Education

Book of Abstracts

Publisher:

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ORGANIZERS

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Second SPE BALKAN SKI will be organized in cooperation with

Olympic Committee of Bosnia and Herzegovina,
Ski Trainers and Instructors Association in B&H - ATUS,
Ski Instructors Association of Slovenia - SIAS,
Faculty of Sport and Physical Education, University of Niš, Serbia,
Science and Research Centre, Koper, Slovenia.

WITH THE PARTICIPATION OF:

ATUS - Ski Trainers and Instructors Association in Bosnia and Herzegovina,
SIAS - Ski Instructors Association of Slovenia,
Macedonian Association of Snow Sport Instructors,
Ski Association of Serbia,
M.A.S.I. - Montenegrin Association of Snowsport Instructors,
Association of the Bulgarian ski instructors - Bulgarian Ski School.

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Bojan Matković, PhD, University of Zagreb, Faculty of Kinesiology, Croatia

General Programme; Venue: Jahorina Mountain, BiH

Sunday, 11th March 2018
14:00 – 18:00 Registration - Hotel lobby "Lavina"
19:00 – 20:00 Keynote Lecture - Erich Miller (AUT) – Conference hall Hotel Lavina
21:00 – 22:00 Welcome Cocktail - Hotel "Lavina"
Monday, 12th March 2018
08:00 - 09:30 Registration - Hotel lobby "Lavina"
10:00 - 13:00 Snow Workshops – meeting point in front of "Rajska vrata" restaurant
10.00 – 16.00 ELAN SKI TEST
13:00 - 14:00 Lunch – Hotel "Lavina" **
17:00 – 17:30 Opening Ceremony
17:30 - 18:30 Keynote Lecture – Pete Allison (USA) – Conference hall Hotel Lavina
18:30 – 18:50 Invited Lecture – Vihren Bachev (BULG)
18:50 - 20:10 Session 1 – Conference hall Hotel Lavina
20:00 - 22:00 Dinner
20:45 - 21:30 SPE BALKAN SKI Boards meeting
Tuesday, 13th March 2018
10:00 - 13:00 Snow Workshops – meeting point in front of "Rajska vrata" restaurant
10.00 – 16.00 FISHER SKI TEST
13:00 - 14:00 Lunch – Hotel "Lavina" **
17:00 – 18:00 Keynote Lecture – Blaž Lešnik (SLO) – Conference hall Hotel Lavina
18:00 - 18:20 Invited Lecture – Ron Kipp (USA)
18:20 - 19:00 Session 2 – Conference hall Hotel Lavina
19:00 - 20:00 Dinner
20:15 - 22:00 Demo Team Show – Ski slope "Poljice" Jahorina

Wednesday, 14th March 2018
10:00 - 13:00 Snow Workshops – meeting point “Rajska vrata“ restaurant, Jahorina
10.00 – 16.00 FISHER & HEAD SKI TEST
13:00 - 14:00 Lunch – Hotel “Lavina”
16:30 - 16:50 INTERSKI Pamporovo (BLG) presentation
16:50 – 17:20 Documentary film – Skiing for disabled *
17:20 – 17:40 Invited Lecture – Martin Zvonar (CZ)
17:40 - 18:40 Session 3 – Conference hall Hotel Lavina
21:00 - 00:00 Gala Dinner Hotel “Lavina”
Thursday, 15th March 2018
08:00 – 10:00 Departure

Scientific programme – 2nd SPE BALKAN SKI Conference

11.3.2018 Sunday	
Keynote lecture	
19:00 – 20:00	**BIOMECHANICS, PERFORMANCE ENHANCEMENT AND INJURY RISK MANAGEMENT IN SKIING** Erich Miller *University of Salzburg, Austria*
12.3.2018 Monday	
Keynote lecture	
17:30 – 18:30	**WHAT IS THE VALUE OF TEACHING SNOWSPORTS?** **Pete Allison** (PSU, IVSS), Dave Renouf (BASI, IVSS), Andrew Horrell (UoE) and Dave Schuilling (PSIA-AASI), USA
Invited lecture	
18:30 – 18:50	**COMPARATIVE ANALYSIS OF AGILITY IN 12-14 YEAR OLD SKIERS AND NON-ACTIVE TRAINING** Vihren Bachev, Orlin Groshev, Pavel Yordanov, Boyan Zlatev *National Sports Academy "Vassil Levski", Department "Theory of Sport" Sofia, Bulgaria*
Session 1	
18:50 – 19:00	**PARTIAL DIFFERENCES ANALYSIS IN ALPINE SKIING LEARNING EFFICACY BETWEEN THE CLASSIC AND DIRECT METHODICAL PRACTICE** **Siniša Kovač**; Nermin Nurković; Mersad Čuljević* *University of Sarajevo, Faculty of Sport and Physical Education, Sarajevo, B&H* **University of Sarajevo, Academy of Performing Arts, Sarajevo, B&H*
19:00 – 19:10	**CONNECTION BETWEEN DIFFERENT MOTOR ABILITIES AND POINTS IN THE RAUCH CUP** **Špela Bogataj**, Blaž Lešnik *Faculty of Sport, University of Ljubljana, Slovenia*
19:10 – 19:20	**AVERAGE ENERGY CONSUMPTION DURING ONE DAY OF SKI SHOOL- A POSSIBLE WEIGHT LOSS OPPORTUNITY?** **Lana Ružić**, Vjekoslav Cigrovski, Matea Sedlaček University of Zagreb, Faculty of Kinesiology, Croatia
19:20 – 19:30	**THE VERY FIRST DAY ON SKIS AND FIRST IMPRESSION** **Saša Pišot** and Rado Pišot, Science and Research Centre of Koper, Institute for Kinesiology department, Slovenia
19:30 – 19:40	**IMPACT OF SPORT COURAGE, WORRY AND FEAR ON SUCCESS OF ALPINE SKI LEARNING** [1]**Vjekoslav Cigrovski**, 1Mateja Očić, [1]Lana Ružić, [1]Ivan Bon, [2]Igor Božić, [1]Ivan Radman, [1]University of Zagreb, Faculty of Kinesiology, Zagreb, Croatia [2]University of Banja Luka, Faculty of Physical Education and Sport, Banja Luka, Bosnia and Herzegovina
19:40 – 19:50	**PULL – PUSH STRATEGY AND SPATIAL – TEMPORAL DIMENSIONS IN THE PROCESS OF SKILLS ACQUISITION IN ALPINE SKIING** **Rado Pišot** and Saša Pišot, Science and Research Centre of Koper, Institute for Kinesiology department, Slovenia

19:50 – 20:00	**ANALYSIS OF SKIING AND SNOWBOARDING INJURIES - SCIENCE IN THE SERVICE OF INJURIES PREVENTION** **Sava Minčić**[1], Nenad Stojiljković[1], Ljubomir Pavlović[1], Saša Pantelić[1], **Goran Sporiš**[2], **Tomislav Krističević**[2], [1]Faculty of Sport and Physical Education, University of Niš, Niš, Serbia [2]Faculty of Kinesiology, University of Zagreb, Zagreb, Croatia
20:00 – 20:10	**MENTAL TECHNIQUES TO ENHANCE SKIING PERFORMANCE** **Uros Marusic,** [1,2], Armin Paravlic,[1], Rado Pisot,[1] *[1] Institute for Kinesiology Research, Science and Research Centre of Koper, Slovenia* *[2] Department of Health Sciences, Alma Mater Europaea – ECM, Maribor, Slovenia*

13.3.2018 Tuesday

Keynote lecture

17:00 – 18:00	**EVALUATION OF IMPACT OF TECHNICAL KNOWLEDGE ON THE COMPETITIVE SUCCESSFULNESS OF YOUNG CATEGORIES IN ALPINE SKIING** **Blaž Lešnik***, Stojan Puhalj** *Faculty of Sport, University of Ljubljana & Ski Instructors and Trainers Association of Slovenia, **Faculty of Education, Department for Sports training, University of Maribor, Slovenia

Invited lecture

18:00 – 18:20	**SLALOM POLE / GATE LENGTH ALTERS PERFORMANCE, ACCELERATION, AND PERCEPTION IN DEVELOPING ALPINE SKI RACERS** **Ronald W. Kipp**1, John G. Seifert2, Jon Nolting3, Lester L. Keller4 1 Squaw Valley | Alpine Meadows Ski Team, Olympic Valley, CA, USA 2 Movement Science Laboratory, Montana State University, Bozeman, MT, USA 3Steamboat Spring Winter Sports Club, Steamboat, CO, USA 4Mt. Hood Academy, Government Camp, OR, USA

Session 2

18:20 – 18:30	**MOTOR IMAGERY AS EFFECTIVE THERAPEUTIC TOOL DURING ACUTE PHASE AFTER TOTAL KNEE ARTHROPLASTY** **Armin Paravlic,1**, Uros Marusic,[1,2] , Rado Pisot,[1] [1] Institute for Kinesiology Research, Science and Research Centre of Koper, Slovenia [2] Department of Health Sciences, Alma Mater Europaea – ECM, Maribor, Slovenia
18:30 – 18:40	**INTENSITY MEASURED BY HEART RATE RESPONSES DURING SKI SCHOOL DAY IN LOW SKILLED SKIERS** **Lana Ružić**, Bojan Matković, Vjekoslav Cigrovski University of Zagreb, Faculty of Kinesiology, Croatia
18:40 – 18:50	**MONITORING OF INTENSITY AND CALORIC CONSUMPTION DURING SKIING** **Saša Pantelić**[1], Ljubomir Pavlović[1], Nenad Stojiljković[1], Milovan Bratić[1], Goran Sporiš[2], Tomislav Krističević[2] [1] Faculty of Sport and Physical Education, University of Niš, Niš, Serbia [2] Faculty of Kinesiology, University of Zagreb, Zagreb, Croatia
18:50 – 19:00	**TESTS AND STANDARDS FOR YOUNG ALPINE SKIERS** **Matej Švegl** Ljubljana, Slovenia

14.3.2018 Wednesday	
16:30 – 16:50	**INTERSKI Pamporovo 2019 (BLG) presentation**
16:50 – 17:20	**Documentary film – Skiing for disabled**
Invited lecture	
17:20 – 17:40	**COMPARISON OF SELECTED DYNAMIC PARAMETERS OF DIFFERENT ALPINE SKIING ELEMENTS AT SKIERS OF DIFFERENT PERFORMANCE LEVEL** Martin Zvonař Masaryk University, Faculty of sports studies, Brno, Czech Republic
Session 3	
17:40 – 17:50	**CONTRIBUTION OF AN ACADEMIC RECREATION AND LEISURE STUDIES PROGRAM TO RETHINKING THE ROLE OF THE SKI INSTRUCTOR** **Jana Hoffmannová**, Luděk Šebek, Rudolf Rozsypal Palacký University, Faculty of Physical Culture, Department of Recreation and Leisure Studies, Olomouc, Czech Republic
17:50 – 18:00	**MODERN SKI TEACHING METHODS PROPER UTILIZATION OF THE SKIS' GEOMETRY FOR QUALITY AND SAFE SKIING** **Peter Sitar** University of Maribor, Slovenia
18:00 – 18:10	**PREFERENCES AND SATISFACTION OF VISITORS ABOUT ORGANIZATIONAL COMPONENTS OF SKI CENTER** **Jasmin Hrnjić1**, Damir Ahmić1, Tarik Šečić2, Dinko Voloder Zelić3 1 Faculty of Education, University of Travnik, Travnik, Bosnia and Herzegovina 2PI Primary School Dolac, Travnik, Bosnia and Herzegovina 3SK Ski team Vlašić, Travnik, Bosnia and Herzegovina
18:10 – 18:20	**TEACHING, COACHING AND FUN - 15 YEARS OF OSIJEK SKI SCHOOL FOR SCHOOL CHILDREN** **Darko Dumančić** Head of department for sport, City of Osijek Osijek, Croatia
18:20 – 18:30	**THE IMPORTANCE OF RIGHT TERMINOLOGY IN TEACHING SKIING** **Robert Ropret** University of sport and physical education, Belgrade, Serbia
18:30 – 18:40	**BAVERAGE BAG** **Mario Blagojevič** Malčki d.o.o., Ljubljana, Slovenij

Content:

EVALUATION OF IMPACT OF TECHNICAL KNOWLEDGE ON THE COMPETITIVE SUCCESSFULNESS OF YOUNG CATEGORIES IN ALPINE SKIING

Blaž Lešnik[1], Stojan Puhalj[2]

[1]Faculty of Sport, University of Ljubljana & Ski Instructors and Trainers Association of Slovenia,
[2]Faculty of Education, Department for Sports training, University of Maribor, Slovenia

Abstract: Introduction

Alpine skiing is a sport in which the success in competitions depends on various internal and external factors that are related to each other. With the development of skiing disciplines, alpine skiing has reached the level, where top results are very hard to reach. In the process of training, there is a set of different special elements that are more effective for each discipline in alpine skiing. The aim of this study is to explore the relationship between various technical aspects of skiing performance among young alpine-skiers.

Method

This research interest follows the concept of scientific approach in alpine skiing for children in late childhood and adolescence exploring part of the factors that influence the success in this sport. Factors that have been studied are variables of techniques of alpine skiing in the free and competitive skiing in comparison with the criterion variable (achieved points in a ski Rauch Cup for the season 2013/14). The study included 40 young boys (year of birth in 2000 and 2001; height 158,97 cm, +/- 9,11 cm; weight 50,18 kg, +/- 9,42 kg) - of selected athletes in alpine skiing.

Results

The analysis of connections between 3 variables of the technique in free skiing (rFSBL=0,728**; rFSCO=0,762**; rFSCT=0,601**) and the 3 variables of the technique in competitive skiing (rCSBL =0,613**; rCSCT=0,743**; rCSLS=0,506*) shows high statistically significant correlation with the criterion variable (success in the Ruch Cup). We have also obtained statistically significant % of explained variance (EV%) of main components in both sets of variables (FSEV%=83,140; CSEV%=72,940 %).

Discussion

In the study, the influence of technical knowledge of skiing in the free and competitive skiing in comparison to the success of competitive alpine skiing has been explored and it has shown a high degree of integration. Research findings of this study are an important confirmation for systematic integration of the training of skiing techniques into the training process of younger categories in Alpine skiing. Based on the research results, the necessary conditions for devising exercise, the establishment of new criteria for selecting children and prediction of the likelihood of sports results in alpine skiing for the selected sample of children will be suggested with the orientations to the more friendly and athletic-focused approach.

References

Hébert-Losier, K., Supej, M. & Holmberg, H.C. (2014). Biomechanical factors influencing the performance of elite Alpine ski racers. Sports Med., 44(4), 519–533.

Lešnik, B. & Žvan, M. (2003). Comparison of centre of mass trajectories in modern giant slalom techniques. Kinesiology, 35 (2), 191-200.

Lešnik, B., Sekulić, D., Supej, M., Esco, M. R. & Žvan, M. (2017). Balance, basic anthropometrics and performance in young alpine skiers: longitudinal analysis of the associations during two competitive seasons. Journal of Human Kinetics, 57, 7-16.

Key words: alpine skiing, competitive performance, training of technique, successfulness, young categories

BIOMECHANICS, PERFORMANCE ENHANCEMENT AND INJURY RISK MANAGEMENT IN SKIING

Erich Müller
University of Salzburg

Abstract:
Introduction

Enhancement of performance and injury risk management are the main goals Biomechanics can contribute to in elite Alpine skiing. The areas in which biomechanics can be applied in the training process are very diverse. In the first and very challenging area movement technique characteristics which essentially influence performance are analysed via biomechanical methods. Based on these analyses sport specific test batteries have to be developed in order to allow the determination of individual, current performance levels and of performance progress. The second area tries to improve the quality of the training process by developing sport specific training devices and exercises. In the third area feedback systems should be provided during the training session in order to minimize intervention times.

Performance Diagnostics

Biomechanical technique analysis and performance diagnostics are essential measures to enhance the quality of training and furthermore the performance of the athletes. Three main aspects have to be considered when biomechanical methods are used in technique analysis and performance diagnostics: (1) the precision of the parameters determined and the accuracy of the measurement system, (2) the parameters determined have to be as technique specific as possible and (3) the athlete should not be severely interfered by the measurement system. The efficiency of the training also depends on the quality of performance tests available.

Specificity in Training

For the development of specific training exercises the principle of kinematic and kinetic correspondence has to be taken into consideration. This principle states that the special exercises must be in harmony with those parameters of movement which characterise the structure of competition technique. A coordinative affinity between training and competition exercises has the advantage that it results in favourable training stimuli in the musculature relevant to the specific movement. In addition suitable feedback systems can significantly contribute to shortening acquisition time according to the principle of objectively supplementing rapid and immediate information.

Individuality in Training

In the near future training concepts in elite sport will have to consider individuality in performance as well as in adaptation to training stimuli. Biomechanics will have to focus on intra-individual movement variability to look for optimal movement techniques. This needs more emphasis on multiple single-individual designs to address issues such as individual signatures of movement coordination and optimisation of performance, rather than group designes.

WHAT IS THE VALUE OF TEACHING SNOWSPORTS?

Pete Allison (PSU, IVSS), Dave Renouf (BASI, IVSS),
Andrew Horrell (UoE) and Dave Schuilling (PSIA-AASI)
International Association Snowsports at Schools and Universities (IVSS)

Abstract: Whilst the skills and attributes needed to teach snowsports to a high and effective level are often well recognised and valued within the snowsports sector, they are often overlooked in other fields such as higher education, and therefore, not valued in various other career pathways. IVSS have worked to promote the development of snowsports in educational systems around the world through collaborations, various events and sharing of resources. Over the past seven years, the British Association of Snowsports Instructors (BASI) has been undergoing a curriculum review and development process to align their qualifications with the European Qualifications Framework (EQF) and further enhance the quality and consistency of the courses. The alignment process has enabled the skills developed to be expressed to a much wider audience, opening 'doors' outside of the snowsports sector for members. The PSIA-AASI are currently embarking on a similar process and building on the learning that BASI experienced, in addition to developing snowsport instructor academic pathways. These pathways further solidify and validate the relevant skills transfer in higher education for broader career opportunities.

COMPARISON OF SELECTED DYNAMIC PARAMETERS OF DIFFERENT ALPINE SKIING ELEMENTS AT SKIERS OF DIFFERENT PERFORMANCE LEVEL

doc. Mgr. Martin Zvonař, Ph.D.
Masaryk University, Faculty of sports studies, Brno, Czech Republic

Abstract: Differences in opinions on skiing are still visible even between professional skiers and ski instructors. We try to answer some of the questions by measuring dynamic changes in the ski boots during different types of ski turns. As a result of the measuring we can see different pressure points in each boot and also difference in pressure distribution between each boot. We did the measurement with top elite skier and with former race skier.

The research has character of empiric study. We use dynamometry synchronized with video recording. For the measuring, we use insole Loadsole from Novel.de. The insole can measure plantar force in the shoe in static and dynamic activities. The insole is divided into three parts. We can see the pressure in great toe area, little toe area and heel area. The insole is connected to iPod from which it is possible to have immediate feedback by sounds and vibrations of the iPod.

As a next step, we would like to continue with measuring high performance skiers and compare the differences with average skiers. We would like to measure different elements of skiing from basic to advanced turns (snow plough, parallel turn, carving turn etc.). The results can uncover connection and methodological continuity between each ski element.

Author: Mgr. Jan Jurečka, Masaryk University, Faculty of sports studies, Brno, Czech Republic. (oral presentation)

SLALOM POLE / GATE LENGTH ALTERS PERFORMANCE, ACCELERATION, AND PERCEPTION IN DEVELOPING ALPINE SKI RACERS

Ronald W. Kipp[1], John G. Seifert[2], Jon Nolting[3], Lester L. Keller[4]
[1]Squaw Valley | Alpine Meadows Ski Team, Olympic Valley, CA, USA
[2]Movement Science Laboratory, Montana State University, Bozeman, MT, USA
[3]Steamboat Spring Winter Sports Club, Steamboat, CO, USA
[4]Mt. Hood Academy, Government Camp, OR, USA

Abstract: INTRODUCTION: A common belief is that young ski racers should begin with props and shorter slalom poles (aka "gates") and progress to a FIS standard 180cm length pole. The purpose of this study was to determine how pole length affected performance, acceleration, and perception of young alpine ski racers.

METHODS: Eighty-seven ski racers with a mean (+SD) age 12.0 ±1.0y, height 153.4 +8.9cm, weight 41.1 +10.9kg, race experience 4.6 ±0.9y, and ski length 140.4 ±7.8cm. Twelve different slopes over 11 days were utilized with an identical 10 gate slalom course, randomized with 35cm Whiskers, 70cm Heroes, 137cm, 152cm, and 180cm length poles. Subjects completed a 10 pt. Likert scale at the end of each run rating their velocity, aggressiveness, confidence, and line. Head acceleration was measured at 100 Hz with a 3-d accelerometer attached to the crown of the helmet.

RESULTS: Reliability between runs of the same pole type (within athlete) was r = 0.97. Overall, racers were significantly faster for the shorter poles than longer poles. Subjects felt slower, less aggressive, less confident, and less satisfied with their line ($p<.01$) skiing the 180cm poles compared to all other poles. Subjects reported less aggressive skiing the 70cm Hero compared to the 35cm Whisker ($p<.01$). Less satisfaction with line and less confidence on the 152cm compared to the 137cm length ($p<.01$). No differences were observed between pole type for head peak acceleration. However, the more skilled skiers demonstrated greater mean sagittal plane head acceleration than the less skilled.

DISSCUSSION: Generally, the shorter poles elicited faster finishing times and greater satisfaction. Shorter pole length positively impacts performance and perceptions of young ski racers. Greater head acceleration found with the more skilled racers may be a result of aggressive skiing style.

CONCLUSION: Practitioners may ask "Which pole is best?" This choice of poles is ultimately the coaches. With this responsibility, race coaches should pay attention not only to racer perception but toward time-per-turn. A World Cup slalom turn averages 0.83 s/turn. For young developing racers it may be advisable to train such that the time-per-turn reflects the slalom event along with a suitable pole type to improve technique and instill confidence.

REFERENCE:

Reid, R., et al. (2009). Turn characteristics and energy dissipation in slalom. In Müller, E. et al. (Eds.), Science and Skiing IV. pp. 419-429.

ACKNOWLEDGEMENT: Whiskers, Heros, and poles were new SPM models provided by World Cup Supply, Bradford, VT, USA.

COMPARATIVE ANALYSIS OF AGILITY IN 12-14 YEAR OLD SKIERS AND NON-ACTIVE TRAINING

Vihren Bachev, Orlin Groshev, Pavel Yordanov, Boyan Zlatev
National Sports Academy "Vassil Levski", Department "Theory of Sport" Sofia, Bulgaria

Abstract: Aim. The aim of the experimental study is to establish the dependencies between the individual components of agility in 12-14 years ski runners and non- active training students.

Materials and Methods. The methods used in the research process were: literary research, questionnaire, experiment, statistical methods. The agility was tested with the "Slalom Movement" test consisting of the elements - forward roll, run, jumping, pass. All of them is part of agility - forward roll and pass with coordination, run with time orientation, jumping with explosive strength of legs. In a sports hall through a method test-retest, 16 skiers (boys - 9, girls - 7) and 46 non-active training (boys - 26, girls - 20) 12-14 year olds were tested. Average height of the first: boys -151 centimeters + - 4,2; weight 37 kilograms + - 3,8; sports experience - 3,14 years + - 2,3; girls -156 centimeters +-2,9; weight 46 kilograms + -2,4; sports experience - 4,5 years + -1,9. Non- active training boys average height 153 centimeters +-3,1; weight 46 kilograms +-1,5; girls height 155 centimeters +-2,2; weight 48 kilograms +-1,8.

Results. Comparing the achievements of skiers and non-active training students, it is found that with regard to the individual elements, ski runners have better results. At the forward roll the average time for skiers is 1.47 seconds, non-active training students - 1.91seconds. In the run, the results between the two groups are very close + -0.04 seconds and for the jumping element skiers performance is 2.2 seconds, and for the non-active training students - 2.38 seconds. The pass of the ski runners is fulfilled for 1,76 seconds and non-active training students - 2.12 seconds. Athletes passed all tests for 6,93 seconds, the coefficient of variation “V” is 10%. Non-active training students passed all tests for 7,97 seconds with coefficient of variation “V” 38%. The reasons for better results are associated with systemic sports activities of skiers.

Conclusions. No system for assessing the results obtained was found. The test which is offered by us meet these requirements is "Slalom movement." In a comparative aspect, the motor quality agility studied with the test in snow sports is better than the group of non- active training students. We are of the opinion that a methodological example has been developed that is useful and should be applied both to bigger athletes and for the other snow-sports practicing.

PARTIAL DIFFERENCES ANALYSIS IN ALPINE SKIING LEARNING EFFICACY BETWEEN THE CLASSIC AND DIRECT METHODICAL PRACTICE

Siniša Kovač; Nermin Nurković; Mersad Čuljević*
University of Sarajevo, Faculty of Sport and Physical Education, Sarajevo, B&H
**University of Sarajevo, Academy of Performing Arts, Sarajevo, B&H*

Abstract: The subject of this paper is based on determining which method of teaching the elements of alpine skiing, with students from 19 to 21 years of age, is more efficient on grounds of two different approaches to the methodology of ski beginners training. The "classic approach" or the "direct method" of learning how to ski presents the manner of skiing through particular phases. Such manner of training ("classic") has a long-standing history and it proved as an efficient way for bringing the skiing closer to beginners. A "direct approach" to the alpine ski training can refer to any training not including plough or V- position of ski technique. Based on presented results of arithmetic means of sub-samples from the set of variables with grades of skiing techniques of the group that was taught alpine skiing using the „classic" method, and the set of variables referring to the grades of the group taught by "direct" method, based on the significance of differences tested under the T-test, significant partial differences can be identified for the given parameters contributing to set hypotheses on qualitative differences expressed through medium values of single assessed ski techniques.

Based on obtained results, the relevant conclusions were also obtained contributing to set hypotheses in this paper. Differences in medium values of variables indicating the grades for the group who learned how to ski using "direct" method in relation to the group, who learned how to ski using "classic" methodical procedures of alpine skiing training, are visible and its values also go in favor of hypothetic assumptions. Research results have contributed to the thesis that a "direct" methodical approach is more efficient in alpine skiing teaching students than the „classic" methodical sequence in the ski training.

When the total value of grades is summed up for the group that was taught using the direct approach, we get the sum of 1,465.50 which is higher than the sum of grades for the group that used the "classic" approach (1.420.00) and methodical procedures of beginners ski training with phases of ploughing or V-position of skis curves, the result goes in favor of the hypothesis claiming that it is expected that the group who did the training using "direct approach" achieves better results on the final testing than the group who did the training using "classic approach".

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Keywords: alpine skiing, direct approach

CONNECTION BETWEEN DIFFERENT MOTOR ABILITIES AND POINTS IN THE RAUCH CUP

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Abstract: The purpose of the research was to determine whether there is a correlation between selected physical tests and the number of points in Rauch cup. The research was conducted on a sample of 41 male competitors from different ski clubs across Slovenia. On test day, boys were 14 years old (generation 2003). We carried out the following tests: taping with a better leg, test of stability, running with a flying start 20m, ten jumps on both legs, 400m run, running nines, CMJ (counter movement jump) and reaction time to a visual impulse (optojump). With Pearson's coefficient we determined the linear relationship of motor tests with competitive performance (Rauch cup points). The regression analysis was used to determine the hypothetical impact of the entire battery test on performance in Alpine skiing. Correlations between each test (individual variables) and criterial variable (Rauch cup points) showed us that all tests except test of stability and reaction time in optojump test have a significant correlation. Multiple regression showed us that 59% of points in the Rauch cup depends on performance in these tests (R square = ,593). Regression model is significant (R= ,770; p= ,000). According to the findings, we can say that motor skills represent a large share of the competitive performance of the alpine skier, therefor tests like this are important part of the training program and evaluation.

AVERAGE ENERGY CONSUMPTION DURING ONE DAY OF SKI SHOOL-A POSSIBLE WEIGHT LOSS OPPORTUNITY?

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Abstract: During the skiing season, many recreational skiers choose to join the ski schools that provide the lessons for 3 to 4 hours per day, after which the skiers continue to ski in the afternoon. Even though the average daily activity time is high, many skiers overestimate the energy consumption and tend to overeat/ overdrink justifying that by the amount of the physical activity they were engaged in. Finally, a week of high calorie intake may lead to body mass increase instead of decrease. For that reason, the aim of this study was to estimate the average daily and hourly calorie consumption in regard to body mass of the skier.

The sample comprised of 12 male skiers (average age 21±1,3; average weight 82,8±7,2) whose ski day was organized as follows: they started the ski day with their instructor at 9.15 am and skied in a group until 1.15 pm. During that period they had one break of 20 minutes. In the afternoon, they skied ad libitum from 2 to 4 pm. The intensity was monitored by V800 Polar heart rate monitors from 8.30am until 4.30pm.

The average estimated energy consumption was 2949,5±288,3 kcal per skiing day (min 2530 and maximum 3350). Out of 480 recorded minutes the active recorded time (active time equaled HR>50% of HRmax) was 273,3±56,5 min while the rest was either on ski lift or spent sitting during the breaks. Relative energy consumption was estimated to be 4,51±0,49 kcal·kg−1·h−1 or 4,5 METs or 371±31,4 kcal/h (active and passive time included in average values). Then we subtracted the energy that would be consumed during that time if the subjects were not skiing (for that equation the 1 MET for rest was used, meaning 1 kcal·kg−1·h−1). It lead to conclusion that the added energy consumption, which originated from skiing, was 288,8±31,0 kcal/h or 2312 additional kcal per skiing day.

From the results we could conclude that during one week of skiing, that recreational skiers usually undertake, and 6 skiing days in that week, we can expect and additional 13872 kcal consumption which might lead to the maximal weight loss of 1,8 kg in ideal conditions and with no food and drink compensation. The limitations of this study are the possibility of generalization of the obtained results on female, older and more experienced skiers which would probably consume much less energy than our subjects, who were young, male and beginner skiers.

Key words: alpine skiing, energy consumption, weight loss

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IMPACT OF SPORT COURAGE, WORRY AND FEAR ON SUCCESS OF ALPINE SKI LEARNING

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Abstract: Research in the field of psychology of skiing is scarce, especially in case of recreational alpine skiing. Skiing is generally considered demanding and challenging, so the fear related to new activity and possible injury, and worry about the exogenous factors can become a psychological barrier that prevents successful learning. Furthermore, mentioned factors can reduce motivation to learn and lead to withdrawal from the activity at an early stage. On the other hand, self-efficiency and courage might be helpful in acquisition of new knowledge of alpine skiing. In this research we investigated whether sport courage, worry and fear differ between alpine ski naive and basic level skiers and how they affect alpine ski learning.

337 kinesiology students (249 ski naive and 88 with basic knowledge) participated in the research consisting of a 4-part questionnaire and 10-day structured program of skiing. Males scored higher in Determination, Mastery, Venturesome, Assertiveness and Self-efficiency factors of Sport Courage Scale-31 (all $p<0.05$), whereas females in Fear ($p<0.001$). Experienced skiers scored higher in Determination, Mastery, Self-efficiency (all $p<0.05$), and beginners in Fear ($p<0.001$). In females, Determination, Mastery and Self-efficiency had a positive correlation with skiing ($r=0.21$, $p<0.05$, $r=0.28$, $p<0.01$, and $r=0.33$, $p<0.01$, respectively), while association between Fear and skiing ($r=-0.46$, $p<0.01$) was negative. In males, Self-efficiency was associated with better ($r=0.39$, $p<0.01$), and higher Fear was related to poorer performance ($r=-0.33$, $p<0.01$). For skiers, lower score in Worry ($r=-0.28$, $p<0.01$) and higher in Self-efficiency ($r=0.22$, $p<0.05$) were associated with better performance. For beginners, lower Fear ($r=-0.30$, $p<0.01$) and higher Self-efficiency ($r=0.28$, $p<0.05$) and Mastery ($r=0.20$, $p<0.01$) were associated with better performance. For beginners, predictors of performance were Self-efficiency ($p=0.004$), Worry ($p=0.014$), and Fear ($p=0.043$), suggesting that reducing Fear and increasing Self-efficiency and Worry increase the ski performance. For skiers only Worry had a negative prognostic role for performance ($p=0.004$). For males, predictor of ski success was related to Self-efficiency ($p<0.001$), while for females Fear ($p<0.001$) was inversely related to success. Courage, Worry and Fear need to be considered during learning phases of skiing, since they can have effect on success of basic alpine ski school.

Key words: sport courage; self-efficiency; worry; fear; skiing performance

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INTENSITY MEASURED BY HEART RATE RESPONSES DURING SKI SCHOOL DAY IN LOW SKILLED SKIERS

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Abstract: The exercise intensity in recreational alpine skiers may not be the highest, but the typical skiing day lasts up to eight hours. The health benefits may well be larger than in standard recreational classes which are usually attended three times a week. The aim of this study was to examine intensity zones and heart rate responses to one typical day of ski school followed with free skiing.

Fifteen male low skilled skiers, age 20-22 who were skiing in the morning hours with a ski teacher and in the afternoon freely, were equipped with heart rate monitors during the whole day in order to examine the heart rate responses and calculate the amount of time spent in each exercise intensity zone. HRmax was estimated according to Jackson et al. as 206.9 - (0.67 x age). Five intensity zones were identified according to estimated HRmax values corresponding to: Zone 1 at 50-60% of HRmax; Zone 2 at 60-70% of HRmax; Zone 3 at 60-70% of HRmax; Zone 4 at 70-80% of HRmax and Zone 5 above 90% HRmax.

The subjects spent 57% of the 8 hours of recorded time as active, meaning 4 and a half hours above 50% of HRmax (mean HR 105±4,6 bpm). Most of that active time was spent in aerobic extensive zone (health improvement) and only 5 % of the total time as higher intensity exercise. Those 5% of higher intensity equaled 24 minutes, which should be considered important in a daily exercise routines. According to zones the average percentage of time was as follows: Passive time=42%; Zone 1= 34,8%; Zone 2=18%; Zone 3= 4%; Zone 4= 1% and Zone 5 =0,2%.

The results show that the intensities during a standard ski school/free skiing day might have a great potential for health benefits as several hours per day are spent in the intensities that influence cardiovascular and metabolic adaptations, which might be of great benefit in chronic illnesses like hypertension and diabetes. The more experienced skiers might increase intensity by taking “short turn skiing” as suggested by Stoggl et al. (2017). The limitations of the study are linked to the sample that was young and able bodied so in older and less fit subjects the intensities might be higher.

Key words: heart rate, alpine skiing, intensity

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MONITORING OF INTENSITY AND CALORIC CONSUMPTION DURING SKIING

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Abstract: Alpine skiing is an activity that is usually a combination of low and high intensity, and can be of different duration (Turnbull et al., 2009). According to some researchers, the intensity level observed at the heart rate can range from 60% to 80% of the maximum heart rate (Seifert et al., 2009). The skiing load depends on many factors, and in particular the snow conditions, the level of knowledge of the skier, the inclination of the terrain, duration, weather conditions, skiing days or skiing style (Scheiber et al., 2009; Seifert et al., 2009). During skiing the energy consumption also depends on these factors, as well as on the body weight and the intensity of skiing (Jeukendrup & Gleeson, 2010). The main aim of the research was to determine the differences in load levels and energy consumption among skiers of different levels of skiing skills.

The sample consisted of a total of 18 participants, out of which 9 participants comprised a group of skiers with high skiing skills (IVSS lincence - average age 34.7 ± 8.1 years, body height 179.6 ± 6.7cm, body weight 77.5 ± 9.3kg and BMI 24.0 ± 2.4 kg/m2) and 9 subjects with a beginners skiing knowledge level (average age 23.0 ± 2.1 years, body height 180.0 ± 4.9 cm, body weight 82.0 ± 3.3 kg and BMI 25.3 ± 1.5 kg/m2). Garmin Forerunner 310xt was used to determine intensity and calorie consumption. The following data were used for statistical data processing: total caloric consumption (KCal), relative calorie consumption (Kcal / kg), average heart rate (HRaverage), maximum heart rate (HRmax), relative HRaverage values and relative values HRmax (Rel. HRmax) expressed in percents (%). The average skiing time for both groups was 280 minutes, and the distance covered was 30km. T-test was used to calculate differences between groups. The level of significance was defined as 0.05. The results were processed in the statistical package STATISTICA 7.0 (StatSoft. Inc., Tulsa, OK, USA).

The results showed that the load in both groups of subjects was on average 72.5% HRmax for a group with high skiing skills, or 75.6% of HRmax in the group of beginner skiers, which is in line with previous studies (Müller et al., 2011; Seifert et al. al., 2009; Scheiber et al., 2009). Statistically significant differences ($p < .05$) between groups in HRaverage, HRmax, and KCal were noted, with the notation that higher values were recorded for a group of skiers of beginners level (94.6 vs 109.6 beat • min-1; 134.26 vs 109.6 beat • min-

1; 1448.4 vs 1869.5 Kcal). The obtained values were lower than in previous studies (Stöggl et al., 2016). Generally, it can be concluded that the level of skiing knowledge significantly affects the load and calorie consumption during skiing.

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THE VERY FIRST DAY ON SKIS AND FIRST IMPRESSION

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Abstract: Introduction: Ski teachers are mostly well equipped with the theoretical knowledge of ski technique and often by following teaching routine don't pay enough attention to the ski beginners which experience fear and distrust in their capabilities while learning skiing. Therefore, the formation of trustworthiness relation of ski teacher - ski-beginner is crucial for an acquisition of newly motor tasks. The human face appears to play a key role in signalling social intentions and usually people form reliable and strong impressions based on someone's facial appearance. Therefore, facial signals could have a substantial influence on how people evaluate and behave towards another person in a social interaction. First impression formed on a basis of a first few sentences and other nonverbal communication has effect on trust formation (Todorov et al., 2008). Previous studies (Klapper et al. 2016) suggest that there is a spontaneous tendency to form relatively stable trustworthiness impressions from facial appearance, which is relatively independent of the context.

Method: Based on presented facts the first impression in the formation of trust in ski-teacher – ski-beginner relation should get more prominent place in spontaneously formation of stable trustworthiness impressions from facial appearance. Following the purpose, we conduct a study with on-line questionnaire to anticipate respondents recall of their very first day on skis, first contact with ski instructor and his/her visual and/or facial appearance. The survey consisted of 18 questions focused on recall of first impression of ski teacher and very first day on skis, additional socio-demographic characteristic and teaching skiing experiences. Questionnaire was disseminated to e-mail addresses of two Slovenian Littoral ski clubs' teachers and via social networks from 9th of January to 25th of January 2018. From 128 clicks on survey, complete data of 73 Slovene Ski Instructors (n= 41, 56 % male) were obtained for descriptive statistic and correlation analysis done by SPSS statistical software (version 22.0, IBM Inc, Chicago, USA). Statistical significance was accepted at $p < 0.05$.

Results: Ski instructors reported they started to ski at average age less than 5 years (±3,58years), mostly under guidance of their fathers (47%), both mothers and fathers (17%) and ski teachers (only 25%). The distance of recall of their very first ski day varied from 15 to over 40 years, so more than one third didn't remember it, while just 13% (n=10) can recall it good and clear. Better recall was with remembrance of the first ski

teacher (60% good and clear), what is in positive correlation of higher age when they got acquainted with ski teacher (p= .012). From the perspective of first impression, they reported memory on ski teacher as positive (average 4,2 on 5-point scale), while main characteristics they remembered were: being fun (26%), friendly (24%), trustworthy (11%), professional (10%) and just in one case as "untalkative" and "boring". In correlation with this, they reported also positive remarks of visual expression in the context of smile and look ski teacher had (friendly smile/look; 55%, 35%) as well as visual characteristics they can recall (hairstyle, outfit.)

Conclusion: Results show that positive first impression and characteristics of ski teachers play significant role in formation of "role model" and as a motive to become a ski teacher, where fathers (mostly as ski teachers, 31%) and other ski teachers (21%) were reported as dominant in opposite to mothers (10%) and top ski racer (10%). According to the presented facts, yearly ski refreshment's seminars should stress the importance of the first impression of the ski instructors which referred to the communicational skills, personal characteristics and to visual and/or facial appearance to achieve trustworthiness relationship between ski teacher and ski beginners.

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PULL – PUSH STRATEGY AND SPATIAL – TEMPORAL DIMENSIONS IN THE PROCESS OF SKILLS ACQUISITION IN ALPINE SKIING

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Abstract: Ski instruction is a cognitive process in which the learners acquire new skills and, thus, enrich their motor memory while simultaneously developing the corresponding motor skills. It is a process that evolves in various stages – logically super-structured milestones on the path to skiing ability. It is important to choose the approaches that are adapted to the learner and that motivate and attract the learner to the activity. For a quality, student-centred process and for selection of appropriate exercises, it is necessary to understand the biomechanical basis and mechanisms of motor control as well as the technique and the didactics of teaching skiing. The model that we are introducing presents these factors as the pull (stimulate) or push (inhibits) strategy of teaching skiing. Beginners learn very efficiently when they are engaged in the process and they find they need to master something to make progress. Acquisition of skiing skills is much more efficient than when someone is pulled to learn something because they might need it someday. The problem which should be solved is referred to as the hill – overcoming the fall line; and the motivation which should be offered is the will. Therefore, all the games, the play and the knowledge which has to be acquired turns out in skiing skills.

Acquisition of the following stages is of particular importance in learning how to ski, regardless of different ski school approaches all around the world. Following the familiarization with the new environment, equipment and surface, the child gradually gains the feel for moving in this environment. Based on numerous experiences, this is followed by gaining the feel for changing direction (a turn) and with that a transition across the fall line. In this phase, an accentuated loading on one ski throughout the turn usually carries out this transition. In the next stage, the individuals must learn to adjust their own centre of gravity. Managing one's own centre of gravity by moving to a higher or lower point, and consequently being able to unload skis at the appropriate time is a very demanding task for a beginner. It is not until the individual has reached this level of skill that we can set our target on making a fully coordinated turn with (or without) a pole plant and on dynamic turning along wider or narrower corridors. Based on the information received from the environment, the awareness of one's own body and the

previous experience the individual creates an appropriate motor response and executes it with greater or lesser competence. In motor learning as well as in exercise, training or even racing, the success of this process depends on certain important dimensions, which, during a single motor action, occur in a specified sequence and provide the necessary precondition for a consistent and successful completion of the action (Pišot, Kipp, Supej, 2015). The five dimensions, namely, accuracy, speed, timing, rhythm and softness of motor task completion are very important factors when performing motor tasks in alpine skiing. Should we be willing to provide a learner-friendly teaching process, we need to organize the entire experience around the pull model of teaching skiing instead of the push model that is prevalent today.

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TESTS AND STANDARDS FOR YOUNG ALPINE SKIERS

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Abstract: Using the relevant statistical parameters, we compared the sample of 18 measured subjects of older boys of the age category U16 of two generations - the years 2011 and 2015. The battery of motor skills included 8 variables, each of which is considered separately. The set standards meet the requirements and the abilities of the measured group. The aim was to establish the statistical significance of the differences between the 2011 and 2015 standards and whether there were generational differences regarding the results of 8 identical tests. The variance analysis method was used. The mutual comparison of motor skills points to the fact that we cannot talk about major generational changes that would have a decisive influence on the performance in Alpine skiing. In five tests - forward bend on a bench, no run long jump, no run triple jump, 20m high start sprint, 20m flying start sprint - no statistically significant differences were observed. Statistically significant differences occurred only in three variables out of eight, namely in the backward polygon, drumming with hands and feet, and lateral jumps over the Swedish bench. Only in the test of drumming with the hands and feet the 2015 measured subjects showed better results while in the other two tests the 2011 measured subjects were better. In the other five tests there were no statistically significant differences.

Such results show a focus on certain contents of co-ordination training (rhythmic structure), while other equally important dimensions are given too little attention (solving motor problems, endurance, etc.). We can conclude that a more one-sided, less intensive, and very likely, even less extensive orientation training process was applied.

CONTRIBUTION OF AN ACADEMIC RECREATION AND LEISURE STUDIES PROGRAM TO RETHINKING THE ROLE OF THE SKI INSTRUCTOR

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Abstract: The role of ski instructor is changing in contemporary society. The military approach and the expert position „I possess the best know-how and I may be willing to teach it to you" is no more applicable. In the last years is getting to the fore the client - oriented approach in the ski instructing. The aim of my presentation is to share our experience from ski instructor training as a part of education at the Department of Recreation and Leisure Studies of Palacký University in Olomouc. Our ski instructors training runs in cooperation with Czech ISIA member organization APUL (Association of Professional Teachers of Skiing) and is based on understanding and combination of 6 core principle ski skills: edging, rotation, pressure, dynamic balance, intensity, and timing. Students learn about flexibility determined by terrain, snow condition and ski equipment. Our concept of the role of ski instructor is based on understanding this role primarily as a guide, facilitator and mentor, rather than teacher. The ski instructor activates the client's learning (also about safety), through fun. The key challenge is to become and stay attuned to the client's needs and learning objectives (interaction) and to help discover and develop the six basic principles of skiing technique based on terrain and snow conditions. The client's feeling of ownership in learning – being involved in the activity and participating on shaping the learning process is seen as important for them to return. In our attempt to perform this approach, we use a variety of ways. We rather address the journey than the destination. We use numerous analogies and video analysis. We've been using small blocks of cross country skiing as an effective tool for increasing awareness of dynamic balance, edging and pressure control as well as for developing better orientation around the ski resort. We've also been finding training of drama – communication skills through case studies and role play activities on the slopes a beneficial part of the program. We've also adopted focus on client service (for example knowledge about events in the ski resort). We benefit from having courses like Safety aspects of Recreation, Group dynamics, Evaluation and feedback, Communication skills, Outdoor games etc. in our curriculum. We see a complex, robust multidisciplinary training program which enables the ski instructor to actively involve the client in co-creating their experience of winter sports as a way to face the recent challenges of increasing consumerism.

MODERN SKI TEACHING METHODS PROPER UTILIZATION OF THE SKIS' GEOMETRY FOR QUALITY AND SAFE SKIING

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Abstract: At the arrival of skis with a pronounced geometry at the beginning of the new millennium, most ski schools faced a great dilemma. The NEW SKIS were made with the goal of COMPENSATION of the necessary ski knowledge and psychophysical skills of the recreational skier for a better performance of turns. The consequence on the easier slopes, decrease of dynamic and speed skiing The dilemmas on how and in what way to bring »new – different skis« to their users, recreational skiers and competitors, are yet not fully clarified. I believe that we all agree, that »CARVING« skis and together with them various »applicable techniques and learning methods« have led to the DIFFERENT WAY of changing the direction. At least at the first glance, faster learning and basic mastery of the necessary ski technique is common to all of them. But is that really so? The paths of much needed »new teaching methods« were very different at the beginning. Some of them have, in the whole euphoria brought by different skis (as a rule, too short), forgot that the principle rule for SAFE SKIING is still its maximum SPEED CONTROL!!! Too much of passive exploitation of ski's geomerty is similar to going down the slide or driving a car WITHOUT BRAKES! Letting the skis do what they know, without the proper »instructions for use« was, above everything else, dangerous, unprofessional and irresponsible. The use of a ski HELMET was one of the few positive »consequences« of such a skiing technique. Is it really needed? Others have, like a blind man sticking to the fence, held too long to the » old traditional« way of teaching. On whose account? The actual highlighting of a different, especially easier and faster way of acquiring skiing skills had at the time gained the exactly opposite effect. Why did everything happened the way it did (PREMATURE exploitation of the skis' geometry, generally with the skis which were too short)?! What are the reasons for such an approach (»teachers – demonstrators« found it EASIER that way...)?! Do we ski in a safer, more controlled way today (definitely NOT...)?! In order to approach the precious goal of MODERN AND SAFE usage of skis, two of the most important components are the appropriately CHOSEN ski length (height of the skier) and its radius (r 15+)!

This paper represents the path of MODERN SKI TEACHING TECHNIQUES, which most recognized characteristics are SLIDING AND ROTATING the skis in the first part of the turn (change of the direction) and CLEAR endings of turns using exclusively the geometry of the skies!!! The SPEED CONTROL accompanies the skier through all services and is recognized in the constant desire of the skier to make CLEAR TURNS at a LOVER SPEED. Thus, gained ski knowledge represents a valuable assistance in achieving the highest standards in MODERN SKI TEACHING!

Key words: NEW SKIS, SPEED CONTROL, SLIDING AND ROTATING, CLEAN TURNS, PROPER EXPLOITATION OF THE SKIS' GEOMETRY

PREFERENCES AND SATISFACTION OF VISITORS ABOUT ORGANIZATIONAL COMPONENTS OF SKI CENTER

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Abstract: The aim of the research is to determine the degree of satisfaction and the preferences of guests in the organizational components of the ski center.

The survey was carried out on a sample of 516 Vlašić mountain visitors, 312 male and 204 female. The descriptive method, the method of theoretical analysis and the service method were used in this article, and all the analyzes were performed on a personal computer using the statistical data packet (SPSS 17.0- for Windows).

The analysis of the results found that there is a high level of satisfaction of the guests by the ski center, confirmed the assumption of customer satisfaction with the services, and also with the infrastructure, and that the most important, qualitative and quantitative determinants of sports and recreational components of the center (quality and quantity of ski trails and vertical transport, ski schools).

Keywords: skiing, visitors' views, ski center, satisfaction, quality.

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TEACHING, COACHING AND FUN - 15 YEARS OF OSIJEK SKI SCHOOL FOR SCHOOL CHILDREN

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Abstract: School sport association of the city of Osijek in cooperation and with the support of the local government City of Osijek organise Ski school for school children for last 15 years. Here it will be presented organisational and professional characteristics of this program. Program starts in 2003 in Osijek, Croatia, as a result of a partnership and activities with twin towns – sister cities between Osijek and Maribor (Slovenia). From 2003 till 2018, fifteen ski schools was held, each year in January, for one week, during the school winter holidays. Altogether children (age 10 to 17) attend the school, approximately fifty each year. Through this period, ski school was held in Maribor and Gerlitzen (Austria). The group of children was accompanied by a minimum of five kinesiologists, who are licensed ski instructors and ski leaders, expert guides, animators and physicians. City sports association and City of Osijek provide ski equipment, organizes licensed ski instructors, ski equipment, helmets, markers, and connection systems necessary for the safe implementation of school closures. Accommodation for children and teachers was organised in hotels based on full board, and these costs were covered by the ski school attendants, except the transportation co-financed by the City of Osijek. This is an example of a successful sports program for children and youth under the auspices of local government and sports communities, which contributes to children's' sport education, and empowerment of school children's physical as well as social competences.

THE IMPORTANCE OF RIGHT TERMINOLOGY IN TEACHING SKIING

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Abstract: Ski terminology includes specific terms that are not everyday and not often used. Teaching skiing requires verbal information that is precise, clear, understandable and unambiguous. A good instructor should not use jargon, complex technical terms, and incomprehensible concepts. Otherwise, inadequate information may be misinterpreted and may lead to errors in skiing techniques. This paper presents some of the terms that ski instructors often use, but which are not precise enough, and often cause misconceptions and result in students' wrong actions.

BAVERAGE BAG

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Abstract: Ski instructors spend their days working on the ski slopes and in the outdoors. While doing their whole day job, they are exposed to different weather conditions. They usually don't have time to have a break, so it is important that they drink enough fluids throughout the day, to avoid dehydration. Headache, exhaustion, low concentration and motivation all are signs of dehydration.

CORE

On the market there are several beverage bags, canteens and other equipment. However, there isn't one which would optimally fulfil the needs of ski instructors. Bags disturb instructors while working and when going on the lifts, drinks become cold too quick and the bags are not convenient for handling or drinking.

With our product we adapted to the needs of ski instructors. Product was developed by the instructors working on the slopes. Knowledge gained from experience was used in developing the product. In collaboration with a company Malček d.o.o. , who are experts in production of bags and other confections, we developed a new beverage bag, which is especially made for ski instructors.

CONCLUSION

Our aim is to make the ski instructors job easier. We want the them to forget about the bag while not using it for drinking. The bag will be ergonomically made and will not be seen under instructor's uniform.

Keywords: Beverage bag, adapted for needs of ski instructors

ANALYSIS OF SKIING AND SNOWBOARDING INJURIES - SCIENCE IN THE SERVICE OF INJURIES PREVENTION

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Abstract: Skiing and snowboarding are high risk activities. As such, a high speed can be achieved in both, which can be very dangerous, and increasing affinities of skiers and boarders to perform acrobatic elements lead to additional increase in risk and a direct impact on the increase in the number of injuries. In spite of the more advanced protective equipment intended for skiers and snowborders, the number of injuries in competitive and recreational skiing remains at a high level. Brain and spinal cord injuries have become more frequent and therefore there is a need for participants, organizations and workers in ski resorts to become more aware of the risks and dangers of this sport.

The subject of this research is injuries caused during the skiing and snowboarding in the ski center Kopaonik in the season 2016/2017. The aim of the research was to perform analysis of all injuries which occurred in the 2016/2017 season in the ski center Kopaonik using the data from the "List of injuries". The connection of the type of injury, the location of the injury, the use of protective equipment and meteorological conditions has also been established. The instrument used to collect information about the characteristics of the respondents and the characteristics of the injuries they experienced at the ski center Kopaonik was the official "Rescue Action Report" used by the Mountain Rescue Service at the ski resort of Kopaonik, and filled in every time they went to the scene of the accident. The obtained results were processed in the statistical package IBM SPSS 21.

On the basis of the obtained results, it was found that skiers often experience knee injuries, while in the case of snowboarders, the most common are arm and shoulder injuries. When it comes to the place where the injury occurred, most of the injured persons were injured on a well-arranged ski trail. It is also important to state that, at the moment of an accident, a larger number of injured boarders wore a helmet than the number of injured skiers did. When it comes to the meteorological conditions in which the injuries occurred, the greatest number of injuries occurred in sunny conditions. It was found that injuries are most commonly caused in the second half of the skiing day, or after 1PM. On the basis of the obtained data it is possible to give recommendations to skiers and snowboarders in order to prevent and reduce injuries.

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MENTAL TECHNIQUES TO ENHANCE SKIING PERFORMANCE

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Abstract: Motor imagery (MI) is one of non-physical approaches, which represents the mental simulation of an action, without any corresponding motor output. This approach is being used implicitly or explicitly, whenever we try to mentally rotate an object or mentally simulate an overt action, respectively. The activation of brain networks during MI is highly overlapping (however, they are not identical) those brain regions that are active during real motor execution. MI is being used among different profile of athletes as a method of choice for a proper anticipation, improvement of skill acquisition, motivation, sport confidence and to reduce anxiety raised by competition (Munzert & Lorey, 2013). Next to sports-related enhancements, when added to common physical therapy, mental techniques have been recognized as beneficial tool in the rehabilitation process. Indeed, recently Needle et al. (2016) highlighted the importance of non-physical exercises in the early phases of rehabilitation as well as injury-related reorganization of the central nervous system that might cause alternations in neural networks, somatosensory dysfunction and motor system excitability. Thus, development of non-physical interventions to enhance (in top sports performance such as skiing) or maintain/optimize (in the rehabilitation phase) cognitive-motor functions should be of a high priority. The present work will deliver an overview of recently developed and currently used non-physical types of training, which are being used in top sports performance as well as in the rehabilitation periods.

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MOTOR IMAGERY AS EFFECTIVE THERAPEUTIC TOOL DURING ACUTE PHASE AFTER TOTAL KNEE ARTHROPLASTY

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Abstract:
Background: Osteoarthritis (OA) is the most-frequent occurring cause of disability among older adults, due to an evident decline in the muscle function (Boutron et al., 2003). When more conservative treatments have failed, total knee arthroplasty (TKA) as a surgical replacement of a degenerated or malformed joint, is administered to patients with OA. Since, quadriceps strength is a major determinant of general physical function following TKA, its early rehabiliation is of great importance. When movement execution is limited, motor imagery (MI), as a mental simulation of a movement without overt muscle contraction, has been largely used to improve general motor tasks in both the neurological and peripheral injuries. However, its potential effects following knee pathologies are scarce.

Aim: We aimed to investigate does MI practice (MIp) in addition to conventional physical therapy can alleviate strength decrease following TKA surgery.

Method: Sixteen older adults with knee OA who were scheduled for primary TKA (Mean (SD) 60.5 (5.68) years of age and 29.87 (2.73) kg/m2 of body mass index) were randomly assigned to a MIp (n = 7) or control group (n =9), who both received a common physiotherapy.

Results: At one month following TKA greater declines (for 24.64%) in maximal voluntary strength were seen for the control as compared to MIp group, suggesting that MIp can successfully moderate detrimental effects of TKA surgery.

Conclusion: MI practice in addition to conventional physical therapy is effective tool to promote physical recovery for TKA patients.

Practical application in rehabilitation of sports injury: In last five decades occurrence of knee injuries (KI) have raised and nowadays KI represent one third of all injuries in adults' skiers. Among several KI, the medial collateral ligament along with anterior cruciate ligament represents the most common knee injuries, that are surgically treated (Pressman, 2003). Due pain, effusion and arthrogenic quadriceps inhibition functional

performance is impaired and several months following a surgery. Given that effects of MIp are moderated by motor representation of an individual and its ability to engage in kineasthetic type of imagery, MIp might be more effective rehabilitation tool for injured athletes compared to older individuals recruited for presented study. MIp designed will be discussed on the conference in detailed.

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