Key issues in childhood physical activity science

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The 7th European Youth Heart Study Scientific Symposium October 2012 took place in Madeira, Portugal. The overall theme focused on key issues in childhood physical activity science and the organizing committee consisted of Karsten Froberg, Rui Ornelas and Luis B. Sardinha. This is not a complete summary of the symposium programme, only some examples of the diverse and large amount of interesting research studies presented and discussed during five intensive conference days.

Lars Bo Andersen started by presenting associations between effects of physical activity and metabolic disorders. His overall question was: How can we sell an hour a day? There is a large amount of evidence of the impact of physical activity on health, but still there has not been very much done in society to increase the level of physical activity among children and/or adolescents.

He stressed the need for designing controlled studies to measure effects of physical activity also on academic performance, i.e., studies dealing with the relationships between physical activity and cognition/learning.

Karsten Froberg, Lars Bo Andersen and Ulf Ekelund presented updates of the European Youth Heart Study (EYHS) database, which contains longitudinal metabolic data from several countries. They invited researchers to use collected data in the large EYHS database for analyses and publications, and moreover, the database will be supplemented with data of academic achievements.

Physical activity, nutrition and sleep in adolescents were the focus in Mikael Fogelholm’s presentation. He has found consistent associations between TV-viewing/use of computer and
sleep in adolescents, suggesting that computer use and TV-viewing may suppress melatonin, the hormone produced in the brain to regulate sleep.

Several oral presentations focused on how to avoid sedentary behavior, for example: Physical activity, sedentary and diet behaviors: Relationship with metabolic syndrome in adolescents by Hélder Vítor Rodrigues, Physical activity intensity, sedentary time and body composition in preschoolers by Paul Collings, and Gender differences in objectively measured physical activity and sedentary time at school and outside of school hours in Finnish children aged 7 to 12 years by Tuija Tammelin. Finnish boys were found to be more physically active and had less sedentary time than girls both in and outside school hours. Finland is the only country with explicit recommendations to avoid sedentary time of more than 2 hours/day and to be physically active at least 1-3 hours/day.

Another theme was Measurement perspectives regarding assessment of physical activity and motor skills. Søren Brage spoke of Measurement perspectives in physical activity research and Ulf Ekelund presented International children’s accelerometer database (ICAD). Several posters also presented measurement perspectives. Objectively measured physical activity means the use of accelerometers or pedometers, in which the validity in some respects could be discussed. Wesley O’Brien talked about Gender and school type differences in objectively measured physical activity in early adolescent youth and Health related activity and fundamental movement skills for physical activity promotion in Irish second level education. An intervention group (n= 132), who had health related and fundamental movement skills focused Physical Education (PE), taught by trained specialist teachers, is going to be compared to a control group (n=60) who participated in regular PE implemented by untrained teachers. The aim is, by integrating fundamental movement skills in the learning environment, to increase participants’ competence to engage in more regular periods of physical activity. The effectiveness and impact of this school-based PE intervention will be examined.

Lifestyle and arterial stiffness: a life-course approach, presented by Isabel Ferreira, stressed the importance of considering the difference between diastolic and systolic blood pressure as the main determinant of heart disease.

Willem van Mechelen talked about sports injury prevention in children and presented results, which showed that the highest risk of injury is among the least active. There has been reduced motor fitness in children from 1980 to 2006. He stressed the importance of physical activity interventions in school, since half of the children in need are not reached by organized sports outside school.

My own contribution was a presentation of the findings from the Bunkeflo project – a health-promoting lifestyle: Daily physical activity in school improves motor skills and school performance. A nine-year prospective controlled exercise intervention study in 220 children. The aim of the nine-year prospective, controlled, population-based exercise intervention study was to investigate long-term effects on motor skills and school performance of increased Physical Education (PE). All pupils born 1990-92 from one school were included in a longitudinal study during nine years. An intervention group (n=129) achieved daily PE (5×45 minutes/week) and if needed one extra lesson (60 min/week) of adapted motor training according to the Motorisk Utveckling som Grund för Inläraning (MUGI, motor development as basis for learning) model. The control group (n=91) had PE two lessons/week. Motor skills were evaluated by the MUGI observation checklist and school achievements by marks in Swedish, English, Mathematics, PE and proportion of pupils who qualified for upper
Findings: In school year 9 there were no motor skills deficits in 93% of pupils in the intervention group compared to 53% in the control group (p<0.001), 96% of the pupils in the intervention group compared to 89% in the control group (p<0.05) qualified for upper secondary school. The sum of evaluated marks was higher among boys in the intervention group than in the control group (p<0.05). Interpretation: Daily PE and adapted motor skills training during the compulsory school years is a feasible way to improve not only motor skills but also school performance and the proportion of pupils who qualify for upper secondary school.

Jorge Mota and colleagues had examined the relationship between vitamin D intake and metabolic syndrome risk factors in azorean adolescents and found that higher levels of vitamin D may play a role in metabolic diseases prevention.

*Bicycling to school improves the cardiometabolic risk factor profile* were results from a randomised controlled trial presented by Lars Østergaard. Faton Tishukaj and colleagues have studied *Body composition patterns and cardio respiratory fitness in 9 and 15 year old children and adolescents in Pristina, Kosovo*. The prevalence of overweight in 9 and 15 year olds respectively was 7.6% and 8.7% in girls and 16.6% and 10.5 in boys.

Tuija Tammelin presented updates from the HEPA Europe Children and Youth Group and the network Schools for Health in Europe (SHE), which is collecting data and good examples of intervention studies.

In his presentation of *Biological determinants of physical activity* Ulf Ekelund discussed heritability, genes and early life factors. Research has shown associations between both low and high birth weight and low physical activity levels later in life. Understanding whether early motor development is associated with body composition, obesity and later physical activity and sedentary time may be important for early prevention of childhood obesity and metabolic risk. While motor development may be partially genetically determined, there is also evidence showing that motor development is modifiable and could be positively affected by motor skills training.

Brad Metcalf and colleagues have examined *Patterns, trends and tracking in physical activity throughout childhood and adolescence* and found a decline in physical activity from ages 9 to 15, with more rapidly decline in girls than boys. The reason for the decline at this specific age needs to be studied, involving for example fundamental motor skills, physical self-esteem and self-efficacy.

Gregor Jurak spoke about long-term effects of the physical activity intervention on physical fitness/motor tasks of Slovenian children and of the bad accessibility of Slovene school sports halls for students with physical disabilities.

Hervör Alma Árnadóttir has investigated *Measurements and self-reported BMI relation to social support among youngsters in Iceland* and Gunnhildur Hinriksdóttir *Physical activity, body composition and bone health in Icelandic Adolescents*. Another Icelandic study, *Physical fitness and health of Icelandic boys in elementary schools with intellectual disability* by Ingi Þór Einarsson and Sigurbjörn Árni Arngrimsson with colleagues, found support for previous findings that intellectually disabled children are at higher risk of developing health problems than other children. No gender differences were found in body composition, fitness, and metabolic risk factor among children with intellectual disabilities.
Adele Dorothy Diamond presented, with efficiency, *Effects of physical activity, and type of physical activity, on cognitive control*. She spoke of self-control, cognitive flexibility, creativity, and executive functions as important factors for cognitive function in the prefrontal cortex. Self-esteem and feelings of comfort were also stressed. She presented studies showing effects of martial arts and yoga on cognitive control, and discussed the impact of behavioral control and executive functions as important mechanisms as well as balance and coordination ability. She cited Aristotle, “We are what we repeatedly do”, and put forward the thought that maybe it is not so important what activity we do, but the way in which an activity is done is crucial.

Several researchers, e.g. Malene Heidemann, presented data from *The Childhood Health, Activity and Motor Performance School (The CHAMPS) study* in Denmark, where children in sports schools have 6×45 min PE/week and are being compared to children at traditional schools with 2×45 min PE/week. This project will be very interesting to follow, and that also goes for a large intervention study in Trudvang School in Norway, presented by Gåre Reseland, where children during one year will have 300 min/week of different physical activities in *the Active Smart Kids (ASK) study*.

John Roger Andersen found that *Physical inactivity is a risk factor for reduced self-rated academic performance in Norwegian adolescents*, and Maria João Almeida with colleagues that students who participated in organized club and school sports were more likely to have higher academic scores. Recent political decisions in Portugal to cut PE time, in order to increase time in other academic subjects, may prove detrimental to academic performance.

**Final reflections**

It is a great relief to learn that out there in the big world so many qualified studies are being conducted by so many devoted researchers. However, when abroad, one often finds oneself being looked upon as representing a leading country: Sweden, a “good model” with the important inheritance from Per Henrik Ling, well known all over the world as the Father of the Swedish healthy and sound gymnastics. So what about the level of physical education and health in Swedish schools nowadays? In 1994, there was a general cut of one lesson, from three to two lessons per week, i.e., all pupils now have 500 hours in total sum of nine compulsory school years. I feel ashamed being forced to admit that Sweden today is on the lowest level in Europe with only 1-2 two lessons/week in the Swedish curriculum, despite the recommendations of the European Parliament to guarantee at least 3 PE-lessons/week for all pupils at all levels, and despite several research studies showing benefits of increased physical education on motor skills as well as on academic performance. Only in some intervention schools, like Ångslättskolan in the Bunkelö project, there has been an increase in PE lessons. There is a lack of political initiative, and decisions to increase physical education and health for all children and adolescents are not forthcoming. What could be more important than children’s health? What are they waiting for?

Regarding the decrease of PE in Swedish schools, there is another interesting fact; as a result, the number of pupils who do not reach the goals of compulsory school, i.e., unqualified students, have increased. In 2010, the proportion of qualified students was 88% nationally and 77% in Malmö, Sweden’s third largest city, which is the lowest percentage since 1998. In Malmö 2010, about one in five students left compulsory school without having access to the national upper secondary school programs. Not being able to go on to higher education could be devastating and have a lifelong impact on the quality of life.
These facts and statistics can be found on the Swedish National Agency for Education website www.skolverket.se. Hopefully they can be used as arguments if it comes to cutting down PE lessons in Portugal and other countries.