**FÈDÈRATION INTERNATIONALE DE MÈDECINE DU SPORT /
THE INTERNATIONAL FEDERATION OF SPORTS MEDICINE**

FIMS Position Statement: November 1990

Excessive Physical Training in Children and Adolescents

It is generally accepted that physical fitness is important for optimal development in children and adolescents. For this reason, physical fitness programs for youth should be recommended and encouraged (1,2).

Medical and public health authorities should view the physical fitness of youth as being within their sphere of competence and responsibility. Children have a natural need to measure their maturing strength, skill, speed, and endurance against each other. Free play, exercise, and games provide a natural way for children and youth to gain an appropriate level of fitness.

A great increase has occurred during recent years in the number of children and adolescents participating in organized sports. Competitive sport contributes to the physical, emotional, and intellectual development of children and adolescents. Experience in sport can build self-confidence and encourage social behavior (3). For all these reasons, children's competitive sport must be considered in a positive light.

The quantitative and qualitative training effort devoted to prospective careers in top level competitive sport entails a great many biological and pedagogical influences. The reason for devoting increasing amounts of time to sports training is that optimal performance can be achieved only after a long period of development. To excel in sports today, the young athlete is forced to train longer and harder and to start at an earlier age. A distinction needs to be made between sports which demand non-specific training over a wide activity range and those in which training for competition must begin early enough to master high skill and to achieve top level performance.

For many reasons which will be presented, this intensified training has no physiological or educational justification. Moreover, it frequently leads to extremely great physical and mental stress during training and competition.

High-level competitive sport in childhood not only entails biological limits for performance but also carries risks of a psychological and social developmental nature. Intensive preparation for high-level sports competitions may occasionally create dropouts and / or psychologically injured children. Such sport competition may be so organized (by adults) that there is little or no room for social relationships and social development.

Content and methods of training must be appropriate to children. Diversity of movement and all-around physical conditioning

should have priority as specialization comes later. Training environments must be organized accordingly (3).

A conscientious medical examination must be performed which guarantees that only children without health risk are admitted to competitive sport. In addition, counseling should be provided regarding the various possibilities for sports participation and for medical supervision during training. In some children where the medical supervision is inadequate or the training methods and sport are inappropriate to the age group, damage to health can occur. Such situations warrant the serious attention of all professional personnel involved in the sports programs.

An increasing number of overuse injuries is registered in children engaged in organized sports. These injuries are the result of frequent overloading causing microtrauma to tissues of the upper to lower extremity overstressed by this training (4,5,6). Children are more susceptible to overuse injuries than adults because of the presence of growing tissue and growth cartilage, as well as the growth process itself, which may induce muscular imbalances around the joints and increase the risk of injuries (4,6). Biomechanical studies have suggested that growth cartilage is more susceptible to stress in children than in adults. Repetitive microtrauma are often caused by overuse and may be associated with overtraining. Etiological factors include the increase in the amount of or intensity of training, inappropriate training methods, and poor equipment (7). Experienced coaches know that, during periods of rapid growth, the intensity of training should be reduced and specific compensatory exercise programs introduced in order to prevent injuries and compensate the muscular imbalances. The theoretical grounds outlined above indicate that growth itself is a risk factor in overuse injuries and that there is a need for vigilance with the prepubescent and pubescent athlete.

It is well known that tolerable levels of exercise seem to stimulate normal physical growth. In healthy young individuals, the positive growth stimulating effects of physical activity outweigh any potential negative effects and negate the growth-related risk factors. However, it is likely that, when physical loading becomes excessive, the beneficial effects on the skeletal system are lost and training becomes traumatic and disturbs normal growth (6, 8). Data concerning the influences of intensive physical exercise and training on the circulatory system are not numerous. The American Academy of Pediatrics warns of the tendency for weight lifting to result in an elevated blood pressure and that the lifting of very heavy weights can cause epiphysial damage in pre-adolescents (10).

The different levels of performance within a given age group are often the result of different levels of maturity rather than a difference in

skill. The level of performance in this reason, the classification on the basis of chronological age is not satisfactory during adolescence. Other systems based on estimation of secondary sexual development should be used (14,15). Very little has been known until now about the influence of repetitive excessive physical stress on the development of various organs and systems in children and adolescents.

It should be possible in this situation to apply the experience of many years of occupational medicine. In many countries, frequent repetition of stereotype work movements and excessive loading are forbidden by law for children and adolescents. In the codes of work-laws are included many limitations on the loads to be employed. In the same way, the number of repetitions of the same work-movement is limited. It would be useful to elaborate similar prescriptions in sport training, especially in children (16).

Parents, teachers, and coaches must be made sensitive to the psychological processes and stresses experienced by the child involved in competitive sport. The sum of the motor abilities, the personal abilities, and the social needs of the child are to be stimulated through sport. Only when children can attribute this to themselves and become self-motivated can top performance in sports be facilitated. The child must be able to maintain diverse social contacts not only in training but also outside of sport. Social isolation because of a special position in sport must be avoided (3). To impair these principles is unacceptable under the pretext of great success or talent. When children are young (or at least under the age of about ten), they fail to recognize that the outcome of a game is determined by both ability and effort. Therefore, winning and losing in sport is not particularly informative to children in relation to their abilities. It is only when children are aged 12 - 13 years of age that they begin to recognize that outcomes are determined jointly by effort and ability (8).

On the basis of the considerations described above, the International Federation of Sports Medicine presents the following recommendations:

1. Prior to participation in a competitive sport program, each participant should undergo a detailed medical examination which guarantees, on the one hand, that only children without health risks are admitted to competitive sport and, on the other hand, provides an opportunity for advice regarding the various possible sports and training. Thorough and regular medical supervision is necessary, especially to prevent overuse and overgrowth injuries, which are more frequent in young adults.

2. The coach has a pedagogical responsibility for the present and future of the children entrusted to him/her beyond the

purely athletic task. He/she must have knowledge of the special biological, physical, and social problems related to the development of the child and be able to apply this knowledge in coaching.

3. The child's individuality and opportunities for further development must be identified by the coach and regarded as major criteria governing his / her organization of training programs. Responsibility for the child's overall development must take precedence over training and competition requirements.

4. If "child coaching" is subjected to medical and pedagogical control as indicated above, it can afford valuable developmental opportunities for the children involved. However, if it takes the form of "training for maximum performance" at any price, it is to be roundly condemned on ethical and medical grounds. Nor is there any doubt that what has been presented here in relation to children also applies to a large extent to adolescents.

5. Children should be exposed to a wide variety of sporting activities to ensure that they identify the games which best meet their needs, interests, body build, and physical capacities. This tends to increase their success and enjoyment of sport and reduces the number of "dropouts." Early specialization should be discouraged.

6. Participants, particularly in collision sports, should be classified according to maturity, body size, skill, and gender, not only on a chronological age basis.

7. The rules and duration of games should be appropriate to the age of the participants while the training sessions should be relatively short and well-planned. The planned session maximizes activity and skills instruction and minimizes the risk on injury.

8. Competitive weightlifting and power lifting should not be recommended before the completion of puberty.

9. Excessively long distance competitive running events are not recommended for children prior to maturation.

References

1. American College of Sports Medicine. Opinion statement on physical fitness in children and youth. *Med Sci Sports Exerc* 1988; 20: 422-423.
2. Mácek M, Vávra J. FIMS Position Statement on Training and Competition in Children. *Journal of Sports Medicine and Physical Fitness* 1980; 20: 135-138.
3. Council of Europe, Committee for the Development of Sport. *Sport for children*. CDDS (83) Inf. 4, 1983.

4. Micheli LJ. Sports injuries in children. *Annales Nestlé* 1986; 44: 20-27.
5. Personne J, Commandré F, Gounelle de Pontanel H. Surles risques de l'entrainement sportif intensif précoce. *Bulletin Academie Nationale de Médecine* 1983; 167: 207-214.
6. Micheli LJ. Overuse injuries in children;s sports: The growth factor. *Orthopedic Clinics of North America* 1983; 14: 337-359.
7. Commandré F, Gagnerie F, Zakarian M. The child, the spine and sport. *Journal of Sports Medicine and Physical Fitness* 1988; 28: 11-19.
8. Caine DJ, Lindner KJ. Overuse injuries of growing bones: The young female gymnast at risk. *Physician and Sportsmedicine* 1985; 13: 51-65.
9. Roberts GC. Children in competition. *Motor Skill* 1980; 4: 37-50.
10. American Academy of Pediatrics. Weight training and weight lifting: Information for the pediatrician. *Physician and Sportsmedicine* 1983; 11: 157-162.
11. Plas F. Guide de Cardiolologie du Sport. Paris: Baillé Ed.; 1976.
12. Cumming GR, Garant T, Boryzyk L. Correlation of performance in track and field events with bone age. *Journal of Pediatrics* 1972; 80: 970-973.
13. Hollmann W, Bouchard C. [Studies on the relation of chronologic and biologic age to spiroergometric measurements, cardiac volume, anthropometric data and skeletal muscle strength in 8 to 18-year-old boys]. *Z Kreislaufforsch*. 1970 Feb;59(2):160-176. (In German).