

IOC Consensus Statement on Training the Elite Child Athlete

Protecting the health of the athlete is the primary goal of the International Olympic Committee's Medical Commission. One of its main objectives is the promotion of safe practices in the training of the elite child athlete. The elite child athlete is one who has superior athletic talent, undergoes specialised training, receives expert coaching and is exposed to early competition. Sport provides a positive environment that may enhance the physical growth and psychological development of children. This unique athlete population has distinct social, emotional and physical needs which vary depending on the athlete's particular stage of maturation. The elite child athlete requires appropriate training, coaching and competition that ensure a safe and healthy athletic career and promote future well-being. This document reviews the scientific basis of sports training in the child, the special challenges and unique features of training elite children and provides recommendations to parents, coaches, health care providers, sports governing bodies and significant other parties.

Scientific Basis of Training the Elite Child Athlete

Aerobic and anaerobic fitness and muscle strength increase with age, growth and maturation. Improvement in these variables is asynchronous. Children experience more marked improvements in anaerobic and strength performance than in aerobic performance during pubescence. Boys' aerobic and anaerobic fitness and muscle strength are higher than those of girls in late pre-pubescence, and the gender difference becomes more pronounced with advancing maturity. Evidence shows that muscle strength and aerobic and anaerobic fitness can be further enhanced with appropriately prescribed training. Regardless of the level of maturity, the relative responses of boys and girls are similar after adjusting for initial fitness.

An effective and safe strength training programme incorporates exercises for the major muscle groups with a balance between agonists and antagonists. The prescription includes a minimum of two to three sessions per week with three sets, at an intensity of between 50 to 85% of the one maximal repetition (1RM).

An optimal aerobic training programme incorporates continuous and interval exercises involving large muscle groups. The prescription recommends three to four, 40 to 60-minute sessions per week at an intensity of 85 to 90% of maximum heart rate (HRM).

An appropriate anaerobic training programme incorporates high intensity interval training of short duration. The prescription includes exercise at an intensity above 90% HRM and of less than 30 seconds duration to take into account children's relatively faster recovery following high intensity exercise.

A comprehensive psychological programme includes the training of psychological skills such as motivation, self-confidence, emotional control and concentration. The prescription applies strategies in goal-setting, emotional, cognitive and behavioural control fostering a positive self-concept in a healthy motivational climate.

Nutrition provided by a balanced, varied and sustainable diet makes a positive difference in an elite young athlete's ability to train and compete, and will contribute to optimal lifetime health. Adequate hydration is essential. Nutrition requirements vary as a function of age, gender, pubertal status, event, training regime, and the time of the competitive season. The nutrition prescription includes adequate hydration and individualises total energy, macro- and micro-nutrient needs and balance.

With advancing levels of maturity and competitiveness, physiological and psychological training and nutrition should be sport-specific with reference to competitive cycles. Confidential, periodic and sensitive evaluation of training and nutritional status should include anthropometric measures, sport-specific analyses and clinical assessment.

Special Issues in the Elite Child Athlete

Physical activity, of which sport is an important component, is essential for healthy growth and development.

The disparity in the rate of growth between bone and soft tissue places the child athlete at an enhanced risk of overuse injuries particularly at the apophyses, the articular cartilage and the physes (growth plates). Prolonged, focal pain may signal damage and must always be evaluated in a child.

Overtraining or "burnout" is the result of excessive training loads, psychological stress, poor periodisation or inadequate recovery. It may occur in the elite child athlete when the limits of optimal adaptation and performance are exceeded. Clearly, excessive pain should not be a component of the training regimen.

In girls, the pressure to meet unrealistic weight goals often leads to the spectrum of disordered eating, including anorexia and/or bulimia nervosa. These disorders may affect the growth process, influence hormonal function, cause amenorrhoea, low bone mineral density and other serious illnesses which can be life-threatening.

There are differences in maturation in pubertal children of the same chronological age that may have unhealthy consequences in sport due to mismatching.

Elite child athletes deserve to train and compete in a suitable environment supported by a variety of age-appropriate technical and tactical training methods, rules, equipment, facilities and competitive formats.

Elite child athletes deserve to train and compete in a pleasurable environment, free from drug misuse and negative adult influences, including harassment and inappropriate pressure from parents, peers, health care providers, coaches, media, agents and significant other parties.

Recommendations for Training the Elite Child Athlete

The recommendations are that:

- more scientific research be done to better identify the parameters of training the elite child athlete, which must be communicated effectively to the coach, athlete, parents, sport governing bodies and the scientific community
- the International Federations and National Sports Governing Bodies should:
 - develop illness and injury surveillance programmes
 - monitor the volume and intensity of training and competition regimens
 - ensure the quality of coaching and adult leadership
 - comply with the World Anti-Doping Code
- parents/guardians develop a strong support system to ensure a balanced lifestyle including proper nutrition, adequate sleep, academic development, psychological well-being and opportunities for socialisation
- coaches, parents, sports administrators, the media and other significant parties should limit the amount of training and competitive stress on the elite child athlete.

The entire sports process for the elite child athlete should be pleasurable and fulfilling.