

Weight training - Pre-adolescent strength training - Just do it!

Narelle Sibte – Strength & Conditioning Coach, Australian Institute of Sport

Resistance or weight training (as opposed to the disciplines of weightlifting or power-lifting) has not been recommended for pre-adolescents because of the concerns for injury and the questionable efficacy of this type of training to improve strength. So let's put an end to the myths and look at the facts!

Change in Strength in Pre-adolescents

The facts:

- For many years it was thought that pre-adolescent children were incapable of improving strength through resistance training
- Over the last 25 years, several studies have shown that pre-adolescent children are capable of safely improving muscle strength with appropriate training regimes. A review of strength training improvements in children found that the majority of studies demonstrated strength gains between 13-30% as a result of resistance training over an 8-12 week period (6).
- Strength increases twofold between the ages of 7 and 12 years, with average values slightly greater in boys. Some would argue that failure to start resistance training before 16 may be detrimental to playing longevity.
- At puberty, the strength of girls plateaus, while stimulated by testosterone, muscle strength in boys increases. In initial stages of training, girls have potential to improve more than boys, as generally speaking, they start from a lower status (8).
- Gains from strength training for preadolescents are generally attributed to the nervous system and motor learning, rather than hormones. (4).
- Preadolescents make similar relative gains in strength compared to later stages of development but usually demonstrate smaller absolute strength increases following strength training (2).

These findings have implications for injury prevention and performance enhancement for young athletes.

Injury prevention

Common overuse injuries such as tendonitis can result from excessive volume of training and competition, particularly when loads are increased dramatically in a short period of time.

The growing athlete may be particularly susceptible to such injuries because of diminished flexibility and muscle-tendon strength mismatches (as often the case with Osgood-Schlatter and Sever's disease)

Of more concern is potential damage to the growth plates of long bones. Recent studies show that growth plates are not affected – either positively or negatively – by a wide range of sports and training modalities (10). In those studies where injuries were recorded, poor technique, excessive loading and performance of jerky/bouncy activities with rotation, were identified as contributory factors (1).

However some degree of bone stress via resistance training may encourage bone growth. Resistance training increases muscle strain, strain rate and compression, which are all important in bone modelling (7).

The low level stresses of weight training are no worse than actually completing sport specific training (jumping, hitting, running, etc)

For injury prevention, adherence to sound exercises principles and competent adult supervision is paramount.

Training principles

When designing any resistance training program, whether for an experienced international campaigner or the young novice, a number of general principles need to be considered:

Progressive overload refers to the practise of continually increasing the stress placed on the muscle as it becomes capable of producing greater force or has more endurance (6). There are a number of ways in which total load can be increased. These include:

- The resistance lifted/moved can be increased
- Increase the training volume (more reps/sets, longer sessions)
- Increase training frequency (more sessions per week)

The 10% rule is a reasonable guide here – limiting increases in training frequency, intensity and duration to no more than 10% per week(3).

Of all the strength training parameters, exercise intensity appears to be the second most important variable in effective program design for pre adolescents. A general guideline suggests that intensity be moderate (approximately 10-15 reps), and that maximal lifts should be avoided (9). The young athlete should be able to comfortably move their own body weight before they attempt external resistance exercises. High repetitions also enable the young athlete more time to practice the techniques, assisting their skill acquisition.

Recovery is often an area that is overlooked for many athletes, particularly young athletes who are trying to juggle school, training and competition. It is important that the coach is aware of all playing and training commitments of their athletes. It is not uncommon for a gifted young netballer to play with a school, club, regional and state team, and adding additional training sessions to her program may not allow adequate recovery between sessions. A failure to incorporate scheduled rest periods into the training program can also contribute to the overuse/chronic injuries.

Recommendations

Strength training for pre-adolescent athletes should focus on skills and technique. Since improvements from strength training come from neuromuscular development in this age group, this is the ideal time to teach co-ordination and stability. Children should work at strengthening all the big muscle groups, using free weight and body weight movements with relatively light loads. Contrary to popular belief, machines may not be the best option for young athletes as they are designed for adults and incorrect set up may cause harm to the athlete. When prescribing load for young athletes, it is always better to underestimate their physical abilities and gradually increase training load, than to overshoot their abilities and potentially injure them.

Adolescents should initially perform one to three sets of 6-15 repetitions of a variety of exercises, beginning with a frequency of 2-3 days per week on non consecutive days (4). There is no minimum age requirement for children undertaking resistance training programs, but participants should have the emotional maturity to accept and follow directions and should understand the potential benefits and risks associated with strength training.

In a growing number of cases it would appear that the musculoskeletal systems of many young athletes are ill prepared to handle the demands of practice, games and tournament schedules. If we are to keep getting great results at major sporting events, we need to invest the time and money into the long-term development of our young athletes. So as one of the shoe manufacturers say – strength training for children, JUST DO IT!

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