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Wiesław Osiński - Physical Activity Undertaken by Elderly People

In the study the literature relating to the level and significance of physical activity in elderly people was reviewed. First, the process of ageing of various societies was discussed and the basic health and life risk factors were presented. It was emphasised that the decrease in physical fitness and efficiency with age is a physiological and inevitable phenomenon, but its rate and intensity varies for individuals. Delaying these processes is favoured by maintaining increased physical activity in old age. Among tests of physical activity for older people, special emphasis was put on the Fullerton Functional Fitness Test. Many scientific centres search for the most effective programmes of physical activity promotion and create multi-directional intervention programmes. A special problem is the increasing risk of osteoporosis and the search for possibilities to limit its effects. Osteoporosis is one of the main reasons of falls which are the cause of approx. 10–20% of premature deaths of elderly women.

**Key words:** *elder age, physical activity, estimation of physical performance, intervention programmes, osteoporosis, risk of falls*

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#### Rudolf Horváth, Michal Belej - Physical Development and Motion Performance in 7–10-year-old Romany Children in the East Slovak Region

The authors applied a reduced EUROFIT battery, including physical development and motion performance tests, to a sample of 1,093 7–10-year-old Romany children in the East Slovak region. They compared the intersexual differences in Romany children, and found out an insignificant advantage of boys to girls. The overall trend of physical development in Romany children is similar to that of non-Romany children, with the former falling behind by about 2,1–2,2 years. In the BMI-index, it amounts to 4–5% in average; for the body height it is 8%, and for weight 18–19 %. The intersexual differences in motion performance of Romany children increase with age in favour of boys. While the motion performance features an acceleration development trend similar to that of non-Romany children, its level is much lower.

The „flamingo” test, the lay down — sit up test, the pull-up endurance test, the 2d-m to-and-fro test, and the tapping test indicate significant lag of about 3.5–5 years. A less significant lag (19–24%) has been observed for the long jump without run-up, the 10x5m to-and-fro test, the sitting forward bend, amounting to 3–3,5 years of age. The overall lag is more striking for girls than for boys.

The lagging of the 7–10-year-old Romany children behind the non-Romany population can be attributed to their preference for the endogenous factors, connected with survival, to the exogenous factors connected with conscious socialization – the education.

**Key words:** *physical development, motion performance, Romany and non-Romany children*

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#### Adam Haleczko - Strength Ability of 13–15-year-old Girls and Boys

The evaluation of the relative strength as it has been done so far seems often questionable. The reason for which the doubts are raised is based on the relation between strength and body

mass. This relationship is especially distinct in children where slimmer and smaller ones are simultaneously weaker than their stronger built peers. The evaluation which is independent on the influence of the body mass may be taken as fully compensatory for all the children. To achieve this goal some attempts were made to design the compensation scale based on the experience of the weightlifting where the same problems occur. The static and dynamic strength of 122 girls and 136 boys was measured to evaluate their strength ability. Several mathematical transformations of the body mass were used in order to create the quotient indices of the relative strength. The five mostly promising indices were then selected on the basis of the smallest correlation with the body mass. The usefulness of such chosen indices was verified by comparison of the mean results obtained for the individuals with extreme values of the body mass. The less the value of their proportion was different from one, the more useful the index was.

**Key words:** *dynamometry, girls and boys, heavy ball throw, relative strength, index ability*

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Stanisław Żak, Michał Spieszny - Analysis of the Level of Results in the Selected Components of Movement Co-ordination in Handball Players Taking Into Account Sport Level and Specialisation in the Course of the Game

The study refers to the results of tests on 42 handball players representing a diversified level in sport training and different game specialisations. The major attempt of this work is to select co-ordination skills decisive on players effectiveness in a specific tactic position. Modified computer tests were used to support solving this problem. The statistic analysis of the collected material helped to find out that the player's effectiveness in handball is conditioned by the level of movement co-ordination. However, its components differ depending on specialisation in the course of game.

**Key words:** *handball, movement co-ordination tests, game specialisation*

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Włodzimierz Starosta, Anna Giniewska, Jasenka Wolf-Cvitak - Dominating Direction of Rotations in the Exercises of Sport Gymnastics Performed by Female Competitors of the Olympic Games in Sydney 2000

Exercises with the rotations around the vertical body axis are considered to be one of the most complex asymmetric movements involving co-ordination. There are only a few publications dealing with the dominating direction of rotations in exercises of various sport disciplines, and only one of them concerned sport gymnastics [Mazniczenko 1959]. Hence the aims of the work hereby was to: 1. Define the dominating direction of rotations in various contests of sport gymnastics. 2. Attempt to determine the direction of rotation of specific elements performed by female gymnasts during competitions. 3. Search dependencies between the direction of rotations and the degree of complexity of elements involving rotations in gymnastic exercises compositions. The dominating direction of rotations was established through indirect observation – video-recording. The observations involved gymnastic exercises compositions presented by 41 leading female competitors from 12

countries ( 42% of competitors) during Olympic Games in Sydney. Out of 555 elements with rotation, 58% were performed to the left. In three gymnastic exercises compositions left rotations dominated. As the category of difficulty of the exercises increased, the number of elements performed to the left also increased. This was a dominating direction in most female gymnasts. A considerable individual differentiation regarding the direction of elements performed with rotations was observed.

**Key words:** *sport gymnastic, dominating direction of rotation, indirect observation, exercises on non parallel bars, exercises on the balance-board, gymnastics jump, free exercises*

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Ewa Dybińska - Selected of Somatic and Functional Parameters as the Speed of Learning and Teaching of Swimming Skills to Boys at the Younger School Age

This study is an attempt at answering the following research questions: what was the level of mastering of swimming skills by 10-year-old boys from some selected primary schools in Cracow, who participated in obligatory swimming lessons? To what degree do selected somatic and functional factors as well as co-ordination and physical fitness predispositions influence the pace at which the tested boys acquired their swimming skills?

This research was conducted on 10-year-old schoolboys from third forms of the selected primary schools in Cracow who attended their obligatory swimming lessons during the 2000 / 2001 school year. Those lessons took place once a week at the swimming pool of the Academy of Physical Education in Cracow, and the lessons lasted for 40 minutes each. Throughout the school year, the swimming syllabus was implemented during 30 lesson units and it included the acquisition of basic swimming skills as well as the mastering of backstroke and the crawl. The children's progress in swimming was recorded every five weeks from the September of 2000 till the June of 2001. Their swimming prowess was evaluated by means of a Skills Test, which consisted in covering a distance of 15 or 25 metres as well as in evaluating their swimming technique according to a scoring system. On basis of the results relating to the level of their swimming skills after the last, sixth test, the following physical fitness groups were created among the boys: Group One – poor swimmers– the children who learnt how to glide on the chest and could swim on the back for a distance of up to 15 metres by alternating their leg movements, Group Two – intermediate – the children who covered a distance of 25 metres using the backstroke and made feet-first jumps into the water as well as Group Three – good swimmers – the children who covered a distance of 25 metres using the backstroke as well as 25 metres by the crawl and executed straight headers into the water.

The measurements of the selected somatic and functional factors concerned:

body height measured with anthropometer in centimetres,

body mass measured by means of medical scales to the nearest 0.1 kg,

body fat – as a total of 3 skin fat folds – those on the arm, shoulder-blade and abdomen – measured by means of a capillarometer in millimetres to the nearest 0.1 millimetre,

lean body mass (LBM) in kilograms measured by means of the TBF 551 Tanita – „body fat monitor”,

vital lung capacity measured by means of the Barnes pneumatometer in cubic centimetres to the nearest 100 cubic centimetres.

Additionally, we also calculated the Rohrer index.

The measurements of the selected co-ordination as well as physical fitness predispositions concerned:

visual–auditory reaction time measured by means of electronic meter,  
receptor and motor co–ordination measured by the time it took the boys to correctly respond to the impulses and by the number of mistakes they made on the Piórkowski apparatus at a imposed speed, adjusted to the subjects' ages, 93 impulses/min,  
space and motor orientation measured with the time to perform 49 assignments in a „free” series by means of the AKN–102 cross apparatus,  
flexibility of the foot (in ankle and shin joint) measured by means of a goniometer in order to define the range of foot movements in degrees from the extreme positions during plantar flexion and dorsiflexion,  
flexibility measured in centimetres when the subjects sitting in simple squats performed trunk bending forward with their straight knees and had to reach forwards as far as possible – this trial is one of the components of „Eurofit” 1993 motor fitness test.

Careful attention was paid only to those schoolboys, whose attendance at swimming classes was over 70 %. 142 boys were qualified to this group.

The material collected in the course of the research was subjected to a statistical and descriptive analysis. The basic values of statistic characteristics for all the tested features were calculated in the groups of boys divided according to their swimming skills. Their statistic significance was assessed with to–Student's test.

The results obtained during the final test made it possible to discover that the swimming skills mastered by the boys were at a diversified level by the end of the school year. The best part of the schoolboys, 65.49 %, mastered their swimming skills at an intermediate level (Group Two), whereas only 19.01 % of them achieved good results (Group Three). Some of the schoolboys, 15.49 %, did not make any significant progress in swimming because by the end of the school year they could perform very poorly (Group One).

The analysis of the results of the subjects' somatic and functional parameters in relation to their swimming skills makes it possible to state that among the boys who learnt how to swim at a poor level (Group One) and those who attained the intermediate (Group Two) as well as good level (Group Three) some significant differences occurred in the majority of the tested parameters: body height, body mass, body fat, as well as lean body mass. Between the schoolboys from the group of poor swimmers (Group One) and those from the good swimmers' group (Group Three) there occurred some significant differences in the mean values of the VC parameter – vital capacity of lungs. The differences in the values of the Rohrer index were not statistically important.

While analysing the results concerning the subjects' co–ordination predispositions in comparison with their achievements in swimming, one can observe that statistically significant differences occurred both between Group One and Group Two as well as Group One and Group Three when testing their space and motor orientation (during the error trial), as well as the simple reaction time both to an aural as well as visual stimulus. No statistically important differences were observed between the created groups of boys during the measurement of their receptor and motor co–ordination as well as space and motor orientation. While testing their physical fitness predispositions one could conclude that significant differences occurred during the foot flexibility trial between the boys from Group One (poor swimmers) and Group Two (intermediate); and they were even more conspicuous between in the boys from Group One (poor swimmers) and Group Three (good ones). A number of important differences became quite manifest during the foot flexibility trial between Group One and Group Two as well as Group Three.

It seems that on basis of the above analyses and observations concerning the progress in the mastering of swimming skills by 10–year–old boys in relation to the selected somatic and functional as well as co–ordination and physical fitness predispositions the following conclusions may be drawn:

1. The schoolboys with the higher indices of somatic and functional parameters made more progress in mastering their swimming skills, than their schoolmates in whose case lower results were observed during the factor analysis.
2. Thus, one could venture an opinion that the selected somatic features like: body height, body weight, thickness of the fat tissue, and lean body mass (LBM), as well as the functional ones: vital capacity of lungs, have a bearing on the swimming progress of those 10-year-old children. The boys, whose progression was the greatest in the mastering of swimming skills obtained in the majority of trials concerning the selected co-ordination predispositions better results in comparison with the schoolboys who made little progress in swimming. In relation to this statement, it could be said that the selected predispositions such as: receptor and motor co-ordination, space and motor orientation, as well as visual-auditory reaction time may be of some importance for the swimming progress of the 10-year-old boys.
3. The flexibility of the foot turned out to be the factor that diversified the subjects the most: the lowest results of this feature were obtained by the schoolboys who did not manage to learn to swim very well while the best results were achieved by those who mastered their swimming skills at a good level.

**Key words:** *10-year-old children, somatic and functional features, swimming process*

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#### Igor Ryguła, Paweł Lula, Grażyna Paliwoda-Pękosz - An analysis of Neural Models Used in the Design of Sports Training

The subject of this paper focuses on the problems connected with the possibility of modeling and designing of sports training process with the use of artificial neural networks (Ryguła 2000, 2001). The authors concentrate on the possibilities offered by Husmeier networks. To enable comparison, the results obtained with their use are presented together with the results developed with the application of classical perceptron networks.

The paper demonstrates that the use of Husmeier models shows very flat character of the distribution of the assumed interpreted variables: this fact makes construction of reliable point predictions difficult; it may be expected that the predictions quality will improve with the number of teaching data.

The feasibility of the construction of individual models for separate athletes should be considered.

**Key words:** *Artificial neural networks, Husmeier's networks, mathematical modeling, sport training, forecasting*

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#### Stanisław Żak - Percentiles of Physical Fitness in Polish Youth Based on Eurofit Tests Physical Fitness Score Tables of Polish Youth Criteria for Measuring Aerobic Capacity by the Cooper Test

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