Fit for life

Dr Aric Sigman examines the impact modern society is having on children's fitness levels.

As countries become more technological and westernized, children's cardio respiratory fitness is declining by 4.3% per decade globally. New research has found that children's fitness levels in England are falling faster than anywhere else in the world. In a running test, the average 10 year old from 1998 would beat 95% of their peers today. The scientists describe this fall in fitness as "large and worrying" and have no hesitation in blaming modern life.

Although children's obesity levels are increasingly monitored, no such assessment takes place for their cardiovascular fitness levels indicating how efficiently their heart, lungs and other parts of the body deliver oxygen to muscle tissue. And while obesity and fitness are linked, in a lot of cases, fitness levels in children of a healthy weight are poor.

Only 2.5% of our school age children now achieve the current (very modest) recommended hour a day of physical activity. Most of us think of physical fitness as benefiting a child's physical wellbeing. But a review of 106 studies on fitness and health in children published in the *International Journal of Obesity* found more than mere physical benefits, concluding: "improvements in cardiorespiratory fitness have short-term and long-term positive effects on depression, anxiety, mood status and self-esteem in young people, being also associated with a higher academic performance."

A large-scale study by the US Centres for Disease Control and Prevention tracked the reading and maths skills of more than 5,000 pupils between 5 and 10. They discovered that girls who attended the highest levels of PE (70 to 300 minutes a week) scored consistently higher on the tests than those who did under 35 minutes a week. Though they found no significant change in academic achievement for boys, they speculated that a higher level of physical activity might be needed to yield the same result because boys are usually more active than girls.

Some of the explanations for these findings may lie in the specific, positive associations between physical activity and cognitive function that are being identified, particularly for executive function. Executive function influences a child's ability to understand when to apply knowledge, effectively plan, update working memory, shift from one mental set to another and inhibit impulsive behaviour. Improvements in any of these may boost academic performance.

Paediatric researchers at the US National Institute of Diabetes and Digestive and Kidney Diseases went further and observed the direct effect of physical activity on children's brain function. Research on animals shows that exercise, particularly regular exercise, stimulates the growth of blood vessels and neurons in the brain. And so the researchers randomly assigned children aged 7 to 11 to one of three "training doses": one third only learnt about healthy nutrition and the benefits of physical activity, one-third also exercised 20 minutes after school and another third exercised for 40 minutes. Children played running games, with hula hoops and skipping ropes, raising their heart rates to 79% of the maximum, considered to be vigorous. Functional Magnetic Resonance Imaging (fMRI) - specialised brain scans - revealed a direct, positive relationship between the level of physical activity and level of frontal-lobe brain activity (blood flow), an important area for executive function. Furthermore, these brain changes corresponded directly with improvements in standardised tests assessing children's decision-making processes and achievement in maths.

It is extremely important to establish good fitness levels and habits in children as early as possible because this influences their long term fitness and health. Fitness however doesn't necessarily mean PE type classes. As children naturally want to move around it's rather a case of letting them do more of what comes naturally. It is the ambient background activity such as spontaneous running, walking, lifting, playground fun and games as opposed to formal exercise that really adds up to optimal physical fitness. We need to allow this to happen more easily and more often for, at the very least, an hour a day. And remember: vigorous is much better than moderate. Walking to school or accompanying a parent when they walk the dog all adds up. Schools, in conjunction with parents, can easily devise ways of increasing physical activity, formally and informally, in and out of school time. We should never worry that physical activity will displace time that could be spent learning. The great Roman philosopher Seneca realised this 2000 years ago when he wrote, *"Roga bonam mentem, bonam valitudinem animi, deinde tunc corporis"*: exercise promotes a good mind, good spiritual health, finally, health of body. ■

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