4th Scientific Conference
SPE BALKAN SKI
Science, Practice & Education

THE BOOK OF ABSTRACTS

Pamporovo, 13th - 17th March 2022

Association of Bulgarian Ski Instructors – Bulgarian Ski School

4th Scientific Conference

SPE BALKAN SKI

Science, Practice & Education

(Pamporovo, 2022)

The Book of Abstracts

PAMPOROVO, 2022

4th Scientific Conference

SPE BALKAN SKI

Science, Practice & Education

The Book of Abstracts

Editors: Saša Pišot & Kaja Teraž

Publisher: Science and Research Centre Koper, Annales ZRS, Slovenia

SPE BALKAN SKI Science, Practice & Education

4th Scientific Conference SPE BALKAN SKI Science, Practice & Education, Pamporovo, 2022

The Book of Abstracts

Editors: Saša Pišot, Kaja Teraž

Technical editors: Kaja Teraž, Alenka Obid

Design and Typesetting: Kaja Teraž

Publisher: Science and Research Centre Koper, Annales ZRS

Publisher represented by: Rado Pišot

Address: Garibaldijeva 1, 6000 Koper, Slovenia

Online publication, available at: http://www.spe-balkan-ski.com/
and https://www.zrs-kp.si/index.php/research-2/zalozba/monografije/

Kataložni zapis o publikaciji (CIP) pripravili v Narodni in univerzitetni knjižnici v Ljubljani
COBISS.SI-ID 103188483
ISBN 978-961-7058-82-6 (PDF)

ORGANIZERS

Association of Bulgarian Ski Instructors – Bulgarian Ski School,

Science and Research Centre Koper (ZRS Koper), Slovenia,

Faculty of Sport and Physical Education, University of Niš, Serbia &

SITAS - Ski Instructors Association of Slovenia

CONTACT:

info@spe-balkan-ski.com

abstract@spe-balkan-ski.com

CONFERENCE WEBSITE:

http://www.spe-balkan-ski.com/

SPE BALKAN SKI Executive Board

Responsible for the administrative and corporate functions of the SPE BALKAN SKI Conferences:

Rado Pišot, PhD; ZRS Koper, Slovenia

Ljubomir Pavlović, PhD; FSPE, University of Niš, Serbia

Blaž Lešnik, PhD; SITAS Slovenia

Damian Ambrožič; Ceo Rodeo Trade, Slovenia

WITH THE PARTICIPATION OF NATIONAL DEMO TEAMS:

Association of Bulgarian Ski Instructors - Bulgarian Ski School

ATUS - Ski Instructor Association in Bosnia and Herzegovina

Romanian Professional Ski Instructor Association

SITAS - Ski Instructors Association of Slovenia

Ski Association of Serbia

Scientific Committee

Chairman

Rado Pišot, PhD, Institute for Kinesiology Research, Science and Research Centre Koper

Members

Nikolay Izov, PhD, Rector of National Sports Academy "Vasil Levski", Sofia, Bulgaria

Peter Iankov, PhD, Association of Bulgarian Ski Instructors - Bulgarian Ski School, Bulgaria

Dieter Bubeck, PhD, Stuttgart University, Germany

Siniša Kovač, PhD, University of Sarajevo, Bosnia and Herzegovina

Milan Žvan, PhD, University of Ljubljana, Slovenia

Blaž Lešnik, PhD, University of Ljubljana, Slovenia

Erich Muller, PhD, University of Salzburg, Austria

Sigmund Loland, PhD, University of Oslo, Norway

Ljubomir Pavlović, PhD, University of Niš, Faculty of Sport and Physical Education, Serbia and Institute of Kinesiology Research, Science and Research Centre Koper, Slovenia

Pete Allison, PhD, Penn State University, USA

Ron Kipp, PhD, Ski Team Education and Development Manager for Squaw Valley, Alpine Meadows Race Team, USA

Vjekoslav Cigrovski, PhD, University of Zagreb, Faculty of Kinesiology, Croatia

Saša Pišot; PhD, Institute of Kinesiology Research, Science and Research Centre Koper, Slovenia

Krastio Zgurovski, PhD, National Sport Academy, Faculty of Public Health, Health Care and Tourism, Bulgaria

Organizing Committee

Chairman

Peter Iankov, PhD, Association of Bulgarian Ski instructors – Bulgarian Ski School, National Sport Academy, Head of Department "Snow Sports"

Members

Rado Pišot, PhD, Institute of Kinesiology Research, Science and Research Centre Koper, Slovenia

Krastio Zgurovski, PhD, Bulgarian Ski School, Demo Team Bulgaria

Ljubomir Pavlović, PhD, University of Niš, Faculty of Sport and Physical Education, Serbia

Saša Pišot, PhD, Institute for Kinesiology Research, Science and Research Centre Koper, Slovenia

Damijan Ambrožič, Organization and promotion of SPE BALKAN SKI, Slovenia

Tomaž Šegula, Organization of the SPE BALKAN SKI Demo SHOW, Slovenia

Sofia Tzankova, Financial director Pamporovo PLC

Ruska Chalakova, Bulgarian Ski School, Office

Kaja Teraž, Science and Research Centre Koper, Slovenia

Honorary Committee

Members

Mr Bojan Križaj, Slovenia

Mrs Ekaterina Dafovska, Bulgaria

Mr Jure Franko, Slovenia

Mr Enis Bećirbegović, Bosnia and Herzegovina

CONTENT

PLENARY SPEAKERS[1]

INVITED SPEAKERS[1]

1- ordered alphabetically by the first's author's last name

CONTRIBUTIONS[1]

1- ordered alphabetically by the first's author's last name

1- ordered alphabetically by the first’s author’s last name

PLENARY SPEAKERS

Dieter Bubeck

University of Stuttgart, Institute of Sport, Stuttgart, Germany

Erich Müller

University of Salzburg, Department of Sport Science, Austria

Lana Ružić

University of Zagreb, Faculty of Kinesiology, Department of Sport and Exercise Medicine, Croatia

SNOWSPORT AS A PERFORMANCE ENHANCER IN EXECUTIVE FUNCTIONS

Dieter Bubeck, Frieder Beck, Dominique Rau

University of Stuttgart, Institute of Sport, Stuttgart, Germany

The ability to selectively control the own mental activity, the mindfulness, the behavior and the own emotions is an important basis for the success in school and in life. A lot of studies show that success in school is direct dependent on physical fitness. If we can concentrate on one thing, can keep ideas in mind, can resist short time temptations and are able to constrain impulsive behavior the so called "Executive Functions" are in a well shape. Moffit et al. (2011) showed that childhood self-control predicts physical health, substance dependence, personal finances and criminal offending outcomes, following a gradient of self-control. Effects of children's self-control could be disentangled from their intelligence and social class as well as from mistakes they made as adolescents. But how to develop the executive functions? Kubesch et al. (2011) concluded that executive functions of children and youth profit from an enhanced physical fitness and from acute physical activity. So, it can be shown that dopamine is an important factor in the development of new synapses and therefore new pathways and connections in the central nervous system. High amounts in the release of dopamine can be observed if a physical and motoric challenging action is realized better than expected. The higher dopamine level enhances the value of binding of synapses which is associated with a learning process. Additionally, physical activity especially endurance type activity leads to the release of so-called brain derived neurotrophic factor (BDNF) which can be seen as a kind of fertilizer for synaptic bindings. So physical activity, executed in a special way leads to these effects. A perfect setting is outdoors sports such as skiing in nature. Here often the actual situation changes and a lot of challenging and motivating situations occur. This leads to the special effects in the release of dopamine and BDNF. So, if these situations would be combined with special neuronal challenging exercises it can induce an enhancement of executive functions. A study we will present with young

skiers demonstrates the positive effects of skiing with challenging tasks on the improvement of the executive functions. To conclude we want to show that skiing with special tasks will be very effective in the development of executive functions and represents an important contribution for their success in school and professional career.

BIOMECHANICS AND INJURY PREVENTION OF ELITE AND YOUTH ALPINE SKI RACERS

Erich Müller

University of Salzburg, Department of Sport Science, Austria

Alpine ski racing is known to be a sport with a high risk of injury. Injury rates of more than 36 injuries / 100 athletes per season have been reported, 36% being severe and partly career ending. Ligament injuries in the knee were the most common injuries (36%) in World Cup athletes. Other frequently injured body parts were the lower back (low back pain), sacrum, shoulder and the head. All disciplines were found to be equally dangerous if the effective exposure time was considered.

Athlete-related risk factors are reported to be a) fatigue within a course or training session, b) inappropriate tactical choices, c) insufficient physical fitness, and d) technical mistakes. With respect to physical fitness, insufficient core strength or core strength imbalances, deficits in neuromuscular control, high asymmetries in unilateral leg extension strength, and hamstring/quadriceps strength deficits seem to be the main risk factors in elite ski racers. But considering the very short period of time during which ACL injuries occur, it is not only a question of the strength of the hamstrings and quadriceps, but also a question of the timing of the co-activation of these muscles (feed forward coordination).

THE RISE OF SKI HELMETS: WHAT HAVE WE LEARNED IN LAST FEW DECADES?

Lana Ružić

University of Zagreb, Faculty of Kinesiology, Department of Sport and Exercise Medicine, Croatia

Looking at the ski slope footage from thirty years ago, the difference that one observes is the head protection garment e.g. ski helmet. The part of the equipment, which was basically unknown till the last few decades, became almost unavoidable. The prevalence of skiers using ski helmets rose from less than 5% in 1990 to around 50% in 2000, and is currently pushing high 80-90%, depending on region. The estimated number of active skiers in the world is 115 million, and with recommendations that a helmet should be replaced every 5 years (no matter the amount of impacts), the potential of the market is huge. The chance of dying while skiing is estimated to be 1 in 1.4 million but despite that the majority of skiers would consider a helmet primary as a lifesaving garment. Nevertheless, there are many other benefits of helmet, maybe even as simple as its warmth. Of course, it protects from some forms of head injuries and it seems to protect from concussions. There is very little doubt left whether the helmets are useful overall, but still the biggest concerns of scientists address three to four major problems. The first one was raised, among others, by ski patrols who reported impairment of hearing and sight. Several studies eventually concluded that vision should not be a problem, whilst there is still some doubt whether helmets reduce the environmental sounds, especially the sounds of danger and distort the sound localization and especially with music.

The next concern was so called "risk taking theory". It was proven before that when a person holds to somewhat as to the "lifesaving cushion" he compensates in behavior for this additional sense of security. This might be a reason that even though the number of helmet users increased dramatically, the overall skiing mortality did not follow the same pattern. This issue is still being debated.

Studies dealt also with transfer of impact forces from head to neck and spine during helmeted falls and few researchers did not prove higher chance for neck injury. Unfortunately, recently, the new suspicions emerged as two studies agreed that helmet wearers suffered less bone skull fractures, but they suffered more complicated bleeding injuries, intracranial hemorrhages, neck injuries, and they were more likely to fall from a jump or hit a tree. So, the old questions emerged again. Does that all bring us back to risk taking theory, to helmet/head combined weight problems, to speed/impact force related helmet limitations and basically to need for more research?

Literature:

Porter, E. D., Trooboff, S. W., Haff, M. G., Cooros, J. C., Wolffing, A. B., Briggs, A., Rhynhart, K. K., Crockett, A. O. (2019). Helmet use is associated with higher Injury Severity Scores in alpine skiers and snowboarders evaluated at a Level I trauma center. J Trauma Acute Care Surg, 87(5), 1205 - 1213.

Ruedl, G., Burtscher, M., Wolf, M., Ledochowski, L., Bauer, R., Benedetto, K.P., Kopp, M. (2015). Are self-reported risk-taking behavior and helmet use associated with injury causes among skiers and snowboarders? Scand J Med Sci Sports, 25(1), 125-30.

Ružić, L., Tudor, A., Radman, I., Kasović, M., Cigrovski, V. (2015). The influence of ski helmets on sound perception and sound localisation on the ski slope. Int J Occup Med Environ Health, 28(2), 389-94.

INVITED SPEAKERS

Ronald W. Kipp

Squaw Valley | Alpine Meadows Ski Team
Olympic Valley, California, USA

Andrej Miklavc

Winter Sport Expert Group

Damir Sekulić

University of Split, Faculty of Kinesiology

Matej Supej

University of Ljubljana, Faculty of Sport, Ljubljana Slovenia;
Mid Sweden University, Department of Health Sciences, Swedish Winter Sports Research Centre, Östersund, Sweden

Asa Tugetam

Linnaeus University, Department of Sport Science, Sweden

Krastio Zgurovski

Faculty of Public Health, Health Care and Turism Trainer of Bulgarian Demo Team

LONG TERM ATHLETE DEVELOPMENT: ALPINE SKI RACING TECHNIQUE CONSIDERATIONS

Ronald W. Kipp

Squaw Valley | Alpine Meadows Ski Team
Olympic Valley, California, USA

Athlete development is a biological and psychological growth phenomenon. Today we know, to achieve the highest levels of sport, training needs to follow a planned, systematic, and progressive menu. Understanding and adhering to physiological and psychological benchmarks allows growth to be optimized.

Unfortunately, athletes and coaches push the optimal developmental pace chasing the dream. When athlete achievement is pushed in a "more is better" accelerated attitude, the momentary satisfying results end up stagnating the athlete's long-term development. Missed developmental reference points that were bypassed in pursuit of transitory fame undermine the athlete's foundation limiting ultimate growth. Without this initial and essential groundwork, the eventual level of achievement will be limited.

Long term athlete development (LTAD) has roots that can be traced to the initial philosophy of "periodization". Periodization, as the name implies, dealt with the time domain. Utilizing timing to optimize training cycles it was found that rest, stress, and type of exercise could be altered to reach even greater levels of athletic achievement.

While periodization was developed around time periods for exercise and sport improvement, LTAD uses time to emphasize the developmental pace or phase of the athlete. In this vein, chronological age is less significant than biological and training age. In other words, the maturity of the athlete's development is foremost.

Today LTAD is the preeminent model, focusing on developmental level rather than just development. This focus on maturity stresses building a skill base rather than just mimicking a World Cup athlete. If a first-grade

math teacher tried to teach calculus to her students, the outcome would be total confusion. Obviously, the prerequisites of learning to count, add, multiply, algebra, geometry, etc. are crucial. And without the order in which they are presented, they could never actually be learned.

One of the many examples is a carved turn on a World Cup injected race piste. For the young athlete this is not the arena to learn, nor the skill level to attempt. We need to adjust the environment and the skill in progressive steps for the athlete's developmental age. World Cup racers are able to balance against a miniscule amount of ski edge on solid ice while making a carved turn. Meanwhile the aspiring U10 athlete learning the same skill is better progressed with a larger base-of-support found in much softer snow and with less edge angle.

ROLE AND CHALLENGES OF ENGAGING KIDS IN SKIING

Andrej Miklavc

Winter Sport Expert Group

To have a sustainable development of skiing in the future, we need to understand the importance of all stakeholders involved in winter sport, especially in skiing.

Skiing is an experience and experience is created by people at first and at most. We all know, if you enjoy and start loving skiing at your young age it is more likely you will continue skiing throughout your all life. And that is our common goal, right. Why children/youth segment needs a special attention on what/how/why, ski teachers, ski coaches and parents play the most important role in this segment of skiing?

Learn simple facts and receive “easy to use” toolbox for ski community, to become more efficient and successful by addressing and working in children/youth segment in ski sport.

DOPING, SUBSTANCE MISUSE AND DIETARY SUPPLEMENTATION IN SKIING. SHOULD WE WORRY ABOUT IT, AND (IF YES), WHY?

Damir Sekulić

University of Split, Faculty of Kinesiology

Doping is a known issue in competitive sport, and academicians and professionals are deeply involved in finding the most appropriate and effective ways of dealing with it. Surprisingly, alpine skiing is not studied regarding this problem. Meanwhile, there is a growing interest about (other) type of substance misuse in sports (i.e. smoking, alcohol, illicit drugs), but alpine skiing society is not involved in such trends although there is a large body of evidence that certain types of substances are an inseparable part of alpine-skiing culture. Finally, the consumption of dietary supplements is more often than not, a usual practice in competitive sport, but skiing is again understudied in this context. In this lecture, the issues of doping, substance misuse, and dietary supplementation are discussed from the perspective of evidence-based approach which will hopefully contribute to assuring the healthy and low-risk environment in alpine skiing. Experiences from other sports and sport-societies are translated into the specific alpine-skiing environment while trying to highlight specific risks and threats that encompass the possible ignorance of this problem.

MONITORING ALPINE SKIING PERFORMANCE USING WEARABLE TECHNOLOGIES

Matej Supej

University of Ljubljana, Faculty of Sport, Ljubljana Slovenia;
Mid Sweden University, Department of Health Sciences, Swedish Winter Sports Research Centre, Östersund, Sweden

Alpine skiing has been an Olympic sport since the first Winter Games in 1936 in Garmisch-Partenkirchen, Germany. After several years of top-level ski racing, it has led to skiers being able to constantly adapt themselves technically and tactically to snow conditions, gate setups, weather conditions and equipment. But progress at such a high level needs a reliable assessment of performance of alpine skiers. Previous research led to conclusions that wearable technology represents the edge in order to be able to obtain 3D kinematics of the entire course, unlike camera-based systems that allow only a very limited part of the course to be analyzed. Such wearable systems nowadays, with the help of biomechanical modeling and/or artificial intelligence, already enable gate-to-gate timing and analysis of trajectories, speeds, energy losses, to some extent resistance and friction during skiing, skiing techniques, etc. Furthermore, to assist skiers and coaches reaching top performance, vibrations are also measured by accelerometers and the ground reaction forces with special force sensors, pressure insoles, and are sometimes also estimated through kinematic measurements. From a practical point of view, a number of performance-related parameters need to be considered to effectively evaluate performance and these parameters are advantageous to be synchronized with video for comprehensive analysis. Advances in technology already today allow, to a certain extent, accurate biomechanical real-time analysis of performance over the entire ski course. In the future, however, a new kind of patch-like sensors can be expected, e.g. SINTECs that will be practically "invisible" and capable of simultaneously capturing both biomechanical and physiological parameters in conjunction with advanced software that will further facilitate data analysis.

LEARNING THROUGH SNOWSPORT

Åsa Tugetam

Linneaus University, Department of Sport Science, Sweden

Sometimes it is hard to explain what we are doing, things are going on between the line so to speak. Contrasting and new environments create new experiences and insights. In this way, everyday activities that are experienced as onerous or demanding in one context may end up being seen in a new light. This paper looks at how students' sensemaking in "friluftsliv" (outdoors life" develops and how this occurs in interaction with other students and with teachers.

The study is based on ethnographic fieldwork, and data were collected through interviews, informal conversations, participatory observation, videos made using GoPro cameras, and logs written by the students themselves. Two classes from a secondary school in southern Sweden were studied and followed over time. The curriculum of the two classes includes one week of frluftsliv in a mountain wilderness area in the Scandinavian mountains.

The purpose of this thesis was to investigate, from the student perspective, the learning processes that take shape in friluftsliv school programs. The study identifies three clear learning processes: contextual learning, relational learning and identity developing learning. These three learning processes are understood as overlapping processes that the students experience simultaneously. It is when the students find themselves in the middle of what is for them uncharted territory, smell and touch the plants in their native habitat, or experience what it means to take responsibility for one's own role in cooperation with a group, that contextual, social and identity-developing learning processes take shape. In other words, above and beyond the instructional practices in which evaluation and grade-assignment take place.

Learning processes that take shape in the outdoors is complex. Engagement in social practice is to be understood as a fundamental process through which people learn and at the same time become who they are. Learning is in this sense not to be understood as a separate activity. There are however times in our lives when learning is intensified: when situations shake our sense of familiarity, when we are challenged beyond our previous experiences of response.

Keywords: Outdoor education, learning, ethnography, Scandinavian friluftsliv.

Literature

Dewey, J. (1925/1981). Experience and natur. I: J. A.Boydston (Ed.) The later works, 1925-1953 (s.?), vol. 1. Carbonedale: Southern Illinois University Press.

Humberstone, B. & Prince, H. (2020). Research Methods in Outdoor Studies. Abingdon, Oxon; New York, NY: Routledge. Print. Routledge Advances in Outdoor Studies.

Tuan, Y. F. (2001). Space and place: the perspectives of experience New ed.]., University of Minnesota Press.

Wenger, E. (1998). Communities of practice: learning, meaning, and identity: Cambridge: Cambridge University Press, 1998.

A STUDY ON THE FUNCTION OF HUMAN BALANCE AFFECTING BEGGINNER TRAINING IN ALPINE SKIING TECHNIQUES

Krastio Zgurovski, Petar Iankov, Deyan Todorov

National Sports Academy "V. Levski", Department of Snow Sports,

Alpine skiing is to a great extent a sport of balance, or rather of disturbed balance during movement. Not surprisingly, in the methodology of beginner skiing, specialists pay special attention to ski balance. In most of the specialized literature, the problem about balance is dealt with in the chapters devoted to biomechanics and methodology of ski training. Attention is paid to the forces providing balance, as well as, the support area related to the ski equipment. Our research on the function of human balance directed us to study the visual and proprioceptive system when using ski boots. The concept of the project is, through simulation on the visual system by means of virtual reality (VR) glasses presenting skiing, to study the effect on balance stability. The acquired results would be used to upgrade and improve the training methodology for beginner Alpine skiers.

The studies were done in laboratory conditions by means of stabilometry, VR glasses and alpine ski boots, using mathematical and statistical research methods.

The human balance function is multi-aspectual and it has to be integrated in the educational methodology of Alpine techniques, not only in terms of biomechanics, but also with reference to ski equipment, metrology, age, sex, anatomy, physiology, and etc. While using VR glasses simulating skiing, it was discovered that six and seven-year old girls have better posture stability in comparison to boys of the same age. No significant difference was established when moving the projection of the basic center of gravity (BCG) with or without VR glasses. In all age groups we found that beginners are less unbalanced with ski boots on, than when they are in bare feet. Using vision like the adults for permanent

balance was established at the age of nine or ten. It is supposed that the turning point of postural strategy to the neutral ski posture is at the age of eight and it is more obviously expressive with the girls. Variations in the values of the projection of the BCG were registered, which, when the body is flexed with ski boots on, provide a state of instability of balance in backward direction with all studied age groups. The acquired results give us reasons to recommend avoiding the use of the following elements when teaching the first steps in Alpine skiing technique for beginners: practicing basic stances, vertical movements (flexing-extending).

Keywords: balance, stabilometry, VR glasses, vertical movements.

CONTRIBUTIONS

ESKI (PROMOTING EDUCATION, SKILLS DEVELOPMENT & DUAL CAREERS IN ALPINE SKIING)

Federiga Bindi – ESKI Coordinator

Alta Badia Ski Race Academy

The paper will present the work done by ESKI (Promoting Education, Skills Development & Dual Careers in Alpine Skiing), an ERASMUS+ Sport collaborative partnership focused on promoting dual careers opportunities for Alpine ski racers. In 2012, the European Commission approved the "EU Guidelines on Dual Careers of Athletes – Recommended Policy Actions in Support of Dual Careers in High-Performance Sports", like Alpine Skiing. It showed how special arrangements are needed to allow talented and elite sportspeople to conciliate education and sport (or work and sport).
A previous project, DC4SKI, showed us the fundamental role the environment plays on athletes' motivation, perseverance, and therefore results. This means primarily three groups of people: families, educators, and coaches. Of these three, ESKI is primarily working on coaches, by enhancing their professional education and skills development. In particular, it is innovating in Alpine ski training, by creating educational and skills development opportunities for Alpine ski coaches and elaborating innovative pedagogical tools and best practices for Alpine ski training, which will allow to trade quantity (on snow) with quality (on and off-snow). ESKI is making such innovative pedagogical tools freely available to all European Alpine Ski coaches on the network's website – in the form of a manual, an e-book and videos.
At the same time, ESKI is build the basis for enhancing Dual Careers opportunities for European Alpine ski racers, by creating a Network of European Ski High Schools and a European Circuit of Mountain Universities, as well as by developing Higher Educations degrees specific for mountain professionals.

INLINE SKATING AS AN ADDITIONAL ACTIVITY FOR ALPINE SKIING: THE ROLE OF THE OUTSIDE LEG IN TURN PERFORMANCE

Ivan Bon, Vjekoslav Cigrovski, Mateja Očić, Tomislav Krističević, Igor Božić

University of Zagreb, Faculty of Kinesiology, Zagreb, Croatia

In alpine skiing, the role of the outside leg is crucial in successful turn performance. To be successful in applying pressure on the outside ski, the skier must be in a specific body position that requires hip and knee flexion, and a side arc. Due to the complexity of the skiing movements, recreational alpine skiers must incorporate many off-season alternative sports which include similar coordination structures and general movements. By measuring biomechanical parameters in this research, one could define whether there is an objective similarity of the outside leg movements while performing a turn in inline skating (IS) and alpine skiing (AS).

The sample consists of ten female alpine ski instructors (age 31.6±8.23, height 170.66±7.32 cm, weight 60.16±7.58 kg), with experience in IS. Overall, 280 turns were analyzed (140 -AS and 140 – IS). Variable sample consisted of 14 variables in total. Pressure distribution during AS and IS was measured with insoles designed for pressure detection (Novel, Pedar). Kinematic parameters were measured by Xsens inertial suit system. Measurement was conducted while performing short parallel turns in the defined corridors, both in AS and IS. MANOVA was used for the detection of differences between short turn performance in AS and IS.

The main findings of our study are defined similarities in pressure distribution during IS and AS and noticed differences in kinematic parameters of the outside leg between the mentioned activities. Despite the differences in equipment and in maximal pressure force values, the distribution on foot regions was similar during IS and AS in both turns. The highest values of foot pressure were detected on the heel, following

medial side of the foot, and the lowest amount of pressure was detected on the lateral side of the foot. Regarding kinematic parameters, even though the coordination of movements and the sequence of lower limb actions are very similar in AS and IS, there were statistically significant differences in all measured kinematic variables ($p<0.01$). Kinematic analysis pointed to differences in the knee and hip angle of the outside leg which has a role of controlling the speed and direction during descent. The maximal pressure is higher during AS which influence greater knee and hip flexion and hip abduction that are found in AS. But the pressure distribution was similar in AS and IS, meaning that the outside leg has the role of maintaining dynamic balance and stability during short turn execution in both activities. IS can be used for solving more complex problems of skiing technique and adopting some specific high level motor skills. Therefore, we recommend IS as an additional activity for skiers who have developed at least basic AS technique to avoid interference with the learning process.

Keywords: biomechanical analysis; pressure insoles; Xsens motion capture system; performance analysis; recreational skiers; dry-land training.

Literature:

Duquette G. (2000). Inline Skating an excellent training for alpine skiing. Ski press, 15(1): 24.

Falda-Buscaiot T, Hintzy F, Rougier P, Lacouture P, Coulmy N. (2017). Influence of slope steepness, foot position and turn phase on plantar pressure distribution during giant slalom alpine ski racing. PloS ONE, 12(5).

Kroll J, Schiefermuller C, Birklbauer J, Muller E. (2004). In-line skating as dry land modality for slalom racers-elektromyographic and dynamic similarities and differences. In Proceedings of the 3rd International

Congress „Science and Skiing“, Aspen, USA, 28 March- 3 April 2004; Muller, E., Bacharch, D., Klika, R., Lindinger, S., Schwameder, H., Eds.; Oxford, UK: Mayer & Mayer Sport, 2005; pp. 76–86.

Ropret R. (2010). The application of rollerblades In alpine skiers training. Physical culture, 64(1): 72–78.

Supej M, Ogrin J, Šarabon N, Holmberg HC. (2020). Asymmetries in the Technique and Ground Reaction Forces of Elite Alpine Skiers Influence Their Slalom Performance. Appl. Sci., 10: 72-88.

DOES THE SEQUENTIAL TEACHING OF ELEMENTS OF ALPINE SKI SCHOOL FOLLOW THE INCREASE OF FORCE BENEATH THE SKIER'S FOOT?

Vjekoslav Cigrovski[1], Ivan Bon[1], Mateja Očić[1], Igor Božić[2], Lana Ružić[1]

[1]University of Zagreb, Faculty of Kinesiology; Zagreb, Croatia
[2]University of Banja Luka, Faculty of Physical Education and Sport; Banja Luka, BiH

To find an optimal balance position by using feet, ski shoes and skies on a snow surface, it is essential to harmonize the pressure that a skier produces during a turn as well as ground reaction forces. In order to control the forces during the turn, skier needs to position the skies at a specific angle (edging angle), press them on the snow surface and rotate them. In everyday practice, it is quite common for a ski instructor to ask participants of a ski school to feel pressure under certain parts of the feet during skiing in order to improve their performance. At the same time literature is lacking concerning ground reaction forces and pressures achieved during recreational level skiing. The aim of the present study was to determine the differences between measured forces and their distribution under skiers' feet during performance of different elements of ski technique. Analysis of kinetic parameters was conducted on four elements of alpine ski school (snowplough, basic turn, parallel turn, short turn). Variable sample included maximal force, medial force, lateral force and force on the heel of inner and outer leg in each turn. In each element of ski technique analyzed were 12 turns (6 in left and 6 in right side). Kinetic parameters were measured by insoles designed for pressure detection. Results of this study suggest that in-boot pressure over outer leg rises as the turns become more complex (from snowplough to short turn). When pressure is compared between inner and outer leg, significantly lower pressure level was on an inner leg (in ratio 1:4) in all elements of technique except during short turn. From a ski technique standpoint, it was clear that the pressure applied with the feet was higher towards more complex elements, and this finding is in

accordance with advancements of plan and program of an alpine ski school. Therefore, it is necessary for ski instructors to teach skiing.

Keywords: beginners where, when and how to apply pressure in each phase of learning process.

Literature:

Falda-Buscaiot, T., Hintzy, F., Rougier, P., Lacouture, P., Coulmy, N. (2017). Influence of slope steepness, foot position and turn phase on plantar pressure distribution during giant slalom alpine ski racing. PLoS ONE, 12(5).

LeMaster, R., Supej, M. (2015). Systematic use of the inside ski in carved turns. In: 6th international congress on Science and skiing. (Muller E, Kroll J, Lindinger S, Pfusterschmied J, Stoggl T) pp. 196-199. London: Meyer & Meyer Sport.

ASYMMETRIES IN PHYSICAL PERFORMANCE, MUSCLE CONTRACTILE MECHANISMS AND FUNCTIONAL MOVEMENT PATTERNS IN YOUNG ALPINE SKI RACERS

Miloš Kalc[1,2], Črt Matejek[3], Stojan Puhalj[3]

[1]University of Maribor, Faculty of Medicine, Institute of Sports Medicine
[2]Science and Research Centre Koper, Institute for Kinesiological Studies
[3]University of Maribor, Faculty of Education

Alpine skiers often have lateral preferences in the right or left turning, in otherwise symmetric turning tasks. It has been suggested that such differences affect the ski turn's temporal, kinematic and dynamic parameters, resulting in shorter turn duration, shorter turn initiation, and higher levels of produced forces for the outer leg of the preferred turning side. Some suggest that such asymmetries can arise from lateral physical performance imbalances, such as muscle force and power production capabilities, muscle composition and characteristics, and lateral functional pattern differences. The assessment of asymmetries is critical in young alpine skiers developing the correct technique and tactics to compete at higher levels. Thus, this study aimed to assess the physical asymmetries and asymmetries in muscle contractile characteristics and functional movement patterns in young perspective alpine skiers.

Thirteen young alpine ski racers (six males, seven females, age: 13.8 ±1.5 years; body mass: 54.9 ± 11.8 kg; height: 162.8 ± 8.7 cm) competing in domestic and international races participated in this single-session study. A bilateral force plate was used to assess squat jump parameters; tensiomiography (TMG) was performed on m. vastus lateralis, m. vastus medialis, m. rectus femoris and m. biceps femoris and functional movement screening (FMS) was used to assess functional asymmetries. The smallest worthwhile changes were calculated to detect asymmetries at an individual level.

Asymmetries were observed at individual levels for all parameters. However, many observed asymmetries were not systematic and showed contradictory insights. It remains unclear which (if any) of the assessed parameters performed in the laboratory setting is the most accurate in reflecting differences in turning laterality since different assessed parameters reflect distinct aspects of physical performance, muscle contractile mechanisms and structure, and functional movement patterns.

As a future perspective, it will be helpful to investigate the relationship between physical asymmetries and kinematic asymmetries observed during ski turning. In addition, it will be beneficial to investigate how the systematic increase or decrease in physical performance asymmetry, muscle structure or functional movement pattern asymmetries will affect ski turning kinematics and how it will be reflected in skiing performance.

Keywords: Tensiomyography, squat jump, FMS, physical performance

Literature:

Vaverka, F., & Vodickova, S. (2010). Laterality of the lower limbs and carving turns. Biology of Sport, 27(2), 129–134.

SELF-ASSESSMENT AMONG SKI INSTRUCTORS WITH DIFFERENT LEVELS OF BASIC ALPINE SKIING SKILLS

Ilija Klincarov[1, 2], Vladimir Vuksanovic[1, 2], Aleksandar Aceski[1], Jovan Jovanovski[2], Kiril Naskov[2]

[1]University Ss. Cyril and Methodius – Skopje, Faculty of Physical Education Sport and Health, Skopje, Republic of North Macedonia
[2]Macedonian Association of Snow Sport Instructors (MAISS), Skopje, Republic of North Macedonia

Ski instructors need to have adequate knowledge and skills in assessing sports techniques as a condition for successful intervention that will lead to improved performance. The purpose of this research was to assess how instructors with different levels of performance evaluate their skiing skills

A total of 58 Instructor candidates were rated with a score of 1 (lowest) to 5 (highest) by Examination Board in 7 elements of basic alpine skiing technique: Gliding straight (basic position), Wedge swinging, Wedge curves, Basic turn, Basic swinging, Wide corridor and Narrow corridor. After the practical exam, all candidates completed a self-assessment form on the same scale of 1 to 5 for each individual skiing element. The average practical grade of all seven skiing techniques, awarded by the Examination Board, was taken as a criterion for grouping. The results obtained from the Examination Board and the Self-Assessment were compared to determine the degree of coincidence expressed as a percentage difference between these two scores. Three groups of high, intermediate and low skiing level were defined. The high-performance group consisted of a total of 16 candidates with an average grade above 4. The mid-level group consisted of 26 candidates with an average grade between 3 and 4, while the low-performance group comprised 16 candidates with an average grade below 3. From the results obtained, there is an evident difference in the objectivity of the self-assessment between groups. The high-

performance group showed the smallest percentage difference (9.79%) in the scores 37 trained by the Examination Board and the Self-Assessment. The mid-level group showed a percentage difference between the two scores of 21.95% and the low-performance group of 54.04%. The high-performance group was recorded also by several individuals who underestimated their performances, which is not the case with the other two groups. There is a significant overrated self-perception in the intermediate group and especially in the low skills group.

The conclusion is that the higher level of performance increases the degree of objectivity of self-assessment. This rate of self-estimation and awareness of body position is probably due to the higher skiing experience of the candidates with the highest level of performance.

Keywords: self-assessment, ski instructors, levels, skills.

Literature:

European Commission, Sport. (2015). Mapping of professional qualifications and relevant training for the profession of ski instructor, in the EU-28, EEA and Switzerland. Final Report October, 2015.

Knudson, V.D. (2013). Qualitative diagnosis of human movement 3th edition. Champaign, IL: Human Kinetics.

CORRELATION OF MOTOR ABILITIES AND BODY CHARACTERISTICS OF YOUNG MALE CATEGORIES WITH PERFORMANCE IN INDIVIDUAL DISCIPLINES IN ALPINE SKIING

Klemen Krejač, Blaž Lešnik, Milan Žvan, Matej Majerič

University of Ljubljana, Faculty of sport, Slovenia

The purpose of the paper was to present the correlation between the motor abilities and body characteristics of the younger male categories with the performance in individual disciplines of alpine skiing. The sample consisted of 26 alpine skiing racers (age 15 and 16) from the U16 category. They were all categorized athletes at the Slovenian Ski Association and had actively competed in the competition VN Nordica Dobermann in the season 2018/2019. Nine variables of motor abilities and four variables of body characteristics were tested. For competitive performance, the criterion was the number of points scored for the competition VN Nordica Dobermann, separated by discipline. Analysis in boys shows the correlation of some motor abilities with competitive performance. We found that performance in the slalom was correlated with the ten-jump (r = 0.39), agility (r = -0.40), pull-ups (r = 0.48), and height jump (r = 0.48). In the giant slalom, the correlation is in the tests, ten-jump (r = 0.41), running 400 m (r = -0.43), balance (r = -0.41), pull-ups (r = 0.70) and height jump (r = 0.42). In the super giant slalom, the correlation is in the tests, running 400 m (r = -0.41), balance (r = -0.48) and pull-ups (r = 0,59). No correlations were found in the analysis between body characteristics and performance in boys. Multiple linear regression analysis also revealed no correlation between the model of all nine variables of motor ability and performance. In the analysis of the model of all four body characteristics and performance, however, the correlation (R^2 = 0.28) is with the giant slalom. Therefore, we found that boys' competitive performance in giant slalom can be predicted from the variables of body characteristics with a 28 % explained variance. Considering that the analysis of the data did not confirm the greater

correlation of motor abilities and body characteristics with the performance in individual disciplines of alpine skiing, we conclude that performance is influenced by some other dimensions, which were not included in the analysis.

Methodological limitations must also be considered when interpreting the data, since the sample was relatively small.

For future research, we suggest updating and expanding the battery of variables for alpine skiing performance prediction and practice testing, as this could give more certainty about what are the variables that determine success in alpine skiing and its disciplines.

SNOW RECRUITER - CONNECTING INSTRUCTORS AND SCHOOLS

Meta Lavrič[1], Ana Pišot[2]

[1]www.snow-recruiter.com – An online portal that connects Snowsports instructors and schools
[2]Ski Instructors and Trainers Association of Slovenia (SITAS) & SLO Demo team

Ski schools are searching for certified instructors around the world. Full-time or part-time, for the whole season or just for the peak weeks, the locals or instructors from other countries. With Snow Recruiter, a centralized database of instructors, ski schools can now find and contact them through the world wide web.

Snowsports instructors' profiles contain information about their certifications, experiences, languages they speak, their availability and other information. They have the ability to apply to job postings or contact schools directly.

Snowsports schools' profiles contain basic information about their school and resort. They have chance to search for specific (instructor's) characteristics and contact them or post a job vacancy.

A *search engine* connects them and gives them the opportunity to work together in the next season or next week.

Snow Recruiter encourages enthusiasts to become Snowsports instructors, helps schools find much needed instructors for the peak weeks and contributes to a healthy competition in the human resources field of ski schools around the world.

Skiing is the best job in the world!

ENHANCING MOTOR LEARNING THROUGH INFORMATION TECHNOLOGY IN ALPINE SKIING

Uroš Marušič[1,2]

[1] Institute for Kinesiology Research, Science and Research Centre Koper; Koper, Slovenia
[2] Department of Health Sciences, Alma Mater Europaea – ECM, Maribor, Slovenia

Alpine skiing requires aerobic and anaerobic power, muscular strength and a variety of complex cognitive-motor abilities, such as coordination, speed, balance, agility, flexibility (White & Johnson, 1993). The degree of difficulty and the duration of the race determine the energy and strength requirements of the ski competition, which underlines the importance of strength and conditioning program for alpine skiers. The aim of such program should be to maximize strength, throughout the force velocity curve with emphasis on eccentric force generation and explosive concentric power generation at slower speeds and to develop strength endurance—capacity to maintain force and dexterity of force from 45–150 seconds. On the other hand, less emphasis is placed on techniques that would provide improvements of complex motor abilities and consequently result in a few milliseconds of improvement that results as a possible victory. Recent advances in information technology (IT) for sport performance enhancement brought new approaches to deal with training optimization and real-time correction of motor learning and re-learning process. The aim of this study was therefore to review the current IT options that could be used to enhance cognitive-motor learning in alpine skiing.

Electronic databases of scientific articles were searched, and reference lists of relevant articles were checked in order to assess current literature in the field of IT usage for motor learning in alpine skiing. The search was not restricted to any publishing date. Included articles were only studies published in English.

The literature in the field of IT usage in skiing is scarce. Recent articles describe the usage of wearable sensors to track and consequently

enhance skiing performance. Moreover, the virtual reality (VR) with the ski-simulator apparatus could be used for motor coordination andlearning as well as relatively new systems (e.g.: FitLight Trainer) to enhance agility and speed of processing.

In the framework of this study we will provide a theoretical background of the importance of cognitive-motor learning with an IT application for alpine skiers. A practical concept of IT application for improving processing speed, agility, coordination and visual cognitive processing will be presented, which can later be used for the purposes of athlete's improvements and/or intensify the learning process while skiing.

Literature:

Hydren, J. R., Volek, J. S., Maresh, C. M., Comstock, B. A., & Kraemer, W. J. (2013). Review of strength and conditioning for alpine ski racing. *Strength & Conditioning Journal*, 35(1), 10-28.

White, A. T., & Johnson, S. C. (1993). Physiological aspects and injury in elite Alpine skiers. *Sports medicine* (Auckland, NZ), 15(3), 170-178.

INJURIES AND ILLNESSES DURING SKIING LESSONS FOR KINESIOLOGY STUDENTS

Bojan Matković[1], Lana Ružić[1], Mandica Vidović[2]

[1]University of Zagreb, Faculty of Kinesiology, Zagreb, Croatia
[2]University clinical hospital „Sestre Milosrdnice", Zagreb, Croatia

The program at the University of Zagreb includes 75 hours of alpine skiing lessons. The practical part of the lessons is conducted out of Zagreb, as field lessons in a ski resort. During the whole stay the students go skiing for undergo 10 days and during this time they are accommodated in a hotel. The aim of this study was to describe the most common injuries and illnesses that occur during the 2 seasons and that cause the absence from skiing lessons.

The total number of skiing days in two seasons was 4180, attended by 418 students in ten groups. Most of the students were Croatian, but 10% of international students (through the Erasmus exchange program and similar) also attended classes.

On average, there were about 5 injuries and 10 illnesses of varying intensity per 1000 skiing days (or per 100 persons over 10 days). The most common reason for lost ski days was increased body temperature (usually 3 to 5 per group), which in total accounted for slightly less than 5% of all participating students. The variance of this symptom between the groups was high, since in some groups there was a spread of the general flu. In case of a flu, it would have been expected that at least 10 to 15% of the students in the hotel would have been affected and would have lost an average of 3 days of ski lessons. In case of a cold, the absence from skiing was on average less than one day. The other common complaint was diarrhea (in rare cases with vomiting), which occurred on average in 1 to 2% of students and usually responded well to a single dose of loperamide and rarely resulted in more than one day's absence. The injuries consisted mainly of knee injuries; a stretching of the MCL, which sometimes returned to teaching after two days (3 injuries/100

pupils/10 days) or more severe knee injuries (1/100 pupils/10 days) and various lacerations (1 to 2 /100 pupils/10 days). Common complaints were compressions of ski boots, which led to blisters and wounds (on average 5/100 pupils/10 days), which in some more severe cases necessitated absence from skiing. Other injuries were rare and included contusions, shoulder dislocations, thumb injuries, hematomas from falls and (1/100 students/10 days). Other complaints were also rare and included toothache, which in 2 cases required the attention of the dentist, conjunctivitis, headache, an allergic reaction of the penicillin skin and, interestingly enough, a cat bite and a brown hermit spider bite (probably).

Literature:

Müller, L., Hildebrandt, C., Müller, E., Oberhoffer, R., Raschner, C. (2017) Injuries and illnesses in a cohort of elite youth alpine ski racers and the influence of biological maturity and relative age: a two-season prospective study. *Open Access J Sports Med*, 8,113-122.

Soligard, T., Palmer, D., Steffen, K., Lopes, A.D., Grant, M.E., Kim, D., Lee, S.Y., Salmina, N., Toresdahl, B.G., Chang, J.Y., Budgett, R., Engebretsen, L. (2019). Sports injury and illness incidence in the PyeongChang 2018 Olympic Winter Games: a prospective study of 2914 athletes from 92 countries. *Br J Sports Med*, 53(17), 1085-1092.

THE INFLUENCE OF SKI HELMET AND GOGGLES ON VISUAL FIELD AND REACTION TIME

Mateja Očić, Vjekoslav Cigrovski, Ivan Bon, Lana Ružić, Tomislav Rupčić

University of Zagreb, Faculty of Kinesiology, Zagreb, Croatia

Increasing number of recreational skiers influence the increased risk of collision and injuries. One of the most serious injuries is head injury. Even though ski helmets usage increases, it is not possible to conclude that the frequency of head injuries decreases significantly. One of the reasons may be the fact that ski helmet in combination with ski goggles might negatively affect width of visual field and reaction speed on visual stimuli.

The sample consists of 43 recreational level skiers. In laboratory conditions, the number of perceived visual stimuli was observed in 5 regions of ortoreter (vision-screening instrument). For testing procedure on the ski slope, Witty timing system was used for assessing the reaction time necessary to perceive visual stimuli. Both in laboratory and in on-field conditions, 3 predefined conditions were tested (1 – wearing only ski cap, 2 – wearing ski cap and sunglasses, 3 – wearing ski goggles and ski helmet).

Significant differences among 3 groups were found when observing visual field in laboratory conditions, tested by ANOVA ($p<0.01$). Visual field was divided into 5 regions on ortoreter instrument. Differences were found in 5 out of 4 regions between mentioned groups. Only middle region of visual field didn´t differ between groups. Least amount of visual stimuli was noted when wearing ski googles and helmet (group 3) compared to other 2 groups. Regarding the field testing, statistical differences were found in both tested situations when the task was registration of visual stimuli from left and right side. Group 3 differed from group 1 and 2 ($p<0.01$).

Although, ski helmets are widely used among recreational level alpine skiers in order to prevent severe head injuries, they are affecting skiers'

visual field. When comparing visual field in laboratory and field conditions, group that had ski googles combined with ski helmets showed significant lack of visibility. In laboratory conditions for the purpose of testing, visual field was divided into 5 regions and the group with googles and helmet had significantly lower peripheral sight. Helmet and googles didn´t affect only middle region which was expected. Similar situation was found in field testing. Due to helmet and googles, examinee had significantly higher time for noticing incoming skier from both sides compared to examinee with ski hat. Therefore, danger of collision is higher on crowded ski slope when wearing the helmet. Although helmet is protecting the head from injuries it might be the reason for numerous collisions on ski slope, which could potentially cause severe injuries.

Keywords: head injuries, visual stimuli, ortoreter, WITTY, field test, safety equipment.

Literature:

Ruedl G, Kopp M, Burtscher M, Zorowka P, Weichbold V, Koci V, Seebacher J (2014). Effect of Wearing a Ski Helmet on Perception and Localization of Sounds. Int J Sports Med, 35(08), 645-650.

Ruedl G, Kopp M, Burtscher M. (2011). The protective effects of helmets in skiers and snowboarders. BMJ, 342, d857.

Russell K, Christie J, Hagel BE (2010). The effects of helmets on the risk of head and neck injuries among skiers and snowboarders: a meta-analysis. CMAJ, 182, 333 – 340.

Ružić L, Tudor A, Radman I, Kasović M, Cigrovski V. (2015). The influence of ski helmets on sound perception and sound localisation on the ski slope. Int J Occup Med Environ Health, 28(2), 389-394.

Ruzic L, Tudor A. (2011). Risk-taking behavior in skiing among helmet wearers and nonwearers. Wilderness Environ Med., 22(4), 291–296.

SKIING IS (STILL) A GAME

Rado Pišot[1], Ljubomir Pavlović[2], Blaž Lešnik[3], Matej Supej[3], Ron Kipp[4],

[1]Science and Research Centre Koper, Slovenia,
[2]FSPE, University of Niš, Serbia
[3] University of Ljubljana, Faculty of Sport, Slovenia,
[4]Squaw Valley Ski Team, Olympic Valley, USA

Over the last 15 years, several books have been published in different languages under the auspices of a group of authors with the common title and focus that "*Skiing is a game"*. The revaluation of the Slovenian, Italian, Croatian, and English versions have complemented the understanding while broadening the horizons of its audience. These alpine ski instructors and trainers have appreciated the simplicity while benefiting from the comprehensive approach addressing the challenges of teaching skiing that are laid out in the current edition.

Today, prior to publication, we have the fifth version of the book - this time in Serbian, which complements the previous content. The authors have been drawn together based on their common desire to find truth in the art of teaching skiing to children while respecting and adhering to the science and pedagogy. While balloons and colored hoops aren't really what you think of when you imagine a scientific laboratory, they are part of our laboratory. Simply, the laboratory where children learn to ski. Specifically, it is where children love to ski, and love to learn to ski. Play and the accompanying movements that facilitate growth while allowing the child to blossom as a skier are introduced. This pathway is designed to allow the child to progress at their own indigenous developmental rate. Understanding this, leads us, the practitioners, to an appreciation that children cannot be forced to ski. Skiing is a child-like activity, and when it is treated as such, the love of skiing grows within the child.

Science forms the backbone of this book. Some readers will find the term "science" obtrusive or irrelevant to teaching, as they think of teaching as more of an "art". The authors couldn't agree more with this need for the

"art" of teaching. But just as a painter needs paint brush, a teacher needs subject matter.

This book offers an insight into the process of teaching skiing from the perspective of students and teachers. It provides the teacher with tools to guide the way to skiing knowledge in the most creative and personalized way.

Literature:

Pišot, R., Pavlović, L., Lešnik, B., Supej, M., Kipp, R. W. Skijanje je igra (in press), 2022

INTERGENERATIONAL DIVERSITY ON THE SKI SLOPES - WHAT DO SKI INSTRUCTORS NEED TO KNOW?

Saša Pišot, Rado Pišot

Science and Research Center Koper, Slovenia

In the media we have witnessed frequent categorizations of people according to generations (x, y, z generations). Despite possible stereotypes, knowing how a particular generation phase characterizes people helps us to understand their actions, behavior and values. Ski Association of Slovenia (SITAS) is today facing 5 different generations of ski instructors, therefore a critical look at the essential characteristics of the generations is welcome for all those who work as ski instructors and with children, teenagers and parents. The purpose of this paper is to highlight the generational characteristics of Slovenian ski instructors and give some guidelines to make ski instruction more successful and fun. In order to obtain clear picture of active ski instructors we have analyzed the data from MARS - SITAS application for electronic assessment of membership, Blue Card holder and licenses, received on 27 January 2022. Data on the professional title, gender, valid license (validity and type) and the age generation of the ski instructors were analyzed. The age generations were defined as "traditionalists" (born before 1945), "baby boomers" (born 1946-1964); "generation X" (born 1965-1976), "generation Y" (born 1977-1997) and "generation Z" (born after 1997). The descriptive statistics and the X^2 test for asymptotic significance with respect to age generation and gender were performed with significant decisions accepted on $p < 0.05$.

The MARS application contained 3,286 personal records with various professional qualifications in Alpine and Nordic skiing, of which 2,803 hold a ski instructor title and 1,689 (51%) a valid instructor license. Only active licensees were analyzed, with 28.7% were females and 71.3% were males. The Chi-square ($X^{2)}$) test confirmed uneven distribution of the age generations of licenses holder of different levels ($P < 0.001$). The representatives of the "Generation Y" (n = 847) dominate with the title

U2 (51%) of the IVSI licenses and have the largest share in the ISIA licenses (48.4%), followed by a quite well represented "Generation X" (IVSI 24% and ISIA 17.3%) and "Boomers" (20% ISIA, 17% IVSI), which together make up more than 40% of all active ski instructors. The "Generation Z" are the least represented, as they are only just becoming ski instructors. Surprisingly, there are 8 representatives of the "traditionalists" who, despite their age of more than 75 years, are still holders of ISIA licenses. The Chi square test also confirmed uneven gender distribution of license holders at different levels (P 0.001), with males having the highest relative share of ISIA licenses (81.6%), while they are lower in IVSI (68.4%) and ZUTS licenses (61.4%). Considering the fact that the majority of ski students are pre-school and school children, the ski instructors train representatives of Generation Z who are characterized as cautious, pragmatic, global, outgoing, unique, visual and high-tech. They are the most "networked", educated and cultured of the previous generations, but also the most "sedentary", overweight generation, with poorly developed physical and social skills, with less contact with nature, with shorter attention spans, but at the same time very multitasking. Ski teaching the Generation Z (also new Generation Alpha born 2010 on) should be dynamic and include clear instructions, focus on visual demonstration, including technology where possible (video analysis on the slopes, immediate feedback, e-gadget games), encourage participation in the lessons and support active cohesion. In addition, the ski instructor must also be well equipped to communicate with the parents (Generation Y), so that the child's goals in skiing (playing on snow) can be better understood and captured by parents' objectives (technical knowledge).

Keywords: intergenerational diversity, educational approach, ski instructors, licenses

Literature:

MARS – application of ZUTS (Ski Association of Slovenia) for electronic assessment of membership, Blue Card holder and licenses

Swanzen, R. (2018). Facing the generation chasm: the parenting and teaching of generations y and z; International Journal of Child, Youth and Family Studies 9(2): 125–150, DOI:10.18357/ijcyfs92201818216;

EXECUTIVE FUNCTION TRAINING FOR IMPROVING SKIING-RELEVANT POSTURAL CONTROL AND SPEEDED REACTIONS

Manca Peskar [1,2], Rado Pišot [1], Uroš Marušič[1,3]

[1]Institute for Kinesiology Research, Science and Research Center Koper, Slovenia
[2]Biological Psychology and Neuroergonomics, Department of Psychology and Ergonomics, Faculty V: Mechanical Engineering and Transport Systems, Technische Universität Berlin, Berlin, Germany
[3]Alma Mater Europaea – ECM, Department of Health Sciences, Maribor, Slovenia

Executive functions are a collection of cognitive processes whose primary function is cognitive control of behavior. Executive functions are considered higher-level cognitive functions as they (i) regulate lower-level cognitive processes involved in basic information processing and (ii) guard selection and monitoring of behavior, emotions, and thoughts to facilitate the realization of the set goals. The three-core executive function are working memory, inhibition, and cognitive flexibility. Working memory is responsible for updating and monitoring of information processing, which allows us to actively manipulate the information at hand. Inhibition guards the selection of our attention and behavior enabling us to react with controlled and suitable actions and resist inappropriate impulses. Cognitive flexibility relates to the ability of adapting to the changing demands, such as switching perspectives or task instructions. Executive functions are essential for the execution of goal-oriented behavior, planning, and problem-solving. Motor skills are typically not understood as cognitive, yet the expression motor actually implies cognition, as physical movement involved in learning requires planning and intention. In children, executive functions and motor skills co-develop in a bidirectional and synergistic way, and motor skills have been linked to early academic success. Significance of executive function in different sports has been demonstrated. For example, in skiing, working memory is used to keep the relevant information about the ski track in mind and to update the knowledge of the weather condition; inhibition filters out the distracting factors, such as the audience noise; and adapting one's behavior to the ever-changing weather conditions

requires cognitive flexibility. All of them working together keeps us focused and enable goal-directed behavior. However, it has been shown that elite athletes of the open-skills sports, such as basketball, outperform the closed-skill athletes, such as skiers, on measures of working memory and cognitive flexibility. Given that executive functions and motor skills are so tightly intertwined that it is almost impossible to discuss one without the other, we here opt to improve executive functions of skiers by applying a cognitive-motor-based training of executive function that targets motor skill which are essential for competitive skiing performance. We demonstrate a training approach that targets and improves speeded reaction to the correct stimulus among many distractors on one hand, and on the other hand, teaches sustained and precisely regulated balance and proprioceptive control.

Keywords: executive functions, cognitive-motor training, reaction time, balance control.

Literature:

Diamond, A. (2013). Executive functions. Annual Review of Psychology, 64, 135–168. https://doi.org/10.1146/annurev-psych-113011-143750

Koch, P., & Krenn, B. (2021). Executive functions in elite athletes – Comparing open-skill and closed-skill sports and considering the role of athletes' past involvement in both sport categories. Psychology of Sport and Exercise, 55, 101925. https://doi.org/10.1016/J.PSYCHSPORT.2021.101925

McClelland, M. M., & Cameron, C. E. (2019). Developing together: The role of executive function and motor skills in children's early academic lives. Early Childhood Research Quarterly, 46, 142–151. https://doi.org/10.1016/J.ECRESQ.2018.03.014

CORRELATIONS OF MOTOR AND ANTROPOMETRIC VARIABLES WITH SUCCESSFULNESS OF YOUNG COMPETITORS IN ALPINE SKIING

Stojan Puhalj[1], Blaž Lešnik[2], Robi Kelc[3], Črtomir Matejek[1]

[1]University of Maribor, Faculty of Education, Maribor, Slovenia
[2]University of Ljubljana, Faculty of Sport, Ljubljana, Slovenia
[3]University of Maribor, Faculty of Medicine, Maribor, Slovenia

In alpine skiing we encounter many factors that affect to a greater or lesser extent competitor and must be overcome or exploited in various ways. Broadly speaking, the game nature plays its role just like equipment, spectators, coach, etc., but it plays the most important role the competitor himself. Optimal synthesis is necessary for the successful participation of a competitor at the top level physical, psychological and social abilities. In the transformation process (training) we bring the competitor with different methods and means from the initial to the final state, which means that it is a matter of consciously changing many of the abilities and characteristics of the competitor, that is as well as affecting his personality.

In this research we wanted to establish the extent to which certain anthropometric and motor parameters related to the competitive performance of younger boys aged 12 to 13 years in the competition for the Nordica Dobermann Cup in the season 2020/21. Based on the measurements of seven tests of motor abilities (MSKOK10 – Ten jumps on both legs, TESJCAS – Squat jump, MS20NVZP – 20m sprint, TREAOPTO – Optojump – Squad jump, MT400 – Running at 400m, MROS - Equilibrium stability index, and SKI9 - Eights around 9 pins) and one measurement of anthropometric dimension (ABMI - Body mass index), we used the Pearson correlation coefficient to determine the connection of individual variables with the performance for a sample of 36 young

competitors in alpine skiing. The connection of whole set of variables regarding performance was determined with regression analysis.

We have established a statistically significant correlation between the number of achieved points and the variables MSKOK10, MS20NVZP, MT400 and SKI9 at the risk level of 1%. In the case of TREAOPTO, MROSI and TESJCAS the correlation coefficients did not show statistically significant connection. For the set of motor and anthropometric variables we have established a high linear connection to the criteria (R=0.76). The correlation between all the variables and performance is statistically significant (Sig F = 0.003). We have also established, that the linear connection between all the motor variables and the performance is high (R=0.72). The correlation between all the motor variables and performance is statistically significant (Sig F=0.006). The findings of this research show the suitability of the chosen variables in determining the potential success of young alpine skiers.

Keywords: Alpine skiing, young competitors' performance, motor abilities, anthropometry

Literature:

Petrović, K., Šmitek, J., & Žvan, M. (1984). Pot do uspeha. Ljubljana: Mladinska knjiga.

Lešnik, B. in Žvan, M. (2007). Naše smučine. Teorija in metodika alpskega smučanja. Ljubljana: SZS – ZUTS Slovenije.

Bandalo, M. in Lešnik, B. (2012). Povečevanje vpliva izbranih telesnih karakteristik na uspešnost mladih tekmovalcev v alpskem smučanju. Šport, 60(1/2), 136–142.

USE OF PRESSURE INSOLE SYSTEM IN ALPINE SKIING RESEARCH: NARRATIVE REVIEW

Dušan Stanković, Milan Simonović

University of Nis, Faculty of Sport and Physical Education, Nis, Serbia

The quality of measuring ground reaction forces in alpine skiing was particularly developed in the 1990s with the emergence of modern pressure sensors. This paper provides an overview of articles researching the use of the pressure insole system in alpine skiing, as well as variations of technology for a direct ground reaction force measuring. Three electronic databases (Web of Science, PubMed, Google Scholar) were used to systematically review the topic using the succeeding key words: pressure, insole, alpine and skiing, for the period of 2011 to 2021. After removing duplicate and irrelevant studies, 21 articles were used for further narrative analysis.

Most studies used Pedar-X system (Novel GmbH, Munich, Germany), with different number of sensors and different sampling frequency, from 50 to 100 Hz. It was usually equipment where data acquisition systems were fixed on a belt and after the run data were exported by specific software. Depending on the research task, stationary and wireless sensors were used.

Due to the possibility of independent monitoring, most studies aimed at asymmetry of the ground reaction force of both legs. Also, some research has shown differences in the ground reaction force in relation to the phases in the technique of turning in alpine skiing.

Keywords: ground reaction forces, turn phases, sensors, angle.

Literature:

Ciniglio, A., Guiotto, A., Spolaor, F., & Sawacha, Z. (2021). The design and simulation of a 16-sensors plantar pressure insole layout for different applications: From sports to clinics, a pilot study. *Sensors*, *21*(4). https://doi.org/10.3390/s21041450.

Falda-Buscaiot, T., Hintzy, F., Rougier, P., Lacouture, P., & Coulmy, N. (2017). Influence of slope steepness, foot position and turn phase on plantar pressure distribution during giant slalom alpine ski racing. *PLoS ONE*, *12*(5). https://doi.org/10.1371/journal.pone.0176975.

Martínez, A., Jahnel, R., Buchecker, M., Snyder, C., Brunauer, R., & Stöggl, T. (2019). Development of an automatic alpine skiing turn detection algorithm based on a simple sensor setup. *Sensors (Switzerland)*, *19*(4). https://doi.org/10.3390/s19040902.

Ogrin, J., Šarabon, N., Madsen, M. K., Kersting, U., Holmberg, H. C., & Supej, M. (2021). Asymmetries in Ground Reaction Forces During Turns by Elite Slalom Alpine Skiers Are Not Related to Asymmetries in Muscular Strength. *Frontiers in Physiology*, *12*. https://doi.org/10.3389/fphys.2021.577698.

Spörri, J., Müller, E., & Kröll, J. (2021). "When you're down, stay down": A lesson for all competitive alpine skiers supported by an ACL rupture measured in vivo. *Journal of Sport and Health Science*. https://doi.org/10.1016/j.jshs.2021.11.004.

THE CONNECTION BETWEEN THE SPECIAL MOTOR ABILITIES AND SUCCESS OF YOUNG COMPETITORS IN ALPINE SKIING

Tomaž Šegula

Secondary school of design, Maribor

The aim of this paper is to determine the relationships between motor performance tests and the success of young competitors in alpine skiing. The sample includes 41 young competitors in the U16 category. The sample of variables represents 8 variables: maximum speed (MS20NVZP), speed endurance (MT400), speed of movement with coordination (MHFNTB, SKI9), agility (M4X15M), propulsive power of legs (MSKOK10, MMEN3SM), power of arms and back (MZGIBE). The criterion variable is presented as success in the Nordica Dobermann Cup competition in the 2019/20 season. The data were analyzed using the SPSS software package, where in the first step we determined the basic statistics of the variables and the relationship of each variable to the criterion variable with the calculation of Pearson correlation coefficients. In the second step, we calculated the relationship of all variables together with the criterion variable, which was determined by regression analysis.

The results confirm that there is a significant correlation between all individual variables and also between all variables together with competitive performance. The results are: MS20NVZP (sig: 0.00; r: 0.66), MT400 (sig: 0.00; r: 0.64), MHFNTB (sig: 0.00; r: 0.67), SKI9 (sig: 0.05; r:0.40), M4X15M (sig: 0.01; r: 0.54), MSKOK10 (sig: 0.00; r: 0.67), MMEN3SM (sig: 0.01; r: 0.55), MZGIBE (sig: 0.00; r: 0.67). The results suggest that specific motor skills are the most important part of the competitive performance of young alpine competitors. Therefore, tests of these skills should be included in the training program at least twice a year.

Keywords: Alpine skiing, young competitors' performance, motor abilities, anthropometry

Literature:

Abbott, A. in Collins, D. (2004). Eliminating the dichotomy between theory and pratice in talent identification and development: Condisering the role of psychology. Journal of sports science, 22: 395 – 408.

Bačanac, Lj. (2005). Psihološke osnove dečijeg sporta. V dečiji sport od prakse do akademske oblasti. Beograd: Fakulteta sporta i fizičkog vaspitanja Univerziteta u Beogradu.

Balyi, I. (2002). Long – term athlete development: trainability in child – hood and adolescent.

Periodization; Theory and methodology of training. United states; York University.

Cote, J. (1999). The infuence of the family in the development of talent in sport. The sport psyhologist, 13: 395 – 417.

DIFFERENCES IN SKELETAL MUSCLE CONTRACTILE PROPERTIES BETWEEN SPEED AND TECHNICAL EVENTS IN ALPINE SKIING

Boštjan Šimunič[1], Luka Golob [2], Rado Pišot [1], Milan Žvan [2]

[1] Science and Research Centre Koper, Institute for kinesiology research, Koper, Slovenia
[2] University of Ljubljana, Faculty of Sport, Ljubljana, Slovenia

Tensiomyography (TMG) is a reliable non-invasive technique that detects radial muscle belly thickening and oscillations during isometric electrically elicited muscle contractions. Its parameters correlate to muscle composition, muscle atrophy/hypertrophy and muscle tone/stiffness. Method has been widely used in sport sciences but never in alpine skiing. Therefore, we will present the only alpine skiing study that compares TMG-derived contractile properties of two knee extensors between two groups of world cup skiers: technical events (TE, giant slalom and slalom) and speed events (SE, super G and downhill racers). We measured 14 world cup racers (age 27±3 years; height 190±5 cm; mass 87±7 kg) that were divided in two groups (TE and SE) of 7 racers, based on their best alpine discipline. TMG was used to assess vastus medialis (VM) and lateralis (VL), in both legs, and in different knee angles: from fully extended knee (0deg) to 90deg flexion, in steps of 10deg. From maximal TMG response five contractile parameters were extracted: Delay time (Td), Contraction time (Tc), Sustain time (Ts), Half-relaxation time (Tr) and maximal displacement (Dm). SE has shorter VM Tc in knee angles from 20deg to 90deg ($P < .05$), while TE has shorter VL Tc in knee angles from 0deg to 10 deg ($P<.025$). SE has smaller VM Dm only at 60deg knee flexion ($P=0.048$), while TE has smaller VL Dm in knee flexions from 0deg to 20 deg ($P<.035$). We also found that TE has consistently shorter Ts in both muscles and both legs ($P<.47$). In general, shorter Tc is correlated to higher proportion of type II muscle fibres, which is most likely not the case for this study. We must consider optimal overlap of both contractile proteins in different angles (e.g. number of

consecutive sarcomeres) to explain differences found in Tc within different angles and both groups.

Further, Dm was previously found to negatively correlate to muscle tone and/or stiffness changes. Therefore, we could say that smaller Dm could explain higher muscle tone. Ts was never validated in previous studies; however, one might expect that those athletes with higher frequency of movement would have also shorter Ts. In conclusion, TMG could be used to assess and individualise sport specific training in alpine skiers; however, we must consider knee angle as an important factor of TMG assessment.

Keywords: Tensiomyography, Contraction time, Muscle contraction, Muscle tone, Muscle Stiffness

Literature:

Šimunič B, Degens H, Rittweger J., Narici M, Mekjavić IB, Pišot R. (2011). Noninvasive estimateon of myosin heavy chain composition in human skeletal muscle. *Medicine & Science in Sports & Exercise*, 43(9), 27-30.

Šimunič B, Koren K, Rittweger J, Lazzer S, Reggiani C, Rejc E, Pišot R, Narici MV, Degens H (2019). Tensiomyography detects early hallmarks of bed-rest-induced atrophy before changes in muscle architecture. *Journal of Applied Physiology,* 26(4), 815-22.

ARE GENERATION-Z FEMALE ADOLESCENTS INTERESTED IN ALPINE SKIING?

Matej Švegl

Secondary school for Pharmacy, Cosmetics and Health care, Ljubljana, Slovenia

Slovenia is considered to be a "skiing country". Unfortunately, in last two decades there seems to be a drop of interest. It is especially apparent at local ski resorts as the one day visitors there are mostly middle aged ("boomers, generation X"). Also, it seems that there is a very small number of younger females ("millennials, generation Z") on the slopes compared to e.g. 80's or 90's. For that reason, the aim of this study was to provide an insight into interest for skiing in teenage female Slovenians and to explore the relation between the parental skiing habits and their daughters' interests for skiing.

A short survey was distributed in one of the biggest vocational high schools in Ljubljana. The pupils were form different parts of Slovenia and did not represent only the capital. Also, the entry requirements to this school are moderate, so the school was a good choice for a pilot project. The survey was administrated through mobile application but was overseen and filled in only after face-to-face instructions. Out of 323 surveys 270 were female and analyzed. Almost 90% know how to ski (38% learned before, 30% in elementary school, 20% during obligatory filed winter school and only 1% in high school). Nevertheless, 52% did not ski at all in last 3 years, and even worse, only 30% skied every year. The disappointing result was the number of ski days as 37% skied only 1 or 2 days and another 40% only 3-6 days. Only around 10 to 20% of girls skied actively, if we consider an active skier to be a person with over 6 days of skiing per year. 48% fathers and 34% mothers do ski, either regularly or from time; some used to ski but stopped, while 22% of fathers and 41% do not know how to ski at all. Regarding the mother and father influence there was an expected extremely strong relationship between fathers who ski(-ed) and girls skiing ($Chi2=37.34$; $p<0.0001$), mothers and girls ($Chi2=33.33$; $p<0.0001$) and the strongest with two parents skiing ($Chi2=59.35$; $p<0.0001$).

The results of this study raise of course the question of money, but the discouraging results were the answers to "If you would be offered a one-week of free skiing holidays, would you go?". Almost a half would refuse it and go somewhere else instead. In conclusion, if the number of skiers continue to drop there will be less and less future parents skiing and as seen in the study, without their influence the future trends will be even worse no matter the closeness of ski resorts. During the ski course in elementary school, we should address the attitudes, as those can be changed.

Keywords: skiing, adolescents, interest

Literature:

Cigrovski, V. et al. Effects of alpine ski course program on attitudes towards alpine skiing effects of alpine ski course program on attitudes towards alpine skiing. Kinesiology, 2014; 46(1): 46–5.

Malasevska I. Explaining variation in alpine skiing frequency, Scand J Hospit Tourism, 2018; 18(2): 214–24.

WHAT SHOULD CHILDREN EAT WHEN SKIING?

Kaja Teraž[1,2], Saša Pišot[1], Rado Pišot[1]

[1] Institute for kinesiology research, ZRS Koper, Slovenia
[2] University of Ljubljana, Faculty of Sport, Slovenia

We already know that proper nutrition is crucial for children to maintain growth and development, therefore, to achieve optimal progress in selected physical activity. Ski schools usually involve all-day learning, which means that children are active for 4-6 hours with a half hour lunch break. The break is intended for rest, relaxation and refreshment., It is inevitable to shed light on the quality of food that children and adolescents consume during such trips. Usually, the food consumed on ski trips is prepared in advance by parents or eaten in local restaurants. Food is usually rich in fat and sugar, poor in proteins, vitamins and minerals and does not cover all body needs.

When we talk about specific circumstances of ski activities, we need to pay attention to several factors. Firstly, the basal metabolic rate is higher in winter than in summer, because the body needs more energy to maintain normal body temperature during activity. Cold environments influence hormones related to hunger, which can increase appetite toward excessive food intake. Moreover, extreme environmental condition (such as high altitude and low temperatures) can also reduce immune function and effect selected micronutrients such as iron status and vitamin D levels. In addition, children require more energy during sports activities than do adolescents or adults. For this reason, we need to provide an adequate food reach in proteins, whole grain carbohydrate and healthy fats.

It is important that children start the day with breakfast and come to the snow ready and fit. A nutritious breakfast gives children the energy to wait for lunch without feeling hungry. Local restaurants often offer French fries, pizza and other fast-food that are otherwise attractive to children, but lack the recommended fruits, vegetables, dairy, whole grains, lean meats and fish. This change in eating patterns leads to excessive consumption of fat, saturated fats, trans fats and added sugars

as well as inadequate intake of micronutrients such as calcium, iron, zinc and potassium, vitamins A, D and C and folic acid. Therefore, it is prudent to encourage children to choose healthy and nutritious meals when possible. Since there is often not a lot of at choice in local restaurants, we can also encourage children to bring snacks or meals with them. In this way, the individual has better control over food choices. Appropriate foods for a backpack snack may include milk drinks, yoghourt, cheese, fruit, grain bread, oatmeal, nuts, granola bars.

To prevent voluntary dehydration children should take drink breaks every 20 minutes. Water or unsweetened tea are appropriate beverages. We try to avoid promoting sweetened beverages. Nevertheless, the role of parents, as well as that of ski teacher, is important when it comes to determine children's food choices. Depending on how what we eat and talk about, they, as ae role models, can have a positive or negative influence on the development of children's dietary/eating habits.

Keywords: eating habits, nutrition, children, outdoor activities

Literature:

American Heart Association, Gidding, S. S., Dennison, B. A., Birch, L. L., Daniels, S. R., Gilman, M. W., Lichtenstein, A. H., Rattay, K. T., Steinberger, J., Stettler, N., & Van Horn, L. (2006). Dietary Recommendations for Children and Adolescents: A Guide for Practitioners. Pediatrics, 117(2), 544–559. https://doi.org/10.1542/peds.2005-2374.

Bar-Or, O. (2000). Nutrition for child and adolescent athletes. Sport Sci. Exchange, 13(2), 1–4.

Dzimbova, T. (2020). Nutritional paterns of children involved in four different sports: Ski, gymnastics, football, and basketball. Research in Physical Education, Sport & Health, 9(1).

Sports dietitians Australia. (2016). Fact sheed: Food for your sport—Snowboarding. https://www.sportsdietitians.com.au/wp-content/uploads/2017/05/FFYS_Snowboarding_2016.pdf.

Sports dietitians Australia. (2021). Nutrition for junior athletes. https://www.sportsdietitians.com.au/wp-content/uploads/2015/04/Junior-Nutrition-FINAL.pdf.

Stroebele, N., & De Castro, J. M. (2004). Effect of ambience on food intake and food choice. Nutrition, 20(9), 821–838. https://doi.org/10.1016/j.nut.2004.05.012.

SNOW SPORTS COURSES AND THE IMPACT ON STUDENTS OF THE NATIONAL SPORTS ACADEMY "VASIL LEVSKI"

Deyan Todorov, Svetoslav Simeonov

Snow Sports Department
VASIL LEVSKI National Sports Academy – Sofia,

The National Sports Academy "V. Levski" – the sports university of Bulgaria, has almost 80 years of history and state accreditation for the education of coaches in more than 76 sports, physical education teachers, kinesitherapy and sport animation specialists. Ever since the founding of the university, a specialized course in skiing has been part of its educational programs as an obligatory course for all students. The present program and content of the course has been upgraded, according to the contemporary trends in the snow sports. The duration of the "Snow Sports" course is 14 days and the students acquire practical skills and knowledge in alpine skiing, cross-country skiing and snowboarding.

The course program includes a total of 12 hours of lectures, and 5 hours of practical seminars per day every day. Apart from the theoretical and practical training aims, the course has a general educational impact on the participants. The impact of the course work on the students and the opportunities for optimization of the course program have always been of great interest to the team of specialists and trainee students conducting the course lectures and the practical sessions. The aim of our research was to study the influence of the "Snow Sports" course on the students from the National Sports Academy "V. Levski", in terms of its social, psychological, physiological, training and educational impact.

The research includes an enquiry with students who had already completed their education in the "Snow Sports" course, aged between 19 and 25. The greater part of them had no preliminary experience in the Snow Sports, and they made their first steps in skiing and snowboarding at the course. However, after finishing the course, a great number of

them chose to continue with additional education in the snow sports. The students gave a positive self-evaluation of their physical and mental health after the end of the course, and they reported an improvement in their general wellbeing. They also noted an increase in their social contacts, in the number of new acquaintances with colleagues, and in their loyalty to the Academy.

The study also takes into account the acquired knowledge and skills in snow sports, in safety rules, and in environmental protection requirements. As a result, students gain confidence that they have developed new training and leadership qualities, giving them the opportunity to practise another new profession. On the basis of these results, we have reasons to assume, that this form of education in snow sports has a multi-aspectual impact on the students. This assumption strengthens our conviction, that snow sports could have a wide application, not only in the education and training of young people, but also in their socialization.

Keywords: course, snow sports, impact, education.

COMPARISON OF SKELETAL MUSCLES BIOMECHANICAL CHARACTERISTICS BETWEEN TOP LEVEL AND RECREATIONAL ALPINE SKIERS

Jure Urbanc, Rado Pišot

Institute for Kinesiology Research, Science and Research Centre of Koper, Slovenia

Alpine skiing has long been considered a Slovenian national sport. Amongst the skiers are the young, the less young, professionals and recreational athletes. Naturally, the skiing equipment, technique and the manner of skiing have changed through the years, and so has the trend and type of injuries. The aim of our study was to determine the differences in biomechanical characteristics of skeletal muscles between professional and recreational alpine skiers.

We included 60 male skiers in the study, 30 of which are professional skiers (this includes all disciplines), while 30 are active skiers but practice the sport recreationally. All the subjects were different nationalities. The average age of professional skiers was 26.3 ± 6.7, while the average age of recreational skiers was 25.7 ±7.3. The body height of professional skiers was 180.4 ± 11.4 cm while the body height of recreational skiers was 182.4 ± 13.6) cm. The body mass of professional skiers was 86.1 ± 16.1 kg while the body mass of recreational skiers was 80.0 ± 16.0 kg. The measurements were made with the TMG method. We measured all superficial anterior and posterior thigh muscles.

The study showed a significant difference in muscle contraction time (TC) and muscle displacement (DM) between professional skiers and recreational skiers. The measurement results showed a statistical significance for selected muscles in contraction time as well as muscle displacement. An interesting observation is that we did not find any statistically significant differences in functional knee symmetry. However, we can say with certainty that the highest number of differences between the measured skeletal muscles of professional skiers and recreational skiers is in muscle displacement (DM). This is because we found statistically significant differences in all measured

skeletal muscles, except for the left leg vastus medialis. Furthermore, we can also say with certainty that there are differences in muscle contraction time (TC) between the subjects, especially for biceps femoris muscles on the left as well as the right side. We found statistically significant differences here as well, and they show that the observed skeletal muscles of professional alpine skiers are much faster. With the study we wanted to prove the existence of differences between biomechanical characteristics in observed skeletal muscles of topmost and recreational alpine skiers, and that they are in favor of the topmost skiers. The results of the study show that recreational skiers are in poorer shape before the ski season, mostly because there is not enough emphasis on the importance of injury prevention in recreational alpine skiing. In our research, we proved many estimated differences and confirmed most of the set hypotheses.

Keywords: alpine skiing, ski technique, ski equipment, motor and functional skills, injuries, tensiomyography.

Literature:

Dahmane R. (2002). Histokemična, morfometrična in biomehanska primerjava mišic zgornjega in spodnjega uda. Ljubljana; Univerza v Ljubljani, 2002.

Golob, L., (2008). Primerjava tenziomiografskih meritev med predstavniki različnih disciplin v alpskem smučanju. Fakulteta za šport. Diplomsko delo.

Lešnik, B., Šimunič, B., Žvan, M. in Pišot, R. (2012). Adaptation of vastii muscles in top skiers from different alpine skiing disciplines. Str. 251–262. Maidenhead: Meyer & Meyer Sport (Verlag).

Pišot, R., Kipp, R. in Supej, M. (2015). Skiing is a game, 2nd ed. Koper: Univerza na Primorskem, Znanstveno-raziskovalno središče Koper – Inštitut za kineziološke raziskave. Univerzitetna Založba Annales.

Puhalj S. (2018). Vrednotenje uspešnosti tekmovalnega alpskega smučanja v obdobju poznega otroštva in adolescence: doktorska disertacija. Koper: Fakulteta za matematiko, naravoslovje in informacijske tehnologije, Univerza na Primorskem

CORRELATION BETWEEN THE PRACTICAL AND THEORETICAL KNOWLADGE OF BASIC ALPINE SKIING TECHNIQUES

Vladimir Vuksanovic[1, 2], Ilija Klincarov[1, 2], Jovan Jovanovski[2], Kiril Naskov[2]

[1]University Ss. Cyril and Methodius - Skopje, Faculty of Physical Education Sport and Health, Skopje, Republic of North Macedonia
[2]Macedonian Association of Snow Sport Instructors (MAISS), Skopje, Republic of North Macedonia

Practical and theoretical knowledge of the skiing performance is of great importance for the successful work of ski instructors. In this paper, the authors aim to present the analysis of the achievements of the candidates who have joined theoretical and practical exam for a Ski Instructor License organized by MAISS in Mavrovo Ski Centre in January 2020. The relationships between the candidates practical and theoretical knowledge have been explored.

The practical knowledge of the candidates was assessed during the demonstration of seven basic skiing techniques: Gliding straight (basic parallel and wedge position) with stopping in wedge position, Wedge swinging, Wedge curves, Basic turn, Basic swinging, Connected Parallel turns in Wide corridor and Connected Parallel turns in Narrow corridor. Each candidate was rated by Examination Board with a score of 1 (lowest practical demonstration) to 5 (highest practical demonstration) in all consecutive techniques. In addition, the written test with a total of 24 questions (with multiple choice) was proceeded to test the theoretical knowledge about skiing techniques. During the theoretical modules that took place a few months before the exams, presentations of the correct performances of the required skiing techniques, were presented and shared (as video material) among the candidates.

In total, the results of 62 candidates who took the practical and theoretical exam were analyzed. The results of the analysis showed a low level of correlation in the practical and theoretical successfulness (r=0.3).

This generally indicates that in the analyzed group of skis instructors, the theoretical knowledge about the skiing techniques was not correlated into the practical performance. Skiing experience and other factors as physical fitness are probably the determinants of practical skills.

Keywords: correlation, practical, theoretical, knowledge, skiing techniques.

Literature:

Chera-Ferrario, B., Popescu-Bradiceni I., & Pica, A. (2019). The Vision of Hermeneutic Interpretation upon the Skiers' Gestures. Postmodern Openings/Deschideri Postmoderne, 10(2).

Kuna, D., Brymer, E., Davids, K., & Marinkovic, D. (2018). Task constraints patterns in acquisition of the basic turn as implemented by international expert ski coaches. Kinesiologia Slovenica, 24(1), 28-34.

THE BENEFITS OF THE COURSES IN SNOW SPORTS FOR STUDENTS OF THE NATIONAL SPORTS ACADEMY "VASIL LEVSKI"

Krastio Zgurovski, Petar Iankov, Deyan Todorov, Milena Zdravcheva

Snow Sports Department, VASIL LEVSKI National Sports Academy – Sofia

The "Snow Sports" course at the "National Sports Academy" has a multifaceted influence on the participants and the benefit they derive from it is much more than the acquisition of new motor skills. The combination of physical activity in a protected natural environment definitely brings great benefits to the participants. The main benefit of the research was the introduction of six multi-aspect groups of benefits:

- physical health,
- mental health,
- socialization,
- education and training,
- ecology and environmental protection and
- a new profession.

The current research involves 1200 students aged 19-25 years for the period 2016-2019, in the research we have used the following methods: Survey Method Spielberger Test for Situational Anxiety Testing, measuring and diagnosis of Physical Development Standard Unmeasured Physical Exercise Test - Ruffier Sample and measurement of anthropometric indicators and tracking changes in the BMI.
The results obtained show a clearly pronounced tendency to improve the physical health of the participants, a positive influence on their psychological well-being and a sense of achievement and success through new contacts, friendships and a specific social environment. The research participants have stated that they have changed their attitude towards the natural environment and already feel closer to it.

At the end of the course the fear of the situation was reduced, and HR improved by 10.26%. The improvement in functional status according to

the index scale for all students is 25.74%. The participants have developed new knowledge and skills related to snow sports, which is a precondition for their future development in a new profession.

Most of the participants expressed their willingness to continue practicing snow sports after their participation in the project.

Keywords: mental health, physical health, socialization, snow sports course

The SPE BALKAN SKI Conference is substantially and professionally supported by the IVSS – International Association Snowsports at Schools and Universities.

ORGANIZED BY

SPONSORED BY


ANNALES
ZRS