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21ST SYMPOSIUM OF THE EUROPEAN GROUP OF PEDIATRIC WORK PHYSIOLOGY

“Exercise and physical (in)activity in children with focus on the girl”

**Corsendonk Priory, Belgium
September 12–16, 2001**

Hosted by the Faculty of Medicine University Ghent
Department of Pediatrics
Department of Movement and Sport Sciences

In Collaboration with

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Faculty of Physical Education and Physiotherapy, University Leuven

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Wednesday, September 12

Rutenfranz Lecture
Anna FARKAS (Budapest, Hungary)
“What about girls?”

of insulin resistance syndrome (IRS) as the common soil for the development of both diabetes and CHD. The different diseases associated with the insulin resistance syndrome, diabetes mellitus or impaired carbohydrate tolerance, atherogenic lipoprotein phenotype, arterial hypertension and central type of obesity, are the main risk factors of atherosclerosis. In particular, the DECODE study group have found a close correlation between the augmented cardiovascular mortality and the 2-h glucose level (GL). Aim of this preliminary study was to assess the exercise tolerance in a group of 16 obese children (OC) (mean age 11 ± 3.5 yrs; 9m, 7f) and then compared to those of 15 healthy controls (HC) of the same age (12.5 ± 1.7 yrs; $p=n.s.$; 10m, 5f). Blood pressure (BP) at rest was measured using the Task Force criteria; all subjects underwent an exercise testing on the treadmill (Bruce prot.); time of exercise (TE) (min), maximal heart rate (HRm) (bpm) and maximal systolic blood pressure (SBPm) were considered; test was stopped for muscular fatigue. Body mass index (BMI) was also calculated (weight in Kg/height in m^2). Each patient performed an oral glucose tolerance test (OGTT) (1.75 gr/kg of ideal body weight, max 75 gr) with the determination of insulin (I) and GL at the time 0, 30, 60, 90 and 120 min (2-h) after glucose load. We calculated the insulin sensitivity index (ISI), a measure of whole body insulin resistance, using the formula proposed by Matsuda M and DeFronzo RA (Diabetes Care, 1999). Data obtained and possible relationships with the ISI were investigated. Student's *t*-test and linear regression analysis were used when appropriate.

	BMI (Kg/h ²)	SBPr (mmHg)	TE (min)	HRm (bpm)	SBPm (mmHg)
OC	29.6 ± 4.0	123 ± 16	6.8 ± 1.8	174 ± 19	144 ± 23
HC	19.3 ± 2.6	111 ± 10	11.4 ± 2.3	174 ± 11	149 ± 27
<i>t</i> -test	$p<0.001$	$p<0.01$	$p<0.001$	$p=n.s.$	$p=n.s.$

OC had a significant reduction in TE; statistical significances were found for SBPr and BMI also (Table). Linear regression analysis showed significant correlations between SBPr and BMI ($r=0.536$; $p=0.03$), ISI and BMI ($r=0.589$; $p=0.01$) and TE and BGL 120min ($r=0.509$; $p<0.05$). These preliminary data show a correlation between the behavior of the glycidic metabolism and the cardiovascular performance; in this study we find a correlation between the TE and the 2-h GL. No correlations were found between the 2-h GL and both the BMI and ISI. We speculate that OC need a regular metabolic and cardiovascular screening to prevent the development of early cardiovascular risk factors. BMI is not the only parameter to consider in the evaluation of OC.

(12) Effects of a 10 Weeks Training Programs on Prepubescent Girls

A. M. Monteiro, T. Barbosa, P. Magalhães, V.P. Lopes, Polytechnic Institute of Bragança, Bragança, Portugal

The purpose of this study was to investigate effects of a training program on the development of the maximal isometric strengths, the push-ups, the pull-ups and the throw of the roller-skate hockey ball.

The sample was composed by 16 girls, at the age of 9,5 years and in the maturation stage I according to Tanner's Scale. The sample was divided into two different groups, the

experimental one (EG, $n = 11$) and the control one (CG, $n = 5$). The EG group was submitted to a training program with callisthenic exercises three times a week (90 min each session) during 10 weeks. The program comprised the training of push-ups, modified pull-ups and the 2 exercises with elastics (elbows flexion and extension and extension of the arms above the head) until exhaustion. The training volume has been gradually adapted from 3 series between the 1st and 3rd week to 4 series between the 4th and 6th week and to 5 series between 7th and 10th week.

The maximal isometric voluntary force (MIVF) was evaluated during the Shoulder Press (SHPRES) exercise, the Arm Curl (ARMCURL) exercise and de Triceps Press (TRIPES) exercise. The MIVF was measured using a dynamometer (TST 121C from Biopac Systems Inc.). We also evaluated the maximal number of push ups and modified pull ups that each girls could do. Finally we measured the distance made by the roller-skate hockey ball after being thrown (THRW).

For the comparison between the two measurements (before and after the training program) was raised the “Paired Simple Test” in each group ($p < 0.05$). It compared the minimum values between the two moments on the e.g., the THRW ($p = 0.006$), the PULL ($p = 0.010$), and the PUSH ($p = 0.014$), presented significant increases. However, the TRIPES ($p = 0.096$), the ARMCURL ($p = 0.403$), and the SHPRES ($p = 0.066$) didn't present significant differences. On the CG the only significant difference was found in the TRIPES ($p = 0.003$).

(13) Physical Fitness Crisis in U.S.A. Urban Children

R. Chatrath, D.G. Thoele, M. Serratto, University of Illinois, Cook County, Children's Hospital Chicago, USA

There is growing concern in the US that physical fitness (PF) of children is decreasing. The objective of this study was to measure PF in a pediatric US urban population and compare it to a reference study from Canada. Bruce protocol was used to evaluate endurance times (ET) of 525 children 4 to 18 years old (303 M and 222 F). The subjects (S) were referred for evaluation of chest pain, syncope, shortness of breath, innocent murmurs, or suspected arrhythmias. All S had history, physical examination, and electrocardiogram and when indicated chest X-ray, Holter, and echocardiogram. They were included if cardiopulmonary pathology was excluded. The mean maximal heart rate in M was 192 ± 15 and in F 194 ± 14 beats per min. ET increased with increasing age in M, it increased up to 10-12 years of age in F, plateauing thereafter. Results were compared to those of the reference study. Mean ET of our S were significantly lower ($p < 0.03$). When the S were placed in percentile groups based on the reference study, 61% of M and 81% of F performed below the 25% percentile. There was a strong negative correlation between BMI and ET ($p < 0.0001$), suggesting that obesity is a major contributor to decreased PF. For each unit rise in BMI the ET fell by 0.0693 min. Compared to the reference study, US urban children have a markedly reduced exercise capacity suggesting poor PF. Inactivity and lack of fitness, if unchecked, are likely to lead to cardiovascular problems in adulthood. Efforts should be made to promote an active lifestyle in childhood.

(14) Longitudinal Research of Cardiovascular Response to Standardised Exercise

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During a 10 year period 1041 examinations of girls and boys during growth and development at the ages 7-16 were done before and after standardised bicycle test in supine.