

The Effects of Resistance Training on Strength Gains In Prepubescent Children

Paul M. Pitton, C.S.C.S.
Palisade High School
Palisade, Colorado

The demand for greater performance from today's athletes poses a controversial question: Can an athlete successfully compete at the college and professional levels without the use of banned substances?

The answer is a resounding yes!

One method is to begin preparing prepubescent athletes to perform at higher levels of competition through strength training. Society has made a strong move toward the support of competitive youth sports programs (2). The accolades and rewards of success in sports at high school, college and professional levels have encouraged young athletes to be the best at any cost (6). Substance abuse has resulted in frightening and tragic results, as noted in the Sports Illustrated article "The Death of an Athlete" (13). A more natural means of accelerating performance, that has been adopted by coaches and parents, is strength training among prepubescent children (8).

During the summer of 1989, Bulgarian Angel Spassov toured the United States to stress the point that the reason for the consistent world

record breaking performances by Bulgarians in the sport of weightlifting is a result of the early ages at which prepubescent children begin training (14). Fortunately, more studies are being conducted to determine the safety factors for prepubescent children to train with weights.

One argument against strength training prepubescent children is that they are incapable of making significant strength gains due to a lack of adequate levels of circulating androgens (3).

According to Spassov, annual physical fitness tests are conducted on most 11-year-olds in Bulgaria. The children with the highest scores are placed in training facilities to become weightlifters. This particular age-group was selected because the Bulgarian research shows that between the ages of 13 and 22 the level of circulating androgens in the male body is greater than at any other age (12) (Figure 1).

The Bulgarians currently have more world champion weight lifters than any other country. The ages of Bulgarian lifters ranges from 17 to 21

years (14). The Bulgarians and the Soviets select and begin training the prepubescents as weightlifters. These two countries not only hold many of the current world team weightlifting titles, but most of the individual world records are being set by 17 to 21 year-olds (14). Although most American parents aren't interested in their children becoming world class weightlifters, strength and conditioning specialists can learn something from the training practices of these countries (7). In our culture it has been established that strength training enhances performance in adolescent athletes (1). It can, therefore, be hypothesized that similar gains may be made in the prepubescent athlete (7).

Opposing Views

Conclusive studies of prepubescent strength training have yet to be conducted (8). Controversial myths, speculation and biases have molded the philosophic viewpoints that epiphyseal damage, high blood pressure, wrist, shoulder, knee and hip joint damage occur as the result of overuse, and excessive forced or

repetitive movements (10). As a result, myths and misconceptions abound concerning the validity, safety and physiological effects of strength training the prepubescent (15). Many of the negative views were reinforced in 1979 as a result of the Consumer Product Safety Commission's (CPSC) report that 35,512 weight lifting injuries occurred that required a visit to the emergency room. Half of the injuries were among 10 to 19 year-olds (5).

Further reports indicated that most of the injuries recorded by the CPSC occurred in the home without proper technique instruction and inadequate spotting (8). Studies are underway to determine the results of strength training safety and its effects on prepubescents. Dr. Lyle Micheli, director of the division of sports medicine at Children's Hospital in Boston, has done several studies on the effects of resistance training on the prepubescent. One of his studies showed that after 24 weeks of resistance training, trained and untrained groups showed mean improvements in static strength of 52 percent and 2 percent, respectively (4). The findings in his studies on strength gains and increases in flexibility from strength training among prepubescents, have helped establish the credibility and benefits of resistance training among prepubescents (5).

Strength Coach's Role

A highly structured environment is essential for proper strength training of prepubescent athletes. This emphasizes the importance of the strength and conditioning coach who must be aware of musculoskeletal risks as well as the need to maintain a positive, nonthreatening training environment. Regular strength training, as a component of a total fitness program, assists the child in accepting this positive lifestyle pattern as a necessary way of life (8).

As a result, more responsibility is placed on the physical educator and coach to gain the expertise needed to design, implement and teach the correct techniques and procedures involved in a good prepubescent strength training program. The instructor/supervisor must also have a complete knowledge of physiological considerations that can increase the risk of injury to the child (11).

Physiological Considerations

"Strength training the prepubescent child has become a controversial topic of discussion among physicians, coaches, exercise physiologists and parents. Many aspiring young athletes are under the direction of individuals who often apply principles of training that are more appropriate for an adult (8). "Far too often youngsters follow the advice of a well-meaning but unknowledgeable relative, or use an older, more mature athlete as a role model. As a result we see injuries to adolescent athletes that could have been avoided. In these types of situations, professionals must exert their influence" (11).

If reports of injuries in prepubescents should arise as a result of resistance training, they must be compared to the findings of similar injuries in any well-accepted forms of athletics or recreation, such as soccer, baseball, wrestling, tennis or gymnastics (7). The types of injuries that commonly take place fall into two categories:

Acute injuries. These occur as a result of a single trauma causing an injury. The most common acute injury to prepubescent weight trainees is a fracture at an epiphyseal plate. This area is prone to injury in the prepubescent because the epiphyseal plate has not yet ossified. Case reports reveal two precautions for prepubescent programs. First, maximal lifts should not be performed; second, proper form for all exercises

should be strongly emphasized (9, 4).

Chronic injuries. These are caused by repeated microtraumas causing injury, typically from overuse. Shin splints and stress fractures are the two most common types of injuries in this category. The growth cartilage of the particular surface of prepubescent joints is also prone to injuries. These would primarily include the ankle, knee and elbow (4). A child is exposed to chronic injuries as a result of inflexibility or weakness of a particular body part relative to the work required of a particular activity. For example, a soccer player who has tight hamstrings may be predisposed to muscle strains (7).

Because of these factors, it is important for the coach to be very cautious when a young athlete reports even minor soreness around a joint when participating in a strength training program (10). It is the responsibility of the coach to educate athletes about the physiological responses to resistance training.

Conclusions

If it is true that resistance training prepubescent children does in fact accelerate the development of strength and flexibility, then it would be worth while to develop and make available programs to sufficiently train prepubescent children. It would also prove beneficial to certify and train coaches in the area of youth strength and conditioning programs. In turn, we should create a method not only to strengthen an individual but, consider evidence that resistance training helps prevent injuries in adolescent athletes (4).

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