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Kazimierz Mikołajec, Adam Maszczyk, Arkadiusz Stanula, Ryszard Litkowycz, Adam Zając

Stretching and strength exercises in relation to running speed and anaerobic power in basketball players

**Aim of the study.** This study aimed to identify the effect of stretching and strength exercises on running speed and anaerobic power of young (13–15 years old) basketball players, and the relationships between variables representing their speed, anaerobic power and flexibility.

**Material and methods.** Thirty-six young basketball players were randomly allocated to 3 groups (GR, GS and GC) that carried out special 3-month training programs. Before the training macrocycle commenced and after it ended, the participants were tested for running speed, anaerobic power and flexibility.

**Results.** ANOVA and post hoc test showed that the “training factor” distinguished more clearly the strength exercise subgroup and the stretching exercise subgroup (p = 0.002 and p = 0.003, respectively). The discriminant analysis showed that power, 5-meter running speed and 20-meter running speed were these variables that distinguished the strength exercise subgroup. In addition, the results of post hoc tests, pointed the level of flexibility as a factor which discriminated more clearly subgroups GR and GS, and then GS and GC (p = 0.005, p = 0.009 and p = 0.006, p = 0.012, respectively).

**Conclusions.** The experiment has demonstrated that under the absence of strong stretching stimuli even low-volume strength exercises lead to the dynamic development of anaerobic power, running speed and flexibility, whereas more intensive stretching exercises limit improvements in these motor abilities.

**Key words:** basketball, stretching, strength exercises, anaerobic power, running speed

Dariusz Boguszewski, Katarzyna Boguszewska, Jakub Adamczyk

The impact of rapid weight loss on the competitive preparation of judoists

**Aim of the study.** Judo is a sport based on weight category divisions. The purpose of the research was to establish the relationship between pre-competition weight loss and competitive preparations, as well as the influence of pre-competition weight loss on the competitive results of judo competitors.

**Material and methods.** The research covered 28 judo competitors (13 juniors and 15 seniors). The research method was the author’s questionnaire, selected tests of motor fitness by Denisiuk, and the Spielberger STAI self-evaluation questionnaire.

**Results.** More than half (53.6%) of competitors in the research group reduced their weight regularly in pre-competition periods. The average reduction was 4.2% among juniors, and 5.4% among seniors. The most commonly applied body weight reduction methods included reducing the amount of food and liquids, increased physical activity, and treatments in the sauna. During the periods of body weight reduction, contestants felt deterioration of mood, decreased strength and endurance, and headaches. Functional trials performed during rapid weight loss pointed to regression of the results connected with the process of weight loss reduction. In the control (non-reducing) group, the differences were not significant. The anxiety level one day before the competition was higher in the reducing group. In the research (reducing) group, 46.7% of the participants fulfilled result assumptions; in the non-reducing group, the proportion was 58.3%.

**Conclusions.** In cases involving judoists, weight reduction in a short period of time has negative effects on their competitive (physical and psychological) preparation. The eventual reduction of body weight should be attempted under the control of professionals (coaches, physicians, physiotherapists).

**Key words:** judo, rapid weight loss, competition, competitive preparation
Body response of hurdle runners to training load in microcycle

**Introduction.** The relationship between response-effect cannot be understood mechanically. Tracking the current response to training load in disciplines of speed and strength character is relatively complicated.

**Aim of the study.** The main aim of this thesis was to follow the immediate, delayed, and short-term cumulative training effect. Two hurdle runners were followed during a specific preparatory period. The training effect is rated according to changes in the level of explosive power of the lower extremities during training units in one training microcycle.

**Material and methods.** These athletes underwent testing consisting of repeated jumps for 10 seconds on the jump ergometer (FITRO JUMPER) at the beginning of the main part of the training session, after their warm-up, and after general and specific workouts. We repeated this test after the end of the main part of the training unit.

**Results.** We found differences in the intraindividual and interindividual reactions of runners in individual training: contact time, power in the active phase of the take-off, height of jump, and force of reflection. A reduction of effectiveness at the end of training sessions focused on speed was recorded in the performance of both athletes. Different immediate and delayed effects were recorded in the performance of both athletes in training sessions focused on strength. Regenerative training focused on endurance brought a slight immediate and also a delayed impact on the increase of effectiveness. Taking both athletes into consideration we recorded a similar body response during the first 2 days of the microcycle in the immediate and delayed effect. In the second part of the microcycle, differences were recorded in intraindividual response to training load.

**Conclusion.** Both analyzed athletes achieved an increase in jumping explosiveness in the first part of microcycle and a decrease in the second part of the microcycle.

**Key words:** sprint hurdles, training load, microcycle, body response, explosive power

The influence of visual and verbal information transfer on the effectiveness of learning and mastering swimming activities among students at the University School of Physical Education in Cracow

**Aim of the study.** The study was aimed to determine the significance of visual and verbal information transfer in the process of learning, teaching and improving swimming activities. Before the research it was assumed that the method of learning and teaching swimming activities based on enhancing visual and verbal information transfer had much larger influence on the effectiveness of crawl technique than the standard method.

**Material and methods.** The study was carried out among the first-year male and female students at the University School of Physical Education in Cracow. The research group consisted of 104 participants (50 women and 54 men) divided into two groups: experimental (E) and control (K). The basic research method was pedagogical experiment combined with the technique of parallel groups. Another experimental factor was the method of teaching swimming activities that involved the implementation of visual and verbal information transfer enhanced with additional audio-visual technique and supplemented with self-observation and self-assessment.

**Results.** Statistically significant changes of the pretest and posttest measurements in the level of mastering crawl technique were noted, evidently higher in experimental (E) than in control (K) group, both of women and men.
Conclusion. A significant correlation between the implemented method of teaching swimming activities and efficiency to master the technique of crawl was observed. The presented results of the study proved the usefulness in the search for didactic methods based on visual and verbal information transfer.

Key words: visual and verbal information, learning and teaching swimming activities, effectiveness of the teaching method

Krustyna Rożek, Jerzy Piechura, Anna Skrzek, Tomasz Ignasiak, Monika Bartczyszyn, Marta Majewska

Assessment of the effectiveness of rehabilitation period on physical fitness and exercise tolerance in elderly people

Aim of the study. The study was intended to evaluate the effectiveness of a two-week program, developed at rehabilitation camp, to improve physical fitness and exercise tolerance in elderly people.

Material and methods. The 10-day training program, which consisted of a 30-minute morning gymnastics and 1-hour water exercise a day, was attended by 50 people aged between 60 and 70 years. In all these patients standard somatic features were measured. To assess the level of physical fitness and physical ability the Fullerton Functional Fitness Test was carried out. Assessment of body balance, upper body strength, flexibility and lower body exercise tolerance was also carried out in all patients.

Results. Normal body mass index BMI was reported only by 22% of participants. The results of the 6-minute corridor walk test showed a significant improvement in covering the above distance for both women and men. In the group with normal and abnormal BMI the improvement of results in the walk test was also reported. In terms of physical fitness the group of female patients similar in age range as the test group of men obtained better results in individual trials of the above test.

Conclusions. 1. Performed set of tests has shown that the exercises conducted in the framework of rehabilitation period significantly improved physical fitness and exercise tolerance in older adults. 2. The results achieved before and after the treatment in the Fullerton Test were significantly different in terms of gender. 3. In terms of exercise tolerance with regard to BMI no statistically significant differences were observed.

Key words: physiotherapy, physical fitness, exercises tolerance, ageing

Václav Bunc

Walking as a tool of physical fitness and body composition influence

Aim of the study. Summarizing the possibilities of walking as a tool influencing health, fitness, body composition, well-being and other physiological variables.

Material and methods. Following the five-month weight loss intervention program with a 1000 kcal energy intensity in seniors, 1500 kcal in middle-aged men and 2000 kcal in children, which was composed of at least 80% walking, pointing to significant changes in fitness and body composition parameters.

Results and conclusions. Together with positive changes in examined variables significant improvement in predispositions for physical endurance and workload was observed. It may be concluded that walking in the range of about 10,000 steps per day helps to remove the motion deficit, which is due to present lifestyle and may be used to improve both health predispositions and physical fitness state in the majority of population.

Key words: walking, movement intervention, physical fitness, body composition, children, adult men, seniors
**Marta Wieczorek**

**Functional and dynamic asymmetry in boys aged 10–12 years (continuous research)**

**Introduction.** Significant changes in motor and psychophysical development are observed during school years. Lateralization is one of the developmental regularities. A lateralization evaluation is essential in cases of diagnostics in children with speech dysfunctions, motor clumsiness, and problems with reading and writing.

**Aim of the study.** The cognitive aim is to observe and compare the functional and dynamic lateralization in boys aged 10 to 12 years during research carried out on the same group of subjects. The practical aim of this paper is to expand the teachers’ knowledge on lateralization, which is important for normal development of human beings.

**Material and methods.** The research was carried out on a group of 30 boys and was carried out for 3 consecutive years. The first phase of the research was carried out when children were 10 years old (2006). The next tests were carried out in 2007 and 2008. The Wroclaw Asymmetry Test, by Koszczyc and Sekita, was used during the research.

**Results.** When we observed changes in functional and dynamic lateralization that occurred during the two years, we can state that there were changes in functions of tested motor and sense organs and the same changes in determined profiles. Changes in dynamic lateralization of motor capabilities were not observed.

**Conclusions.** Showing that the lateralization process in the investigated group of boys aged 10 to 12 years takes place enables us to observe it, to diagnose it, and to employ a therapy, if necessary, to avoid developmental abnormalities. Physical education teachers are very important, since they can stimulate this process through suitably selected exercises and games involving physical movement.

**Key words:** functional asymmetry, dynamic asymmetry, boys

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**Beata Wojtyczek, Małgorzata Pasławska**

**Knowledge of downhill skiing safety principles among students at the University of Physical Education participating in an obligatory winter camp. Part II**

**Introduction.** The appropriate training of future instructors and teachers of children practicing downhill skiing is extremely important to improve and ensure the safety of participants in this form of recreation. The evaluation of the effects students participating in an obligatory winter camp received through the training process included theoretical knowledge. The proper evaluation of factors ensuring safety and the limitation of risky behavior is the basis for the appropriate education of future teachers.

**Aim of the study.** This work is aimed at the evaluation of the level of theoretical knowledge about safe downhill skiing obtained by students who graduated from downhill skiing training camp with positive results.

**Conclusion.** In the future we should put even greater stress on requiring knowledge of the theory of safe skiing, that is, taking care of ski clothes and boots, health risks connected with mountain climates in winter and with altitude sickness. This is especially true of pedagogy students, who are expected to guarantee the security of children and youth at, among other places, ski slopes. At the same time it should be emphasized that skiing is, according to the majority of the training camp participants, an exceptionally attractive form of physical activity.

**Key words:** skiing, security, health risks, courses
Long-term trends in changes of physical fitness defined in the concept of health (H-RF) in light of result of physical fitness assessment using T-scores

Aim of the study. The goal of the research was to assess the scope and direction of inter-generational changes (secular trends) of physical fitness components studied in the health convention (Health-Related Fitness), and using the authors’ point scales.

Materials and methods. The comparative analysis was based on the research results collected from 1993 to 2002 (a total of 23,600 people, including 10,600 girls and 13,000 boys) and on observations made from 2002 to 2011 (a total of 11,520 people, including 5,390 girls and 6,130 boys). The subjects were students at primary and secondary schools in southeast Poland. Statistical analysis was conducted on both the raw measurements and the scores converted into points on a T-scale. New point tables were developed using the materials collected at the beginning of the 21st century.

Results and conclusions. The proposed method of scoring on a T-scale, which consisted of calculating a normalized ten scale jointly for girls and boys of all age groups, proved to be a good tool to capture both the comprehensive dynamics of morphological, functional and motor development, as well as long-term trends of changes in the components of health-related fitness. The results have provided evidence challenging current views on the existence of “opening scissors phenomenon” in the biological development of young Polish generations. In the last decade, there has been a tendency for the desired inter-generational changes in components such as cardio-respiratory, musculoskeletal, morphological, and motor – all of which can be regarded as positive indicators of health. Their scope has been so significant that it justified the need to update existing point tables of physical fitness. Therefore, on the basis of the latest materials, new scoring scales have been developed that utilize the authors’ calculations.

Key words: health-related fitness (H-RF), evaluation, ten scale, inter-generational variation (secular trends), scoring tables for a ten scale

Anthropological evaluation of the influence of socio-economic factors on the development and physical fitness of rural boys from Lublin region

Aim of the study. The aim of the work was to evaluate changes of the influence of family socio-economic factors on the level of the somatic development and motor fitness of rural boys from Lublin region in the years 1998–2007.

Material and methods. The research included 547 boys in 1998 and 484 boys in 2007 in selected categories of boys aged 10–11, 14–15, and 17–18 years. Physical development of the subjects was evaluated on the basis of body height and mass measurements, which were then used to calculate BMI. Motor fitness was defined with the use of Eurofit tests. Taking into consideration the level of education of parents and the number of children in families both in 1998 and in 2007, two groups were distinguished according to socio-economic stratification (SES), i.e., with a high and low SES status. The values of somatic parameters and the results of motor abilities tests were normalized for the arithmetic mean and standard deviation in particular age categories.

Results. In both 1998 and in 2007, higher normalized values of body height, mass, and BMI were noted in subjects belonging to the group with a high SES status. Only in 17–18-year-olds from 2007 were higher values of body height and mass observed in the group with a low SES status. As far as physical fitness was concerned in the categories of those aged 10–11 years and 17–18 years, higher normalized values of the majority of the analyzed motor tests occurred in boys from families with a low SES status, both in the research from
1998 and from 2007. However, in the age group of 14–15-year-olds, in the majority of the analyzed motor tests higher normalized values were observed in boys from the group with a high SES status.

**Conclusions.** No substantial changes in the influence of socio-economic variables on the somatic development and motor fitness of rural boys from Lublin region in the years 1998–2007 were observed.

**Key words:** boys, socio-economic conditions, body height, body mass, BMI, motor abilities, time changes

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**REVIEW PAPERS**

*Emilia Mikołajewska, Dariusz Mikołajewski*

**The movement of a human being in the medical exoskeleton – the anthropomotoric aspects**

Exoskeletons are mechanical constructions attached to particular parts of a human body, supporting its movement with the in-built effectors. Exoskeletons are promising solutions as rehabilitation devices and as tools, supporting patients, medical personnel, families and caregivers in everyday life activities. They may be particularly helpful for the people with deficiencies and those who suffer from pathology of the central nervous system (CNS) in result of, for instance, a stroke. The aim is to improve the quality of life of such people by supporting and expanding their motoricity. As for today, the knowledge and understanding in the area of adaptation of a human being to walking and performing everyday life activities in combination with such robots as exoskeletons are limited. This article is aimed at estimating to what extent the possibilities in this field are being exploited.

**Key words:** rehabilitation, physical therapy, exoskeletons, biomechanics