

## The first part

The question of when youth competition and training should start is not new and is much debated. Unfortunately, there cannot be a straightforward answer, because between members of the same sex, given the same chronologic age, there is considerable variation in growth and development. Early maturing children are biologically advanced for their chronologic age. Therefore, the use of chronologic age to ascertain physical potential may cause significant problems by not taking into account biologic age. This situation is particularly true during puberty, when differences that are related to maturity in strength, flexibility, speed, endurance, and power become more evident among children of the same chronologic age.

Sports competition and training often begin as early as age 6. The number of children taking part in organized competitive sport increases linearly from this age, with a maximum between 11 and 13 years of age. Although efforts should be made to concentrate on encouraging children to participate instead of competing, most parents encourage the competitive aspects of the sport being played. With this focus comes the emphasis on training. It is not clear what constitutes intensive training. In our study, the Training of Young Athletes, we encountered children who were already training between 14 and 18 hours per week at age 14 to compete at high levels in gymnastics, football, running, and tennis. Anecdotal reports from the former Eastern block countries would suggest, however, that children of that age were training at least 50% more than the children recruited in our study. Findings from more recent studies in the United States suggest that an average of 18 hours of intensive training per week is the norm in this age group.

## The second part

The dangers of high level training and competition at a young age are twofold. Children and adolescents are not miniature adults. At any given chronologic age, children differ not only in their biologic age and physical maturity but also in their psychological attitude. Psychological factors are important when determining children's readiness for sport, their degree of sports involvement, and their enjoyment. Also, by taking part in high level sport at a young age, it has been argued that children may fail to develop necessary everyday social skills.

The dangers of intensive training in young athletes are represented by the musculoskeletal injuries from which these athletes may suffer. There is no doubt that acute and overuse injuries can be a serious problem in this age group. We have found that young athletes who were able to compete and train at a high level are a naturally gifted group whose musculoskeletal system is intrinsically well endowed. These athletes had a low rate of injury. Young athletes at the subelite level, however, who train intensively to reach the elite standard, may not be so fortunate. These children may suffer serious injuries that cause them to abandon their sport and experience significant problems in everyday life.

Regular physical activity should be part of everyday life for all children. Unfortunately, natural multiactivity propensity of all children for games and play is channeled too early to a single sport. To safeguard young athletes and to avoid burnout, children should start and practice several sports at an early age. They may then focus, possibly starting to train intensively, on one or two sports in which they especially excel only in the more advanced phases of puberty (Tanner stages 4 and 5).

## Technology in Sports

The world of sport is continually changing over the years, and the use of technology is just one of those areas that has made an impact on many sports in the modern day. See the annual sports technology awards for the latest technology ideas in the world of sport.

Making changes to a sport, with the inclusion of new technologies, has often caused controversy. One criticism of the use of technology is that it can slow down the speed of the game, but on the other hand for many people it makes watching it more enjoyable to see the correct decisions being made. If a new technology is available, and shown to be accurate, then it should be used so that the correct decisions can be made. It is only fair to the players and teams that the right decisions are made.

Most professional sports in the United States have long used instant replay and other high-tech aids to help referees make the right call. Gridiron has used video replay systems to check referees' calls for many years. Basketball referees use replay systems to make sure players are shooting within the time allotted by the shot clock. In international cricket, the third umpire has been used, one sitting off the ground with access to TV replays of certain situations (such as disputed catches and boundaries) to advise the central umpires. The umpires out on the field are in communication via wireless technology with the other umpire. The third umpire is also asked to adjudicate on run out decisions, which he makes without consultation with the two central umpires. One sport that has resisted the use of high-tech assistance until very recently is soccer/football. Replays could be used to decide off-side decisions, whether a ball passes over the goal line, and clarify penalty decisions.