

Anatomy and physiology

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Child's organism is not just a small copy of adult body (Rowland T., 2005). It has some distinctive peculiarities - morphological, functional and psychological. The different anatomical and histological structure and biochemical composition determine age-specific functional capabilities presented by immaturity of adopting mechanism, by greater sensitivity to environmental impacts (e. g. stress factors). Exercises and sport could be considered as powerful tools of optimising adaptive capabilities of child organism. Thus, which characteristics of child's' anatomy and physiology can be related to this phenomenon. Let's discuss these problems.

The locomotoric system of children is developing intensively during all periods of childhood but especially rapidly - in the puberty. The process of ossification starts in the womb of the mother and comes to its end at the age of 16-17 (for girls) and at the age of 18-19 (for boys). The children's bones contain a lot of organic substances, little amount of calcium and phosphorus. As a result they are very flexible - this circumstance can explain deformations occurring among children (e. g. scoliosis).

The muscular system develops during all childhood. The weight of muscles of 8 year old boy is 27% only but 15 year old boy has 32% of muscles in his total weight and 17-18 year old boy - 44% (Wilmore J., 1999). The chemical composition of child's muscles differs from that of adults. They are rich in water and have low percentage of protein, fat and salt. Children's muscles get tired very quickly because of their metabolic peculiarities. At the pre-school period the characteristic peculiarity of the muscular system is considered to be the slow development of the flexors and small muscles. Because of the late development of these muscles, it is very difficult for children at pre-school age to fulfil work with small objects. Sport exercises

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could be useful for harmonization of muscles development.

The peculiarities of cardiovascular system of children are characterized by well-developed capillaries network and greater ratio between blood volume and heart mass. Maximal exercise maximum heart rate is higher in children than in adults and it decreases gradually as children age. Children under age 10 frequently have maximum heart rates exceeding 210 bpm, when older children never have such high maximum heart rate (Rowland T, 2005).

(Usually maximum heart rate decreases by 0.5-1 beat/min per year).

The respiratory system of children also has many peculiarities. The breathing of children is superficial and more frequent, so they cannot achieve high respiratory exchange ratios during vigorous physical activities. The volume of ventilation of the lungs per 1 kg of the body weight (per 1 minute) decreases accordingly to the age of child - from 158 cm³ in 6-year-old boy to 128 cm³ in 14 years old (Rowland T., 2005). Sport exercises, especially swimming, skiing or toboggan are an important factor in the development of respiratory system.

The physiological distinctions of child's organism such as size, metabolic and neuromuscular differences determine the specific requirements for planning and management of physical activity. Sport exercises are used not as the universal mean to hold records but as the powerful tool of harmonization of growth development and maturation.

References:

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