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**REVIEW PAPERS**

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Biocultural heritage. Present and future of physical activity

*Vladimir Korenberg*

### **Analysis of Human Movements – a Kinesiological Approach**

**Introduction.** It has been proved that analyses of human motor function by means of isolated sciences, such as anatomy, physiology, mechanics, psychology, pedagogy etc., however useful, do not allow comprehending thoroughly crucial aspects of motor activity. Analyzing and discussing motor sub-activities need to adopt a multidisciplinary approach, which joins together particular sciences as whole as well as their specific aspects (theory and methodology of physical education and sport, medicine, sociology, logic, philosophy, cybernetics etc.) as a whole, as well as their specific aspects.

**Aim of the study.** Forming theoretical basis for kinesiology as an independent discipline of science.

**Methods.** Biomechanical and mental modelling, logical analysis and elimination of contradictions, quantitative and qualitative biomechanical analysis, dynamometry, testing, observation.

**Results.** The author has reviewed and analyzed key psychological, pedagogical and biomechanical approaches developed during the last 50 years. It enabled integrative and complex analysis of human motor functions, specific to kinesiology, and resulted – to some extent – with rationalizing the system of notions in the listed sciences. The following notions have been presented and substantiated: reliability of motor activities and solutions of motor tasks (1963, 1979), qualitative analysis of motor activity (1965, 1979), functional conception of preserving body stability (1965, 1971), conception of two-stageness of organism reactions etc.

**Conclusion.** The results enables developing more productive approach to the exploration of human motor functions, performing in a more effectively way analyses and syntheses as well as understanding the essence of human motorics, what might be also useful in learning how to solve the motor tasks of any type.

**Key words:** activity, performance, scientific approach, modelling, motor performance, motor task, motor habit, motor skill

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*Vladimir Lyakh*

### **Analysis of motor learning models theory based on six evaluation criteria**

**Introduction.** How to assess relative advantages of any theory of learning and teaching motor activities bearing in mind a wide range of alternatives? Can we choose the best one evaluating on the basis of two compulsory functions: explanatory and predictive? What criteria should be established to evaluate particular motor learning theory as such?

**Aim the study.** To analyze selected theories of learning and teaching motor actions using as tools six evaluation criteria and two compulsory functions: explanatory and predictive that every theory should meet.

**Methods.** Developing a literature review focused on viewpoints of Adams (1987); Belej (1994); Bogen (1985); Czabański (1998); Frömel (1999); Gordeeva (1995); Hossner and Künzell (2003); Pertyński (2008); Pöhlmann (1986); Raczek (2010); Schmidt (1988) as a field to conduct deeper analysis of selected theories of learning and teaching motor activities. Considering the following theories: the theory of conditioned reflexes, activity theory, association theory, behaviorism, Gestalt psychology, the Bernstein (and his successors) theory of motor structure, prescriptive, emergent etc.

**Results.** Structured assessment of theories of learning and teaching motor activities should be conducted on the basis of six criteria: 1) verification, 2) internal compliance, 3) heuristic value, 4) economics, 5) wide meaning of the phenomenon, 6) functional significance.

**Conclusions.** Formulating the advantages and disadvantages of particular theories in the light of six precise criteria is useful to 1) choose one of the many/few theories to explain and predict the problems of learning

various classes of movements, 2) compare old and new/grounded theories with one another, 3) determine how accurately they treat the recognized problems and issues belonging to this matter and also to what extent the prospects for understanding are yet unknown possibilities.

**Key words:** learning and teaching motor activities

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*Jerzy Januszewski, Edward Mleczko*

**The sharpness of social gradients  
at the turn of the 20<sup>TH</sup> and 21<sup>ST</sup> centuries in lesser Poland in the light of physical fitness  
assessment. an h-rf approach with application of t-scores scale**

**Aim of the study.** An attempt of evaluation of the sharpness of social gradients at the turn of the 20<sup>th</sup> and 21<sup>st</sup> century in South-Eastern Poland (Lesser Poland) by anthropological methods with the use of T-scores scale.

**Material and methods.** The results of observations of physical components, according to H-RF Convention, of 23,296 students aged 8–18 from schools in rural and urban areas of South-Eastern Poland were considered. The study has been conducted between 1993 and 2003. For both sexes, regardless of age, the following values were calculated: weighted averages with their point values using the T-scores scale and the differences between the groups with regard to the place of residence. For all of the 50-persons groups drawn from the entire material, in the classes aged 8–18, the above mentioned statistical characteristics were estimated. To examine the intergroup differences, the t-Student test has been employed.

**Results.** The averaged indices of physical fitness components in the Convention H-RF, both with and without consideration of the age, revealed in majority of the cases statistically significant differences in favour of girls and boys living in the urban areas. Therefore, the arguments for rejection of the research hypothesis existed, suggesting the possibility of weakening environmental differences. The results did not confirm the commonly accepted model of motor capabilities of rural and urban children. A trace of significant differences in this respect could be the trend of differentiation in cardio-respiratory components.

**Conclusions.** The proposed method of assessing the scope and direction of differentiation of the physical health components, researched according to H-RF concept, with the use of T-scores scale, has been proved to be simple and useful tool in the field of research of social stratification. The unveiled intergroup differences in the averaged values, regardless of age, as well as the direction and extent of differentiation of the physical fitness components in further life of the respondents have revealed the existence of social stratification in the South-Eastern Poland (Lesser Poland). There is a need to change the adverse phenomenon with specific social policy of the government.

**Key words:** Health-Related Fitness (H-RF), T-scores scale, children and youth, South-Eastern Poland, social gradients

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*Mohsen Assarzadeh, Mohsen Akbarpour*

**The effect of aerobic training on inflammatory markers  
of cardiovascular disease risk in obese men**

**Aim of the study.** Investigating the effect of aerobic training on inflammatory markers of cardiovascular disease risk in obese men.

**Material and methods.** In the research program participated 24 male subjects in the 35–48 age range (12 obese and 12 with the appropriate body weight), who were assigned either to the aerobic training perform-

ers or to control group. Blood samples (5 cc) were taken in fasting state from all subjects. To the members of experimental group a 13-week aerobic training, included 3 sessions per week and consisted of continuous running (in gymnasium) with an intensity of 75–85% maximal heart rate, was implemented.

**Results and conclusions.** Aerobic training caused a significant decrease in the serum CRP and WBC levels of the obese men ( $\alpha = 0.05$ ). The authors concluded that aerobic training caused a decrease in the inflammatory markers and probably could decrease future cardiovascular risk in obese men.

**Key words:** aerobic training, inflammatory markers, obesity

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*Lenka Kovářová\*, Karel Kovář\*\**

### **Differences in heart rate and lactate level at the individual anaerobic threshold in swimming, cycling and running in national junior triathlon athletes and their importance for management of sport training**

**Introduction.** The knowledge of individual anaerobic threshold value is among the most important tools in the management of endurance sports training. In triathlon, which belongs to endurance sports, the monitored parameters of heart rate (HR) and blood lactate (LA) vary in its different parts.

**Aim of the study.** To compare levels of heart rate and lactate at anaerobic threshold intensity in different parts of triathlon.

**Material and methods.** The research sample included 13 males – Czech national triathlon athletes in categories of juniors and K23 (age  $20.0 \pm 2.1$ ; body height  $182.6 \pm 5.0$  cm; body weight  $74.7 \pm 5.0$  kg;  $VO_{2max}$   $71.2 \pm 3.0$  ml · min<sup>-1</sup> · kg<sup>-1</sup>). To process statistical data, non-parametric Friedman's test (2-way Friedman's test with all pairwise multiple comparison) was used.

**Results and conclusions.** Analysis showed significant differences in both measured parameters HR (sig. 0.000) and LA (sig 0.000) between parameters from swimming, cycling and running tests. The found changes are important tool for an overall concept of sport training in triathlon. Their importance is mainly in smooth transitions between different events of triathlon where a sudden change of HR and LA appear, especially when intensity at AT is required. An increased emphasis should be given to training of the transitions.

**Key words:** diagnostics, performance assessment, determination of intensity

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*Zofia Ignasiak, Anna Skrzek, Anna Sebastjan*

### **The evaluation of physical fitness of elderly people in accordance with the body mass index**

**Introduction.** Physical fitness plays significant role in keeping the optimal health and health behaviours, within each period of ontogenesis. However, in case of elderly people, it is of great importance, as it enables them to remain independent in everyday activities and to maintain family and social contacts. At the same time physical fitness is connected to a large extent with the diet and therefore with the BMI (Body Mass Index) level.

**Aim of the study.** To evaluate the physical fitness of elderly women, considered in the BMI aspect.

**Material and methods.** The research works were conducted in the Department of Biostructure among 138 women within the age range of 55–70 years ( $\bar{x} = 62.54$  years). The examinations included bone mineral density, body composition, posture, basic somatic parameters, efficiency of respiratory and circulatory systems and physical fitness measured by means of Senior Test. The results were evaluated statistically, regarding the basic characteristics ( $\bar{x}$ ,  $s$ ,  $v$ ) as well as the variance analysis between BMI values and the physical fitness level.

**Results and conclusions.** Achieved results indicate that the level of muscular power of the upper extremity and the spinal range of motion, as well as the hip joints, are not combined with BMI. Other tests revealed negative connections with the Body Mass Index, especially when BMI values exceeded 35 kg/m<sup>2</sup>.

**Key words:** Senior Test, BMI, elderly women

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*Daria Domosławska, Ewa Demczuk-Włodarczyk*

### **Dimorphism of the spinal curvatures in the sagittal plane compared with somatic development**

**Aim of the study.** To characterize the dimorphism of the antero-posterior spinal curvatures in a chosen development period in boys and girls contrasted with their somatic development.

**Material and methods.** The assumed hypothesis was that diversification of the antero-posterior spinal curvatures in boys and girls was dependent on age and gender. The research was carried out in Płock in randomly chosen kindergartens and schools. The research group consisted of 1395 participants aged 6 to 16 (728 boys, 667 girls). The analysis of the spinal curvatures in the sagittal plane was carried out by means of the photogrammetric method based on the Moiré effect and evaluated with the help of statistical methods of data analysis.

**Results.** Spatial position of the spine is characterized by changes whose dynamics and direction depend on age and gender. The percentage of the spine's length in the body height in 14 years old and older girls decreases, whereas in boys this tendency is noticeable during the whole analysed period. The length of lumbar lordosis and its percentage in the total length of the spine increases along with aging, whereas in the case of thoracic kyphosis it decreases – regardless of the gender.

**Conclusions.** The depth of the antero-posterior spinal curvatures depends on the curvatures' direction as well as on the age and sex of the person. Thoracic kyphosis shows a constant tendency to decrease, whereas lumbar lordosis to increase. In all age groups girls are characterized by a greater inclination angle in the lumbo-sacral spine. The remaining analysed angles of the antero-posterior spinal curvatures show no gender-dependent characteristics.

**Key words:** body mass, body height, antero-posterior spinal curvatures

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*Jakub Grzegorz Adamczyk, Małgorzata Polkowska, Dariusz Boguszewski*

### **The influence of exercises with elements of sherborne developmental movement on the psychomotor development of children between first and second year of life**

**Aim of the work.** The purpose of work was to determine the influence of exercises with elements of Sherborne Developmental Movement (SDM) for the psychomotor development of children between first and second year of life.

**Material and methods.** The examination included two groups with 14 children in each. The age of participants was located between 12 and 24 months of life. The first group of children for three months systematically once a week has attended on 45-minute classes with Sherborne Development Movement – 6 boys and 8 girls were in it. The other 5 boys and 9 girls constituted the control group. To evaluate children's behavior the Bogdanowicz scale of observation (SOZ-D) was used. Examining the experimental group was conducted twice, on the first and the last session. Obtained results were statistically analyzed by the Statistica 9.0 program.

**Results.** Examined groups in no parameter differed statistically significant between themselves in the first examination. Conducted exercises contributed to the acceleration of psychomotor development and after

three months period, characteristic differences among groups were observed in two subscales (emotional development  $p = 0.013$ ; social development  $p = 0.025$ ).

**Conclusions.** Judging the SDM influence on the development of children, it is possible to state that in all subscales we noticed a growth of results. Similar changes were observed in both groups. To separate what is associated with the natural development of the child, from the influence of the SDM sessions, one should pay attention, that in spite of the lack of important differences among groups in the first examination, the cycle of SDM classes had a positive effect on the examined group and it contributed to significant diversifying both groups after the period of three months. The method had a positive effect on the development of children, with the special change in the cognitive sphere. Children participating in the three-month session of SDM demonstrated the better orientation of the own body, the development of imagination and the ingeniousness.

**Key words:** psychomotor development, Sherborne Developmental Movement, children

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## REVIEW PAPERS

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*Napoleon Wolański, Anna Siniarska, Maciej Henneberg*

### **Biocultural heritage. Present and future of physical activity**

During 99% of existence, the *Homo* genus was a hunter and gatherer, and belonged to a foraging society where all food was obtained from wild plants and animals. Also, the concern of pastoral, nomadic societies was the care, tending and use of livestock. These people were mobile in order to utilize different sources of water and pasture. Almost 50% of their diets came from their own herds. Only agriculture was closely related to more permanently occupied land because sedentism was a source of a more reliable food supply. For all these reasons, all changes in human behavior during these times should be seen as bio-cultural phenomena.

All improvements and inventions (for example a spear and a bow) meant that a distance between humans and animals during an attack or defense could be greater, therefore safer for the person. Also production of metals changed the character and effectiveness of weapons and tools. Wheels and cart inventions, using animal for traction power and horseback riding changed the nature of efforts necessary from certain muscles and simultaneously influenced human body shapes and improved body functions.

Just as the mind is a form of existence of human brain (as similarly life is a form of protein existence), culture is a non-material (spiritual) as well as a material (artifactual) product. The human mind is understood as having cognitive and creative abilities. Culture includes non-organic behavior favoring survival and therefore longer species existence. Culture, a product of singular brains, comes into existence as social products, as a need for contacts between people. Culture serves this need. Physical culture is a bio-cultural phenomenon, taking care of the body and allowing for intellectual development through the stimulation of the central nervous system.

Industrial production and related work organization, especially work on an assembly line, eliminates many normal, day to day, body movements. A sedentary lifestyle also affects the whole body movements negatively.

**Key words:** climate changes, human evolution, physical activity, biocultural adaptation, actual status