

## Youth Strength Training

Fitness training has traditionally emphasized aerobic exercise such as running and cycling. More recently, the importance of strength training for both younger and older populations has received increased attention, and a growing number of children and adolescents are experiencing the benefits of strength training. Contrary to the traditional belief that strength training is dangerous for children or that it could lead to bone plate disturbances, the American College of Sports Medicine (ACSM) contends that strength training can be a safe and effective activity for this age group, provided that the programs properly designed and competently supervised. It must be emphasized, however, that strength training is a specialized form of physical conditioning distinct from the competitive sports of weightlifting and powerlifting, in which individuals attempt to lift maximal amounts of weight in competition. Strength training refers to a systematic program of exercises designed to increase an individual's ability to exert or resist force.

Children and adolescents can participate in strength training programs provided that they have the emotional maturity to accept and follow directions. Many seven and eight year-old boys and girls have benefited from strength training, and there is no reason why younger children could not participate in strength-related activities, such as push-ups and sit-ups, if they can safely perform the exercises and follow instructions. Generally speaking, if children are ready for participation in organized sports or activities — such as Little League baseball, soccer, or gymnastics — then they are ready for some type of strength training. The goal of youth strength training should be to improve the musculoskeletal strength of children and adolescents while exposing them to a variety of safe, effective and fun training methods. Adult strength training guidelines and training philosophies should not be imposed on youngsters who are anatomically, physiologically or psychologically less mature. Strength training should be one part of a well-rounded fitness program that also includes endurance, flexibility and agility exercises.

Properly designed and competently supervised youth strength training programs may not only increase the muscular strength of children and adolescents, but may also enhance motor fitness skills (e.g., sprinting and jumping) and sports performance. Preliminary evidence suggests that youth strength training may also decrease the incidence of some sports injuries by increasing the strength of tendons, ligaments and bone. During adolescence, training-induced strength gains may be associated with increases in muscle size, but this is unlikely to happen in prepubescent children who lack adequate levels of muscle-building hormones. Although the issue of childhood obesity is complex, youth strength training programs may also play an important role in effective weight loss strategies.

There is the potential for serious injury if safety standards for youth strength training such as competent supervision, qualified instruction, safe equipment and age-specific training guidelines are not followed. All youth strength training programs must be closely supervised by knowledgeable instructors who understand the uniqueness of children and have a sound comprehension of strength training principles and safety guidelines (e.g., proper spotting procedures). The exercise environment should be safe and free of hazards and all participants should receive instruction regarding proper exercise technique (e.g., controlled movements) and training procedures (e.g., warm-up and cool-down periods). A medical examination is desirable, though not mandatory, for apparently healthy children who want to participate in a strength training program. However, a medical examination is recommended for children with known or suspected health problems. A variety of training programs and many types of equipment — from rubber tubing to weight machines designed for children — have proven to be safe and effective.

Although there are no scientific reports that define the optimal combinations of sets and repetitions for children and adolescents, one to three sets of six to fifteen repetitions performed two to three times per week on nonconsecutive days have been found to be reasonable. Beginning with one set of several upper and lower body exercises that focus on the major muscle groups will allow room for progress to be made. The program can be made more challenging by gradually increasing the weight or the number of sets and repetitions. Strength training with maximal weights is not recommended because of the potential for possible injuries related to the long bones, growth plates, and back. It must be underscored that the overriding emphasis should be on proper technique and safety — not on how much weight can be lifted.

Proper training guidelines, program variation and competent supervision will make strength training programs safe, effective and fun for children. Instructors should understand the physical and emotional uniqueness of children, and, in turn, children should appreciate the benefits and risks associated with strength training. If appropriate guidelines are followed, it is the opinion of ACSM that strength training can be enjoyable, beneficial and healthy experience for children and adolescents.

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