Mostly about motor and technical ability of skiers and its predisposition

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Changes of parameters of physical capacity of a female cross-country skier within preparation period

In our project, we have observed the structure of strain of a cross-country skier within the preparation period and its influence on aerobic performance and capacity. At an observed cross-country skier we have recorded an increase of VO$_2$max from 58.15 ml · kg$^{-1}$ · min$^{-1}$ to 63.15 ml · kg$^{-1}$ · min$^{-1}$ (thus by 5 ml · kg$^{-1}$ · min$^{-1}$). At the same time, we have recorded shift of lactate line and thus speed increase at ANT (at relatively the same value of HR and lactate level).

Estimation of selected parameters of acid-base balance and electrolytes in Alpine skiers and biathlonists

The aim. Physical effort is among the elements that indicate disturbance of acid-base balance in organism. The course and grade of these factors intensification depend on the sort of effort and the level of organism adaptation. The aim of the paper is to present the estimation of chosen parameters of acid-base balance in biathletes and alpine skiers and influence of maximum exercise on these changes.

Material and methods. During the experiment, in which took part 15 biathletes (B), 26 alpine skiers (AS) and two control groups, biathletes performed incremental test, AS and both control groups performed 30 sec. Wingate test. During the test selected physiological parameters were measured. Pre- and post-test blood sample were collected to determine: concentration of hydrogen’s ions (H$^+$), deficiency of base’s (BE), partial pressure of oxygen (pO$_2$) and dioxide of carbon (pCO$_2$), concentration of lactic acid (L$\text{A}$) and concentration of electrolytes: Na$^+$, K$^+$.

Results. It was found, that biathletes have greater pool of buffering base (BE 1.28 ± 1.00 mmol/l) in relation to alpine skiers (BE –0.08 ± 1.52) and control group (BE 0.44 ± 1.18). They were also characterized by the lower level of post-exercise changes in acid-base balance.

Conclusion. Biathletes were characterized by the universal level of adaptation, however alpine skiers’ level of anaerobic adaptation was lower.

The investigation of physical capacity changes in yearly training cycle on Alpine skiers’ example

The most principal physiological feature of Alpine skier should be high aerobic and anaerobic capacity. Adequate exercise tests allow to determine the current level of the skiers’ physical capacity. An indepth analysis of the obtained results enables appropriate methods and training loads selection, which simultaneously should be confronted with the current level of psychological and physical health. Only such comprehensive approach to the training control issue can lead to certain results accomplishment.

The purpose of the study was to evaluate the aerobic and anaerobic capacity of an Alpine skier during a yearly training cycle.

An elite Alpine skier participated in the study. Physical capacity tests were performed during the three phases of a yearly training cycle (introductory, preparatory and starting phase). Oxygen uptake was estimated during the incremental test and the anaerobic physical capacity was evaluated in a 30-second Wingate test.

The aerobic capacity decreased slightly at the three training phases. This together with lower VO$_2$max in comparison with world class skiers [2] provokes recommendation to put more emphasis on the endurance component of the training in the initial phases of the yearly training cycle.
The analysis of the Wingate test results indicates a correct tendency to increase the value of the maximum power as well as times of its achievement and maintenance in subsequent phases. The power decline index was decreasing progressively. The obtained results suggest an appropriate training loads selection, but in order to increase the peak maximum power more repetitive exercises are recommended.

Przemysław Bujas, Dariusz Tchórzewski, Leszek Gargula

Morphofunctional development level of candidates for ZSMS in Zakopane on the background of peer population – the estimation

The aim of the paper is to define the level of motor fitness and basic somatic parameters of 15-year-olds, candidates for ZSMS in Zakopane on the background of non-training peers. The completion of the research come down to answering the following questions: (1) Do the candidates for ZSMS differ from all-Poland population in morphostructural predispositions? (2) Is the level of separate motor abilities demonstrated by the candidates higher than that, which is typical for the rest of population? (3) Are the differences between the candidates and the all-Poland population nearly the same for both sexes?

Material and methods. The research was carried out on the group of candidates for LO ZSMS in Zakopane (105 girls and 180 boys), who practice winter sports. The comparative material formed the results of their non-training peers from Krakow conurbation and Eurofit-based centile grids for evaluation abilities. During the research, basic somatic parameters and chosen motor abilities (such as strength ability in local aspect, muscle’s resistance to tiredness, endurance, non-acid lactate maximal anaerobic power, balance and flexibility) were analyzed with the help of commonly used and verified motor tests.

Results and conclusions. Judging from the values of basic somatic parameters (body height and body mass), training groups are in the middle of population, however, in the field of body components their results are much better (especially women) and they have advantage in all motor tests. Such traits as difference between training and non-training 15-year-olds and sexual dimorphism are more noticeable in groups of women.

Ivan Čillík, Lubomír Král

Effectiveness of teaching downhill skiing to beginners depending on ski length

Contemporary teaching of skiing offers up-to-date carving technique by using new methodical approach. The aim of the research is to compare the effectiveness of downhill training on short ski (up to 100 cm) to beginners; on gradually protracting ski (groups A1, A2), and on ski 10–15 cm shorter than the stature (groups B1, B2). We compare the effectiveness of downhill training on the basis of differences in the length of time of instruction necessary to manage the basic stage of ski training; in the quality of technical accomplishment of curves in carving fun park and in the results of final championship in slalom.

The research took place in ski school and during ski training of secondary school students. In ski school the group A1 consisted of 19 participants and group B of 20 participants. The secondary school students who took part in the ski training were divided in two groups A2 (9 participants) and B2 (9 participants). During teaching there were used the methodical techniques according to Austrian ski school.

Participants of groups A1 and A2 mastered the basic stage of ski teaching in 325 minutes (5 hours 25 min) in average. Participants of groups B1 and B2 mastered the basic stage of ski teaching in 16 hours by using the methodology of teaching skiing on ski 10–15 cm shorter than a stature with the use of snow plow turn. The students – group A2, who were training on short ski, arrived at better average final time: they were 0,92 seconds faster than the students of group B2.

The results confirmed higher effectiveness of teaching skiing to beginners on short ski, on gradually protracting ski (groups A1, A2).

Piotr Kunysz, Beata Blachura

Changes of Body Mass Index and body composition of snowboarders due to their participation in 5-day snowboard training
This research was to establish how body composition and body mass index of the snowboarders changed depending on the advancement of these sportsmen as a result of their participation in a 5-day training.

The studies were conducted with the use of an electronic scale, the TBF-300P model by Tanita, during a winter camp of the students of Wroclaw University School of Physical Education, which lasted 6 days (5 days of the training) in Zieleniec (900–950 m above sea level).

The results of the conducted studies and the analysis revealed that the snowboard training during a 5-day camp caused changes to the BMI (increase) and particular elements of body composition in the analysed groups. The changes in the BMI had the same direction (increase) in the groups of a different level of advancement. Only in the group of the beginners these changes occurred to be statistically significant. In both groups the body mass increase was recorded along with the loss of the fat mass and the increase of the water volume in the body. Only the fat-free body mass increased in the group of the beginners, whereas in the snowboarding group this mass decreased.

Beata Blachura

The role and tasks of the downhill skiing trainer during physical abilities’ improvement and social integration in the opinion of visually disabled people

The fear of moving is one of most significant barriers, which limit visually disabled people aspirations. It is the well-known fact, that efficient and appropriate physical activity influences general physical fitness and the high self-esteem developing. The downhill skiing develops the disabled person’s body as a whole, because of non-standard environmental condition and activities necessary to develop skiing technique. The basic condition to make progress is to overcome psychological barriers, which appear in new, different environment. The trainer is the person, who is responsible for compensation capabilities’ development and who is the guide also. These capabilities reflect and allow learning to ski.

The aim of the study is to draw attention to the trainer qualifications, which have decisive impact on the safe and efficient training process organisation and the learning to ski process in the opinion of visually disabled people, who have taken part in the skiing trainings. The research has been carried out in 1999–2007 in Zieleniec. The diagnostic survey method with questionnaire forms has been applied. The group of 41 visually disabled people, who took part in the intensive, seven-day skiing training, answered questions (open and closed). The questions were the source of information on communication, better understanding of reality and effective moving in new environment. According to respondents, blind and visually impaired people expect their trainer-guide to create suitable training climate, which would allow overcoming their capabilities’ barriers. They point out good weather and snow conditions, good organisation of trainings and learning conditions and barriers, which have limited their activities, not only as the skiers.

Dariusz Tchórzewski, Andrzej Szczygieł

Mutual relations between dynamic balance and giant slalom results in the group of adult adepts in Alpine skiing

Problem. The aim of this thesis is qualification of relations between dynamic balance and level of advance in alpine skiing technique (based on the results of giant slalom) in the group of adult adepts in skiing. The following questions were formulated: (1) Are there any significant relations between results of slalom giant and individual dynamic balance parameters? (2) Has sex any influence on the above-mentioned reports?

Methods. The subjects of the research were 30 women and 8 men – students of physiotherapy at the University School of Physical Education. They had had no previous contact with alpine skiing. The research was done using Libra balance platform made by EasyTech. Each subject did three following tests performed separately for the frontal and sagittal planes (each subject did six tests): (1) standing posture, feet parallel, straight line, no feedback, (2) standing posture, feet parallel, straight line with feedback, (3) standing posture, feet parallel, sinusoid line with feedback. The level of mastery was estimated on the results of giant slalom.

Results. The are no results proving that there are any dependences between level of dynamic balance and the giant slalom results.
**Conclusion.** (1) There is no dependence between dynamic balance level and giant slalom result. (2) There are no sexual differences in accordance to relations between dynamic balance and giant slalom results.

_Dariusz Tchórzewski, Przemysław Bujas, Leszek Gargula_

Development of motor accommodation of winter sports competitors at the age of 15–18 in comparison with peers

**Problem.** The goal of this thesis is qualification of changes in the level of motor accommodation of youth (age: 15–18) subjected training process in comparison with untrained peers. The following questions were to answer: (1) Is there any improvement in motor accommodation level in the three-year period of sport training? (2) Are the changes in motor accommodation the same in both sexes?

**Methods.** The material of the study is based on results of lasting three years constant research of LO ZSMS Zakopane students, practising winter sports. The research of untrained peers is the comparative material. The measurement was taken using alternative choices’ measuring instrument. The measuring instrument issued two series of impulses: lighting and acoustic one, intervals: 1.2 and 0.8 sec.

**Results.** In all examined groups the statistically significant improvement was certified. Visibly better effects were certified in female competitors groups in comparison with peers. No significant results were certified in male groups. There were no differences in single-sex training groups.

**Conclusions.** (1) The motor accommodation ability is improving in the analysed age: 15–18. (2) There is no unambiguous information about faster improvement of the motor accommodation in the training groups. (3) There are no sexual differences in the level of motor accommodation in the analysed competitors.

_Dariusz Tchórzewski, Przemysław Bujas, Leszek Gargula_

Differences in the level of motor efficiency in the winter sports representatives – candidates to ZSMS in Zakopane

**Aim:** The aim of the study was to determine differences in the level of motor efficiency in winter sports competitors on the example of 15 year-old adepts to Grammar School of ZSMS in Zakopane.

**Material and methods:** The material of the research were young people, who actively practise winter sports: 162 boys and 88 girls from various regions of Poland. There were applied commonly used tests in order to evaluate the level of motor efficiency (endurance, speed, strength, coordination, directed efficiency).

**Results and conclusions:** The representatives of winter sports illustrate a differential level of motor efficiency largely in men. It mainly refers to the ability level of speed, endurance and directed efficiency. In the level of endurance ability the best results were achieved by ski runners, whereas within speed ability – by ski jumpers. Considering the disciplines analyzed, we did not notice any similarities in the level of discrepancy in women and men parameters.

**DISCUSSIONS**

_Adam Haleczko, Leszek Korzewa, Ewa Misiółek, Urszula Włodarczyk_

Connections between strength-speed task with different structure of movement. Epilogu

**Introduction.** This study is a completion of three previous reports devoted to analysis of the relations between the basic strength and speed tests. Too small disproportion in weight of balls, which were used in the initial measurements, induces the authors to complete the considered relations by wider description of the important role of speed in throwing trials. An application of light objects throws in estimation of speed abilities suggested by Farfel and other authors provide us with an incentive to do the measurements of similar type. The inversely proportional relationship between strength and speed was a theoretical premise of such research. Individual’s speed predisposition manifests itself in longer distance of the light object throw. However, Matviejev and Zaciorski gave valuable information warning against the use of too light equipment. The same conclusion follows from the practical recommendations by Mulak.

**Aim.** Completion of previous parts of the study by information concerning the importance of the speed (velocity of movement) in strength-speed tasks as well as expressing an opinion about legitimacy of definition of speed as “complex” or “hybrid” motor ability.
Material and methods. A sample of 58 female and 47 male second year students of University of Physical Education in Wrocław comprised the first analyzed group. Measurements, taken in May 2008, included basic somatic trait, 3 kg medicine ball backward throw and 1 kg ball one-hand ball throw performed in a baseball manner. The throws of 304 g and 104 g rubber balls were performed with the use of the same technique. These trials were supplemented with the jumps over a bar. Additionally the speed abilities were evaluated by a value of an index respecting results of the light and heavy balls throws.

The second group under consideration comprised 34 girls and 34 boys of IV–VII grades in Grammar School in Miłoszyce. Like in the student group the basic somatic trait were measured in this group, but 2 kg and 1 kg medicine balls throws were performed forward from above a head. Throws of five different weight rubber balls were performed like in student’s group. Also the speed-strength indices were calculated which link the distance of the lightest 32 g ball throw to the distance of the more heavy balls throw. Moreover, from among many available motor tasks, the 20 m run from flying start, long jump from standing position, run in place with clapping and hand muscle dynamometry (hand grip) were considered. From the other side the variety of opinions of the part of researchers in relation to the fundamental concepts of motor abilities persuades to do the review of the most important reports and to formulate possible remarks.

Results. In both student groups the correlations between the throws results and the body built traits increase as lighter equipment was used. In women, the time of over bar jumps was independent on somatic features as well as the results of ball throws. It practically excluded this group from the further analysis. However, in men a significant correlation coefficient between 304 g ball throw and over bar jumps time made possible a calculation of the speed-strength index. Motor index being the ratio of the distance of 304 g ball throw and the result of 1 kg ball throw was found to be the most diagnostic. Its discriminant value distinctly appears when one considers the jumps time performed by students with extreme index values. In children group, correlation calculations in boys show to some extend an analogy of relations to these observed in students, despite a different kind of trials and the manner of performance. Relatively small diagnostic value of the speed-strength indices can be explained by different ways of performing the throws of more heavy balls and by placing in the index numerator the lightest 32 g ball, while correlations for somewhat heavier balls showed the possibility of more accurate evaluation.

The second task was consideration of reasonableness of application of the “complex” (“hybrid”) motor ability term in relation to the speed. Following the many reports, mainly by Szopa, Młynarski, Raczek and others, and first of all by Matviejev and Zaciorski it was recognized that the four motor abilities have be described only by one term, and the so called Ważyń’s regular pyramid, formulated by him in seventies years of last century, may be taken as the most simple and logical model of relationships between them.

Conclusions. An applied way of the speed ability evaluation considering throws needs however a further study. Nevertheless, in the future it may be useful in practice provided that the balls were adequately chosen in accordance with the strength and speed characteristic for a motor activity. The light balls throws themselves as well as speed-strength indices with the use of heavy balls can be considered as a tool in the speed evaluation. The estimation of the speed abilities by use of sprint runs and jumps – the typical speed-strength trials seem to be not very apt as regards their content-relation. In addition, the movement frequency presents a measurement doubtful with regard to aptness of evaluation. Qualification “complex” or “hybrid” applied to all abilities haven’t to treat exclusively the speed. The regular pyramid by Ważyń may be considered successfully as the simplest, logical model of cooperation of all motor abilities.