Sports Medicine and the Young Athlete

Professor Hazzaa M. Al-Hazzaa
Director, Exercise Physiology Laboratory, King Saud University, Riyadh, KSA

Sports Medicine Training Course, Saudi Sports Medicine association, April, 2003

Children are not considered merely miniature adults. They have unique responses and adaptations to exercise and training compared with adults. This is due to both qualitative (functional) and quantitative (structural) differences between the two groups. Furthermore, children themselves differ in their physiological responses to exercise across age. Mass-dependent cardiorespiratory variables such as absolute maximal oxygen uptake (VO2 max), pulmonary ventilation, O2 pulse, and so on, exhibit linear increases with age. However, VO2 max relative to body mass or to lean body mass does not show any appreciable changes across age. Walking or running economy has been shown to improve during the course of children growth. Reasons for that include improvements in substrate utilization, elastic recoil force, gait coordination, and body dimensions. Exercise training in children can lead to improvement in cardiorespiratory fitness similar to that occurring in adults but with lesser magnitude. Anaerobic power and muscular strength develop slowly before puberty. The thermal responses to exercise are also different in children compared to adults. Children generate more heat relative to their body mass than do adults. The sweat rate per body surface area in children is low and increased with growth. The rate of thermal adaptations of children is considerably slower than in adults. This may, therefore, place the child exercising in hot environment at greater risks of heat injuries. In addition, compared with adults, children are more susciptable to overuse injuries, because of the presence of growing tissues and growth cartilage as well as muscular imbalance around joints. Disposing factors for injuries in young athletes may include overtraining, inappropriate training methods, and poor equipments. Excessively long distance competitive running events are not recommended prior to maturation. Moreover, early sport specialization in children should be discouraged. They should be exposed to a wide variety of sporting activities to ensure that they identify the games, which best meet their needs, interest, body build, and physical capacities. In collision sports, classification should be based on maturity, body size, skill, and gender, not only on a chronological age basis.