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**THIS ISSUE WAS PUBLISHED
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INTRODUCTION OF THE CHAIRMAN OF THE 5th INTERNATIONAL CONFERENCE MOVEMENT AND HEALTH 2007



Dear colleagues!

One of the basic conceptual problems after the establishment of the Faculty of Physical Culture at Palacký University was the overall aim of its activities. With regards to the current problems of society, to problems associated with the physical, psychological, and social health of the current population, and to means, which we have at our disposal in our profession, the aim, expressed as the connection of two concepts, known as “movement and health” was accepted. This connection brings with it a very wide scope, demanding the interest of both natural and social sciences, and also responds to fields which are studied at our faculty. It therefore reflects not only in the scientific, but also in the educational orientation of the faculty. With regards to this reality, it seemed logical to introduce this concept by means of organizing an international conference “Movement and Health”. Due to tragic events in the USA in 2001, which led to skipping one year of the conference, a fifth year of the conference is being organized in this year in cooperation with a number of international and national organizations. It can be said that a certain tradition has been built up and gradually, a line of interesting people from various countries have appeared in Olomouc, who have significantly contributed to this. With regards to the number of people who registered, it is obvious that the introduced trend will continue in the future. We would like to express our hopes that Olomouc will become a place, where interested experts will want to come in the future.

Dear colleagues, I wish you all not only enjoyment from your participation at this conference, but also enjoyment from visiting Olomouc, and to us, the organizers, I wish that we will be able to ensure this enjoyment.

Bohuslav Hodaň
Chairman of the 5th International Conference
Movement and Health 2007

ABSTRACTS OF KEYNOTE LECTURES

THE RELATIONSHIP BETWEEN MOVEMENT AND HEALTH IS A SOCIOCULTURAL PROBLEM

Bohuslav Hodaň

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After experiences from previous years, how do we perceive the problem of the relationship between movement and health? It is obvious that certain shifts are taking place, associated with the general advancement of mature societies. Thanks to the existing development trends, it is possible to see the given problem in these fields:

1. The fundamental, predominantly resolved relationship is understood from the point of view of human movement as *biomechanical movement* and from the health point of view as *physical health*. Without question, from the point of view of human functions, however insufficient, and moreover leading to the understanding that the human is more or less a "healthy" and productive organism, it is a primary relationship. It corresponds to the concept of *homo faber*. Understandably, it moves around in the field of qualitative research and is thus far, most frequented.

2. So far, the relationship between movement and *psychical health*, is little resolved. This relationship, understandably shifting the human into a higher level, connects the physical side to the psychical side, and it is more near to the concept of *homo sapiens* (I would rather use the concept of *homo cogitans*). Besides quantitative methods, qualitative methods are pushed forward; the human is therefore more conceived as a more factorial phenomenon.

3. At least resolved is the problem of the relationship between movement and *social health*. According to my opinion, it is of the highest level, which is conditioned upon two previous levels. This relationship finally shifts the human there where he belongs. It is understood as a multifactor phenomenon in which qualitative methods

are pushed forward. It corresponds to the concept of *homo socialis*.

No matter what approach we have towards the definition of health WHO, it is clear that it is a multi level concept, not excluding any reduction.

In the given three levels, the researched relationships change considerably with a focus on *human - citizen* and *human - athlete*.

In both cases, we are dealing with individual categories, between which are fundamental differences in the researched relationship movement - health, each of them must therefore be solved separately.

Human - citizen and *human - athlete* lives in some environment (geographical, demographical, ecological...) which constantly changes due to civilization development. The prime researched relationship, movement - health, by this means get into secondary relationships, *human - environment*. Qualitative methods are further more pushed forward.

With technological development, the relationship of *work × non work*, respectively *work × leisure time* changes. It is obvious that the concept of leisure time, founded by Dumazediere, is changing and the deciding concept is becoming *lifestyle*. The fundamentally researched relationship of movement - health is therefore shifting into the relationship of *movement - lifestyle - health*.

The very complex problem which emerges from the fundamental relationship of movement - health, must not only be scientifically solved, but on the basis of acquired results must be influenced the life of people. This is a problem of education the appropriate specialists, therefore a *curricular problem*. This is, without question, connected with *political resolution* corresponding to the given political system.

MORALITY, MEDICINE AND MEANING - TOWARD AN INTEGRATED JUSTIFICATION OF A PHYSICALLY ACTIVE LIFE

Sigmund Loland

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What are the values of a physically active life? What is its meaning and possible significance to the individual and society? Should movement education be part of a standard curriculum in the education of the young? If so, why? These questions are calls for a philosophical justification of a physically active life. Ideas of an active life are socio-cultural constructions created by people for people and on the basis of particular human goals and values. Critical reflection over such views is the topic of this paper. More specifically, the paper presents a critical review of what can be considered three ide-

al – typical justifications of the physically active life: the justifications from morality, health, and meaning. In a final section, a proposal is made for an integrated justification restating and relating these justifications into a consistent whole.

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DOSE-RESPONSE OF PHYSICAL ACTIVITY AND HEALTH AS THE BASIS FOR PUBLIC HEALTH RECOMMENDATIONS

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The dose of physical activity consists of the frequency, intensity and duration of the activity of interest, and the health response of the consequent changes in a chosen health indicator. These dose-response relationships inform us on how much and what type of physical activity is needed for a desired health outcome. As the evidence of the health benefits of physical activity became evident mostly from epidemiological studies on all cause or disease specific mortality, more recent research has focused on the quantitative dose-response relationships between physical activity and specific health outcomes. The accumulated evidence led to the first public health recommendation of physical activity in 1995 (CDC & ACSM): "Every US adult should accumulate 30 minutes or more of moderate intensity physical activity on most, preferably all, days of the week". This recommendation has been adopted in various forms as a national guideline in many countries including several European countries.

During the past decade a vast amount of new evidence on the dose-response of physical activity and health has been published. Majority of it has largely supported the CDC/ACSM recommendation. However, some of it, particularly that related to overweight and obesity, has been used to challenge the original recommendation by way of suggesting that substantially larger dose is needed for the primary and secondary prevention of overweight and obesity. While these early recommendations have targeted primarily adult populations, supplementary recommendations have been issued also for children and adolescents (e.g. Sallis & Patrick, 1994) and for the elderly people (e.g. Health Canada, 1999).

The most recent assessment of the accumulated evidence on the dose-response of physical activity and health was done by the American College of Sports Medicine and the American heart association leading to updated recommendations for adults (Haskell et al.,

2007) and for older adults (Nelson et al., 2007). For adults it is recommended: "To promote and maintain health, all healthy adults aged 18–65 year need moderate intensity aerobic physical activity for a minimum of 30 minutes on five days each week or vigorous intensity aerobic activity for a minimum of 20 minutes on three days each week." In addition muscle strengthening activity on two days each week is recommended. While the core message in the new recommendation is basically similar to the original one, there are several modified or new aspects indicating the importance of continuous evidence collection and evaluation as the basis for physical activity recommendations.

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MULTIPLE ENVIRONMENTAL FACTORS ARE NEEDED TO SUPPORT WALKING AND PHYSICAL ACTIVITY: AN 11 COUNTRY STUDY

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Most studies of the relation between neighborhood environments and physical activity analyze each environmental variable separately, so the cumulative impact of environmental variables is not clear. Multi-country studies are needed to achieve wide environmental variability and accurate estimates of effect sizes.

PURPOSE

To examine the “dose-response” relationship between number of activity friendly environment attributes and outcomes of walking and physical activity.

METHOD

Eleven countries used the same 7 self-report environmental variables and the short International physical activity questionnaire, allowing pooled analyses representing wide environmental variation. The countries were Belgium, Brazil, Canada, Colombia, China (Hong Kong), Japan, Lithuania, New Zealand, Norway, Sweden, and USA, with a total sample exceeding 18,000 adults. Samples were roughly representative. Sufficient walking was defined as meeting the moderate activity guideline (30 minutes/day $\times$ 5 days). Physically active was defined as meeting either the moderate or vigorous (20 minutes/day $\times$ 3 days) guideline. Environmental attributes were categorized as “activity friendly” or not. Logistic regression analyses evaluated associations between number of “activity friendly” environmental attributes and physical activity outcomes, adjusted for age, sex, and country, and using zero attributes as the

referent. The Wald statistic can be interpreted as a test of linear trend.

RESULTS

For walking, the Wald statistic was significant ($X^2 = 33.55$; $p < .0001$), and having six (OR = 1.43) and seven (OR = 1.38) environmental attributes was associated with significantly higher odds of walking. For total physical activity, the Wald statistic was significant ($X^2 = 32.48$; $p < .0001$), and having five (OR = 1.43), six (OR = 1.50), and seven (OR = 1.74) environmental attributes was associated with significantly higher odds of being active.

CONCLUSION

Results suggested a threshold of numerous activity friendly attributes were required to increase the likelihood of walking and being physically active, and the data did not support a linear association. Because the odds ratios were large, creating activity friendly neighborhoods is a high priority for international health promotion.

ACKNOWLEDGMENT

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**ABSTRACTS
OF ORAL AND POSTER PRESENTATIONS**

PHYSICAL FITNESS OF YOUNG FOOTBALLERS IN SIX MONTH TRAINING PERIOD

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The process of sport training has a scientific and pedagogical character and through adaptation changes in player's organism should lead to the champion model. Footballer's fitness is determined by training burdens. Sustaining a good level of physical fitness demands continuity in testing essential motor abilities. Controlling the elements effecting physical fitness is a basic tool that allows a coach to work successfully on a football player's development (Przewęda et al., 1992). The aim of the work is to define the dynamics of changes in chosen elements of physical fitness due to training and match burdens in a half year macro-cycle training.

MATERIAL AND METHOD

19 young footballers at the age of 13, playing for WKP "Lech" Poznań, were the subjects of the research. Each one of them was, on average, 156.69 cm tall (± 8.51 cm) and weighed 48.01 kg (± 8.43 kg). The boys have been playing football for 5 years. The research was conducted at fixed intervals in accordance with the process of sport training structure. The following Stuła tests were applied to do research into the level of physical fitness:

- slalom with a ball (evaluation of leading the ball),
- on-pitch maneuverability (evaluation of the dynamism of the player's movement),
- slalom finished with left-foot strike and right-foot strike,
- three-stage run with the ball and without it along 45 m long triangle shape line.

To express the degree of assumption between the series correlation coefficient was proposed.

RESULTS

Applied training and match burdens during six month training had a significant impact on improving special physical fitness of all the subjects. The greatest rise in average values were noticed in the slalom test finished with a right-foot strike. Statistical differences/discrepancies between three period studies turned out to be significant at the level of $p \leq 0.01^{**}$. Of all the tests only maneuverability test showed decrease in average values.

CONCLUSIONS

The main goal of the research was to improve chosen fitness elements during six month's time. The programmed training burdens proved to be successful as the goal was fully achieved.

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PHYSICAL ACTIVITY PROMOTION IN A SPA SETTING

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FH Joanneum was asked to develop a concept for a new spa facility in upper Styria. The main focus should be set on physical activity. Different areas were developed; one should deal with health promoting offers mainly in the area of physical activity but also in mental health for recreational guests as well as regional residents. This paper focuses on the results about health promoting physical activity services. There are many physical activity offers in recreational, wellness facilities and spas promising health effects. However there is hardly any evidence about the effectiveness and quality premises for health effects of such offers.

AIM

To develop a health promotion programme with a focus on promoting physical activity in a spa setting in upper Styria.

METHODS

Needs assessment was done by means of a rapid appraisal (analyses of routine and survey data, expert interviews, internet based research) to find out about main health problems and to describe already existing health promotion activities in the region as well as to find out about existing health promoting offers in recreational facilities in the area. A literature review was conducted about effective health promotion activities in recreational facilities. Based on results of the needs assessment and of the literature review the health promotion programme was developed by means of experts working groups. Working groups also proposed recommendations on partnerships and evaluation.

RESULTS OF THE NEEDS ASSESSMENT

In the region there is a need to offer physical activities for prevention of cardiovascular diseases and diseases of the musculoskeletal system. Girls aged 12–18 and older people were identified as specific target groups.

Health promotion programs in regional enterprises and communities exist, but not in schools.

RECOMMENDATIONS

The health promotion programme should comprehend following measures: effective and professionally delivered services for individuals (like aqua jogging, water gymnastics, tai chi, baby swimming, outdoor programs), activities for specific target groups (like volleyball, basketball and dancing for girls; exercise programs for fall prevention and for prevention of osteoporosis, group and circle dancing, tai chi for older people) and activities to support individuals to change their health behaviour. There is also the possibility to offer occupational health promotion programs for regional businesses as well as for healthy cities, healthy communities and schools through a regional spa. Measures to ensure health promoting policies and a health promoting spa environment (like health as a part of the spa's mission statement, health programs for employees, healthy and health promoting surroundings, e.g. health promoting transport systems, health as important fact in all management decisions, e.g. committing on non smoking policies) should complete the programme. Partnerships with regional businesses, schools and communities, with other health facilities and health promotion organisations as well as with research institutions should be built. A process and outcome evaluation of the health promotion activities has to be conducted from the beginning.

CONCLUSION

This piece of work shows that the evidence base of health and physical activity promotion services can be used to develop innovative activities for a commercial setting. The proposed health promotion programme got positive feedback from the planners of the spa. However, a conflict between the commercial interests of a spa and the needs and evidence based practice of health promotion remains.

EFFECTS OF PHYSICAL EFFORT ON BALANCE PRESERVATION IN STANDING POSITION IN PATIENTS SUFFERING FROM CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Chronic obstructive pulmonary disease (COPD) constitutes one of the most common respiratory disorders. It is demonstrated through a gradual loss of functional effectiveness of the lungs, which results in respiratory disability. This disease is distinguished with the occurrence of disorders in the whole body including the worsening of the overall condition and lower effort efficiency of the patients. This results from the impairment of activity of skeletal muscles accompanied by the reduction in mass and occurrence of bio-energetic disturbances. However, the most important matter for dealing with the challenges of everyday life is associated with the balance preservation in standing position. Standing position constitutes the most characteristic position for a human, while the appropriate preservation of a balance is the basic function of an organism. In connection with this, any degree of deficiency in balance preservation may result in a considerable deterioration of a living quality for the patients. In consideration of this, the objective of the current paper is the assessment of stability of standing position in patients suffering from chronic obstructive pulmonary disease in its mild stage. This assessment was conducted prior to and following the process of 3 week pulmonological rehabilitation, on the basis of measurement of stabilography parameters gained prior to and after an effort test. Concurrently, the values gained during an effort test along with dyspnea levels declared by patients were recorded and subsequently analyzed.

The test group involved 62 patients suffering from COPD (25 female and 37 male). The investigated

group were characterized with the limitation in air flow down the respiratory tract, the level of which was $FEV_1/FVC < 70\%$, a $50\% \leq FEV_1 < 80\%$ of the due value which is classified as stage II of COPD (mild COPD). In order to compare the results gained by the patients, a control group was identified, which consisted of 30 healthy people (12 female, 18 male). The average age for the investigated groups was 61.7 ± 7.6 years for the patients and 60.5 ± 7.5 for the healthy ones.

The results presented in the current paper indicate that the process of balance preservation in the group suffering from mild COPD occurs similarly to the test group. This is confirmed by similar values of stabilography parameters, which were the basis for the evaluation of balance in standing position. Simultaneously, physical effort has a destructive effect on the process of stability preservation in both of the investigated groups. However, the effect of effort has a more negative effect on the patients suffering from, which is reflected in the larger increment in the values of stabilography parameters under the influence of physical effort. The program of rehabilitation, which involved the patients, does not affect the change of stabilography parameters in the static test. However, it affects an improvement of performance in physical effort test, which results in a lower increase of parameters enabling the evaluation of balance preservation process. Simultaneously, there is a direct relationship between the values of stabilography parameters and the dyspnea levels indicated by patients suffering from chronic obstructive pulmonary disease.

INFLUENCE OF YOGIC EXERCISE ON BIOCHEMICAL VARIABLES OF SENIOR SCHOOL BOYS

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The purpose of the study was to find out the influence of yogic exercise on various biochemical changes of senior school boys. This study was conducted on 30 randomly selected school going boys, their age ranged between 15–18 years. They were observed for a period of 10 weeks in a self controlled study and then exposed to an experimental treatment of yogic training for a period of eight weeks. The training was programmed for duration of five days per week in the morning session of one hour for a total period of 10 weeks. Prior

to self-control and before and after experimental treatment, the data were collected on lactate dehydrogenate, high density lipoprotein, low density lipoprotein, red blood cells, and white blood cells. Statistical analysis by ANOVA revealed that there was significant mean gain in the selected biochemical variables (LDL = 11.973, HDL = 32.97, LDL = 4.554, RBC = 6.75, WBC = 8.35). Thus, yogic exercise was found biochemically safe for the youth and recommended strongly for growing school boys to maintain their good health.

LOCOMOTOR POSSIBILITIES FOR VISUALLY HANDICAPPED INHABITANTS IN REGION OF ÚSTÍ NAD LABEM

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Over the last few years Department of P. E., Pedagogical Faculty of University of J. E. Purkyně has managed to contribute to the improvement of locomotor activities for visually handicapped people in Ústí nad Labem and its surroundings. The outcome of the research (apart from other procedures) was used as the basis for our work, which pointed at some specifics of this phenomenon. The visually handicapped meet similar problems. They have worse conditions for practicing physical activities. The reason is a limit or absence of visual control over movement and spatial orientation. The visually handicapped have objectively worse conditions not only in terms of being offered more spectrum of jobs but also in participation in locomotor activities and so they have less chances to experience a healthy lifestyle. This interaction becomes the limitation in cultivation of other skills including working skills and range of competence. Limitation or the absence of visual control over the movement itself and the orientation also limits incorporation into society. The aim of our research was to contribute to the solution how to do activities with a positive effect on health and forming the healthy lifestyle of the visually handicapped. One of the task of our survey was to determine main problematic areas, which could be influenced by civic policy, educational process, cooperation with the public, etc. We have also tried to increase the attendance of the visually handicapped in locomotor activities provided by students of Ústí nad Labem. Through our results we present what (along with visual handicap) the main reasons for not taking part in any sports activities are.

Research was carried out by questionnaires in district of Ústí nad Labem. There were used questionnaires, which were orientated on specific problems of the visually handicapped. The examined array were clients of Tyflocentrum. They were put into the array according to stratification random selection. Data were analyzed by common statistic methods in dependence on the use of non parametric types of data in a programme MS EXCEL. We present data about 96 men (M) and 151 women (W) in these groups: men B1 (MB1, n = 54), men B2 (MB2, n = 17), men B3-B4 (MB3-4, n = 25), women B1 (WB1, n = 68), women B2 (WB2, n = 32), women B3-B4 (WB3-4, n = 51). Age structure of group

members was comparable (in accordance) with required statistic characteristics.

From the result it is to see that quite a lot population of the visually handicapped can get over the feeling of being laugh at while doing any of sports activities or they just ignore it. On the other hand they do have a fear to get injured regardless their degrees of handicaps (in the group with the handicap B1 almost 60% of the interview). This worry is regarded as the cause for passive attitude towards locomotor activities regardless of the degree of the visual handicap. Conditions for sports activities, which are provided, do not affect (in any way) the attitude of the badly visually handicapped towards sports activities. Individuals with not so serious degree of visual handicap have different opinion. This issue begins to appear questionable in the moment when individuals do not play any kind of sport. The significant difference appears in perceiving levels of learning new locomotor skills in groups of the visually handicapped. With the increase of the degree of the handicap there is deficit of skills, the reason why not to be involved in any sports activity. The badly visually handicapped very often claim that the needed knowledge about activities is missing. Subjective perception of overweight of the handicapped (B2, B3) while practicing PA does not influence it significantly.

However, for the badly visually handicapped overweight has a huge impact on practicing PA so that they want to avoid it. The visually handicapped B3 find the access to sports facilities insufficient or considerably in bad conditions. In accordance with expectation there was a proof of the existence of a visual handicap in relation to practicing locomotor activities. The visually handicapped with higher degree of visual disability perceive, while practicing locomotor activities, their visual handicap more noticeably. The higher degree of the visual handicap is a serious obstacle to practice sports activities, similarly it is seen in other activities. The attitude towards sports activities of B1 type handicapped individuals would not improve even if there were built up new sports facilities. There could be seen better results by mentioning rebuilding tourist paths, pavements, and adjustment of communications. A big potential for attendance improvement of those visually handicapped in sports activities involves presence of a leader (guide).

MONITORING OF AUTONOMIC NERVOUS SYSTEM ACTIVITY DURING RECOVERY PERIOD AFTER MARATHON RUN BY SPECTRAL ANALYSIS OF HEART RATE VARIABILITY: A CASE STUDY

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Autonomic nervous system (ANS), through sympathetic and parasympathetic branch, regulates and coordinates functions of all internal body organs, and in that way, it keeps a homeostatic balance. A monitoring of ANS activity, for example by spectral analysis of heart rate variability (SA HRV) method, enables feedback evaluation of the amount of internal changes induced particularly by the training or non training stimuli.

The primary aim of this work was to analyze and interpret ANS activity changes during recovery period after a marathon run. The secondary aim was to compare dynamics of the ANS activity with dynamics of subjective feeling of fatigue during recovery period.

A 31 year old athlete participated in this study. His performance swimming career has been finished when he was 26 year old. In present, his physical activity is according to habitual activity. The value of his body mass index was $25.2 \text{ kg}\cdot\text{m}^{-2}$, and value of his maximal oxygen uptake was $50.7 \text{ ml}\cdot\text{kg}\cdot\text{min}^{-1}$. The ANS activity was measured and evaluated by noninvasive method SA HRV (diagnostics system VariaCardio PF7) during standardized ortoclinostatic maneuver lying – standing – lying positions. The ANS activity was expressed by age dependent parameter total power (P_T) and complex indexes of SA HRV: the complex index of vagal activity (VA), sympathovagal balance (SVB) and total score (TS). The reference values of these parameters range from -5 to +5 points. The first measurement of ANS activity before the marathon run was made at 7:30 am. Then, the athlete underwent the marathon run (42.195 km) which started at 9:00 am. The athlete ran 4 hours and 26 minutes, and the exercise intensity was around 85% maximal heart rate reserve. In the recovery period was of ANS activity measured in following time

intervals: at the beginning of the 7th; the 19th; the 34th; the 44th; the 58th; and the 67th hour. The feeling of fatigue was evaluated by the athlete himself each time before the measurement of the ANS activity. The level of subjective feeling of fatigue was ranged from 0 (non fatigue) to 5 points (very high fatigue).

The return of all evaluated parameters to their base level was recorded between beginnings of the 19th and the 44th hour from the end of the exercise. The parameters reached their preexercise level in following order: the 1st) P_T (some time between beginnings of the 7th and the 19th hour of the recovery); the 2nd) complex index SVB (some time between beginnings of the 19th and the 34th hour of the recovery); the 3rd) complex indexes VA and TS (some time between beginnings of the 34th and the 44th hour of the recovery). Values of all evaluated parameters SA HRV overshoot their base level in different time of the recovery period. The highest value of the overshoot for P_T (at the beginning of the 19th hour of the recovery) and complex indexes VA, SVB, TS (at the beginning of the 44th hour of the recovery) were detected. The feeling of fatigue was usually evaluated with 5 points, except one (4 points).

According to the presented results, the ANS activity was completely recovered after the marathon run some time between beginnings of the 34th and the 44th hour of the recovery period. The very high fatigue persisted within whole monitored recovery period. Therefore, we consider that the ANS activity as an objective marker of actual state of the body did not link with subjective feeling of fatigue. It seems, that the monitoring of ANS activity by SA HRV could be a way how relatively accurately evaluated the time course of recovery of the body after various exercise.

PROBLEMS OF TALENT IDENTIFICATION AND SELECTION IN ARTISTIC GYMNASTICS

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Artistic gymnastics is one of the most popular spectator sports at the summer Olympic games, although it is not a particularly popular participant sport, because a basic level requires very high levels of fitness and skills. In addition to that, gymnastics is dependent on genotype, with participants already possessing the basic physique of small stature, short limbs, broad shoulders, and narrow hips, because body type is critical to successful performance in gymnastics. Taking this into consideration, smaller gymnasts with a high strength to weight ratio are better able to handle their own weight during complex skills, particularly those involving rotation around one or more axis of the body. Biomechanical principles underlie this trend in both physique and style. We know that selection of the appropriate body type prior to training is critical to be successful in elite adult gymnastics in this day and age (Richards, n. d.).

What about children who build the base of future high performance and perform easy skills? Is physique important for performance in childhood?

So, in our research we want to know if young gymnasts with better prerequisites of physique have better performance in the competition, than gymnasts with any deficits of physique. The sample consists of artistic gymnasts from following clubs: SK Hradčany Praha,

MS Brno, Sokol Zlín, GK Šumperk, Sokol Brno I., Sokol Šternberk a GKM Olomouc. All gymnasts were monitored for the period of three years. We did basic anthropometric measurement on them. We measured their body height, body weight. Girth, length and width measurements were taken from specific points on the body. We determined their body type, body composition, and biological age. Our measurements were validated by the results of national championship.

To determinate the body type we have used the Heath-Carter method (1967), which turns out to be the most suitable for choosing sports talents. Body components were determined by estimation of body composition method according to Pařízková (1962). The biological age was determined as proportional age. Calculation of particular components of body type was made by ANTROPO 3.

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THE EFFECT OF 8 WEEK PULMONARY REHABILITATION PROGRAMME ON VENTILATORY PARAMETERS, CHEST MOBILITY AND QUALITY OF LIFE IN PATIENTS WITH COPD

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The treatment of chronic obstructive pulmonary disease (COPD) calls for a multidisciplinary programme. Comprehensive care involves not only using drugs but also non pharmacological treatment. Pulmonary rehabilitation is the very important part of non pharmacological treatment and combines a number of different techniques to help reduce symptoms of this disease.

OBJECTIVES

The aim of this research was to assess the effect of 8 week pulmonary rehabilitation programme on ventilatory parameters, chest mobility and quality of life in patients with COPD.

METHODS

The tested group (group A) was consisted of 14 patients with COPD (aged 65.2 ± 7.4 years) who underwent 8 week pulmonary rehabilitation. All the patients participated in pulmonary rehabilitation programme which included techniques of respiratory physiotherapy, mobilization techniques, postfacilitation techniques and physical activity.

The control group (group B) included 14 healthy persons (aged 59.9 ± 2.53 years).

Group A

The basic spirometric examination and measurement of chest mobility was carried out at the beginning and at the end of the treatment. We measured ventilatory function which included vital capacity (VC), forced expiratory volume in one second (FEV_1), forced expiratory flow and peak expiratory flow. The quality of life (QoL) was measured with St. George respiratory questionnaire (SGRQ) at the beginning and at the end of the treat-

ment. The total score can achieve from 0 to 100 points (0 = very good QoL, 100 = very bad QoL).

Group B

Ventilatory function and measurement of chest mobility were performed in all healthy people.

RESULTS

Group A

The values of VC and FEV_1 were statistically increased at the end of the treatment. The value of VC was diminished by 9 persons (< 80%) at the beginning and by 4 persons at the end. The value of FEV_1 was under 80% of the norm by 13 persons at the beginning and by 9 persons at the end. We proved a decreased average SGRQ total score from 36 points at the beginning to 22.6 points at the end of the treatment. We observed improvement of chest wall motion at the end of the treatment.

Group B

We noticed normal values of VC and FEV_1 and normal chest wall motion in all healthy persons.

CONSLUSION

From these results it can be concluded that the pulmonary rehabilitation has a positive effect on ventilatory parameters, chest wall motion and quality of life. The observed improvement in VC and FEV_1 we put down to combination of pharmacological treatment and better timing of inspiratory and expiratory muscles during breathing. But we suppose that the influence of breathing exercise on ventilatory parameters will require more research studies.

ANALYSIS OF THE PADDLE TENNIS PRACTICE: A HEALTHFUL SPORT FOR ALL

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The aim of the present work is to determine the physiological exigencies as well as the structural characteristics of the paddle tennis practice in order to determine if these are between healthful intervals and therefore it can be recommended to the whole population. A total of 12 top level male players (age, mean $\pm$ sd: 16.57 ± 1.51 years) participated in the study. Twenty-four hours before competition, the subjects carried out an incremental test on a treadmill, determining different cardiorespiratory parameters, such as oxygen uptake (VO_2) and heart rate (HR). In competition the total time of game (TT), the real time (TR), and the time of pause (TP) were registered, entering all the shots performed by the analyzed subjects. In addition, VO_2

and HR values were obtained during the competitive effort. The VO_2 in competition reached values below 50% of the maximum that those reached in treadmill test, whereas the mean HR represented, approximately, a 74% of the maximum HR reached in the same test. On the other hand, ratio TP: TR was 1 : 0.79 s, existing a predominance of the direct shots being volley the main shot. After the definition of the structural and functional characteristics of paddle competition, these last were very similar to those of individual tennis. Taking into account that these exigencies are on the healthful rank advised by the ACSM, we recommend its practice to a wide spectrum of the population.

PHYSICAL ACTIVITY LEVELS OF TURKISH UNIVERSITY STUDENTS WITH RESPECT TO GENDER, RESIDENCE AND FIELD OF STUDY

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The purpose of this study was to examine physical activity levels of undergraduate students with respect to gender, residence and faculty. 953 students (496 male, and 547 female) from 5 different faculties of a university in Ankara participated in this study. Participants were selected by using stratified random sampling method. For the data collection International physical activity questionnaire was used. Data analysis were performed by descriptive statistics (frequency, mean, median, percentage), and nonparametric statistical methods (Mann Whitney U-test, Kruskal-Wallis test). Findings indicated

that male students and students living in campus were more physically active than female students and students living out of the campus, respectively ($p < 0.05$). In addition, faculty of architecture students were physically inactive than the other faculty students ($p < 0.05$). In conclusion, female students, students living out of campus and students of faculty of architecture were more at risk of inactivity. University physical activity facilities, extracurricular programs and physical activity courses should be reconsidered to meet the needs of these special groups.

DIFFERENCES IN FITT CHARACTERISTICS OF PHYSICAL ACTIVITY IN CZECH SMOKERS AND NON-SMOKERS

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Smoking is one of the factors negatively impacting health (O'Loughlin & Tarasuk, 2003). Despite the fact that the Czech Republic is under the average of European Union, still the number of smokers is high (Daňková, Chudobová, Kamberská, Popovič, & Tvrdá, 2007). Thus, smoking should be paid attention to. Physical activity is considered a means that can reduce negative impacts of smoking on the organism (Anton et al., 2006). However, the exact characteristics of physical activity effective in this matter have not been revealed yet. Comparison of FITT characteristics of physical activity in smokers and non smokers can provide information that could serve as a basis for prevention and treatment of nicotine addiction.

METHODS

A systematic random sample of 6296 females and 6027 males aged 15–64 from all the regions of the Czech Republic was used in the study. The data were collected during the years 2003 and 2004 using the Czech short version of the international physical activity questionnaire. The associations between cigarette smoking and FITT characteristics of PA, sex, age and BMI were analyzed.

RESULTS

Smokers show less vigorous PA than non smokers. Greater differences in vigorous PA have been found in men than in women. There are no significant differences found in moderate PA, walking, total PA, and sitting between smokers and non smokers. Men smokers aged 55–64 show the lowest values of total PA (Mdn = 2876 MET-min-week⁻¹; IQR = 5284 MET-min-week⁻¹). Throughout the year, recreational PA is performed more by non smokers than smokers. It is alarming that 21.3% of women smoking (20.1% men smoking) report that

they do not participate in any sport or recreational PA during the year as opposed to 12.5 % of women non smoking (10.2% of men non smoking). Cycling is the other major recreational PA type next to walking in both smokers and non smokers.

CONCLUSIONS

Identifying and better understanding of the relations between FITT characteristics of PA and smoking establishes conditions for more effective prevention and treatment of nicotine addiction. In the prevention of cigarette smoking, it is among priority tasks for the Czech Republic to maintain the current levels of “walkability”, to expand bicycling activities, and further increase a number of other lifelong physical activities.

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PHYSICAL ACTIVITY AMONG FLEMISH PRESCHOOLERS IN RELATION TO THEIR MOVEMENT SKILL DEVELOPMENT

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An omnipresent concern has been expressed for children's poor engagement in physical activities. Often this poverty is related to a negative influence on health related factors, such as increase of blood pressure, resting heart rate, obesity and prevalence of type 2 diabetes, etc. During the preschool years, however, when the preschoolers have to develop their fundamental movement skills (Gallahue & Donnelly, 2003) this lacking engagement in PA's can have a negative influence on the development of those skills as well. The risk of creating a severe constraint (Haywood & Getchell, 2005) for further engagement in PA's later in life is not inconceivable. Recommendations for daily MVPA for preschoolers are not uniform. The National association for sport and physical education (NASPE 2002) suggests children attending preschool should accumulate at least 120 minutes of MVPA per day. Other recommendations on health behavior are derived from broadening the widely accepted recommendations for school age youth of at least 60 minutes of MVPA per day. BMI referenced standards expressed in step counts are 12000 for 6 year old girls and 15000 for 6 year old boys (Tudor-Locke et al., 2004).

This study focuses on the amount of daily PA among preschoolers (age 4–6) during a regular school day and on the relationship between preschooler's PA and the development of their fundamental movement skills.

METHODS

Subjects for the present study were recruited through preschools in Flanders. Two schools were asked to and agreed for participation in the study. 105 parents of 2nd and 3rd year preschoolers were invited to enroll their children in the study by an information letter. Sixty parents (57%) provided informed consent. Before assessment, oral consent was provided by all individual preschoolers. Step counts were assessed using the Yamax digiwalker pedometer TYPE SW-200 (Yamax corp., Japan). Pedometer data were collected on three full school days. In the present study step counts were registered in absolute

count per school day. Movement skill development was assessed using the MOT 4–6 assessment tool (Zimmer & Volkamer, 1987). The preschooler's weight was measured using a digital balance, their length was measured using a standard measuring tape. All preschooler wore light clothes without shoes. Data on movement skill development was collected in one test session of 15–20 minutes per preschooler. Data were analyzed using SPSS 15.0 for windows.

RESULTS AND CONCLUSIONS

Will be presented at the conference and included in the full paper.

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DO WE NEED TO ESTABLISH SUBGROUPS WHEN WE PRESCRIBE PHYSICAL ACTIVITY TO WOMAN WITH FIBROMYALGIA?

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To define groups in women with fibromyalgia syndrome (FM) based on symptomatology and determine cardiovascular parameters during treadmill exercise to prescribe them physical activity.

METHODS

Women (N = 32, age = 53.26 ± 6.61 years old) were assigned into two different groups based on their functional capacity and symptomatology. During incremental treadmill exercise test exercise intensity was increased until participants achieved volitional exhaustion ($\text{VO}_{2\text{max}}$). Expired respiratory gases, ventilatory parameters and heart rate (HR) were measured continuously during exercise and RPE was assessed each minute during the test.

RESULTS

Peak VO_2 values for the group 1 were significantly different than for the group 2 ($26.2 \pm 2.1 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ (group 1) and $22.1 \pm 2.5 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ (group 2)). In the other hand if we take into account the $\text{VO}_{2\text{VT}}$, we found not significant differences between groups in both trials. We found also differences in all the evaluated parameters.

CONCLUSION

Based on the level of affectation and the symptomatology of the FM patients their aerobic capacities were different; therefore, we are not able to prescribe physical activity with the same intensity for both groups.

HOW CAN WOMEN WITH FIBROMYALGIA TO CONTROL THE INTENSITY OF THEIR DAILY PHYSICAL ACTIVITY?

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To examine the validity of a simple tool based on perceived exertion (RPE) scales in women with fibromyalgia syndrome (FM) during treadmill exercise.

METHODS

Women (N = 32, age = 53.26 ± 6.61 years old) were assigned into two different groups in order to their functional capacity and symptomatology and they were asked to use an RPE scale (Borg 6–20RPE) during incremental treadmill exercise test. Exercise intensity was increased until participants achieved volitional exhaustion ($\text{VO}_{2\text{max}}$). Expired respiratory gases, ventilatory parameters and heart rate (HR) were measured continuously during exercise and RPE was assessed each minute during the test. Reliability of the RPE scales was assessed using Pearson and Cronbach coefficients in test–retest. Validity estimates were calculated using

Pearson product moment correlations, with % HRmax, VE, RR, RQ and % $\text{VO}_{2\text{max}}$ as criterion measures.

RESULTS

Reliability estimates were $r_{xx} = 0.71$ in group 1 and $r_{xx} = 0.81$ in group 2 compared with the Borg scale. Validity coefficients (r_{xy}) were high for most of the physiological parameters (VE, RER, HR, VO_2), $\text{Rho} = 0.58 - 0.87$ in group 1 and $\text{Rho} = 0.43 - 0.86$ in group, comparing with 6–20RPE.

CONCLUSION

The 6–20RPE scale was found to be reliable and valid for use with fibromyalgia women. This tool let the patients to exercise in an independent way and to the professionals to prescribe the exercise with a high security and control.

VALIDITY OF THE OMNI-RES SCALE OF PERCEIVED EXERTION FOR RESISTANCE EXERCISES AMONG THE ELDERLY

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There is no doubt about the importance of the strenght training among the third age. This type of exercise can prevent osteoporosis or improve the stability of the body. Physical activity is more and more used in the rehabilitation of patients, although for this exercise to be effective, it is necessary to be careful with its prescription and control. Its because with need to develop a symple tool to control the evolution of the patients without requiring a lot of time, and allowing an autonomous form of control. In this sense, the rating of perceived exertion (RPE) has been defined as the act to detect and to interpret the sensations originated by the body during the physical exercise. During 40 years several RPE scales have been used as valid and safe measures of the intensity of the exercise.

The OMNI-RES scale, developed by Robertson et al. (2003) allows, as the traditional scales of perceived exertion developed by Borg in 1962, to get information about the intensity of the effort. The obtained data from OMNI-RES scale are able to be correlated with physiological parameters (heart rate, lactate concentration, etc.). These correlations are fundamental, not only for health and sport scientific community, but also for the prescription of exercise programs fit in healthful parameters, extrapolating these programs to daily situations.

The aim of this study is therefore to examine the validity of OMNI-RES scale of perceived exertion in men and women older than 65 years, executing two strength exercises.

EVALUATION OF SOME ATTRIBUTES OF TEST OF GROSS MOTOR DEVELOPMENT - 2 IN CZECH REPUBLIC: PRELIMINARY STUDY

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For children, gross motor skills are essential for the execution of many motor tasks. Gross motor skills are important for both social interaction on the playground and performance in physical education. These skills typically include running, jumping, throwing, catching and kicking (Doty, McEven, Parker, & Laskin, 1999). Many physical educators consider gross motor skills to be the most important motor skills taught in physical education because they are the cornerstones of many games (Butterfield & Loovis, 1993; Williams, 1992). The motor coordination is needed for successful performance of the gross motor skills which correspond to the age of children. Developmental delay or disorders in the coordination can influence mind and social position of children in negative way. Developmental delay or disorders in the coordination can be called a syndrome of clumsy child and can be associated with an incidence of another particular learning disorders (problems in communication, dysgraphia). In some measure, this syndrome occurs in 6% of children in school age. In case of developmental delay or disorder, appropriate physical education and psychomotor programs represent the best intervention (ADAPT, 2006). Thus the examination of developmental delay or disorder in coordination is needed. Test of gross motor development - 2 (Ulrich, 2000) is one of the most employed tools for the examination of developmental delay or disorder in coordination. Test of gross motor development - 2 (TGMD 2) follows-up previous version and its purpose is to identify children which are significantly worse than their coevals. The test evaluates the gross motor skills such as running, jumping, galloping, sliding, or fundamental ball handling skills. TGMD 2 is open testing system which can be modified as necessary. Even though test is integrated into European curriculum for adapted physical activities it has not been standardized in the Czech Republic. The objective of this study is to assess some of the attributes of test, particularly construct validity, reliability and dimensionality.

METHODS

Unlike in previous version the attributes of TGMD 2 have been evaluated by a new methodology, particu-

larly Rasch model (Zhu & Cole, 1996; Ulrich & Sanford, 2000). The same methodology will be used in the project solution. To evaluate attributes of the test the Rasch model will be used (Wright-Masters test, index of item separation and index of person separation, differential item functioning).

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AN OVERVIEW OF RESEARCH METHODS AND SHORTCOMINGS IN THE STUDY OF PHYSICAL ACTIVITY AMONG PRESCHOOLERS

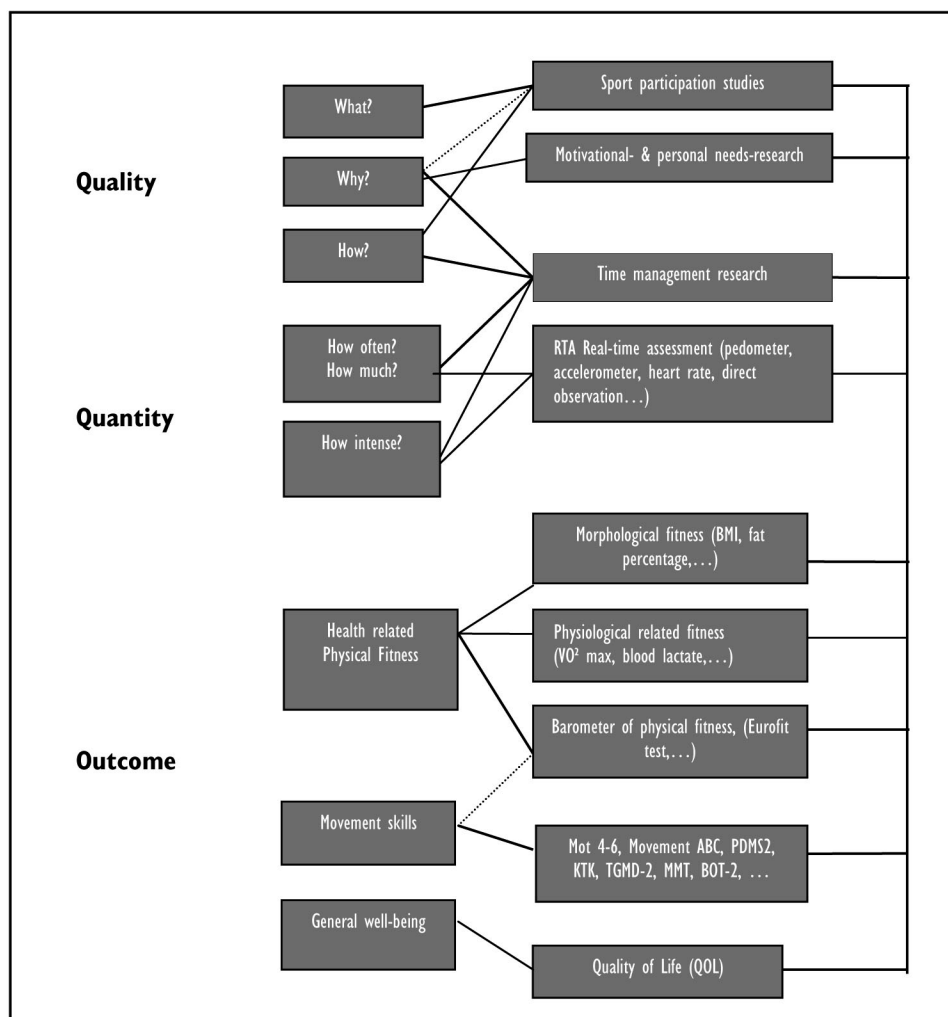
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Past descriptions or studies of physical activity in our society have mainly focused on youths and adults. Preschoolers, by contrast, have only rarely been the subject of study. This contribution addresses questions in the above mentioned categories specifically with regard to preschoolers. Physical activity research concerns itself with questions pertaining to three categories of inquiry: the quality, the quantity and the outcomes of participation in physical activities (Fig. 1).

In our overview we will summarize the research methods that are used to study the quality, quantity and the outcome of physical activity among (young) children in order to focus on the specificity of physical activity research among preschoolers. The methodologies as well as the shortcomings in gathering relevant data for the age group of the 3–6 years old children will be discussed.

Fig. 1



CLASSICAL BALLET – NOT ONLY FOR PROFESSIONAL DANCERS

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Dance is characterized as a conscious effort with the aim to create visual performance in space by continuously moving body through a series of poses and pattern. A theatrical work or entertainment in which a choreographer has expressed his ideas in group and solo dancing to a musical accompaniment with appropriate costumes, scenery and lighting (more on www.abt.com). Classical ballet in which the style and structure adhere to the definite framework was established in 19th century. The famous classical ballets are for example Swan Lake, The Nutcracker and The Sleeping Beauty (all by Tchaikovsky), Coppélia (by Delibes), Giselle (by Adam) and La Fille mal gardée (by Hérold). Theory of the classical ballet is given in Beaumont and Idzikowski (1966), McFee (1992) and Vaganova (1969).

Ballet dancers have some things common with athletes, in that their instruments are their bodies and both require special training regimens. But not everyone can be a dancer. The first for the career is aesthetical point of view. The professional ballet dancer's body type is identified by (1) proportions (small head, long neck, shortened torso, long, thin and lean legs), (2) loose joints (3) turnout of the leg (4) slight knee hyperextension (5) bow-legged and (6) foot shape. The personality of ballet dancers were studied by Bakker (1991).

For the serious sportsman (not only gymnasts, figure skaters and athletes) who wants to achieve their highest level of stamina, flexibility, agility and form are ballet "exercises" an additional part of training. Ballet training added to their workout regimen aids in all these, plus, functional balance, body alignment and injury prevention.

Classical ballet training usually begins after warm-up exercises at the bar which dancers use to help balance. The exercise consists from pliés, tendues, port de bras and battements. The second part – centre work contains

port de bras, turns (pirouettes – en dehors, en dedans) and jumps.

Technical ballet is used in conjunction with speed and agility drills and stretching techniques. An athlete's needs are different for every sport. A typical program for athletes is set up by using a variety of valuations to determine the athlete ability and strength levels in the following areas: range of motion and flexibility, speed, agility, endurance, control and functional balance art (for example Pedersen et al., 2006).

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URBANISTIC BACKGROUND OF MUNICIPALITIES AS AN INDICATOR OF FREQUENCY OF MUNICIPAL CITIZENS' PHYSICAL ACTIVITY

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The sphere of leisure time has lately become an issue discussed in broad public as well as on a political scene. Political and social changes, economic situation, and, in particular, a changing value-orientation of the citizens can be cited among the drivers of this development. Abundance of documents related to leisure time problems only points out the importance of the field.

Why is it necessary to pay attention to leisure time related issues? The main reason is the fact that life style and active leisure time spending has an impact on the overall quality of a person's life, not only on his health. It is therefore the entire society's interest to increase citizens' participation on active leisure time spending as a part of their active life style. The mission of communal

recreation as well as of the aforementioned studies is to offer positive solutions of related problems.

The article is based on and reflects results of the "Analyses of the current state of sport and physical education in the Moravian-Silesian region" study. It characterises relation between citizen's opinions and attitudes concerning leisure time spending preferences and accessibility and structure of the subjects related to it. Furthermore, it compares differences among the individual districts of the region and searches for connections and relations.

When composing the article, we used methodology and data presented in the "Analyses of the current state of sport and physical education in the Moravian-Silesian region" paper, which was realised in 2006.

BODY COMPOSITION OF YOUNG VOLLEYBALL PLAYERS

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This presented study is a somatometric probe of young volleyball players. The study objective was to examine and evaluate the current somatic state of the individuals with specifically targeted, regular and controlled physical activity – female volleyball players. The research group was made up of 53 girls. Somatometric parameters were compared to Czech population normative (Bláha et al., 1986), to determine the body composition of probands according Matiegka (in Riegerová & Ulbrichová, 1998) and determine the somatotypes of examined girls according Heath–Carter (1967). The female volleyball players were taller and more robust comparing to the normative and that their body height and weight was in the zone of norm. The young volleyball players had lower values comparing to population norm solely in perimeter parameters of the upper limbs and in biacromial width of the shoulders. They did not significantly differ from the population norm. The absolute values of metric characteristics came out in evaluation of the individual fractions of body composition. Comparing to the population of Czech girls, the volleyball players had greater skeletal fraction, adipose fraction,

calculated residuum as well as fat free mass and on the contrary the muscular fraction was smaller. The somatotypes of the girls were mainly in A category where there was also the average somatotype of the measured group characterized by figure 3.1–3.3–3.7. The effect of the training process does not notably manifest itself yet in the body structure of the young organism.

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MOVEMENT ACTIVITY AND BODY STABILITY AS A PART OF LIFE STYLE IN DIFFERENT AGE

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Physical activity is an important factor both composing human ability and influencing health status. Unspecific physical activity, especially in earlier life periods, generates a kind of potential, which can influence functioning of the elderly. Physical fitness, giving not only independence in some extent, but also abilities of coping with unpredicted situations, requiring involvement of coordination, skills, especially balance skills, are recognized as essential in such an age group. It is presently one of leading research directions, conducted with priority of fall prevention among the elderly. Nonetheless, the question of posture and balance control applies to individuals of every age. An objective control of balance skills (body stability) seems important, as recognizing any deficits in this respect can be a valuable indication towards establishing specific preventive actions, soothing such deficits or minimizing consequences of a potential fall.

THE AIM OF THE STUDY

The aim of the study was to define the influence of level of previous physical activity on body stability in aged individuals.

MATERIAL AND METHODS

Over 100 volunteers, aged 20–70 years, with some outnumber of females, took part in the study. Data about intensity and characteristics of present and past physi-

cal activity was taken from participants. Balance and body stability were measured with AMTI stabilographic platform. Balance regulation skills and stability (stability safety margin) were assessed. The stabilographic data, with subjects' age and physical activity, were analyzed statistically.

RESULTS

The findings indicate interpersonal heterogeneity of body stability regulation ability, stability and reaction time. A tendency towards worse results was seen in subjects over 50 years of age, as compared to younger participants, especially in stability, manifested by increased (so called) safety margin, especially during backward swings. A tendency towards better results was observed in subjects formerly more physically active, regardless the age. The correlation was not thoroughly consistent.

CONCLUSIONS

Interpersonal heterogeneity of body stability and tendency for its declining with aging indicate that risk of falls among aged people does appear, but varies interpersonally. Better results, normally achieved by more active persons, suggest it purposeful to treat physical activity as a long distance prophylaxis. Physical activities engaging coordination and balance control to a greater extent seem more beneficial in this respect.

STRUCTURE OF PA IN 25–69 YEAR OLD POPULATION IN THE CZECH REPUBLIC

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Knowledge of the state and trends in various facets of physical activity (PA) in population is essential so that changes in behavior can be introduced and healthy and active lifestyle in population is enhanced.

AIM

The aim of the study was to estimate the structure of PA in adult Czech population and to point at the PA correlates specific for Czech environment. Furthermore, to characterize differences between PA in men and women in vigorous PA, moderate PA and walking, at work, in transportation, at home and in leisure time. The data are to be provided to decision makers in national and community authorities to serve in creating health and education policies.

METHODS

The study was carried out in spring 2005 in a random sample of 25–69 year old Czech population; 1110 men and 1228 women participated in the study. The Czech version of the International physical activity questionnaire-long form (Craig et al., 2003; www.vzpa.upol.cz) was used to estimate the level and structure of weekly PA and the official guidelines for data processing and analysis were used to assess the collected data (www.ipaq.ki.se). The recommendation guidelines Healthy people 2010 were applied as the criterion of the PA levels. Binary logistic regression was applied to analyze the data using the forward stepwise method in Statistica 6 and SPSS 15.

RESULTS

Meeting the recommendations for **vigorous PA** (at least 3 times a week for 20 minutes) is associated with younger age, employment and car-ownership in females; and with lower education, employment and declared participation in sports throughout the year in males. Participation in organized physical activity is an impor-

tant factor that supports reaching the vigorous PA levels both in males (OR = 1.50, CI = 1.13–2.00, $p = .005$) and females (OR = 1.80, CI = 1.36–2.39, $p \approx .000$). However, only 15.5 % males and 11.7 % females meet the vigorous PA levels in leisure activities.

Meeting the recommendations for **moderate PA** (at least 5 times a week for 30 minutes) is in females associated with older age, living in a smaller sized place, living in a family with adults or children, and the weekend home ownership. In males, it is associated with lower education, living in a smaller sized place and living in a house.

Important correlates of meeting recommendations for walking are employment, living in a family with adults or children and not owning a car in females. The correlates in males are lower education, employment, having a dog and not owning a car. At work (“in transport”) 69.7% (59.7%) of females and 35.7% (33.4%) of males meet the recommendations for walking. In leisure activities, only 17.9% females and 15.4% males meet the recommendations. Czech population can be still marked as “walking society”, because 56.6% of males and 61.5% of females meet the recommendation of walking 5 times a week for at least 30 minutes. These data correspond with the data obtained from the short version of the questionnaire (Frömel & Bauman et al., 2006).

CONCLUSIONS

Systematic monitoring of trends in the structure of PA in population is an important prerequisite for carrying out intervention research and for economically favorable research strategies. In order to maintain and especially improve active lifestyle in population, an integrated support of a different type of PA is essential in case PA decreases in some field.

The issues at forefront are: increasing PA in females so that PA recommendations are met by them, at least maintaining PA in males and females at work and in transport, and increasing PA in leisure activities. The association between PA and level of education need to be more analyzed, particularly in men.

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FORMATION OF THE HANDBALL PLAYERS' GAME AND TACTICAL THINKING IN THE PROCESS OF LONG TERM TRAINING

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The handball players' game and tactical thinking in subsequent stages of long term training was investigated. The dynamics and the main formative periods from the stage of selection till achievement of the sportswomen's

full individual skills were determined; the correlation of the sportswomen's thinking levels was found to be stable during all the training stages with double priority of the tactics and game thinking in assault.

RELATIONSHIPS AMONG PAIN INTENSITY, DIZZINESS, NAUSEA AND DISABILITY IN PATIENTS WITH CERVICAL DERANGEMENT SYNDROME

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OBJECTIVES

To explore the relationships among pain intensity, dizziness, nausea and disability in patients with cervical derangement syndrome.

SETTING

Two outpatient clinics in Łędziny and Ustroń, 2004–2006.

METHODS

64 patients (49 women, 15 men) who met the inclusion criteria participated in the study.

Background data (age, height and weight), pain, dizziness, nausea, and disability were measured. The subjective magnitude of pain was rated by Visual analog scale (VAS) at each of four sites (head, neck, shoulder, arm) and overall. The disability was measured by use of the NDI (the Neck disability index).

RESULTS

The overall pain correlated positively and moderately with headache ($r = 0.399$) and disability ($r = 0.407$). A significant positive and moderate correlation between headache and neck pain ($r = 0.497$) and disability ($r = 0.428$) was also shown as well as between neck pain and disability ($r = 0.432$). There was a statistically significant negative, rather low correlation ($r = -0.256$) between overall pain and weight. Patients suffering from dizziness had a higher level of overall pain but lower level of pain in the shoulder area than subjects without dizziness. Additionally there was an association between dizziness and nausea.

CONCLUSIONS

Overall pain, headache, and pain in the neck and shoulder area, dizziness, nausea and weight may be useful in identifying the level of disorders in individual subjects suffering from cervical derangement syndrome. Further studies are needed to confirm the relationships observed in this study.

BENCHMARKING ANALYSIS OF COMMUNITY RECREATION MANAGEMENT SYSTEM IN SELECTED MUNICIPALITIES

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The issues of community recreation and its management at the level of local authorities are enjoying an increasing interest of a number of university experts, municipal government officers as well as state administration executives. The submitted article analyses the community recreation management system in ten selected municipalities in the Czech Republic. On the basis of specified benchmarking indicators it presents the evaluation of effectiveness of implementation of the community recreation system in these municipalities.

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GENERAL LIFE SATISFACTION AND MOTIVATIONAL FACTORS IN FEMALES AGED 40–65 TO ADOPT REGULAR PHYSICAL ACTIVITY

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The paper discusses motivational factors and individual goals that influence females aged 40–65 to adopt regular physical activity. In our study, 48 women participated in regular physical activity (aerobic) in six month period. The findings have proved the positive effect of physical activity and group cohesion and social support during the physical activity on better self-perception of their physical and mental wellbeing. The hypothesis of different self-perception after the participation in the study in groups of females with different goals; body shape or non body shape, have not been proved. We emphasize that in order to increase positive self-perception; participant oriented approach and continual adapting of aims are essential.

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RECREATIONAL CYCLING THROUGHOUT THE LIFE SPAN: HEALTH BENEFITS AND PHYSIOLOGICAL DATA IN RECREATIONAL ATHLETES AGED 11 TO 62 YEARS

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Regular cycling may reduce the risk of cardiovascular and metabolic diseases and can maintain the state of psycho-physiological health. The purpose of the investigation was to compare body composition, pulmonary function and aerobic capacity in 360 recreational cyclists (males $n = 321$, females $n = 39$) aged 11 to 62 years in a cross-sectional study. All the subjects were examined for anthropometry and spirometry, and they performed a maximum stepwise bicycle ergometry (VO_2max test). The results of male recreational athletes were arranged into 12 age groups, below 12, 12 to 13.9, 14 to 15.9, 16 to 17.9, 18 to 20, 20 to 25, 26 to 30, 31 to 35, 36 to 40, 41 to 45, 46 to 50, and 51 to 60 years of age, respectively. Female recreational athletes were arranged in 5 age groups: below 16, 16 to 19.9, 20 to 29.9, 30 to 39.9 and 40 to 50 years of age respectively. The results were compared with the Czech national population norms (Seliger & Bartůněk, 1976).

Body fat in male athletes was lower than the population norms, from the youngest age group (11 years: 9.7 ± 3.8 (SD) % fat = 58% of the population norm), the value decreased till the 18 to 20 years group (6.9 ± 2.9 % fat = 51% of the population norm), and then the value slightly increased with age (the oldest age category 51 to 60 years: 13.5 ± 3.3 % fat = 86% of the population norm). Body fat in female cyclists was also substantially lower than the population norms from the youngest age group (14 to 15.9 years: 11.3 ± 2.5 % fat = 56% of the population norm), the value decreased till the 20 to 30 years group (10.4 ± 2.8 % fat = 52% of the population norm), and then the value slightly increased with age (the oldest age category 40 to 50 years: 13.3 ± 5.0 % fat = 52% of the population norm). Body mass index in male and female athletes increased with age, from $17.5 \pm 1.7 \text{ kg.m}^{-2}$ in 11 year old male athletes to $21.8 \pm 1.4 \text{ kg.m}^{-2}$ in 20 year old cyclists to $25.6 \pm 2.2 \text{ kg.m}^{-2}$ in the oldest male group. In female cyclists, there were only small differences between the youngest and oldest group ($20.0 \pm 1.1 \text{ kg.m}^{-2}$ and $22.5 \pm 1.4 \text{ kg.m}^{-2}$, respectively). Pulmonary function indices (FVC, FEV_1 and PEF) expressed as percent of predicted values were unrelated to age, similarly in males and in females, however, absolute values of pulmonary function indices, as it could be expected,

decreased with age. VO_2max and maximum power output in the youngest age category of 11 years of age ($54.9 \pm 6.6 \text{ ml.kg}^{-1}.\text{min}^{-1}$ and $4.8 \pm 0.3 \text{ W.kg}^{-1}$) corresponded to 108% and 108% of the population norms, however, at the age of 20 years, the values of athletes ($69.6 \pm 5.1 \text{ ml.kg}^{-1}.\text{min}^{-1}$ and $6.0 \pm 0.6 \text{ W.kg}^{-1}$) corresponded to 153% and 150% of the population norms, then the absolute values are decreasing with age, and, for example, in the oldest age category (50 to 60 years), the values of VO_2max and maximum power output attain $50.5 \pm 5.2 \text{ ml.kg}^{-1}.\text{min}^{-1}$ and $4.2 \pm 0.5 \text{ W.kg}^{-1}$, but expressed relatively, these values correspond to 155% and 156% of the population norms, that is similar as in younger age groups. In female athletes, VO_2max and maximum power output in the youngest age category of 15 years of age ($58.2 \pm 4.2 \text{ ml.kg}^{-1}.\text{min}^{-1}$ and $4.7 \pm 1.1 \text{ W.kg}^{-1}$) corresponded to 154% and 137% of the population norms, at the age of 20 years, the values ($56.1 \pm 4.5 \text{ ml.kg}^{-1}.\text{min}^{-1}$ and $4.7 \pm 0.4 \text{ W.kg}^{-1}$) corresponded to 154% and 143% of the population norms, and in the oldest age category in females, the values of VO_2max and maximum power output attained $43.8 \pm 7.8 \text{ ml.kg}^{-1}.\text{min}^{-1}$ and $3.7 \pm 0.6 \text{ W.kg}^{-1}$, and corresponded to 154% and 152% of the population norms, similarly to younger age groups.

The results of the cross sectional study in male and female recreational cyclists had demonstrated the positive effects of physical activity on body composition, maximum power output and aerobic capacity throughout the life span.

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CORTICAL MOTOR NETWORK MODULATION BY EMOTIONAL SPEECH DURING HAND MOVEMENT BY STROKE PATIENTS

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Strategies to enhance motor system activation and motor plasticity after hemiparetic stroke include increased afferent input. We have previously shown that employment of affective prosody in voice instruction while stroke patients perform hand movements with the impaired hand leads to enhanced activation of motor cortices detected by functional MRI (fMRI). The present pilot study tested the hypothesis that this enhancement is associated with strengthening of effective connectivity among the area processing affective prosody (right posterior superior temporal sulcus, RpSTS), the supplementary and cingulate motor (SMA/CMA) cortices and the contralateral primary motor cortex (M1).

METHODS

Three right handed participants with residual hemiparesis after middle cerebral artery stroke sparing the motor cortices and the RpSTS were studied using BOLD fMRI during performance of a motor task performed with the impaired hand under two different modes of voice guidance. The task involved repetitively flexing and extending the fingers to embrace and release a cylindrical object affixed to patient bed. Movement was performed under voice instruction "embrace completely – and release" provided in MR – compatible headphones, in a block paradigm alternating with rest. In condition 1 (emotion), natural engaged and encouraging voice was used, in condition 2 (indifferent), the voice was equally loud but indifferent, without affective prosody and word stress.

Single subject fMRI data were processed voxel by voxel with a general linear model using AFNI and a whole brain corrected statistical threshold. Volumes of the activated areas within anatomically defined M1, SMA/CMA and the RpSTS regions were measured in both conditions. Effective connectivity was studied using structural equation modeling (SEM), assuming a model with the 3 described regions and connections RpSTS → SMA/CMA → M1. Hypothesized differences

in connection strengths were evaluated with one sided paired T-tests.

RESULTS & DISCUSSION

There were no apparent differences in the amplitude of finger movement between the two conditions. FMRI brain activation maps included bilateral perisylvian network associated with listening to sentences, contralateral M1 and bilateral SMA/CMA. Engaged voice instruction was associated with a significantly larger volume of active motor cortices (M1, SMA/CMA: both $P = 0.03$). In all patients, the proposed network model provided a good fit to the data. SEM – derived effective connections for the group (mean ± SD) were as follows: RpSTS → SMA/CMA increased significantly from indifferent (0.72 ± 0.08) to emotional (0.80 ± 0.07), $P = 0.01$. SMA/CMA → M1 remained about the same: indifferent (0.83 ± 0.01), emotional (0.84 ± 0.03), $P = 0.19$. The network analysis helps us to proceed from observation of effect (enlargement of motor cortical activation with emotional voice instruction) to exploration how this effect might be mediated by changes in network relationships among active regions. A larger study to confirm the results is ongoing.

CONCLUSION

This pilot study supports the hypothesis that the observed enhancement of motor cortical activation by movement guidance using emotional voice is mediated by dynamic interactions between language areas (RpSTS), the limbic system (motor cingulate) and the motor cortex.

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SPORT AND FREE TIME ACTIVITIES AS A PROSPECTIVE POTENTIAL FOR EMPLOYMENT

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The employment and the economic growth are the two most important aims stated in the Lisbon strategy of the EU. In some areas, case studies document potential employment initiated by sport development.

INSTRUCTION

One of the significant coordination and development centres of employment are in every country public services and municipalities, which creates legislative framework, organisational and economic conditions for general development. The state government in particular does not recognize sport as a potential source of development and therefore there are still considerable reserves.

METHODS

In this papers were used the methods of secondary and contend analysis. To evaluate the hare of non profit sector and grants were used common statistic methods. The methods of synthetic and casual synthesis were used to draw the conclusion about grant, subsidy policy and employment policy, while the method of theoretical reflection was used for normative conclusion.

RESULTS

- Organisational security of sport systems in the EU states.
- Employment and institutional security.
- The effect of sport on the national economy (case studies).
- Volunteer work and employment.

DISCUSSION

According to German and Austrian studies, sport initiates economic activities up to 7.5% of GDP and employment between 1-3%. The most important recognition is the wider economic area, which is affected by free time activities and the rising trend of employment in this field.

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EVALUATION OF FUNDAMENTAL ANTHROPOMETRIC CHARACTERISTICS OF CZECH CHILDREN FROM BIRTH TO SIX YEARS OF AGE

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In our paper we present a part of results of a cross-sectional anthropological investigation "The 6th nationwide anthropological survey of children and adolescents, Czech Republic" in 2001.

The file counts 15 997 children aged 0–6 years of age (8 260 boys and 7 737 girls). The standard anthropometric Martin-Saller's method was used. Recumbent length (0–1.99 years), standing height (2.00–5.99 years) and body weight have been compared with results of 5th nationwide anthropological survey of Czech children in 1991. Proportional indices – weight-length ratio (0–1.99

years), weight-height ratio (2.00–5.99 years) and body mass index ($\text{kg}\cdot\text{m}^{-2}$) – are presented as well.

The results are completed by selected socioeconomic factors.

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ASSESSMENT AND ASSESSING PROCESS IN PHYSICAL EDUCATION CLASSES IN THE OPINION OF PARENTS OF STUDENTS FROM SELECTED SCHOOLS IN OPOLE

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School assessment has many functions; the basic one is providing information. It plays an essential role in the didactic process that allows for providing students with the information regarding their current “rank” in striving for realisation of objectives or regarding the scope of already accomplished aims. School assessment also facilitates communication between teachers and parents (guardians), essential in order to inform them about the progress of their children at school. The information carried by school assessment is not always fully comprehensible. It is not always perceived with suitable interest and appropriately interpreted. The objective of the re-

search was to obtain information from parents regarding their interest, interpretation and the significance given to the assessment received by their children in physical education classes. Analysis of the obtained results allows for the conclusion that the assessment in physical education classes is treated similarly as assessment in other school subjects. Interpretation of the information carried by the assessment is intuitive and would require a change of assessment form (e.g. for a multi-element assessment) or, at least, providing more complete information regarding assessment criteria in physical education classes accepted for assessment of students.

THE CHANGES OF HEART RATE VARIABILITY AFTER SIX-MONTH LONG AEROBIC DANCE- OR STEP-DANCE PROGRAM IN WOMAN 40–65 YEARS OLD: THE INFLUENCE OF DIFFERENT ADHERENCES, INTENSITY AND INITIAL LEVELS

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AIM

The main aim of the study was to evaluate changes in chosen parameters of spectral analysis (SA) of heart rate variability (HRV) after 6 month long aerobic dance or step dance program in woman. The partials aims were to find out how the changes in HRV are related to adherence and other qualitative and quantitative parameters of realised exercise training. So called low of initial values was examined as well.

SUBJECTS

The experimental group consisted of 44 woman aged 47.3 ± 5.4 years. Estimated values of the VO_2max were $33.3 \pm 5.7 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ and BMI $26.18 \pm 6.3 \text{ kg}\cdot\text{m}^{-2}$.

METHODS

- 1) Spectral analysis of short term recordings of RR intervals by test lying–staying–lying;
- 2) Incremental uphill walk–jog test realized on the treadmill with use Bruce protocol.

INTERVENTION

A grope aerobic exercise with music under supervision of expert instructor, 6 months long, three times per week, duration of main (aerobic) part was 40–45 minutes. Exercise intensity was monitored and controlled with monitor of heart rate. Exercise intensity was set up in the range $10 \text{ beats}\cdot\text{min}^{-1}$, when the high limit

correspond to anaerobic threshold evaluated by means of V-slope method from maximal exercise test.

RESULTS

The style of aerobic exercise (dance or step) did not influence significantly any of monitored parameters. Great differences among the woman were in realised training unites (9–73 from maximum 76). The exercise intervention caused statistically but not relevantly significant reduction of weight form average 72.1 ± 12.9 to $71.1 \pm 11.8 \text{ kg}$, VO_2max significantly increased from average 33.3 ± 5.7 to $37.0 \pm 5.1 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$. Only two characteristics of exercise intervention (total duration of aerobic part of exercise and average intensity of exercise) correlated with changes of HRV. Negative correlation was found between the most of monitored parameters of HRV and their changes.

CONCLUSION

Correlation analysis suggested that in the woman with a higher adherence to the program happened shift of spectral power from sympathetic to parasympathetic. But it was showed that influences of volume and quality of exercise have been suppressed by initial level of each parameter of HRV. The lower (worse) were initial values of these parameters before starting of the program, the greater were their increases in half of year. With regards to relation between aerobic power and autonomic nervous system (ANS) activity is possible to state that, in light of impact on ANS activity, dance or step aerobic could serve as a suitable exercise activity rather for subjects with lower aerobic power.

QUALITY OF LIFE AND LEVEL OF COORDINATION ABILITIES IN SENIORS

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Aging is a physiological process associated with a considerable amount of damage to cellular and organ functions. The expression rate of the damage is different in individual people. Despite the fact that it is a natural process, its progress may be in general relatively successful. Among the internal factors influencing its course, hereditary factors or liability to disease plays an important role. One of the external factors able to affect the dispositions is especially the lifestyle, whose basis is gradually formed in childhood and gets stabilized in adulthood with the factor of motor activities and environment being its inseparable parts (Bartůňková, 1998).

Unsuccessful aging is regarded as aging connected with early onset of changes resulting in low functional fitness, bad health condition and even losing independence of a man. In this case physical activity may represent a substantial contribution (Šipr, 1998).

Irreplaceable status in the life of a man in the period of senescence is possessed by coordination abilities. The level of coordination abilities makes the life of seniors easier and concurrently enhances their quality of life when conducting activities of daily living – locomotion, self-care, solving of unexpected motor situations, reduction in risk of falls etc.

The aim of the contribution is to monitor the effects of lifestyle on the level of coordination abilities in selected groups of seniors.

The research sample comprises 3 groups of seniors, which according to age have been divided into two groups: young – old (65–75 years of age) and old – old (75–84 years of age).

Data on the previous and current quality of life have been collected by means of a questionnaire. The assessment of 8 coordination abilities was carried through application of standardized motor tests. To assess the

level of each of the coordination abilities, one test per one type of coordination ability has been applied, with the exception of the balance ability. Regarding balance factor as highly relevant we used three motor tests to diagnose static balance, dynamic balance and balancing with objects.

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DEVELOPMENT OF PHYSICAL ACTIVITY PROMOTION POLICIES IN EUROPE: RESULTS OF AN ANALYSIS OF 27 POLICY DOCUMENTS

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Over the past few years there has been increasing interest in physical activity promotion and specifically the development of appropriate policy to support that. Although some international comparison work has been undertaken, there has been no comprehensive overview of the activities taking place in Europe in this comparatively new area of public health policy. To help filling this gap, disseminating and facilitating access to these experiences HEPA Europe, the European network for the promotion of health-enhancing physical activity, is establishing an inventory of approaches, policy documents, and targets related to physical activity promotion in different countries. The inventory is being developed in a stepwise approach using a combination of different methods and sources. The first step has focused on the identification of national policy documents on physical activity promotion.

In total, 213 national documents were identified until April 2007. Among these, 53 were national policy documents on physical activity promotion. Twenty-seven of these national policies from 14 countries were published in English and were included in the content analysis.

Analysis of the documents showed that many of the general principles and recommendations for policy developments are being followed. For example, general goals were formulated, an implementation plan was included, a timeframe and often a responsible body for the implementation was identified. However, limited evidence for inter-sectoral collaboration in the preparation and implementation of the policies was found in the documents. Quantified goals for physical activity were the exception. Population groups most in need such as people with low levels of physical activity or with low level of economic status were rarely specifically targeted. Less than half of the analysed policies indicated a specific budget for the achievement of goals. Most of the policies emphasized the importance of an evaluation of the implementation and achievement of goals. However, only about half of them indicated an intention or requirement for evaluation.

In conclusion, in recent years there has been a noticeable development of national policy documents on physical activity promotion. However, following principles for policy development more closely could further increase the effectiveness of their preparation and implementation.

PROMOTING PHYSICAL ACTIVITY: COST-EFFECTIVE METHOD TO IMPROVE QUALITY OF LIFE

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The world is witnessing a significant increase of the global burden of non communicable diseases such as cardiovascular diseases, cancer, diabetes and chronic respiratory diseases. The increasing global epidemic of these diseases relates closely to respective changes in lifestyles mainly in tobacco use, physical inactivity and unhealthy diet. Physical activity is one of the major components of healthy life style. It is essential for our health and well being and has enormous economic benefits especially in terms of reducing health care cost, increasing productivity, healthier physical and social environment. Physical activity is for an individual a strong means for maintaining an ideal body weight, managing obesity and preventing disease; and for nations a cost-effective method to improve public health across the population. In the USA, an investment of US \$ 1 to promotion of physical activity leads to US \$ 3.2 in medical cost saving – it is an incredibly profitable investment. In the UK, an estimation of the cost of the inactivity is £ 10 billion per year. Increasing activity levels by 10% could save at least 6.000 lives, and £ 500 million per year. Even there is strong evidence about the economic benefits of physical activity (not only Czech) government do not encourage people to be active. The question is: “Why the government does not use such an economically effective

intervention to save money from the budget?”. Is not it an absurdity? We have concluded the government of the Czech Republic should make a strategy on promotion of physical activity and should invest certain amount of the budget to promotion of physical activity.

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RELATIVE CONTRIBUTION OF WALKING STEPS TO WEIGHT REDUCTION IN OVERWEIGHT WOMEN

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Prevalence of overweight and obesity defined as more than 25 of BMI has been increasing especially in men and middle-aged women in Japan. In 2005, the examination committee of the criteria for metabolic syndrome in Japan proposed the definition and criteria for metabolic syndrome in Japan. Since then, a nation-wide political health promotion strategy to prevent metabolic syndrome has begun and health education targeted for those who are overweight and obese with an annual check-up will become mandatory for those who are 40 to 75 years old from 2008. In 2006, the Japan society for the study of obesity proposed a slogan "3-3 campaign" (3 kg body weight and 3 cm waist reduction). The key concept of health education is to reduce weight by an increase in energy expenditure through walking every day and a decrease in energy intake. However, there is no information about how daily walking steps contribute to weight reduction in comparison with a decrease in energy intake. If we could understand the relative contribution of walking steps to body weight reduction, we could apply the results to health education programs.

PURPOSE

The purpose of this study is to elucidate the relative contribution of an increase in walking steps to weight reduction in overweight women who participated in a 10 week weight reduction program.

METHODS

The study subjects were 447 women with a mean age of 48 years old (range 20–71 years old) who participated in 10 week weight reduction programs held during 1992 to 2004 in Koto-Ward in the Tokyo metropolitan area. The programs were held once a year in winter and the participants were recruited by a Ward newsletter. About 40 women were selected at one time. The requirement for participation was that their BMI was over 25. The program duration was 10 weeks and consisted of 60 minute aerobic dance and 30 minute lecture once a week. They were instructed to wear a pedometer and to increase their walking steps to 10,000 steps per day. They were also instructed by a registered dietitian to restrict their daily energy intake to less than 1600 kcal

per day. Before and after the program, a health check-up including body weight, height, waist circumference, blood pressure, and blood sampling was performed in the fasting state. They recorded their daily walking steps in their diary, and mean daily walking steps during the 7 days before and after the program were calculated. They recorded two day's food consumption and mean daily energy intake was calculated by a dietitian. This study was approved by the ethical committee of the Graduate School of Medicine, the University of Tokyo.

RESULTS

Four hundred and seven women (91.0%) completed the program. Their mean BMI was 26.8 before the program. Mean body weight decreased by 3.0 kg ($p < 0.01$) and mean waist circumference decreased by 4.1 cm. They increased their mean walking steps from 6298 to 9212 steps per day and decreased their mean energy intake from 1729 kcal to 1480 kcal per day. Blood pressure decreased and blood profile significantly favorably changed also. Multiple regression analysis was performed. The independent variable was the body weight change and dependent variables were initial body weight, daily walking steps change, and energy intake change. The resultant equation was as follows. $\Delta \text{body weight} = 0.087 \times \text{initial BW} + 0.000110 \times \Delta \text{walking steps} + 0.001486 \times \Delta \text{energy intake} - 3.054$. Adjusted R square was 0.216 ($p < 0.001$). From this equation, an increase in walking steps by 1000 steps almost equated with a decrease in energy intake by 74 kcal. If we assume 1000 walking steps is about 30 kcal energy consumption, the ratio of increase in energy expenditure by walking steps to a decrease in energy intake was 1 to 2.5.

CONCLUSION

In conclusion, the relative contribution of the increase in energy expenditure by walking steps to the magnitude of weight reduction was calculated to be about 40% of a decrease in dietary energy intake.

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We thank the participants of the weight reduction programs.

IPEN - CONCEPTS & PROPOSED METHODS FOR A COORDINATED INTERNATIONAL STUDY

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The international physical activity and the environment network - IPEN - was established in 2004 to promote research into physical activity and the built environment around the world. Physical activity is a public health priority internationally. Environmental and policy strategies to increase physical activity levels in whole populations are being widely advocated but they need to be guided by research. While physical activity environments vary within countries, the greatest and most informative sources of variation may be between countries. IPEN seeks to stimulate and support systematic and rigorous studies of physical activity and the environment, in as many countries as possible. This presentation will review the literature on physical activity and the built environment and show the limited effect sizes in studies to date and the need for an international study to assess a wider variance in built environments.

IPEN now has 240 members in over 40 countries. IPEN recommended surveys have been translated into 8 languages and IPEN based studies have been funded in 7 countries. The IPEN website is a valuable resource for members. IPEN has now proposed a coordinated study to better assess the impact of the built environment on physical activity. This presentation will show

the theoretical models and concepts that inform the study design. The planned coordination process and data collection methods will also be outlined.

The proposed study will establish coordinating centers to support training in data methods, translation validation, data collection quality control, data entry procedures, and data analysis. The study aims to collect comparable data that can be pooled. Individual countries will collect data in participants in specially selected neighborhoods that maximize within country variance in walkability and income. Up to 10 countries will collect data to maximize the between country variance. From the 16-32 selected neighborhoods in each country, a random selection of at least 500 participants will be surveyed for their perceptions of the built environment using the NEWS and their physical activity levels (using the long IPAQ). In a subsample of at least 200 participants, accelerometer and GIS data will be collected.

These data will allow analyses of walking for transportation, overall leisure PA, overall moderate-vigorous physical activity and obesity. It is hypothesized that specific environments will support each of these outcomes. The potential impact on local and national policies will be highlighted.

PAIN INTENSITY AND DISABILITY IN PATIENTS WITH LOW BACK PAIN

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OBJECTIVES

To explore the relationships among pain intensity and disability in patients with low back pain.

SETTING

One outpatient clinics in Bielsko-Biała, 2002–2005.

METHODS

112 patients (60 women, 52 men) who met the inclusion criteria participated in the study.

Background data (age, height and weight), pain and disability were measured. The subjective magnitude of pain was rated by Visual analog scale (VAS). The disability was measured by use of the Oswestry low back pain disability questionnaire.

RESULTS

The level of disability correlated positively and highly with age ($r = 0.388$) and number of episodes of

low back pain ($r = 0.269$) – especially during last year ($r = 0.275$), and negatively and moderately with height ($r = -0.197$) and straight leg raising test (SLR) – $r = -0.225$. There was no statistical significant correlation between disability and weight ($r = 0.127$) and sex ($p > 0.05$). Additionally there was no statistical significant correlation between disability and topography of pain (classification by McKenzie) ($p > 0.05$), and between disability and duration of pain ($p > 0.05$).

Patients suffering from low back pain longer than 7 weeks had higher level of pain than other patients. It was statistically significant ($p < 0.05$). Patients, which work in standing position had higher pain than patients which work in seating position ($p < 0.05$).

CONCLUSIONS

Age, number of episodes of low back pain and SLR may be useful in identifying the level of disability in individual subjects suffering from low back pain. Additionally the level of pain depends especially on time of duration of low back pain and position of the body in work.

Further studies are needed to confirm the relationships observed in this study.

RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND NEIGHBORHOOD ENVIRONMENT IN TWO DIFFERENT RURAL AREAS IN JAPAN

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Physical inactivity has been shown to be positively associated with morbidity in many studies. Recently, studies concerning physical activity (PA) in Europe and the United States have reported that neighborhood environment could influence PA. And, physical inactivity is a more common problem in rural areas compared to urban areas. However, there is no study focusing on the correlation between neighborhood environment and PA in rural areas. The purpose of this study was to demonstrate the relationship between PA and neighborhood environment in two different rural areas in Japan.

METHODS

Two study areas were selected, one from the eastern and one from the western part of Japan. Furthermore, a high mixed land use (HML) region and low mixed land use (LML) region in the area were selected according to previous studies. Study subjects were selected using the stratified random sampling method among the residents (30–69 years old) of each region by sex and age strata. A total of 865 subjects (385 from the east and 480 from the west) were selected for this study. Subjects answered a questionnaire regarding their perception of the neighborhood environment and their demographic characteristics. This questionnaire was the Japanese translation of the Abbreviated version of the neighborhood environment walkability scale (ANEWS) which was developed for international comparison. And the scores for residential density, land use mix diversity, land use mix access, street connectivity, walking/cycling facilities, aesthetics and safety were calculated. Using the International physical activity questionnaire (IPAQ), subjects also reported their PA including minutes per day of walking for leisure, walking for transport, and moderate to vigorous physical activity (MVPA) for leisure.

RESULTS

From the eastern and western areas of Japan, 107 and 156 subjects answered the questionnaire, respectively. There were no significant differences in the mean age, BMI, percentage of male subjects and habitual exercisers between the HML region and the LML region in both areas. Among the neighborhood environment scores, land use mix access and walking/cycling facilities were significantly higher in the HML region than in the LML region in the eastern area. The scores for land use mix access and street connectivity were significantly higher and the score for walking/cycling facilities was significantly lower in the HML region than in the LML region in the western area. For the neighborhood environment, the score for land use mix access was positively associated with the minutes per day of MVPA for leisure, and the score for street connectivity was negatively associated with the minutes per day of walking for leisure and minutes per day of MVPA for leisure in the eastern area. In the western area, the score for aesthetics was positively associated only with minutes per day of MVPA for leisure.

DISCUSSION

In both areas in Japan, PA correlated with land use mix access, street connectivity and aesthetics of their perceived neighborhood environment. Earlier studies conducted in Europe and the United States have only reported a positive association between PA and land use mix access, aesthetics and street connectivity. However, the perceived factors of the neighborhood environment that correlate with PA differ between the two study areas in the current study.

CONCLUSION

The perceptions of the neighborhood environment that correlate with PA differ between the study areas. To promote physical activity, consideration of the environmental factors unique to the areas' environments is needed.

ACKNOWLEDGMENTS

This study was supported by a grant from the Japan Ministry of Education, Culture, Sports, Science and Technology (ID #17200041) as a part of the study on the evaluation of neighborhood environments affecting residents' daily physical activity (principal investigator: Jung Su Lee). Many thanks to study participants.

MONITORING OF STRUCTURE OF SPORT ACTIVITY PREFERENCES IN SECONDARY SCHOOL STUDENTS

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The main reason for making this project is the unsatisfied situation in the sphere of physical activity of young people. We consider the area of physical activity preferences to be the very important area, which needs to be examined in the context with consecutive interventions leading to healthy and active lifestyle. The majority of research studies in the physical activity area are nowadays carried out mainly in the quantitative approach. The results of these research projects are mostly in the form of recommendations: e. g. „it is necessary to increase the level of physical activity“ or „the unsatisfied level of physical activity is the major reason of civilization diseases“ (Anderssen, Wold, & Torsheim, 2005; Frömel, Novosad, & Svozil, 1999; Saris, Blair, Van Baak, Eaton, Davies, Di Pietro, Fogelholm, Rissanen, Schoeller, Swinburn, Trambly, Westerterp, & Wyatt, 2003; U. S. Department of Health and Human Services, 2000). A kind of deficiency of these projects can be considered the unanswered question: Which way should be reached these recommendations? Many of the research projects examine the associations and reasons of the negative trend in the area of physical activity. The outcome of these studies is e. g. the announcement, that television viewing and unhealthy nutrition in childhood is associated with overweight, obesity, poor fitness, smoking or consecutively with raised value of cholesterol in adulthood (Armstrong, Sallis, Alcaraz, Kolody, McKenzie, & Hovell, 1998; Katzmarzyk, Malina, Song, & Bouchard, 1998). In the most cases of these studies, there is still missing relevant solution of the „discovered“ situation.

AIM

The aim of the study was to analyze the structure of sport activity preferences of secondary school students, which will be useful for consecutive interventions in the area of physical activity (at the particular secondary school).

METHODS

The research has passed off under the protection of Center for Kinanthropology Research in Olomouc. We

used the standardized internet version of „Sport preferences questionnaire“. The cooperation was offered to the secondary schools in Slovakia. It was a pilot study for the major part of our project.

RESULTS

The acquired results in the sphere of sport activity preferences show us discrepancies among activities which are offered by curriculum of the concrete secondary school and activities which are really preferred by students. Just the existence of this discrepancy has the negative tendency in the sense of the declining level of physical activity. There are also differences between boys and girls, which should be respected in the forming of curriculum and sports programs.

CONSLUSION

The importance of the assessment of the sport activity preferences is in the PA research unsubstitutable. The research of PA (and consecutive recommendations) without knowledge of sport activity preferences sphere is for school practice poorly effective.

ACKNOWLEDGEMENT

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PUPILS WITH A HEARING DISABILITY AT THE SECOND STAGE OF PRIMARY SCHOOL FROM THE HEALTH PROMOTION ASPECT

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These days the fundamental aim of people with special needs is to ensure that provisions are made for equal opportunity (in education: inclusion in general education classrooms or services provided in special schools as well as equal opportunity in the workplace). The common school attendance is conceived as an important prevention factor of social exclusion (National plan for the support and integration for persons with disabilities 2006–2009, 2005). The presented findings are part of the post-doctoral research project: A comparison of integrated and special education from the point of view of a healthy lifestyle for pupils with a hearing disability. The main objective of this project is to compare the conditions under which integrated and special education is provided from the viewpoint of healthy life style of pupils with hearing disability (HD). Some pupils with HD at second stage of general primary schools and those who are served in schools for pupils with a HD all over the Czech Republic will be included in this research.

The following methods will be used: document analysis, observation, questioning, basic statistical procedures, and human relations evaluation.

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ACKNOWLEDGMENT

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THE RELATIONSHIPS BETWEEN FUNCTIONAL ASYMMETRY PREFERENCES IN CHILDREN AGED 10-13 AND LEARNING RESULTS

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Laterality is a long term process taking part within whole body and leading to an occurrence of a sidedness or a dominance that is a functional prevalence of one body side over the opposite body side. The process of laterality is associated with a series of consequences of a considerable practical importance, particularly in learning of motor and sports skills. Although laterality has been long considered as one of the factors of motor development, many researchers hypothesised a causality and a relationship between laterality and difficulties in writing and reading. A crossed dominant and unstable lateral preference model was observed in children with unsatisfactory learning results. Therefore, a homogeneous model, either right or left sided is considered to be correct. According to Spionek, from the point of view of the process of teaching reading and writing, most important is the homogeneous dominance of the eye and hand on the same side of the body.

The aim of this work is to investigate the relationships between the functional asymmetry preference and the learning results. The hypothesis was set that children exhibiting homogeneous lateral preference profiles would achieve better learning results than their peers

with heterogeneous profiles. The study was conducted at a primary school in Opole and involved 90 boys and 90 girls from years 4, 5 and 6. The laterality preference test was used as the study approach to identify the tendency of the functional asymmetry based on the observation of the subject's free choice of his/her dominant eye, hand and leg to perform a given test motor task. In addition, the study involved an analysis of school records and school grades were used as a measure of school performance. The findings indicate that the group of the children aged 10-13 was characterized by the right sided functional asymmetry and an undefined laterality profile. In the girls' group, there were fewer subjects with undefined functional asymmetry preference and profile with their increasing age. The girls demonstrated better outcomes in learning than the boys. In the girls' group, there were observed significant relationships between the functional asymmetry preferences and the learning results. The girls with homogeneous functional asymmetry profiles achieved the highest average grades. There was no hypothesized relationship between the functional asymmetry preference and the school performance in the boys.

NEIGHBORHOOD ENVIRONMENT AND LEISURE TIME PHYSICAL ACTIVITY IN RESIDENTS OF TOKYO METROPOLITAN AREA

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Physical inactivity is one of the major independent risk factors for chronic degenerative diseases. Many studies have been conducted to elucidate influential factors on people's physical activity (PA) level such as psychological, social, and demographic factors. Nevertheless, the importance of the neighborhood environment (NE) factors on PA levels is not clear. Daily PA is composed of leisure time PA and non leisure time PA such as occupational, domestic, and transportation PA. Non leisure time PA would be influenced by people's working status, but leisure time PA would be more influenced by the NE. However there is no data indicating which kind of neighborhood environment would be conducive to daily PA and leisure time PA in Japan.

PURPOSE

The purpose of the study was to investigate which kind of actual or perceived neighborhood environment would correlate with the leisure time PA or daily PA in Tokyo, Japan.

METHODS

Study participants were residents living in a ward of metropolitan Tokyo, and were recruited by the ward newsletter. From September 2005 to March 2007, two hundred residents (30–80 years old) participated in the study. The actual NE was assessed by the Geographic information system (GIS) and the perceived NE was assessed by a questionnaire. The actual NE for each participant was constructed for a 500 m radius from each participant's household. And, residential density, land use mix, street connectivity, retail floor area ratio,

altitude, and the number of subway or train stations and bus stops were calculated. Participants answered a questionnaire regarding their perception of the NE including types of residences, access to stores and facilities, access to services, streets connectivity, places for walking and cycling, scenery and traffic safety, and their demographic characteristics (age, sex and job). And, they also reported their leisure time PA including walking, moderate and vigorous intensity PA. Daily PA was assessed using the number of walking steps by a pedometer. Participants wore a pedometer and reported their daily number of walking steps during one week.

Correlation between actual NE or perceived NE and leisure time PA or walking steps were analyzed using the multiple regression analysis stepwise method after adjustment for age, sex and working status.

RESULTS

One hundred eighty-eight (54 male and 134 female) participants completed all of the study requirements. Leisure time PA was significantly lower in the participants with job. However, the number of walking steps was significantly higher in the participants without jobs. Leisure time PA was positively correlated with the number of stations, and the number of walking steps was positively correlated with land use mix and negatively correlated with altitude for the actual NE after adjustment for age, sex and working status. For the perceived NE, land use mix diversity and places for walking/cycling were positively correlated with leisure time PA, and land use mix diversity was positively correlated and residential density and safety from traffic were negatively correlated with the number of walking steps after adjustment for age, sex and working status.

CONCLUSION

The highly urbanized Tokyo metropolitan area has only subtle differences in NE. However, study results showed that the actual number of stations, and perceived land use mix diversity and places for walking/cycling could influence people's leisure time PA. Also, actual street connectivity, and perceived land use mix diversity could be conducive to people's daily PA. Further study will be needed in other regions such as rural areas to elucidate regional differences in the observed correlations.

ACKNOWLEDGMENT

This study was supported by a grant from the Japan Ministry of Education, Culture, Sports, Science and Technology (ID #17200041) as a part of the study on the evaluation of neighborhood environments affecting residents' daily physical activity (principal investigator: Jung Su Lee). Many thanks to study participants.

WALK TEST IN THE PROCESS OF QUALIFYING CARDIOLOGICAL AND PULMONOLOGICAL PATIENTS FOR PHYSIOTHERAPY

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The cardiovascular system diseases and respiratory diseases are linked by similar physiotherapeutic treatment mostly based on implementing closely controlled physical training. An initial physical efficiency assessment is the condition for suitable and effective cardiological and pulmonological rehabilitation. It allows for appropriate choice of workload for each individual patient.

The aim of this research was to assess the level of usefulness of the 6 minute walk test in the process of qualifying patients after heart attacks and CABG and patients with COPD for exercises as well as for evaluation of the effects of physiotherapy used with these patients.

The research involved 51 patients (16 patients with COPD, 23 patients after heart attacks, 12 patients after

CABG). The patients were treated in the home office Specialist hospital in Glucholazy and physically trained in Physical therapy department.

The patients were tested with the use of exercise test and a 6 minute walk test to assess the level of physical efficiency tolerance and to establish energy expenditure in MET. The results were subjected to statistical analysis with the level of statistical significance at $p < 0.05$.

The research shows a high level of correlation between the results of the parameters obtained with the use of the 6 minute walk test and those obtained with the exercise test. At the same time however, there is a statistically significant difference between these parameters which might hinder the use of the 6 minute walk test for the qualification of patients for exercises.

WATER ENVIRONMENT IN THE THERAPY OF THE LOW BECK PAIN SYNDROMES*

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Degeneration of the spine are an often reason of the low back pain. These changes are characteristic to middle aged and elderly persons. They are caused, in many cases, by prolonged overload caused by overweight, improper work ergonomic, bad habits for free time spending. As a percentage of people with lower back and loins parts of spine changes increases with the population aging, the modern physiotherapy still searches for new therapy methods to effectively fight with this problem. In our dissertation we have focused on loin's pain. The authors have proposed a scheme of physiotherapeutic behavior, in which exercises in water were an important element.

MATERIAL AND METHOD

Diagnosis was given for persons suffering from loins and low back pains, based on interview and clinical and radiological research. In a radiological research, for all patients, degenerative changes of vertebra core were affirmed. Patients, for whom clinical symptoms were not affirmed were classified to the group of treated. Pain intensiveness was measured based on analogical visual

pain scale (VAS). In first group we used kinesitherapy and physical therapy. In second group we added exercises in water. Average treatment time is about three weeks. Procedures were done on every day basis, with an interval for Saturdays and Sundays. After the treatment was finished patients were examined and the pain was measured with an analogical visual pain scale (VAS).

RESULTS

Results were based on a comparison of pain assessment before and after the treatment, using the analogical visual scale (VAS).

CONCLUSIONS

1. Patients treated with the method combined with exercises in rehabilitation pool a positive therapeutic effect was proven.
2. During the treatment we have not noticed complications in the form of ailment escalation, which proves the safety of the method used.

* The experiment has been performed within the scope of statutory (Ds-97) financed from the Warsaw Academy of Physical Education funds.

PROMOTION OF HEALTH ENHANCING PHYSICAL ACTIVITY - THE EVIDENCE BASED APPROACH OF THE HEPA EUROPE FRAMEWORK

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Physical inactivity has been well documented and recognised as an important public health risk and among professionals it is widely accepted that public health interventions and more specifically the promotion of health-enhancing physical activity HEPA should be based on best available evidence. However, for most key players outside a very limited circle of experts there are no clear concepts for increasing health-enhancing physical activity on the population level. Therefore, communication to decision makers and a wider audience on the principles and mechanisms of HEPA promotion can be considered as a key task.

For such purposes, HEPA Europe, the European network for the promotion of health-enhancing physical activity has developed a framework and applied it in the development of an impact model and in a national setting in Switzerland.

The framework has an overall cyclic structure consisting of a chain of levels from policies over programmes and activities over determinants of physical activity to physical activity behaviour and finally to health. The central role of collecting and making available information from practical experiences and from scientific evidence as well as the role of the societal context are illustrated. On the national level, the framework has been applied in HEPA communication material for Switzerland and in the development of the Swiss National programme on diet, physical activity and health. The framework was generally welcomed by physical activity promotion experts and stakeholders on different professional levels as well as by experts from the fields of general health promotion and sports. Particularly appreciated were the clarification of the terminology, the explicit description of the mechanisms of HEPA promotion and the capability of the framework to cover a broad range of different approaches in physical activity promotion. The four main categories for programmes and activities – structured activities such as physical education

classes, activity-friendly physical environment, counselling and coaching, campaigns and events – were useful in classifying activities and were understandable also to actors in the field.

The HEPA Europe framework is suggested for communication and collaboration, for example in the development of national strategies on diet, physical activity and health.

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THE CONTEMPORARY CONCEPTION AND DEVELOPMENT PERSPECTIVE OF REHABILITATION AND PHYSIOTHERAPY

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The contemporary physiotherapy combines both physical culture and medicine, which is rooted as early as in mythology or ancient history. Physical culture and medicine have always been combined through physical movement which was used as a therapeutic element. Hipocrates mentions such a solution in his works. The foundations of physiotherapy had been based on physical culture and it soon turned into a separate field of study.

However, before it became a rightful element of medicine it had undergone a number of changes driven by a medical progress, political transformations and a development of physical culture as well as physical education. Both rehabilitation and physiotherapy in Poland and all over the world went through a long period of changes that shaped their aims and points of view to a large degree. Nowadays when we look at therapeutic rehabilitation of a patient or a handicapped, we often use term physiotherapy, although terms like rehabilitation, revalidation, and reactivation are often adopted as well. It goes without saying that the term rehabilitation and other terms with the prefix "re" must not be applied to all the people who suffer from physical fitness problems or functions. We cannot talk about rehabilitating something that has never existed as it is in the case of people who have inborn malfunctions or diseases that they acquired in their early childhood. However, they undergo rehabilitation or physiotherapeutic treatments.

The term rehabilitation developed as a result of emergence of new fields of knowledge and experience from medicine and physical culture. The aim of the new fields

was to help a stricken or handicapped man to recover their body functions. One of such fields is physiotherapy, which is an integral element of the rehabilitation process, if we look at rehabilitation from therapeutic (medical), social and professional point of view. Although physiotherapy is only an element of rehabilitation, it plays a very important role in this process. The name (gr. physis – nature, therapeia – treatment) suggests that it makes use of such factors as: movement, light, electricity, air, water, etc. for therapeutic purposes.

Nowadays physiotherapy is a field of academic and therapeutic research and it makes use of such fields as anatomy, physiology, psychology, kinetics and pathology. It can assess movement defects and it leads to medical diagnosis. The knowledge of movement phenomena, physiology, biomechanics and therapeutic effects of different methods enable a physiotherapist to introduce a therapy that will improve and soften patient's problems. Taking into account all these values determines a successful physiotherapy and rehabilitation and only in such a context and comprehension one can perceive rehabilitation and physiotherapy as a one common field.

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ACTIPA2006: HOW TO PROCESS PHYSICAL ACTIVITY DATA FROM ACTIGRAPH?

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Accelerometer ActiGraph GT1M allows objective monitoring of physical activity (hereafter PA) of respondents of all age groups. Special software ActiPA2006 was created at the Center for Kinanthropology Research to process PA data from weeklong PA monitoring using ActiGraph GT1M. The software transforms and analyzes data from ActiGraph and creates individual feedback from the weeklong PA monitoring for each participating respondent (Fig. 1). Obtained data is available for further statistical processing.

The ActiPA2006 converts the time of wearing the ActiGraph to the energy expenditure (based on weight, height, sex and age). Each day of monitoring, the structure of physical activity and inactivity can be specified in more detailed. This allows for more valuable individual feedback from the weeklong PA monitoring. The software converts data into spreadsheets or database files.

Respondents' output forms represent transparent spreadsheets and charts. They show weeklong PA, inactivity, structure and intensity of PA of an individual in comparison to other respondents. Each form contains personal data and date of the measurement. First spreadsheet presents time of PA, inactivity of respondents and their energy expenditure. Second spreadsheet shows PA as a part of respondents' job (school) or PA in any type of an organized PA. First chart describes time of PA and inactivity per week, per working days and per weekends. Second chart transparently shows total and active energy expenditure. Further, the chart displays the time that respondent spent with different intensity of PA (average per day). All results are in comparison to other respondents (class, working group, city residents etc.). Every individual can easily recognize the lowest, the highest and personal values of the pursued PA. The curves in the third chart inform about individuals PA carried out in every day.

Strong points and benefits of the software are:

- easy access and downloading the data from the ActiGraph GT1M,
- users friendly operating,
- well arranged feedback to every single participant,

- data in spreadsheet or database files for further statistical processing,
- multi lingual feedback.

Main weaknesses and limitations:

- incomplete records from monitors are removed and respondent does not get the feedback,
- software is currently only in Czech version (English version will be developed),
- number of respondents in groups is limited to 100.

Although there are weaknesses of the software (see above), it is a valuable instrument for the basic tasks. ActiPA2006 allows to process data from the ActiGraph GT1M; offers immediate individual feedback to respondents and stores data in adequate quality for further statistical processing. Respondents appreciate the individual feedback. Based on knowledge from other research teams we value the feedback information as one of the motivation factors that influence the agreement of respondents to participate in research on PA and lifestyle of the inhabitants.

ACKNOWLEDGMENT

The study has been supported by the research grant from the Ministry of Education, Youth and Sports of the Czech Republic (No. MSM 6198959221) "Physical activity and inactivity of the inhabitants of the Czech Republic in the context of behavioral changes".

Fig. 1

Feedback from the weeklong PA monitoring using ActiGraph GT1M



Palacky University - Faculty of Physical Culture Center for Kinanthropology Research

Assessment of weekly physical activity and inactivity

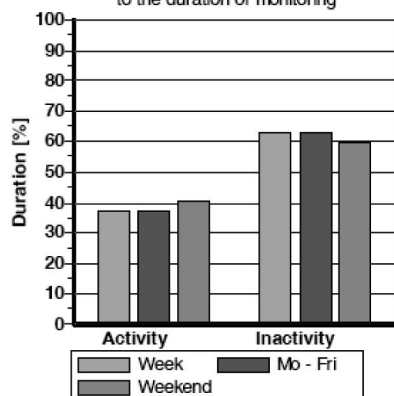
Last Name: _____ **First Name:** _____ **Age:** 42.7 years
Weight: 78.0 kg **BMI:** 23.8 **Height:** 181 cm **Sex:** male
Date of measurement: 23. 3.2007

Average physical activity (PA) and physical inactivity (PI)

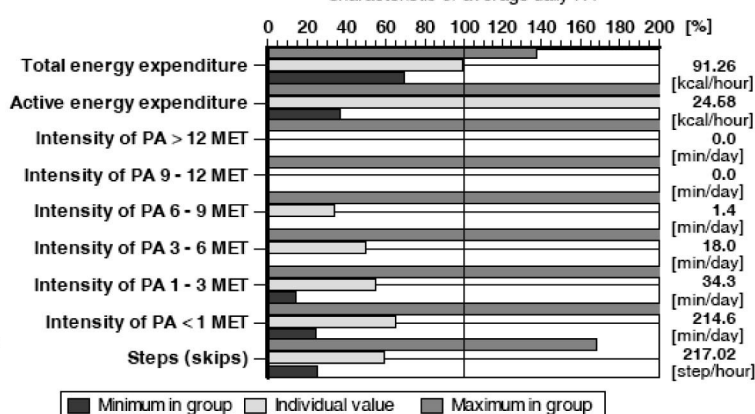
Days:	Duration of monitoring			AEE - active energy expenditure		TEE - total energy expenditure				AEE/TEE 24	Steps
	PA	PI	Total	[kcal]	[kcal/hour]	Duration of monitoring		Total per 24 hours		[%]	
	[hours]	[hours]	[hours]			[kcal]	[kcal/hour]	[kcal]	[kcal/hour]		Number
Weekend	1.75	2.56	4.31	125	31.55	470	111.62	2045	85.19	6.1	1917
Mo-Fri	5.64	9.62	15.26	329	21.79	1549	101.77	2249	93.69	14.6	6525
Week	4.53	7.60	12.13	270	24.58	1240	104.58	2190	91.26	12.3	5209

Average PA and PI recorded with ActiGraph

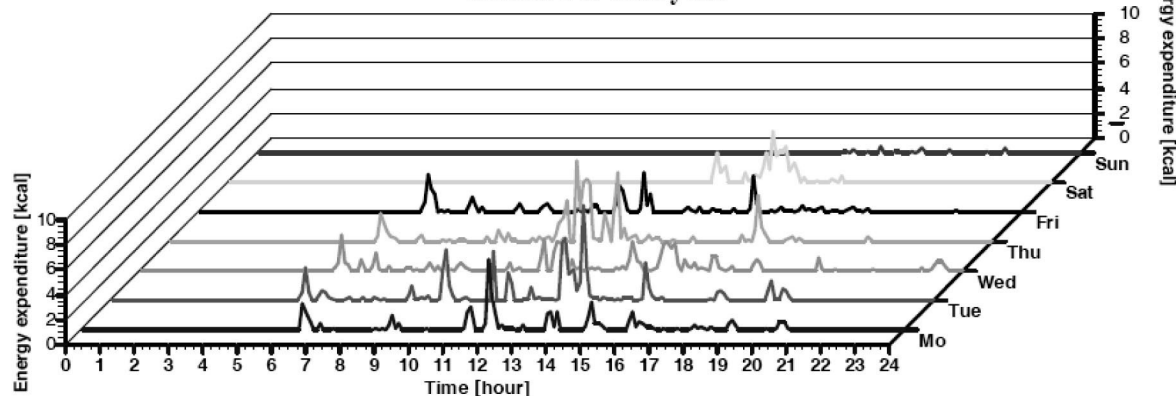
Average duration of PA and PI in relation to the duration of monitoring



Characteristic of average daily PA



Overview of weekly PA



Average PA during working hours or organized PA

	Duration of monitoring			AEE - active energy expenditure		TEE - total energy expenditure			Steps	Lessons
	PA	PI	Total	[kcal]	[kcal/hour]	[kcal]	[kcal/hour]	[MET]		
Physical activity:	[min]	[min]	[min]						Number	Number
Working hours	215.4	345.6	561.0	243	25.53	990	105.48	1.35	4730	5
Physical education	53.0	37.0	90.0	57	38.00	177	118.00	1.51	1238	1
Organized PA	119.0	77.0	42.0	53	26.72	212	106.89	1.37	1132	1

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PHYSICAL INACTIVITY OF STUDENTS AGED 14–15 WITH REGARD TO PLACE OF LIVING AND SCHOOL ENVIRONMENT

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The level of physical inactivity and lifestyle among adolescents living in different locations varies. The built environment in smaller communities supports people to be more physically active than in larger cities. Children spend the same amount of time or maybe even more at schools as adults people do at their job. Five workdays each week except holidays just promote the inactive and unhealthy lifestyle habits from the very early age. Schools should play an important role in establishing healthy lifestyle habits in adolescents, but what are we offering to children? Usually sitting during lessons and staying quite during breaks and not every principal is inclined to adopt more “active environment” in their schools. Possible factor is the size of the community where students live in and go to school. Along with parental care, these are factors that develop the personality and the lifestyle habits in growing adolescents.

OBJECTIVES

The main objective of this study was to analyze sitting habits of adolescents with regard to the size of the community where adolescents live.

METHODS

The “PAQ – long” questionnaire was used to collect data in this study. 144 boys and 158 girls aged 14–16 participated in this study. Data were collected in winter 2006.

The research was conducted in three selected regions of the Czech Republic. In each region, 3 schools were randomly selected that matched these criteria: 1. a school in a town over 100.000 inhabitants, 2. a school in a town with 10.000–30.000 inhabitants, 3. a school in village (less than 10.000 inhabitants). The research was carried out in all pupils of ninth grades (aged 14–15) of selected schools. For data analysis we used basic statistical characteristics and binary logistic regression (SPSS). Odds ratio calculations were adjusted by age, gender, BMI, location and participating in an organized PE (last

group in each category was the referent group in each binary logistic regression).

RESULTS

Based on the findings concerning the PA characteristics, we have found that girls were significantly more likely to be sitting than boys. BMI, participation in any organized or unorganized PA did not influence time spent sitting. However children living in a smaller community, meeting recommended level of PA based on walking and living in an apartment are significantly more likely to be sitting.

CONCLUSIONS

Sitting and physical inactivity are trends that rapidly increase across the whole population. Current school system – sitting at the table and do not move much for 6 hours a day should be changed very quickly. Everything we teach our kids with current methods will be their handicap for tomorrow. It is alarming, how much time spend adolescents just sitting and doing nothing. It is the age full of physical changes and our adolescents are passive. Not only school, but parents and whole society should understand that this is going to be a big problem. Overweight, obesity and other diseases related to unhealthy lifestyle are becoming the number one task for medical care and physicians. Among other factors, the results of the study are to be used as an effective tool and information source when establishing new school programs that will provide more classes enhancing PA and healthy lifestyle in students in their common life.

SUPPORTING AND FUNDING

This study was conducted as a part of international study of the IPAQ and IPEN in the Czech Republic at the Palacký University in Olomouc. Supported by research project “Physical activity and inactivity of the inhabitants of the Czech Republic in the context of behavioral changes”, no 6198959221.

COMPARISON OF CALCANEAL BONE DENSITY IN ARMY PERSONNEL

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The aim of this study was to assess values of lifestyle factors including physical activity, job, calcium intake, and smoking in 355 army male personnel.

METHODS

From February to June 2004, 355 males (age between 35–55 years) in two equal separate groups; operative (active field soldiers) and non operative (army office staff) were evaluated with dual X-ray and laser (DXL) calscan for measurement of calcaneus bone mineral densitometry (BMD). Lifestyle factors including smoking, calcium intake and physical activity were evaluated by the investigators through a specifically designed questionnaire. Training programs for operative personnel include: marching at least 2 times per week, walking at least 30 minutes per day, army special field operation at least 4 times per year. Operatives were compared with

non operative personnel who did not perform the regular active field training maneuvers.

RESULT

Linear regression revealed that BMD is significantly associated with job ($P < 0.001$), age ($P < 0.001$), smoking ($P < 0.01$), calcium intake ($P < 0.05$), and years of physical activity ($P < 0.001$). In addition, dual energy X-ray absorptiometry (DXA) of lumbar spine and femur were performed for 35 participants for correlation that the result was same as for DXL ($P < 0.05$).

CONCLUSION

This study suggests that years of regular physical activity and mechanical loading were the strongest predictors of calcaneus BMD.

ACTIVITY IN KNIGHT BROTHERHOOD AS A NEW FORM OF RECREATION

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Knight brotherhood is one of a new forms of recreation, which appeared recently in Poland and is becoming highly popular. The aim of this paper is proving that membership in knight brotherhood may be treated as a form of physical recreation. It was also interesting to find out about conditionings of participation in brotherhood, motives of members, and the benefits of participating in the brotherhood.

MATERIAL AND METHODS

The research, which results were used in that paper, was conducted in June and February of 2006. The research was conducted on members of knight brotherhood, who were mostly members of knight brotherhoods of Opole. 63 people, 19 women and 44 men took part in the research. To achieve this aim the method of diagnostic survey was applied with the aid of questionnaire form. This method was applied to gain necessary information from a person questioned about their activity in knight brotherhood and it was done by means of a questionnaire.

The criteria which was taken under consideration was a favourite form of physical activity. Two groups were distinguished. The first one was characterised as fighters and the second one as non fighters (their main interests are shooting, archery, dancing and others like jugglery, fire shows and craft).

CONCLUSIONS

Results proved that the assumptions of active physical participation are fulfilled by the participation in the knight brotherhood, not only in theory but also in practice. Knight brotherhoods offer their members the ability to choose varied forms of physical activities, which can satisfy the needs of different target groups. Brotherhoods are types of organization which encourage to the physical activity, and have a positive effect on shape and health of members.

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THE EFFECT OF WALKING STEPS ON BODY WEIGHT LOSS

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Obesity is a risk factor of cardiovascular disease, type 2 diabetes, hypertension and dyslipidaemia. Although the majority of the Japanese have relatively smaller BMI than people in western countries, the increased health risks associated with obesity occur in people with lower BMI in the Asia-Pacific region compared with Europe or the United States, therefore weight reduction in Japan is considered to be important. It is obvious that body weight loss occurs by negative energy balance, and many weight reduction programs promoting increasing energy expenditure have been conducted. Walking is one of the typical aerobic exercises practiced easily; it needs no special space or machines and is easily incorporated into one's daily life. Previous studies have reported the association between the increase of the number of walking steps and body weight loss, but on the other hand, some studies showed no relation between them. These inconsistent results may occur because these studies did not examine or adjust for change in energy intake. The purpose of this study was to clarify the correlation between the increase of walking steps and body weight loss.

METHODS

Subjects were a total of 261 middle aged women ($n = 224$) and men ($n = 37$) who participated in a community 12 week intervention program between 2002 and 2004 in a city in Japan. In the program, subjects were instructed to increase the number of walking steps to ten thousand per day. They also received individual dietary advice for reducing energy intake by dietitians. Body weight, the number of walking steps, energy and nutrition intake were assessed before and after the program. To compare the mean body weight, the number of walking steps, energy and nutrition intake before and after the program, the paired t-test was used. Successful weight losers were defined as subjects who lost 3 kg or more during the program. On the other hand, subjects who lost body weight less than 3 kg were defined as less successful weight losers. To compare the change in the number of walking steps between successful weight loss (SWL) and less successful weight loss (LSWL) groups,

the general linear model (GLM) adjusting for age, sex, baseline number of walking steps, baseline energy intake and change in energy intake was used.

RESULTS

The percentage of male and female was 14.2% and 85.8%, respectively. The mean age of the subjects before the program was 58.4 ± 7.5 years, and the mean body weight and the number of walking steps were 61.7 ± 8.9 kg and 8153 ± 3580 steps, respectively. After the program, body weight significantly decreased and the number of walking steps significantly increased. Energy, fat, carbohydrate and dietary fiber intake were significantly decreased after the program. Fat (% of total energy) was also significantly decreased, but carbohydrates (% of total energy) and dietary fiber (g/1000 kcal) were significantly increased.

The number of subjects who were classified into the SWL group was 56 and the LSWL group was 205. Change in the number of walking steps in the SWL group was significantly greater than that of the LSWL group even after adjusting for age, sex, baseline number of walking steps, baseline energy intake and change in energy intake (change in the number of walking steps in the SWL and LSWL groups; 1022 and 540 steps, respectively).

DISCUSSION

Subjects' body weight was significantly decreased after the program, and this was considered to be due to the increase in the number of walking steps and the decrease of energy intake. However, the change in the number of walking steps was significantly related to body weight loss. Furthermore, because the number of SWL subjects was only one fourth of all the subjects, we reanalyzed the data with a cut off value of -2 kg. The number of the subjects in each group was about half and half, but the result was almost the same (change in the number of walking steps in the SWL and LSWL groups; 927 and 443 steps, respectively; $p < 0.05$). Therefore,

these results showed that the increase in the number of walking steps had an influence on the degree of weight loss even after adjusting for change in energy intake.

CONCLUSION

The increase of walking steps was related to the degree of body weight loss, and increasing the number of walking steps is recommended as an effective means of weight loss.

PHYSICAL DEVELOPMENT AND PSYCHOLOGICAL FUNCTIONS IN JUNIOR SCHOOLCHILDREN

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The authors studied the physical development as well as the state of psychological and neurodynamic functions in junior schoolchildren. The study encompassed 55 girls and 53 boys at the age of nine of the fourth form of a secondary school. To evaluate the chil-

dren's physical development, the authors measured the subjects' anthropometric and functional indices. The results show that the level of physical development correlates with the condition of psychological and neurodynamic functions.

SMOKING AND PHYSICAL ACTIVITY IN 15 TO 18 YEAR OLD CZECH ADOLESCENT GIRLS

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Smoking and physical inactivity together with wrong nutrition habits belong to serious risk factors for health of a population (Dishman, Washburn, & Heath, 2004). Some studies show that smoking belongs to factors negatively affecting a physical activity level (Aarnio, Winter, Kujala, & Kaprio, 2002).

Presented study belongs to a wider project assessing physical activity level and its associated factors of the Czech adolescent girls. The main aim of this subproject was to analyze the physical activity level in the Czech adolescent females according to their smoking status.

A sample consisted of $n = 1825$ Czech adolescent girls aged 15 to 18 selected (by quote and randomized sampling) from all main regions of the Czech Republic. To assess the physical activity level (i. e. vigorous physical activity, moderate physical activity and walking, summed as total physical activity), a Czech edition of the short "last 7 days", self-administered version of the international physical activity questionnaire (Craig et al., 2003) was used. The Czech edition is supplemented by demographic and additional questions (Frömel et al., 2003). Non parametric variables (median, quartile range) and Kruskal-Wallis ANOVA were used for statistical procedures in Statistica 6.0 software.

As our results show, 13.73% of the Czech adolescent girls aged 15 to 18 denote themselves as smokers. The percentage of smokers increases dramatically with age from 6% in 15 year old girls to 20% in 18 year old ones. Taking the total physical activity into account, smokers ($n = 256$) and non smokers ($n = 1569$) do not differ significantly ($H = 1.21$; $p = .272$). The smoking is probably associated with the intensity component of realized physical activity. While nonsmokers seem to be more active on the vigorous ($H = 26.98$; $p = .000$; $\eta^2 = .015$) and moderate ($H = 18.51$; $p = .000$; $\eta^2 = .010$) level, smokers indicate more walking activity ($H = 11.18$; $p = .001$; $\eta^2 = .006$). However, effect size coefficients do

not permit to draw any more definite conclusion. Thus, more analyses to clarify the associations between smoking habits and physical activity levels in the adolescent girls are needed.

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ANAEROBIC CAPACITY IN FEMALE AND MALE STUDENTS

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The main indexes of the 30 s Wingate test are the peak power (PP, the highest power elicited from the test taken as the average power over any 5 s period), mean power (MP, the average power during the 30 s of the test) and fatigue index (FI, the amount of decline in power during the test). By definition, PP and MP are considered as indicators of the alactic and lactic anaerobic capacity, respectively. Purpose of the present study was to investigate the relationship between these two parameters.

Fifty six female (age 22.72 ± 1.96 years old, body mass 60.7 ± 6.06 kg, stature 1.69 ± 0.06 cm, BMI 21.19 ± 1.92 kg·m⁻² mean $\pm$ standard deviation) and 152 male (23.34 ± 2.14 years old, 77.3 ± 7.85 kg, 1.82 ± 0.06 m, 23.28 ± 1.93 kg·m⁻²) students of physical education and sport volunteered to perform this anaerobic test on a friction loaded cycle ergometer, against braking force 0.075 kg and 0.090 kg per kg of body mass in females and males respectively. The independent T-test was used to determine whether female and male students' means differed reliably from each other and the Pearson product moment correlation coefficient (r) was employed to correlate PP and MP in absolute and relative to body mass values in females and males respectively. Significance levels were evaluated by proper statistical tables.

The results revealed significant gender differences in the main indexes of the Wingate test (63.36% in PP,

60.76% in MP and 8.15% in FI). These differences remained significant even when the power parameters were expressed in relative to body mass values (28.03% in PP and 26.06% in MP). The correlation coefficient between PP and MP was higher when these parameters were expressed in absolute values for both the genders ($r = 0.83$, $p < 0.001$ in females and $r = 0.89$, $p < 0.001$ in males) than when they were in relative values ($r = 0.54$, $p < 0.001$ in females and $r = 0.66$ in males, $p < 0.001$). PP accounted for 29.32% and 69.08% in females and 43.69% and 79% in males of the variance in MP in relative and absolute values respectively (Fig. 1).

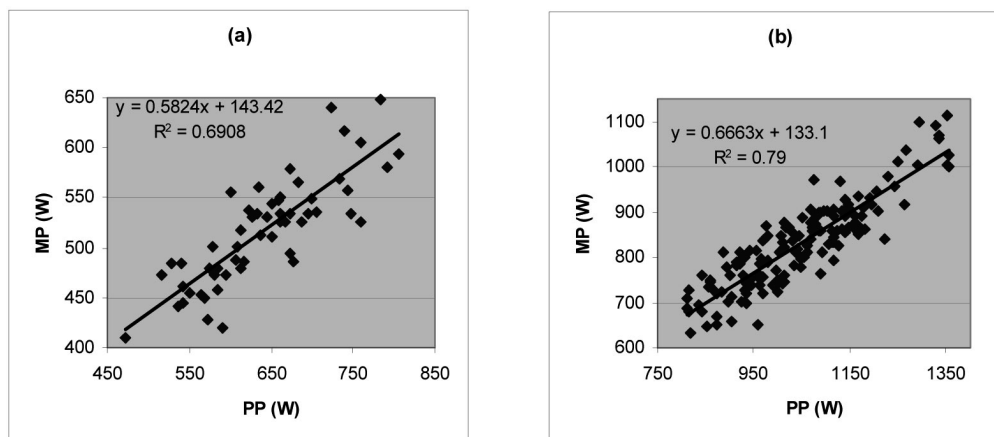
Practical implication of the results could include the employment of the prediction equations to calculate MP based on the measurement of PP in people with similar anthropometric characteristics to those of this study. The results indicated that the alactic and lactic anaerobic capacity were higher correlated in males than in females. Further investigation could examine this relationship in field conditions.

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Fig. 1

Prediction equations of mean power (MP) based on peak power (PP) in absolute values in female (a) and male students (b) and the coefficient of determination (R^2)



GENETIC AND SHARED ENVIRONMENTAL INFLUENCES ON EXERCISE PARTICIPATION

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The established health beneficial role of physical activity in combination with the identification of sedentarism and inactivity as health risk factors attracted multidisciplinary interest about environmental and genetic determinants of physical activity related phenotypes. The evidence from the genetic epidemiology studies proposed that there was a contribution of genetic factors that influenced physical activity levels. However, few researches focused on these influences on the exercise component of physical activity. A design based on nuclear families was chosen, as the assessment of the correlations between family members could infer information about familiarity and heritability of a trait. Therefore, purpose of the present research was to examine familial aggregation and heritability of exercise participation.

The members (43 mothers, 35 fathers, 41 daughters and 46 sons) of 50 nuclear families completed a validated and reliable 16 item questionnaire of physical activity. Exercise participation was expressed in hours per week and its estimation was based on the responses to the scaled items "How many days per week you practise any exercise or sport?" and "How much time (in minutes) lasts a training session of exercise or sport?". A one way ANOVA on the age adjusted (age, age², age³) exercise participation outcome as the dependent variable and family identity as the independent variable compared the between family to the within family variances to verify the hypothesis that exercise participation aggregated in families. Maximal heritability h^2 , which described the combined effect of genes and shared environment, was calculated from parent offspring's regression analysis.

Although significant differences ($F(3.161) = 3.54$, $P < 0.05$) existed among groups' (mothers, fathers, daughters, sons) unadjusted phenotypes, the Scheffé technique's critical value revealed difference only be-

tween mothers and sons. The ANOVA of the age- djusted phenotypes ($F(49.111) = 1.88$, $P < 0.005$) indicated that there was 1.88 times more variance between than within families in exercise participation. Low and moderate correlations were found for siblings' ($r = 0.23$, $P < 0.05$) and parent offspring's phenotype ($r = 0.31$, $P < 0.05$), respectively, while the correlation between spouses was non significant ($r = 0.09$). Mothers' phenotype was significantly and moderately correlated with daughters' ($r = 0.33$, $P < 0.05$) and sons' ($r = 0.31$, $P < 0.05$), whilst fathers' was not significantly correlated neither with daughters' ($r = -0.10$) nor with sons' ($r = 0.20$). Maximal heritability was estimated 0.31.

The result of analysis of variance suggested aggregation of exercise participation in families. Familial (genetic and shared environmental) factors explained the 31% of the variance in exercise participation. Employing the index of maximal heritability did not allow for further quantification of the genetic and shared environmental contributions. However, the pattern of familial correlations – significant parent offspring and sibling, non significant correlation between spouses – suggested that the heritable variation might be primarily due to genes. Also, the significant influence (69%) of the non shared environment was confirmed, recommending that environmental factors, e. g. effective physical education interventions, were able to improve significantly exercise participation, and therefore physical activity levels. The employed genetic tools were statistics being prone to specific assumptions and hence it should be paid attention when they were interpreted. As these statistic indexes were unique for each population, further research in various populations might provide more detailed knowledge about the relative contribution of genetic, shared and non shared environmental on the variation of exercise participation.

VALIDATION OF PHYSICAL ACTIVITY QUESTIONNAIRE FOR FEMALE STUDENTS

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The well-established health benefits of physical activity (PA) have posed the question for accuracy in PA measurement. The validation of a PA questionnaire can take place by using either direct or indirect methods (e.g. physiological criteria). Previous studies revealed a wide ranging correlation between PA and cardiorespiratory fitness. The purpose of this study was to validate a PA questionnaire against physiological parameters, considering the close relationship between PA and health-related fitness (HRF).

Seventeen female students (age 23.2 ± 3.6 years old, body mass 63.3 ± 8.2 kg, stature 169.2 ± 6 cm, mean $\pm$ standard deviation) volunteered to participate to the present research. They were given a 22 item questionnaire, which covered four main areas: sport participation, leisure time PA, occupational PA and lifestyle. Aerobic capacity (maximal oxygen uptake, workload in heart rate 170 in cycle ergometer), force vital capacity (spirometry), hand grip strength, flexibility (modified sit and reach test, advantage +15 cm), body fat (%) estimated by the sum of 10 skinfolds and measured by bioimpedance analysis were the physiological parameters employed to test its validity. The Pearson product moment coefficient of correlation (r) was used to study the relationship between PA and HRF variables and significance levels were evaluated by proper statistical tables and analysis.

The results (TABLE 1) revealed significant correlations between the total PA level and VO_{2max} and body fat, as well as between sport participation and VO_{2max} , W_{170} and body fat. Occupational PA was significantly correlated with body fat. No significant correlation was found between leisure time PA and any of the examined HRF parameters. A comparison of the two employed methods for the assessment of cardiorespiratory fitness and body composition showed significant correlation only between body fat estimated by the sum of ten skinfolds and measured by bioimpedance analysis ($r = 0.71$, $p < 0.001$) and not between maximal oxygen uptake and workload in heart rate 170.

Regarding the three parameters of PA, sport had closer to total PA level correlations than leisure time PA and occupational PA did, which was in consistency with previous findings. This study confirmed the relationship between PA and HRF, validated a PA questionnaire in female students and suggests the further use of cardiorespiratory fitness and body composition as criteria of PA levels. Considering the outcome of VO_{2max} and W_{170} (cardiorespiratory fitness) and two measures of body fat (body composition), it was highlighted the need for selection of proper assessment methods of HRF.

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TABLE 1
Physical activity vs. Health related fitness

	Leisure time PA	Occupational PA	Sport	Sum of PA
VO_{2max}	-0.03	0.17	0.68**	0.69**
W_{170}	-0.03	-0.29	0.51*	0.29
FVC	0.26	0.23	0.03	0.21
Strength	0.01	0.23	0.09	0.19
Flexibility	0.14	-0.03	0.13	0.15
Body fat ^a	-0.14	-0.11	-0.01	-0.12
Body fat ^b	0.11	-0.50*	-0.54*	-0.68**

^a Calculated by the sum of 10 skinfolds

^b measured by bioimpedance analysis

* $p < 0.05$

** $p < 0.01$

ERGONOMICS OF PHYSIOTHERAPIST THEORETICAL ASSUMPTIONS AND REALITY

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Therapeutic features of movement are commonly utilized in physiotherapy, where movement therapy is one of fundamental sections. Physical activity is also an important part of prevention of many conditions, particularly so called civilization diseases. Deprivation of movement, its excess or bad quality can adversely influence health. Thus, a specific situation takes place in exercise therapy – physiotherapists use movement as a treatment, but, on the other hand, often become “victims” of their actions (especially, when working in unergonomic conditions). Physiotherapist’s professional activities should be categorised as movement acts – static and dynamic efforts done in various positions, against additional external loads – e.g. while transferring a patient and/or equipment. Numerous repetitions of given actions lead to particular movement habits. Fossilizing of improper habits and further repetitions of professional actions in an incorrect way, in general, are followed by harmful consequences, generated by overloading, particularly of the spine. Thus, creating appropriate working conditions and educating physiotherapists themselves in terms of optimizing workloads, are becoming vital.

THE AIM OF THE STUDY

The aim of the study was to assess physiotherapists’ working conditions from the point of applying canons of ergonomics. The most often disorders, connected by physiotherapists with their jobs, as well as the ways they attempt to counteract them, were also studied.

MATERIAL AND METHODS

Over 70 physiotherapists, aged 22–52 years, with professional history ranging from 6 months to 30 years, par-

ticipated in the study. The trial represented two aspects. Firstly, a survey about professional position’s characteristics (type of institution, work schedule, character and number of patients, positions while working, career duration, number of working hours a week), and occurring complaints and ways of reducing them, was conducted. General knowledge about overload syndrome and its backgrounds, and about applying rules of prophylaxis in professional activities were also assessed. Subsequently, after subjects had been divided into groups, according to most frequent working positions, indices of harmfulness of the work site were computed with OWAS software.

RESULT

Obtained results have shown that profession of physiotherapist is a strenuous physical labour, leading to a number of disadvantageous symptoms. They occur not necessarily in connection with job seniority. A distinct correlation between the character of disorders, kind of job activities and working positions was observed, though. It has also been found possible to reduce loads by modification of actions (working positions). Physiotherapists are in majority aware of hazards resulting from working in unergonomic conditions, but proper attempts to eliminate them are not common.

CONCLUSIONS

It is necessary to educate physiotherapists properly in terms of knowledge and applying rules of ergonomics in professional activities and establishing ergonomically optimal working conditions.

POSSIBILITIES OF USING TRAINING DIAGNOSTICS FOR HEALTH OF AN ATHLETE

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Expert information offered by training diagnostics can be very effective tool to gain a control of training process of top level athletes.

Article contains examples demonstrating the possibilities of using different information and results obtained by training diagnostics to improve health and increase the effect of training. Some of the given examples of applicable training diagnostics are as follow:

- Examination of explosive strength and muscle imbalances in lower extremities measured by isokinetic bicycle ergometer. Example is base on data from karateka who after knee surgery won a silver medal

in EC 2007. Strength of his legs had increased by 28% in just 3 months. Author recommends to implement preventive lower extremities muscle imbalances examination, which is argued on example of cyclist participating in WC.

- Weekly follow up examination with use of spectral analysis of heart rate variability after WC in cycling demonstrating unexpected results.
- Practical application of physiological curve monitoring during exercise in regard to training intensity and volume in soccer.

RECOVERY OF POSTURAL STABILITY AFTER STROKE

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BACKGROUND

Insight into mechanisms underlying balance recovery following stroke is necessary to develop effective rehabilitation strategies for different types of stroke. Till now these are few studies dealing with the recovery of standing balance from stroke. One of the best method of assessment of standing balance after stroke is posturography. This enables the estimation of recovery of postural stability in stroke patients.

AIM

The aim of this study was to assess the sways in standing position in stroke patients. This could be the determinant of improvement after rehabilitation.

MATERIAL

The study group consisted of 50 patients from one to three month after first ever stroke. Among them was 20 women and 30 men, mean age was 58 years.

METHODS

For posturography the Cosmogamma tensometric platform has been used. Sways has been recorded in all patients three times, as well with eyes open as with eyes closed. The results has been compared to the control group (50 healthy individuals in the same age).

RESULTS

In all cases the influence of the visual control on sways as well in frontal as in sagittal area has been observed.

CONCLUSIONS

Postural stability after stroke is usually decreased. The postural instability in sagittal area is the determinant of aging. The instability in frontal area is characteristic for stroke patients. The visual control is very important in keeping stabile posture.

LITERATURE

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THE STUDENTS' TOURISTIC ACTIVITY AS SYMPTOM OF EDUCATION TO PHYSICAL EDUCATION

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Tourism is the durable element of student physical education (Gołembski, 2002; Kocemba, 1983). Tourism plays an important part in formation of passion for physical activity, and moreover it is possible to practise throughout life.

Tourism matter in processes of education and socialization of youth which values tourism as the source formation of own physical education as a perfect prepare a realization of free time. Youth shows on inspirations exalted with the school to practise of tourism and connected with physical education. The school across making possible the pupils, students of conquest of concrete skills, e. g. swimming, sailing, skiing, can have the influence on development their touristic interests (Żukowska, 2000).

The research is designed to the self-characterize of the students' touristic activity in studied environment, and in peculiarity of durability these behaviours as symptom of education to physical education.

The research included the students of daily studies of universities in Kielce. Assuming that the dean group is a unit of drawing, 4% out of 551 groups was drawn. The assumed group consists of 22 dean groups, which theoretically assuming the equal number of students in groups, gives 563 students.

513 people – including 378 women (73.7%) and 135 men took part in the research. The random trial includes young people aged from 19 to 26, but most of them (92.2%) are the students between 20 and 24. Only every fourth examined person studying at universities in Kielce live in this city permanently (25.8%) while nearly half of them (49%) come from small town and villages. Every third person out of the examined is a first year student (32.2%) while every fifth one is a fourth year student (19.3%).

The independent studies are based on diagnostic poll method and the empiric data collection technique is implied as the poll research.

In studied group 40% students participate in tourism. The women's touristic activity (37%) is characterized tendency to increase number of women participating in tourism together with the length of duration of study, just the opposite than at men, which 44.1% practise tourism.

Studied students the most often participate in rallies of pedestrians (23.2%) and bicycle (13.6%) and mountain wanders (15.2%). Youth the most often practise tourism 2–3 times in year (45.1%) and from no more than six years (52.8%). Students' number practising tourism is on the decrease in duration of study. Among students fourth year only 4% practised tourism throughout studies, 17.2% by one year, and 64.6% didn't practise tourism. The small durability of active attitude in range practising the tourism shows that low effectiveness of process of education to physical education.

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THE RELATIONSHIP BETWEEN NEIGHBORHOOD ENVIRONMENT, DEMOGRAPHIC VARIABLES, AND PHYSICAL ACTIVITY LEVEL IN CZECH HIGH SCHOOL STUDENTS

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In progressively more sedentary society, one of important aims of recent studies is to identify the impact of environmental factors on physical activity. The purpose of this study was to determine associations between neighborhood environment, demographic variables, and level of physical activity in high school students.

METHODS

132 students of first grade at high school (15–16 years) participated in this study. Environmental variables were assessed by the abbreviated version of the neighborhood environment walkability scale (NEWS-A) (Cerin, Saelens, Sallis, & Frank, 2006). Additional demographic and other information was also obtained. Pedometer Omron and accelerometer Caltrac were used to measure 7 day physical activity. Based on active energy expenditure, the students were classified as more active ($n = 43$) and less active ($n = 89$) and according to step based guidelines (The president's council for physical fitness and sport: The presidential active lifestyle award fact sheet, 2007) as meeting guidelines group ($n = 60$) and non meeting guidelines group ($n = 72$).

RESULTS

Logistic regression analysis showed association between physical activity (active energy expenditure) and demographic variables – size of location ($P = .02$; $OR = 21.56$; $95\% CI = 1.78$ to 261.42), number of motor vehicles in household ($P = .00$; $OR = .12$; $95\% CI = .03$ to 0.43) and participation in an organized physical activity ($P = .00$; $OR = 16.07$; $95\% CI = 4.4$ to 58.6). Associations between number of steps and gender ($P = .01$; $OR = 4.73$; $95\% CI = 1.59$ to 14.07), type of residence ($P = .00$; $OR = 7.83$; $95\% CI = 2.30$ to 25.7), size of location

($P = .01$; $OR = 9.71$; $95\% CI = 1.61$ to 58.56), participation in an organized physical activity ($P = .01$; $OR = 4.0$; $95\% CI = 1.47$ to 10.89) and accessibility of parks ($P = .01$; $OR = .25$; $95\% CI = .09$ to $.75$) were found according to logistic regression analysis.

CONCLUSION

Predominantly demographic variables and participation in organized physical activity were found to be associated with the level of physical activity and number of steps. There were no relationships between neighborhood environment and physical activity level with the exception of accessibility of parks in Czech high school students.

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USING EXERCISES, PLAYS AND GAMES WITH THE BALL FOR AROUSING EMPATHY WITH SECONDARY SCHOOL STUDENTS (EXAMINATION REPORT)

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Physical activity, which is based on games, exercises and plays with the ball, is regarded as one of the most attractive forms of physical education classes, where all the students can participate, regardless of their level of physical, mental or intellectual fitness or their social status. This activity ought to provide the students with possibilities of improvement of their key competences, thus preparing them for adult life. By introducing appropriate rules or procedures and by arousing empathy among the

participants (as an expression of positive interpersonal relations), we can contribute to the situation in which every person can experience pleasure out of cooperating or coexisting with others. Therefore, the aim of our work is to determine the changes in the level of empathy with secondary school students who participate in physical education classes where games, exercises or plays with the ball were employed – as a means of stimulating the comprehensive development of a contemporary man.

THE STUDENTS' OPINIONS ON MOTIVES OF DRUG USE IN SPORT

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There are many definitions of doping but the superior aim is to understand the essence of doping (Verroken, 1996). Within the presented work, doping is discussed in its common, negative meaning, as an invasion into human's organism with the use of various drugs and in order to improve one's mental and physical fitness in numerous forms of sport competition. Doping, together with commercialization, is becoming the greatest danger for universal sport values (Smorawiński & Grucza, 2000). The aim of the work was to examine the students of the University School of Physical Education in Poznań in order to find out about their opinions on motives of drug use in sport.

MATERIAL AND METHOD

The author used the method of diagnostic opinion poll, accompanied by a questionnaire technique. Questionnaire contains 61 questions, including the open ones and the closed ones. All the questions were categorized into: demographic data and kind of studies of the respondents, bringing up environment, physical activity and students' knowledge about doping. Empirical data was gathered in computer data base, prepared in calculating program Statistica 6.0. Also the whole set of calculating procedures, based on descriptive statistics methods was prepared. The actual research was conducted in 2002. The material which was compared included 811 questionnaires from students of the first ($n = 226$), second (164), third (208), fourth year ($n = 213$), divided into those from the students of the major physical education (PE), physiotherapy (P) and recreation (R) from tourism and recreation department (T and R).

RESULTS

Students opinions are similar: they are strongly against doping in sport (95%) and encourage to fight with it with the old and new methods. According to the polled students the main reason for athletes taking banned substances is the desire to improve the results and succeed (78%). They also pointed at financial bene-

fits (30%), cosmetic need of improving body mass (21%) and increasing one's self-esteem, acceptance (18%), social pressure and pressure of coaches (16%) and laziness in sport (15%). Other more critical reasons (9%); such as: unawareness, stupidity, carelessness, lack of imagination; were also mentioned. The subjects say that people using doping are most exposed to wasting of the body and upsetting of hormonal balance. Almost all of the polled students (86%) believe that a doctor should "not do any harm" (the Hippocratic oath) and should not give banned substances. Also 83% of the polled postulate that the Polish law should ban a citizen from owning and taking such substances. A minor percent (5%) of respondents declared that ever used doping.

CONCLUSIONS

On the basis of the results of the poll the students turned out to be well-read in the problems of doping in sport and competent to give others knowledge on this issue and generally in the process of health awareness.

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PHYSICAL ACTIVITY AND NUTRITION PATTERN IN „STOB“ COURSES AND ITS RELATION TO SOMATIC CHANGES

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The aim of the study was to examine the effect of physical activity and the modification of nutrition patterns on the somatic parameters in STOB courses – the courses for weight loss and obesity reduction in women at the age of 30–60 years.

The standardised anthropometrical methods were used to determine the basic somatic indexes – body weight and height, risk indexes and central obesity indexes, the body composition by Pařízková method and by Matiegka and the determination of body composition by bioelectric impedance method. Women were divided into the groups according to age decennary. Women were measured at the beginning and at the end of the course that lasted 12 weeks. STOB courses are led by professionals who are involved not only in physical activity but also in modification of nutrition and food intake patterns.

In the groups as a whole, the BMI reached the average values of 30.65 in entrance examination although the maximal value exceeded the limit of morbid obesity 45.56. On basis of BMI categorisation by WHO, only 7.5% of women were in a category of standard, 37.5% was in the category of overweight and 47.5% were obese of which 5% were morbidly obese. The lowest BMI values were in the youngest women (20–30 years old), in other age categories the values did not differ from each other. The average value of WHR was 88.0 of which 77.5% exceeded the limit of riskiness. The lowest average value was again found in the youngest group, the highest (90.7) in the oldest group (50–60 years old).

According to the evaluation of subcutaneous adipose tissue by Matiegka methodology, 57.5% had more than 30% fat of which 28.75% was in the category of over 40% fat. The values of centrality index, which shows the distribution of subcutaneous adipose tissue in individual body parts, corresponded with WHR and it confirmed the distribution of fat particularly on the trunk part in

comparison to lower extremities – thus abdominal type of obesity.

The intervention by means of physical activity and modification of food intake patterns has an individual effect. The evaluation of average values of circumferential dimensions showed the reduction in waist and hip circumference, eventually in lower extremities circumferences. The BMI and WHR values lowered as well. Strong willpower is an important feature and an integral part of intervention but not every woman owns it. So there is always some small percentage of women who neither lose weight nor circumferential parameters and subcutaneous fat.

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ANALYSIS OF BODY COMPOSITION THROUGH THE MEDIATION OF ANTHROPOMETRY AND BIOIMPEDANCE IN SENIOR FEMALES

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Within the framework of the grant project GA CR 1995–2007 “DTP2 Diagnostic system and its use in the effect of the goal directed training (exercising) program in the population group of seniors”, the 2nd phase of the goal directed intervention program was realized in 2006. The Chinese therapeutic exercise Chuej čhun kung was applied for the period of 6 months. The women did their exercises once a week to the extent of 1.5 hours and at home every day for at least 15 minutes. The somatic examination was performed at the beginning and at the end of the training cycle. We observed the influence of the selected Chinese therapeutic exercise on the changes in the body composition which was determined with the help of anthropometry and bioimpedance. By the given method of solution, we were looking for the answer to the question of how much it is possible to achieve significant changes in the body composition at the senior age through the mediation of a goal directed training program. The Chinese therapeutic exercise Chuej čhun kung is called “rejuvenation exercises of Chinese emperors”, and a large therapeutic effect is attributed to it among the lay public. It was created by the Taoists for the members of the emperor’s court in order to prolong their lives and juvenile flexibility. The exercises are fully goal directed slowly made motions which are compiled so that they have an effect on the whole body. The set of exercises stimulates the system of meridians and in this way also the body’s organs. From the point of view of evoking the mental balance, imagination and a smile are important.

We performed analysis of body composition before and after completion of the goal directed exercising program in the group of 23 senior females with the aid of bioimpedance and anthropometry. The adipose fraction mass determined anthropometrically was subjectively lower in both of the measurements than the results of bioimpedance, with 2.90 and 3.19 kg on average. The anthropometrically defined body composition of our senior women differed only minimally from the body composition of the women at the age of 45 to 55 years who were exercising at the last Czechoslovak Spartakiáda in 1985; the difference in the skeletal, muscular and adipose fraction varied in the interval from 1.10% to 1.57%.

The effect of the six month exercising program proved itself positively and significantly in increasing LBM in kg, TBW in litres and percentages, and in increase of BCM. Decrease of the ECW share and increase of the ICW share was only subjectively significant, the same as a small increase of the absolute weight, decrease of the percentual fat share and decrease of the girth parameters in the area of the waist and the gluteal girth.

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HEALTHY BEHAVIOR AND PERSONALITY OF THE JOGGERS

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Human health depends on various types of behavior, in range of healthy diet, physical activity, positive thinking and prevention impact. Type of personality can also be tied with occurrence of certain diseases. Personality of type "A" is connected with the circulatory system troubles, however, type "B" is defined as "healthy". These article answers on the question: do the jogging practicing athletes, characterize of healthier lifestyle and type of personality, than people reveal absence of physical activity?

As research have exerted, the joggers present healthier behaviors, particularly in the feeding habits and prevention, and they demonstrate less stress related to a hurry also. Positive thinking, healthy practice, and rivalry scales do not differentiate the investigated groups. As analysis of the variance shown, physical activity can better influence on a health than type of personality. Probably, systematic physical training inclines for greatest discipline with reference to the other factors of health.

EFFECT OF AEROBICS WITHOUT OR WITH REDUCTION DIET ON BODY COMPOSITION AND CHOICE OF BIOCHEMICAL INDICES

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Sedentary lifestyle and poor nutrition can cause diseases that place an enormous burden on the individual and the whole of society. The importance of achieving and maintaining a good level of health, fitness and nutrient intake is receiving greater recognition from employers, the government and the general public. There is debate over the influences exercise and exercise combined with energy restricted diet on improving metabolic risk factors (body composition, fat distribution and biochemical indices).

OBJECTIVE

To compare the effects of aerobics exercise alone (24 weeks) with subsequent aerobic exercise combined with diet (6 weeks) on body composition, fat distribution and biochemical indices in overweight/obese women.

DESIGN

Two types of intervention: aerobics exercise (3 times/week, optimal intensity was calculated by modified Karvonen formula) without or with energy restricted diet (reduced approximately 2000 kJ/day) in duration 24 weeks and 6 weeks.

SUBJECTS

17 overweight/obese females with a mean body mass index of 30.31 ± 3.79 kg/m², weight of 81.08 ± 9.24 kg, and age of 45.8 ± 7.4 years.

MEASUREMENTS

Weight, waist circumference, body fat, biochemical indices (triacylglycerols, total cholesterol, HDL cholesterol and LDL cholesterol) were determined at baseline

and after 24 weeks (effect of exercise) and 30 weeks (combined effect of exercise and diet).

Statistical analyses were performed with use of STATISTICA 6.0 program (standard version).

RESULTS

The women following 30 weeks intervention reduced their body weight ($p < .001$), body mass index (BMI) ($p < .001$), waist circumference ($p < .001$), and body fat ($p < .001$). Both programmes produced significant beneficial effects on body weight and body composition. Due to the different duration of our programmes (24 vs 6 weeks) we calculated relative value (value divided by number of training units). The exercise intervention combined with diet caused greater reduction of relative body weight ($p < .001$), BMI ($p < .001$) and body fat ($p < .01$) than exercise alone. Significant difference was not found out in relative lost of waist circumference. There were no significant differences among the level of biochemical indices at the baseline, after 24 and 30 weeks of intervention.

CONCLUSION

The intervention program had positive effects on improving of body weight and body composition, but biochemical indices were not influenced. Study has shown that exercise, when combined with dietary restriction, leads to greater amelioration of body composition than exercise alone.

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BONE MINERAL DENSITY IN WOMEN

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This presentation deals with the health concerns that would normally only be seen in older Caucasian females. Osteopenia is the precursor to Osteoporosis. Osteoporosis is silent but a preventable disease. One can not tell by looking who's at risk and one can not assume their bones are healthy without having a bone density test. The results of a bone mineral density test that was given to females in South Georgia between the ages of 18-50 has shown large numbers of females not consuming adequate calcium on a daily basis. There were 355 participants from the ages of 18-50 ($m = 29.94$), 80 of which were currently playing a collegiate sport, while others either were students of a southern college or teachers in the South Georgia area. This study found that many young females between the ages of 18 and 24 are currently in the osteopenia stage.

The calculations from the BMD test using the MetriScan (which measures the 3 middle fingers on the non dominant hand and gives a T-score) are as follows: normal (+ to 0 to -1.00), osteopenia (-1.00 to -2.5), and osteoporosis (-2.5 and above). The entire study's analysis on the T-score averaged -.14, which is only .86 points away from being in the osteopenia stage. The results of the athletes ($n = 80$), 6 = osteopenia, 8 = osteoporosis,

and several who were extremely close to -1.00. Weight bearing exercises can help to increase BMD, so one would think that athletes BMD scores would be higher, but they were not.

This research has found that females are not getting the right amount of calcium needed to build bones at a young age. Out of 355 participants (including the athletes), 71 were found to have osteopenia, and 6 with osteoporosis. Those 6 who had osteoporosis were between the ages of 18-24. This could be from the lack of meals being cooked at home (dark green leafy vegetables), and females' not consuming milk or other sources of calcium (yogurt, ice cream, cheese). Adolescents and young adults (ages 11-24) need 1200-1500 mg of calcium daily, adult women (ages 25-49) need 1000 mg of calcium daily, (ages 50-64 postmenopausal taking estrogen) need 1000 mg of calcium daily, (ages 50-64 postmenopausal not taking estrogen) need 1500 mg of calcium daily, (ages 65+) need 1500 mg of calcium daily. The body must also have at least 600-800 IU of vitamin D each day to help with the absorption of calcium. Better eating habits need to be instilled in our young females before we deal with osteoporosis as a major disease among younger females as we are beginning to see in this study.

CIVILIZATION CHANGES DEMONSTRATED ON LOCOMOTORS APPARATUS

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Human evolution has not been finished yet. During last ten years significant changes in ligament tissue (articular hyperlaxicity and hypermotility) in children population can be observed. After the second year of age static deficiency becomes more pronounced; we have on our minds planovalgus deformities and genua valga with recurvation. These deformities are needed to be corrected by orthotic aids with concurrent strengthening of back muscles, abdominals and feet exercise.

One sided overexertion can cause scoliosis progression and feet deformities fixation. Axis deviations in the area of knee joint can lead to overexertion of one compartment and micro traumatization of cartilage. These situations can be considered as prearthrosis.

Cooperation of orthopedist and remedial assistant with appropriate amount of physiological load and strengthening of particular groups of muscles can lead to physiological conditions improvement in frame of locomotors apparatus.

TOURISM, SPAS AND WELLNESS ACTIVITIES

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This article considers the state of spa services in the Czech Republic and abroad and their importance in the travel and tourism industry. The purpose of the paper is to present to readers current trends in Czech spa services. In particular, present trends point towards shorter terms of stay, a decrease in the average age of clients, the introduction of new spa locations, and the introduction of wellness as a contemporary phenomenon. Particular attention is given to newly introduced procedures, wellness programs, and so-called "day spas." Among modern cures we can list: salt caves, cryotherapy, hydroxer, chocolate wraps, beer baths, wine baths, regeneration defence against a stress and youth rejuvenation therapies, as well as holistic approaches to health. The author also presents differences between conceptions of spa services in the Czech Republic and other parts of Europe. Finally, professional organizations dedicated and managed to the spa industry and spa exhibitions will be examined.

Spas are one of the attractions often used to propagate the Czech Republic abroad. Spa services can be seen not only as a sector of the national economy, but also one of the most modern and dynamically developing sectors of the tourism industry. For the tourism industry, this field has great importance for its economic as well as social and environmental dimensions. Balneology is one of the main contributors to development of each regional destinations.

Their historical foundation, long tradition, and good image around the world and the particularly favorable natural conditions provide Czech spa services excellent opportunities for further expansion. An important prerequisite for such development, however, is the maintenance of traditional standards of balneology, qualified personnel, and good advertising domestically and abroad. The future establishment of new spa facilities is currently being considered among other places in Bilina, Lednice, Pasohlávky and Kostelec nad Ohří. The future of Czech spas lies in continuous expansion of the current offering of services along with the addition of further possibilities, in particular by the introduction of new procedures along with youth rejuvenation and wellness programs, recreational sports activities and other tourist services.

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STABILITY OF PHYSICAL ACTIVITY PREFERENCES SURVEY IN PHYSICAL EDUCATION STUDENTS AGED 21–24

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Due to an increasing number of obese children and adults and increasing time spent sitting, programs enhancing daily physical activity (PA) should be promoted. Enjoyment of PA and satisfaction from PA performance in children and youth are important prerequisites for performing PA daily and maintaining PA during lifetime. Therefore, these programs should be based on a favorite and preferred types of PA. There are not, however, enough valid instruments to measure PA preferences.

AIM

The aim of the study was to verify the stability of a new physical activity preferences survey.

METHODS

The stability of the physical activity preferences survey was determined in 111 university students aged 21–24 (25 females and 86 males) majoring in physical education during fall 2006. The questionnaire is divided into 8 categories (individual sports, team sports, conditional activities, water activities, outdoor activities, martial arts, rhythmical and dancing activities, and physical activities; the later assesses the 7 previous categories). It involves 82 types of sports. One group of students ($n = 50$, 8 females and 42 males) filled in the questionnaire twice (a re-test was carried out after 14 days). The other group of students ($n = 61$, 17 females and 44 males) filled in the questionnaire twice, too. However, the re-test carried out in the later group after 14 days had a reversed order of items in each category. The

Spearman correlation coefficient r_s was used to assess the strength of the association between the orders of items in each category in the test and the re-test in all categories.

RESULTS

The strongest association between the first and the second filling-in of the questionnaire concerning the most preferred PA was found in the category of team sports, the lowest than in the category of rhythmical and dancing activities or martial arts (Fig. 1). High correlation coefficients in both groups of the students show high stability of the physical activity preferences survey independently on the order of the items in each category.

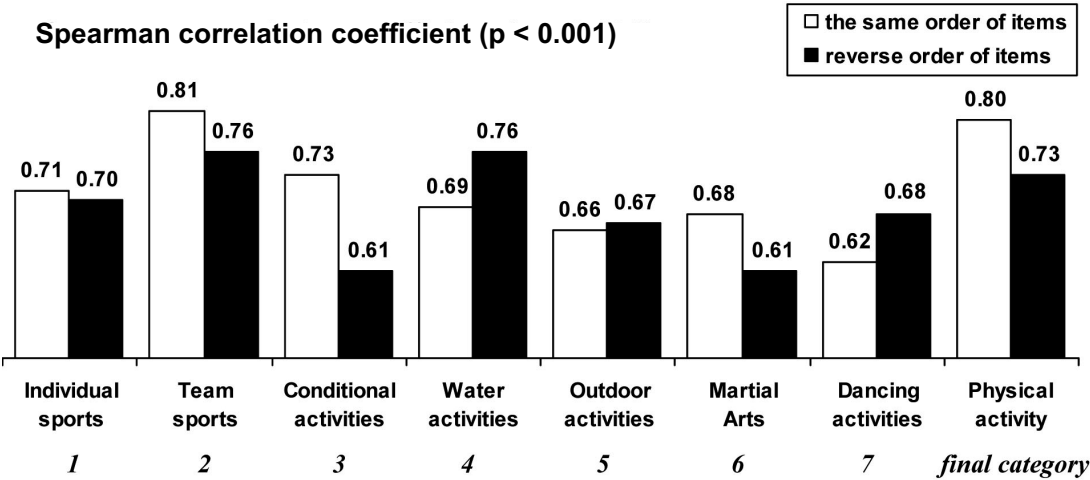
CONCLUSION

The newly constructed physical activity preferences survey shows high level of stability. However, its stability needs to be still verified in other groups of population. The validity of the questionnaire needs to be also determined for younger groups of boys and girls.

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Fig. 1
The strength of the association between the first and the second filling-in of the questionnaire



PROMOTION OF HEALTHY LIFESTYLE - THE LIFESTYLE OF ELDERLY PEOPLE AS THE REFLECTION OF LIFESTYLES OF THEIR PARENTS

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The aim of the article is to present the results of the survey on healthy lifestyles as the reflection of earlier models of behaviour conducted among the group of elderly people taking part in the classes of exercises in water. The participants in the classes were 100 students of the University for Elderly People in Opole. All of

them attended 45 minutes classes once a week. Among the students there was huge variety as far as the length of time they participated in this kind of activities before they responded to the questionnaire. The results of the questionnaire partly confirm the thesis that reflection of parents' behaviour is the motivating factor for healthy lifestyle of elderly people.

EFFECTS OF INCREASED PHYSICAL ACTIVITY AND MILD CALORIC RESTRICTION ON HEART RATE VARIABILITY IN OBESE MEN

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The effects of exercise and mild caloric restriction on heart rate variability (HRV) were investigated in 20 obese men aged 54.16 ± 3.15 (SEM) years with a body mass index (BMI) of $36.09 \pm 3.89 \text{ kg/m}^2$. The subjects participated in a 6 month program aimed at intensive aerobic and resistance training (3–5 times per week) and modifying eating behavior (intervention group). The control group consisted of 18 men (age 54.16 ± 3.15 years, BMI $35.78 \pm 3.45 \text{ kg/m}^2$) who did not attend the program. The autonomic nervous system (ANS) activity was assessed by means of power spectral analysis (SA) of HRV at orthostatic maneuver before and after the exercise program. Results of the SA HRV were evaluated by both standard parameters and complex indexes. After 6 months, BMI decreased to $33.16 \pm 3.58 \text{ kg/m}^2$

($p < 0.001$ vs baseline) in the intervention group, in the control group non-significantly increased ($36.07 \pm 3.48 \text{ kg/m}^2$). The most of standard parameters and complex indices of the SA HRV significantly improved after the intervention, whereas no significant changes were seen for the controls. The changes in the HRV variables significantly correlated with the volume and qualitative parameters of training, especially with the parameters of resistance training.

Our data suggest that combination of intensive exercise and mild caloric restriction led to improvement in the ANS activity. Especially addition of resistance training to the aerobic activities significantly increased positive effects of the intervention.

HOW TO INFLUENCE ATTITUDE TOWARD HEALTHY LIFESTYLE: PRESCRIPTION NOT ONLY FOR PHYSICAL EDUCATORS

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Reliable research data clearly show both the increasing incidence of corpulence and obesity among adult populations of developed countries and the alarming spread of the problem to very young age groups. For example, data from a nationally representative sample of 2630 British children showed an overweight frequency ranging from 22% at the age of 6 to 31% at the age of 15 and that of obesity from 10% at the age of 6 to 17% at the age of 15 (Reilly & Dorosty, 1999). Similarly, the obesity rate among U. S. school age children has tripled from 5% to 15% in the past twenty years (Lemonick, 2005).

In the same way, the obesity rate among 52 countries in the European region is rising and excess body weight is the most commonly found childhood disorder. The world health organization's European health report for 2005 points out that corpulence among children in western Europe rose from 10% in the early 1980s to around 20% by the end of the 1990s while in southern Europe one child in three is overweight (World health organization, 2005).

While the solution to this problem is straightforward, a combination of sound nutrition and regular physical activity, gaining widespread acceptance of this deceptively simple formula is at best a formidable task. Its efficacy hinges on influencing attitudes and perceptions on the value of a lifelong, salubrious, lifestyle. The chance for success here is far more likely with young people whose attitudes and habits are still in the formative stage than with adults whose attributes are more firmly entrenched.

Sidentop (1999) argues that while the mindset of young people toward a healthy lifestyle can be modified, it cannot be accomplished by any single group of mentors acting alone. He recommends a comprehensive three prong strategy coordinating the efforts of family, school, and community to achieve a significant degree of success. Jarret et al. (2001), Pellegrini et al. (1995) and Ridgers et al. (2007) also recommend the school as the logical starting point for promoting healthy lifestyle habits and physical education as valuable opportunities to engage in moderate to vigorous physical activity. Clearly, physical educators are in a unique position to

be the vanguard for such an approach. Their quotidian involvement with young people in a physical education setting provides the opportunity to influence positive lifestyle predispositions. As Aicinena (1991) explains: "The amount and quality of teacher interactions has been consistently found to correlate significantly with student attitudes toward physical education," and these "interactions would seem to be the most important factor the teacher may contribute to student attitude formation or modification". This presentation identifies a blueprint that physical educators can use to promote a healthy lifestyle through their classes.

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THE CHANGES IN CUTANEOUS MICROCIRCULATION IN VOLLEYBALL PLAYERS AT VARIOUS STAGES OF THE TRAINING CYCLE

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Circulatory adaptation to physical exertion is an important determinant of athletes' practising capability. Little is known about the reaction of the cutaneous microcirculation in athletes at various stages of the training cycle. That's why the aim of this study was to explore, whether chosen parameters of the cutaneous microcirculation in volleyball players, measured using laser Doppler flowmetry, change between the start of the training (non-training period) and the competitions phase (competition period).

MATERIAL AND METHODS

The study was performed in 15 men, volleyball players (the academic volleyball premier league), mean age 20.93 ± 1.58 . The microcirculation was measured using Doppler laser flowmeter Perifluks 4001 (Perimed, Sweden). Rest flow, hyperaemic, hyperthermic and orthostatic reactivity of skin microcirculation and maximal minute oxygen uptake ($VO_{2\max}$) were evaluated. Apart from frequency, the signal power was also analyzed. All parameters were recorded twice: immediately before the preparation period and in the competition period.

RESULTS

Beside biological zero, all other measured parameters were statistically significant higher in the competition period (RF - 25.36 ± 8.25 PU; BZ - 3.05 ± 0.38 PU; PORH MAX - 122.51 ± 45.14 PU; TH MAX - 240.02 ± 69.11 PU; OR - $52.99 \pm 6.5\%$, $VO_{2\max}$ - 57.73 ± 5.81 ml/kg/min), compared with the preparation period (RF - 18.91 ± 5.31 PU; BZ - 2.96 ± 0.33 PU; PORH MAX - 87.79 ± 31.78 PU; TH MAX - 185.05 ± 51.82 PU; OR - $45.35 \pm 4.49\%$, $VO_{2\max}$ - 47.81 ± 5.03 ml/kg/min). The frequency analysis showed smaller oscillations of the sympathetic system and also in the cardiac frequency and increased activity of the endothelium in the competition period.

CONCLUSIONS

In the competition period the capacity and efficiency of the cutaneous vascular bed increases. This is probably due to decline of the sympathetic control and increase in endothelial excretion of NO.

PSYCHOPATHOLOGY IN SPORT

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In the text there are analyzed various variants of psychopathology symptoms appearing in the field of sports. The author spares a thought for two interpretation frames – power of attraction of the sports environment for the individual with the pathological behaviour and enjoyment, and the (de)formative influence of the sports environment on the personality of the athlete. Further there are defined some groups of psychopathology syndromes and symptoms typically appearing in the field of sports – increased aggressivity, movement addiction, and body scheme disorders.

1. The aggressivity is one of the basic motivation sources in sport. In the most cases, it is neutralized in the sport activity itself, it is transformed or “broke” to the sociological accepted form. Despite of it sport is, in some of its forms, an attractive environment for the individuals, who can be noted for some marks of disturbed personality (psychopathology or sociopathology) showing by increased degree of an aggressive behaviour to their environment. They are typically cumulated in the area of football and ice hockey fans, in the group of recreational-efficiency supporters of bodybuilding and combat sports. There are different reasons for increased aggressivity in male veteran categories across the sport sector.

2. Movement addiction is defined as: “Complex of behavioural, cognitive and physiological phenomenon that is grown after repeated use of psychoactive substance.” It includes strong longing for gaining the substance, difficulties with the control of its use, permanent use despite dangerous consequences and preferring the substance to different activities and duties, increased toleration and sometimes somatic weaning away (Smolík, 1996). If we supply the substance with the term exercise, we can get quite close picture of symptoms of exercise addiction.

Exercise addiction can have many forms. Endurance exercises addiction. This type of addiction is character-

ized by similar experience as the opiate addiction is. The physiological basis is an increased secretion of endogenous opiates as the result of long lasting middle sub-maximal intensity of the activity. The opiate peptides influence pain perception. Emotionally they evoke senses of happiness, satisfaction, increased self-confidence; symptomatically it deals with the states similar to hypomania. Type of “adrenalin” addiction. This type of addiction is characterized by some similar features to the stimulants addiction. Compared with the previous type, we talk about the similarity on the emotional level. Physiologically it is increased secretion of catecholamine hormones caused by intentional evoking of strong, as the case may be long lasting sense of fear, danger or distress. Psychological emotions can be described as the euphoria, senses of enthusiasm, excess pressure energy. There are sports like speed skiing, bike downhill race, snowboarding, parachuting, free rock climbing, etc. Psychosocial addiction (“obsession”). This type of addiction quite differentiates from the first two. It results from the reason of psychosocial phenomenon and there is no physiological correlate. We talk about individuals (mostly women) who, from the different reasons, dedicate their life to the exercises. Both their horizons and social contacts are narrowed down to the fields dealing just with the exercises. Those people are not able to neither think nor speak about anything else (they are concerned with their own figure, healthy diet, new forms of exercises or new fitness centres...).

3. Food acceptance disorders and body scheme disorders. In some cases it is the extreme limit of above described type of psychosocial addiction; sometimes it appears as the result of demands connected with the giving a maximal performance in a top performance. It is displayed as the non typical mental anorexia and bulimia (largely by women) and it is also connected with the misuse of substances like anabolic steroids and growing hormone (largely by men).

INDOOR CYCLING AND IT'S USING AS A HEALTH ENHANCING PHYSICAL ACTIVITY

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Lack of time is the most often presented barrier influencing the realization of regular physical activity (PA), mainly in middle age population.

It is one of the reasons why it is very important to look for activities which are easily accessible, attractive, and above all as effective as possible with respect to the relation between time demand and health effect. The activity generally called indoor cycling (IC) (group cycling on stationary bicycles with music accompaniment) is a good example of the above mentioned. IC can fulfill these criteria, but special requirements must be met.

The authors tried to find out whether it is possible to use IC as health enhancing physical activity (HEPA) in practice. And what are the criteria which must be matched to be able to use IC as HEPA. Concerning IC as a very modern and one from the most often attended group PA in commercial setting it is important to study and present essential conditions to be fulfilled for IC to conform to role of HEPA activity.

The presentation describe the main differences between the information concerning IC as presented in promotion materials in commercial setting, information from different IC schools and courses, and real scientifically verified information.

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PHYSICAL ACTIVITY AS A FACTOR OF COPING AND IMPROVING THE QUALITY OF LIFE FOR ADULTS WITH DEAFBLINDNESS

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This study examined the effects of adapted physical activities to improve the quality of life for deafblind people. In general people with deafblindness have the same basic needs as people without special needs. Handicapped people have fewer opportunities to enhance physical and social skills. The data were collected by means of a questionnaire with the aim to gain relevant informations for programmes of physical activities to enhance good conditions of life in the group home as a form of social care for people with deafblindness in the Czech Republic with consideration for their needs. 13 applicants (8 men and 5 women; age 16–56) asking for this type of housing put the concrete demands for spending their time. All applicants want to have personal assistants for special activities in group home. Assistants must be prepared not only in the area of adapted physical activities, but also in the area of the unique way of communication as this is basic prerequisite to any programming. Findings indicate that physical activity is an experience for these people because it facilitates perceptions of legitimating their social identity and social network and satisfaction with quality of life are enhanced. At the same time physical activity can be practiced by deafblind people together and can also serve as an effective coping mechanism.

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ASSESSMENT OF LUMBAR CORD MOBILITY IN SPORTS-PRACTICING CHILDREN

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Lumbar cord is the section of spinal cord that suffers from the highest burdens in its daily functioning. Properly chosen and dosed physical exercises in developmental age, and thus practicing of sports, cause hypertrophy and strengthening of the vertebrae themselves as well as similar effects in ligaments and muscles which stabilize them. This constitutes a positive effect of the motor activity on development of the child organism. Rowing and lawn tennis are the systemic sports. They shape and develop different parts of the body. But with children who practice sports the following question appears inevitably: does this cause some adverse changes in the body structure, particularly within the spinal cord in children?

The governing premise of the study is the evaluation of effects caused by practicing of rowing and lawn tennis by children on mobility range of the spinal cord, and comparison of relevant values with those represented by their healthy peers who practice no sport. The experiment has been performed within the scope of statutory research (Ds-80) financed from the Warsaw Academy of Physical Education funds.

The study covered children of 10–15 years, and thus the people who are yet to see termination of their growth and development processes. This age range makes a period when one is particularly prone to changes taking place in the skeletal muscular system resulting from various reasons – from practicing of sports in this particular case. Qualified for study of the spinal cord functional status in children of 10–15 were 41 children (20 girls and 21 boys) who practiced rowing, and 37 children (17 girls and 20 boys) who practiced lawn tennis. The control group covered by the study was 67 students (33 girls and 34 boys) of 10–15 who practiced no sport.

The method that served the purpose of the lumbar cord functional assessment constitutes an element of

the objective, static, localized examination of patient, providing for linear measurement of the spinal cord motion range. Examination was carried out in compliance with the methodology and standards applied in physiotherapy, based on the SFTR method, using flexible anthropometric tape. The examination concerned six motions of the spinal cord in sagittal, frontal and transverse planes.

Comparison of the examined groups of sports practicing children with the control group yields explicit results. Mean motion range of the lumbar cord in examined sports children is in each type of measurement in excess of that found in the control group. It is only in straightening motion in rowers that the range was lower in comparison with the control group.

1. Lumbar cord motion range measurement results recorded in children who practiced lawn tennis are higher in all motions subject to examination than the measurement results recorded in control group.
2. Motion range measurement results found in children who practiced rowing are not higher in all examined motions than those found in control group. Straightening motion values are lower.
3. Exercising of lawn tennis and rowing affects development of the child through improvement of physical fitness and increase of the motion range.
4. Specificity of the exercised sport is of effect on value of the presented lumbar cord motion range in children.

The studied group allows concluding that practicing of rowing and lawn tennis increases mobility of those joints which take active part in the exercise while periodical and regular exercising of sport leads to a situation where the difference is not significant, though measurable.

EFFECTS OF MOTIVATION ON PROCESS OF TRAINING YOUNG LIGHT ATHLETES

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Conscious participation in the process of sport training constitutes one of the most fundamental factors affecting the attainment of success in sport. The preparation for a training and sport competition require a variety of actions which have an impact on the mentality of and athlete and includes development of motivation and attitudes, intellectual and theoretical preparation (Sozański, 1999).

The objective of the current paper is the determination of motivation level in young light athletes in the training process and investigation into the question whether the athletes endowed with cognitive control (fully consciously participating in training process) tend to be more involved in the course of training than the ones who do not possess this control.

This testing involved 30 students (15 female and 15 male) aged 14–15 with a similar level of sport competence. They were subsequently divided into two groups.

At the first stage of testing the experimental group was made acquainted with the purpose of the experi-

ment and with the structure of planning training cycle. Each unit of training cycle was preceded with a short overview of the training tasks and collection of information concerning the current well-being of individual athletes. Throughout the course of the training process the objectives of undertaking particular activities were determined and discussed with athletes. In contrast, the control group was only generally familiarized with the general overview of training. The survey which followed served in order to determine the level of aspiration, expectation and motivation along with the level of conviction about the effect on sport results.

The results confirm that cognitive control upholds motivation in the fulfillment of tasks, even the ones which are in a distant future. On the basis of the published psychological research of cognitive control it could be concluded that results in sport attained by experimental group will be better in the experimental group than in the control group.

SPORTSMANSHIP OF YOUNG ATHLETES VERSUS CONTROL GROUP

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The objective of this research was to undertake an assessment of light athletic training (increased motor activity) effect on the development of motor abilities of male and female group aged 13–16.

The testing involved 93 boys and 95 girls, of which 64 were actively training light athletics, while the remaining 124 were demonstrated average physical activity.

The diagnostics of motor abilities involved a selection of motor trials listed by International physical activity test – 50 meter race, forward jump from a standing position, 4 × 10 meters front and back race, sit-up from a lying position and 800 meters race for women and 1000 meters for men. The assessment of the level of strength, speed, endurance and co-ordination related abilities was undertaken.

For the purposes of comparison the results were transformed into points in accordance with Polish standard.

As a result, the relatively higher level of investigated abilities was indicated in the population, which was training light athletics in comparison to the ones who were not training.

The results clearly indicate the differences between the investigated groups. On one hand, this indicates the positives aspects of undertaking light athletic training, which is reflected in the higher level of sportsmanship. On the other hand, however, this indicates the low level of motor skills among the youth not undertaking physical activity regularly.

The paper gives reference to 24 bibliographic items.

URBAN CYCLISTS - RELATIONS BETWEEN BUILT ENVIRONMENT AND HEALTH

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From 1999 to 2002 Odense, the third largest city in Denmark, was the official national cycle city of Denmark. During this period the citizens of Odense have made 35 million new cycle journeys. This corresponds to 25.000 extra cycle journeys per day. Bicycle traffic in Odense has increased by 20 per cent adjusted for external factors. The citizens of Odense now use a bicycle for every fourth journey. The results of Odense cycle city is contrary to the national trend, which shows a fall in bicycle traffic. Over half of the new cycle journeys are made by motorists who have voluntarily decided to change their means of transport.

In relation to project "Odense: The national cycle city of Denmark" research was implemented with the aim to analyse and evaluate what is important for and about cycling as a form of transport. The empirical material consists partly of a longitudinal questionnaire investigation (N = 2700) and partly of qualitative research interviews with daily cyclists and car users (N = 12).

The quantitative data showed that daily cyclists are identical to other groups of road users, but in comparison with the non cycling groups the cyclists consider themselves in better physical shape, they are more physically active during their leisure time, have healthier eating habits, smoke less and drink less coffee and alcohol. A multiple logistic regression analysis thus traces a connection between cycling as a form of transport and lifestyle in general.

The qualitative research interviews had the purpose to explore this connection. By examining the life world of the informants the conclusion is that as forms of transport, both the car and the bicycle can fulfil dreams and ambitions of a good and active life. The difference is, however, that whereas the car is primarily seen as a regular means of transport providing freedom and independence, the bicycle stands in a position where it fulfils several concurrent aims and needs. To the daily cyclist, the bicycle is not only a means of transport but a form of transport which makes it possible to combine the want for health, physical well-being and the experience of rural and urban spaces with transport independence.

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NEED OF RECREATION AND PHYSICAL ACTIVITY AS A MOTIVE OF TOURISTS TRIPS OF GEOGRAPHY STUDENTS AT JAGIELLONIAN UNIVERSITY

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Trips to therapeutic waters were very popular in XVIII century, there were synonym of high position in society and affluence. Simultaneously development of needs such as active recreation, treatment, return to nature, regeneration of physical and mental strength, caused by economic urbanistic and political transformation in XIX century, by many are sustained as main factor of rapid transformation in tourism. These motives were embraced with joint name: rehabilitation motives.

Choice analysis of motivation chosen by students of geography at Jagiellonian University showed that above named needs also nowadays have high influence on development of tourism activity of young people who are known as the most active tourists.

From distinguished groups of motivation which contained 31 motivations, category embracing needs such as improvement of general state of health and physical fitness had sixth points in ten points gradation. Aesthetics needs, acquaint needs, self-actualization, change, affiliation and love were chosen as the main determinant of tourist trips.

Dependency between intensity of physical activity, popularity of one of third form of recreation and place of trip was observed. Motive which gathered the most attention for all students was relaxation. Strength regeneration by increasing physical activity (bike trips, mountain trips) was far less popular. Whereas developing of sport skills by taking part in sport camps was the least popular. All above named activities were conducted more likely in Poland for all students.

MOTOR SYSTEM IN PATIENTS OF MIDDLE AND SENIOR AGE TREATED IN LUHAČOVICE SPA

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Middle age is characterised by onset of health problem series, which increase in old age. Chronic pain comes especially from locomotor system, which is stricken with arthritis, osteoporosis and diminution of muscle matter.

The aim of this paper is examination of locomotor system of 149 patients (55 men, 94 women), who took a cure in Luhačovice spa. Muscle dysbalances were examined by Janda method (1996). The results have shown us evident increase of weakening of muscles with age particularly at deep flexors of neck, gluteal muscles at abdominal muscles. Out of the group of muscles, which tend to shorten themselves, especially shortened neck extensors, trapezius muscles and breast muscles were found in older age. These results are in congruence with the increase of kyphosis senior age.

Spa cure specialized in the locomotor system is used especially to maintain the existing fitness, to strengthen the muscular corset and to maintain self-service and self-sufficiency of the seniors. Based on the acquired

results, the motional therapy during the stay concentrates on compensation of the existing handicaps. Also, the seniors are offered with a whole spectrum of suitable movement activities, which help to maintain these clients in a good health conditions. The most suitable activities are swimming, walking, cycling, yoga and also, last but not least, dancing, which is very popular activity in the spa resort with positive effects on mental condition of the seniors. Also so called Nordic walking has recently become a modern and popular method of fitness training or natural relaxing exercise. The Nordic walking is walking with sticks in a terrain. To gain successful results and eliminate adverse effects it is very important to get familiar with the basic technique and to apply reasonable load intensity. Material equipment for Nordic walking consists of good shoes, suitable clothing and the sticks.

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ARTHROSIS AND MUSCLE FUNCTION

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Arthrosis is the most frequent illness that affects people beginning at the age of 40. Both males and females are affected and cause various types of pain making it difficult to create movement in the articulation. Its beginning is gradual, the first symptom observed is pain that tends to worsen with the progress of time. The articulation starts to grow in size caused by the reaction of the cartilages, bone, ligaments, tendon and the inflammation itself. Sport overloading and injuries can cause premature degeneration of cartilage. Authors are interesting in muscle function if cartilage and joint surface is damaged. The agreement between the clinical diagnosis performed in a large population studies and radiological grading scales was only moderate. Above all sportsmen have big differences between clinical problems and radiological grading scales. Main reason is muscle function, it is undisputed that sport has a beneficial effect on muscle function and physical fitness.

METHODS

We tested group of patients with knee replacement operated in six months of year 2005. From 49 patients we described 46. We tested function of knee replacement, self service, pain. We compared it with their moving activity. We divided patients into two groups, active with regular moving activity (walking, cycling, swimming and sport) and passive without any moving activities. Active were only 11 patients (24%, age 69.0) and passive 35 (76%, age 70.8). We modified knee score to evaluate pain difference, ability to walk and range of movement.

In second group we treat young people with premature chondral degeneration gr. IV. after sport knee injuries, operations. Two young athletes age 29 with hypotrophy of muscles, pain, restriction of movement we trained to health muscle and joint functions.

RESULTS

In knee replacement group there are big differences between pain and walking ability, but no between range of movement of the knee.

Young patients with exercising restore power, range of movement of the knee and reduced dosage of NSAID.

CONCLUSIONS

Same results of the operation of the knee replacement, but major subjective problems, algaesthesia and lower self-attendance in passive group. With exercising we can induce clinical manifestation of arthritis and return young people back to society. Every results shows that muscle function is important for progress or regress symptoms of arthritis. In spite of overloading of joints in sport and acceleration of degeneration, regular sport prevents arthritic symptoms and rebuilt function of the joint, although radiologic scale grade can be far gone and doesn't need to respond with clinical difficulties.

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GLUCOSAMIN SULPHATE AND CHONDROITIN SULPHATE IN SPORT OVERLOADING

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Sport activity is loading test of the locomotor system. Loading and injuries are leading to premature degenerative disease of the joint cartilage. Result is chondropathy, which is painful and limiting movement. These problems are common in professional sport, most frequently in knee joint. SYSADOA (Symptomatic slow acting drugs of osteoarthritis) support metabolism of joint cartilage. Characteristic is slow start of effect and effect after stop of using. Authors are treating professional sportsmen and trying to describe effect of peroral SYSADOA comparing with phases of sport training cycles and metabolism of sportsmen.

METHODS

25 sportsmen were tested, men with problems of knee joint in training. Sportsmen were after contusions, distortions, ruptures of ligaments, arthroscopies. They were using peroral combination of chondroitin sulfate and glucosamin sulfate for three months, next three months stopped using. Athletes were tested for six months. We compared subjective problems and evaluation of sportsmen with their training dose and condition of metabolism. Controls were before using, after using of two weeks, four weeks and than every month. Eight controls.

RESULTS

2 sportsmen stopped participation, 2 sportsmen without effect, only 3 sportsmen with effect and effect after stop of using. 18 sportsmen were in some phases with effect, from these were 13 with vacillation of effect and phases without effect. In some trainings we could explain it with cartilage, ligaments and muscle damages. Dynamic force training leaded in loss of effect. If we had compared statistics with ILAR rules of SYSADOA, we could say that SYSADOA were without effects. But vacillation of effect was conformable to metabolism of athletes described with quiescent value of heart rate and return of heart rate after training test. With overtraining was no effect. In reference to neuro-endocrine mechanism of sport training and metabolism of cartilage,

authors compared effect of SYSADOA to anabolic or catabolic status of sportsmen metabolism.

CONCLUSION

The observation support the view that effect of peroral SYSADOA depending to general metabolism. If the metabolism is catabolic, peroral SYSADOA can not induce cartilage reparation. This is overtraining and trauma. For athletes with overloading of locomotor system is recommended continuous using of peroral SYSADOA according these results. After trauma can not peroral SYSADOA induce cartilage repair 1–3 weeks according to heaviness of traumas. These results are opposite DMOAD.

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SURFACE ELECTROMYOGRAPHY ASSESSMENT OF MUSCLE ACTIVATION DURING SINGLE STEP UP

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Climbing stairs and negotiating curbs and other obstacles is a critical element of gait in daily life. If consistent muscle synergy patterns associated with postural preparation for stepping activities can be identified, physical therapists may be able to use this information in evaluation and intervention for individuals with balance or gait disorders.

The study was focused on appraising and comparing the order of activation (timing) of six muscles registered by surface electromyographic (EMG) methods during single step up forward with the right lower limb.

The tested group consisted of 16 healthy subjects of both sexes (5 men, 11 women with a mean age 22.5 ± 2.5). With the aid of surface electromyography, we were able to scan the activity of the chosen muscles. The surface electrodes were put onto precleaned skin and positioned parallel to the muscle fibres: on the right

and left m. gluteus maximus at the line between the os sacrum and trochanter major, at the point of the muscle's greatest prominence, on the right and left m. biceps femoris at the line between tuber ischiadicum and condylus lateralis tibie, plus on the right and left mm. erectores spinae placed at two finger width lateral from the processus spinosus of L2. The reference electrode was placed above the spina iliaca posterior superior. The subject stood upright with feet parallel. They were asked to load equal weight on each foot. The experiment was carried out by means of spontaneous speed of single step up forward with the right lower extremity.

The sequence of timing upon examination by surface electromyography was as follows: the first activated muscle proved to be the left m. erector spinae and ultimately the right m. gluteus maximus. The different sequence of muscle activation was registered for four other muscles.

INSTRUCTIONS FOR MANUSCRIPT

The Acta Universitatis Palackianae Olomucensis. Gymnica is an independent professional journal. The content of the magazine is focused on presentation of research notifications and theoretical studies connected with the problems of kinanthropology. The Editorial Board is looking forward to all manuscripts written on the above subject.

General instructions

The text of the contribution is in English. The contribution is not to exceed a maximum limit of 15 pages (including tables, pictures, summaries and appendices). A summary will be in the Czech language, and by rule 1 page at the most.

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All contributions are reviewed anonymously.

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We look forward to our further cooperation!

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