Misconceptions About Training Youth

KNOWLEDGE TO SHARE WITH PARENTS AND ADMINISTRATORS - LON KILGORE, PHD

There has been considerable debate among the public, educators, coaches, physicians, and scientists as to when it is appropriate to begin weight training in children and adolescents. A variety of apparently sound reasons have been provided as grounds for not training youth or training them only with the use of machines with pre-determined movement pathways. Presented here are some common criticisms leveled at the training of youths by the biased, misinformed, and inexperienced. Each of these common claims is followed by an objective examination of the scientific and medical literature. Although this book is most relevant to students just beginning high school, the wide array of maturation rates in children makes these issues relevant to the coach. Every coach should be versed in the literature and theory surrounding his profession and be able to defend his methods of training. Lack of knowledge can be mistaken for lack of competency.

Criticisms of Youth Weight Training

(1) Weight training has been portrayed as ineffectual in improving strength in younger children, as hormonal response is largely absent in preadolescents.

Although most students benefiting from this text will be pubescent, a significant number will not. As such this information can be quite valuable for the coach. Studies that demonstrated a lack of strength increase were inadequate in magnitude of training load, training volume, duration, or did not use the simple principle of progression (Ainsworth, 1970; Docherty, 1987; Hettinger, 1958; Kirsten, 1963; Siegel, 1989; Vrijens, 1978). Research points to the loads, volumes, and durations similar to those commonly used in the training of competitive weightlifters to be effective in increasing strength in children. A program's ability to increase strength appears to be more closely related to the intensity of training than on volume (duration) of training. High intensity programs have been shown to increase strength in preadolescents in 6 weeks or less (Mersch, 1989; Nielsen, 1980; Ozmun, 1991, Wescott, 1979). If the conventional wisdom that weight training is ineffective in children, simply because they do not produce significant amounts of testosterone, were correct, females of all ages would be unable to get strong as they produce only a tenth of the amount secreted by an adult male.

Figure 1. Curt White, 12 years old in this national championship photo, began training with weights several years earlier and developed into one of the strongest men in US history, the holder of the American record Clean & Jerk of 440 pounds in the 181 lb class. Kids can get very strong using sound exercise principles that progressively challenge them physically.

Within the clinical community there is a general recommendation that all physical activity be prescribed at moderate levels. With respect to weight training, this recommendation excludes powerlifting, weightlifting, bodybuilding, and general training with maximal weights until the completion of puberty. The utility of this recommendation points to inexperience, and a lack of understanding of the activity by the clinical community. By specifically naming these types of training on their condraindicated list, they propose to eliminate high volume – low intensity weight training (body building), low volume – high intensity weight training (powerlifting), and moderate volume – moderate to high intensity training (weightlifting) from youth training. Any coach that attempts to use these overly restrictive guidelines will be ineffective in making a stronger, healthier young athlete. An analogy demonstrating the lack of reason within the clinical community's recommendation would be to argue against sprinting (high speed – low volume training), against distance running (low speed – high volume training), and against middle distance running (moderate to high speed – moderate volume training) in the young trainee. To produce a track athlete within these guidelines would be virtually impossible. It is revealing that they fail to see this inconsistency.

Another problem with these guidelines is the clinical community's position on the use of progression (recommended use of progressive resistance training). The premise of progression is to make the body work harder than it has worked previously, then repeatedly apply that load over the following days and weeks until the body adapts to it by becoming stronger. Inherent in this concept is that the athlete must be pushed beyond his current work capacity in order to make gains. Another term for pushing beyond their current work capacity is "maximal" or "near maximal" work, something the clinical community recommends against (i.e., the stated inconsistency). An efficient and effective method of progressive resistance training that can be safely employed is detailed in the programming chapter of this book.

(2) Injury rates with weight training are a continual source of concern and have been proposed as one of the major rationale for precluding children's training with weights.

One of the strongest supporting documentations of this claim is a report from the US Consumer Product Safety Commission (1987) in which it is stated that weightlifting can cause injury to children. The report claims that 8543 weightlifting-related injuries occurred in children younger than 14 years of age. Strains and sprains were the least severe injuries (and most commonly reported) and fractures were the most severe (and least commonly reported) injuries noted in the study. This study did not examine any conditions that may have

predisposed the subjects to injury, nor did it examine the training history and program of the subjects. It was noted, however, that a large percentage of the injuries occurred in unsupervised training in the home. In adults, weight training is often recommended as a means to reduce the frequency of injury and is also used to re-establish normal function after joint and soft tissue injury. Data from adolescent male football players point to this as a potential use in young athletes as well. Cahill (1978) noted that the number and severity of knee injuries was reduced in athletes who trained with weights. Further evidence of the safety of weight training relative to other sports and exercise activities can be seen in the injury rates of other youth sports (Hamill, 1994). Weight training's injury rate of 0.0012 injuries per 100 participant hours pales to the 6.2 injuries per 100 participant hours in youth soccer and 1.02 injuries per 100 participant hours in basketball. Time in the weight room carries even less risk of injury than a traditional physical education class where there is an injury rate of 0.18 injuries per 100 participant hours. In fact, weight training, unlike many other sporting activities is an accepted and recommended therapeutic modality following injury. If weight training can damage injured tissues, why would any responsible clinical professional recommend them for rehabilitation or prevention? The idea that healthy juvenile muscle, bone, and tendon is more fragile than injured adult tissue is baseless.

Epiphyseal plate (growth plate) fractures may be the key concern in this controversy. Damage to these plates induced by weight training is frequently cited as a reason for avoiding weight training in children. The existing medical and scientific data do not support this as a valid contraindication. One instance of epiphyseal fracture attributed to weightlifting has been reported in preadolescents (Gumbs, 1982). In pubescent athletes, five publications have reported instances of fractures related to weight training (Benton, 1983; Brady, 1982; Gumbs, 1982; Rowe, 1979; Ryan, 1976). The overwhelming majority of these injuries were attributed to improper technique in the execution of the exercises and excessive loading. Each report failed to consider that the injury may actually have occurred as a result of contact with the floor or other object subsequent to loss of balance and falling, and not be attributable to the actual weight training movement. Further, proper diagnosis and treatment of this rare injury resulted in no detrimental effect on growth (Caine, 1990).

It has also been noted that weight training does not interfere with growth by other means (Ramsey, 1990; Sailors, 1987; Seigel, 1989; Weltman, 1986). Research reviewed by Theintz (1994) seems to suggest that sport training for less than 15 hours per week was not disruptive to hormonal status, growth or puberty.

Training programs in which training loads are prescribed and monitored and in which training activities are supervised have proven to be remarkably safe in terms of the frequency of injury occurrence. Several studies have followed the rate of injury during training programs of several weeks to a year in duration (Pierce, 2000; Ramsay, 1990; Rians, 1987; Servidio, 1985; Sewall, 1986). Rians' 14-week long study (1987) reported only one minor shoulder strain which resolved itself by the end of the study. One study of importance to the competitive weightlifting community, or any other group using higher percentages of maximum, is the one-year study of a USA Weightlifting Regional Development Center program that included

more than 70 pediatric athletes in which no reports of injury were noted (Pierce, 1999). The bottom line is that it seems to be the level of supervision, not the practice of weight training that is problematic. Qualified coaches need to be in the weight room any time a youth is training.

Weight Training Benefits for Youth

The benefits of strength training are unquestionable. It is considered an essential element in preparing for competition in virtually every sport. The American College of Sports Medicine recommends that nearly everyone train with weights for the health benefits associated with resistance training. It is consistently one of the top three recreational exercise activities in the US, according to the Sporting Goods Manufacturers Association. An understanding of these benefits by parents, school personnel, and medical staff is important for acceptance of the use of weight training in school-age populations.

(1) Strength and power increases with proper training in children.

An indication of this relationship can be seen simply by comparing strength norms for the US youth population and performances of weightlifters competing at USA Weightlifting events, high school powerlifting events, and from scientific data demonstrating increases in vertical jump (a measure of power output) following weight training in children (Nielsen, 1980; Weltman, 1986).

(2) Neuromuscular coordination improvement in children has been linked to repetitive practice of the specific skill (regardless of the skill investigated).

Figure 2. While weight training for kids can develop sport related fitness, good coaches consider how accessory training combined with on-the-field practice affects the child.

The ages that appear to be optimal for learning movement patterns are between 9 and 12 years of age (Singer, 1970). The average age of incoming freshman will be 14 years, not too far from the optimal motor development ages. The preponderance of data suggests that there are no valid reasons to assume that these children cannot effectively learn and

correctly execute weightlifting skills repeatedly if taught and supervised properly. Free weight exercises develop balance and coordination that cannot be developed using machine weights.

Figure 3. Every kid can smile in the weight room. No other training activity lets everyone experience the joy of success regardless of physical capacity.

(3) Weight training is inclusive.

Many sports select directly or indirectly for very specific physical attributes (Duquet, 1978; Keogh, 1999) or involve competition against other youth regardless of body mass. Powerlifting and weightlifting, with their multitude of weight classes and age groups, allow for athletes who traditionally have few competitive outlets the opportunity for competition in a controlled, equitable environment. Even in a non-competitive weight room, any student or athlete can experience success since any participant can improve his performance. As such the activity may be more suitable for child participation than sports where success is measured simply by victory or defeat.

Recommendations

Based on the available medical and scientific data we strongly recommend:

1. Weight training programs for youth should be conducted by well-trained adults. Ideally, the supervising staff should be certified to coach and certified in first-aid. The American Academy of Pediatricians proposes that it is essential that all staff working with children should be trained in supervising strength training through completion of programs from universities or professional organizations. Few universities possess faculty that are both experientially and academically prepared to teach coaches proper coaching methods pertaining to weight training. USA Weightlifting, in particular, and the National Strength and Conditioning Association both have strong coaching education programs for developing and certifying coaches that are easily accessible. Ensure that the certifying authority you choose is backed by an organization with professional membership and that the certification examination is rigorous. Obtaining a certification from an organization in business only to sell them is rarely of value. Professional workshops, when conducted by trained professionals, are also appropriate methods for gaining expertise.

2. Weight training should take place in facilities equipped to support safe training practices. Use of quality free weights in supervised weight training sessions, as presented in this book, can be done inexpensively.

3. Skill-based weightlifting programs that include a wide variety of general athletic preparation are appropriate for children and can commence between the ages of 9 and 12 years of age.

4. Total exercise training time should not exceed 15 hours per week. Coaches must consider the cumulative effect of all the trainee's physical activities. We recommend a holistic approach to training, an approach that requires the coach to be cognizant of the trainee's exercise/activity behaviors on and off campus.

Figure 4. Weight training is for everyone regardless of age, gender, and sport.

5. Utilization of maximal weights, although no data currently establishes a clear-cut relationship, has been opposed as a practice that places the child athlete at risk of injury. We do not discourage use of maximal and near-maximal loads (see Chapter 7 for clarification). These loads should be used cautiously and applied only as part of a regimented training program for technically proficient trainees. Each attempt and set must be supervised and safety measures must be in place. Excellence in technique should be emphasized rather than the amount of weight lifted.

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