

## Cardiorespiratory Training during Childhood and Adolescence

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### Abstract

Increasing numbers of young people are participating in sports competitions (Sport England, 2003) and use training programmes to improve their cardiorespiratory (or aerobic) fitness as indicated by peak oxygen uptake (peak  $\dot{V}O_2$ ). This paper reviews the scientific bases of training programmes in young people and presents recommendations for training programmes appropriate for enhancing the peak  $\dot{V}O_2$  of children and adolescents from the age of 8-18 years. From the studies reviewed, 3 to 4 sessions per week, of 40 to 60 minutes duration, at an intensity of 85 to 90% of maximum heart rate, over a period of at least 12 weeks appears to be the minimum volume of exercise required to induce improvements in peak  $\dot{V}O_2$ . Both children and adolescents are capable of increasing their peak  $\dot{V}O_2$  through appropriate exercise training and there is no evidence to suggest that there is a sex difference in responses.

**Key Words: Age, Exercise Prescription, Maturation, Peak Oxygen Uptake, Sex**

### Introduction

The origins of this paper lie in an invitation to participate in the International Olympic Committee Medical Commission consensus statement meeting on "training the elite child athlete" in November 2005. At the end of the conference the expert committee agreed a consensus statement (*International Olympic Committee's Medical Commission, 2005*). This consensus document provides, in addition to specific training recommendations, information on the principles of training for child athletes and issues related to overtraining. The intention of the document was to improve the health and safety of the elite child athlete through the promotion of safe training principles and increase awareness of these principles amongst the athlete's support team.

An increasing number of young people are now participating in sports competitions. In a survey conducted by

Sport England in 2002, 61% of young people were found to take part in sports competitions in or out of school (Sport England, 2003). This represented a rise in participation rates of three percent above those reported in a survey conducted in 1999 and eight percent above those reported in 1994 (*Sport England, 2003*). In order to improve their performances and chances of success in these competitions young people participate in many different training programmes. Unlike recommendations designed for adults, many of these training programmes are not based on strong scientific evidence.

Exercise prescriptions for improving adults' cardiorespiratory (or aerobic) fitness are well established (*American College of Sports Medicine, 1998*) and some authorities have recommended their application to young people (*Rowland, 1985; American College of Sports Medicine, 1988*). However