

H.I.T.

HIGH INTENSITY TRAINING

NEWSLETTER

Reliable and Sensible Information on Strength Training and Conditioning

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Strength Training Injuries: On The Field But From The Weight Room

By Dr. Ken E. Leistner

Last issue, the HIT newsletter discussed the types of injuries which could occur from the improper training methodologies so often seen in the weight rooms and gyms around the country. What is less obvious, are the injuries which occur as a direct result of one's strength training work, yet are rarely connected to weight training. If one gets tackled on the field and comes up limping, it is rare to see one's weight room procedure as being a causative or contributing factor. While it is immediately understandable that not training hard might make one less resistant to injury, relative to the highly trained player, the improperly trained athlete might be at greater risk than the untrained one.

One of the nicest things about strength training is the ability to alter strength levels in specific muscle groups. Unfortunately, many coaches do not understand or recognize this aspect of training. They encourage their athletes to be "strong", but forget that it is just as important to be strong in a manner that allows one to perform at the highest levels of play without incurring injury. The bench press presents the most obvious example. For a number of reasons, and most of these without basis, the bench press has been singled out as being the "most important" football related exercise. Even those coaches and athletes who quickly state that "the hips and thighs are the most important thing for football, you have to work those squats," hold a special reverence for the bench press. Most high school and college strength programs are built around the bench. It is the primary exercise, often with many "bench assistance" movements. It is not uncommon to see a program consisting of bench press, incline press, flyes, press behind the neck, and possibly dips or decline presses. Some programs have the players do all of these movements in one day, some have them bench press two or three days per week with two or more similar pressing assistance movements per session. Even those who use a HIT method, will have their players single or do "heavy benching", and use one or two all out sets to momentary muscular failure/fatigue on all other movements.

The typical college football player has a bench press which either outstrips all other lifts, or is proportionately much



Dr. Ken Leistner pushing Jim Wyndas through an intense set of front raises.

greater than hip and thigh or back related movements. Those muscles used in the bench press and related movements, the anterior deltoids, pectorals, and triceps are almost disproportionately strong relative to the upper back and rotator cuff areas. This leads to a situation where the weaker area is subject to on the field injury due to a significant imbalance of strength. It is rare to find a torn pectoral or anterior deltoid injury on a football field, yet rotator cuff damage and pinched nerves in the trapezius area can be seen on almost every campus within two weeks of the beginning of fall camp. "Elbow area" injuries are often the result of tendon tears or stretching that result from disproportionate strength between the forearm flexors and extensors. Credit this to too many curls (those programs that leave the players on their own to train), or too few (the result of the so-called Russian and Eastern European philosophies which leave "unnecessary" bicep development to cleans and power pulls), and almost always, not enough forearm and wrist work.

Adolescent Strength Training

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Although calisthenics and running activities have been viewed as an acceptable means of physical conditioning for youngsters, strength training has yet to gain such favor. Much of this reason is that the literature contains very little information that can be applied in a practical manner to meet the needs of the adolescent. This is unfortunate, since younger individuals have a great deal to gain from weight training. A safe, practical and productive strength program can prepare youngsters for the demands of their particular sport. Strengthening their muscles, joints and connective tissue is an excellent precautionary measure against injury. In addition, young athletes can perform closer to their potential by increasing their functional strength.

AT WHAT AGE CAN YOU BEGIN?

The answer to the question, "At what age can a youngster begin weight training?" is not so simple. The so-called "adolescent growth spurt" is a period of accelerated increases in height and weight that occurs with the onset of adolescence. The age of onset and the duration of the "spurt" may vary considerably from one individual to another. For example, the average boy experiences this rapid period of growth at about the age of 13. However, it may begin as early as 10½ or as late as 16. For the average girl, the growth spurt occurs around the age of 11, but may begin as early as 7½ or as late as 14½. These wide variations in maturation can create a difficult and confusing dilemma for the coach, physical educator or parent who wishes to get their youngsters started on a weight training program.

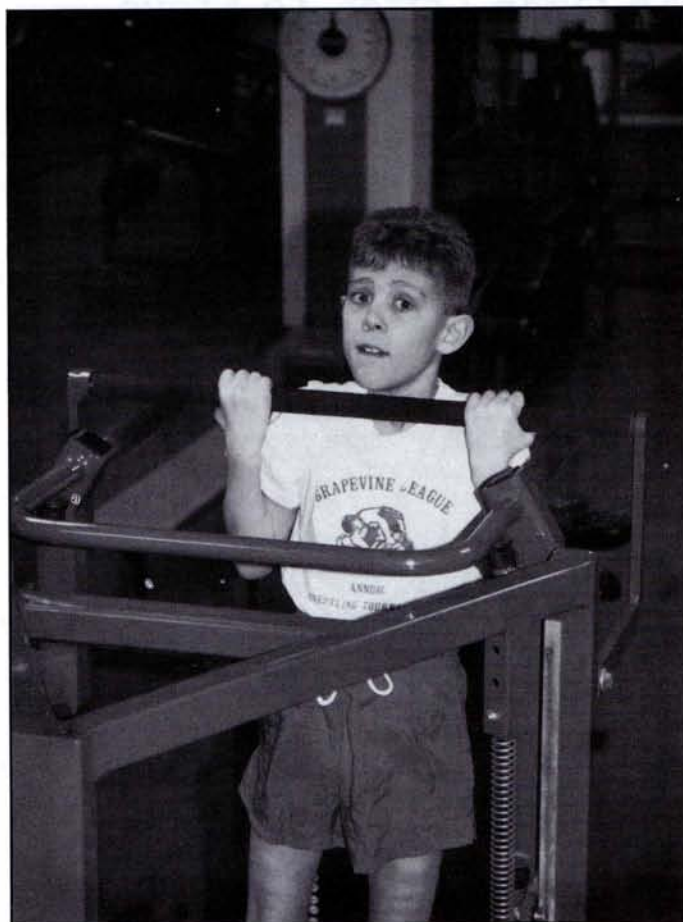
Bone development is often used as an indicator of body maturity; an individual's skeletal age can be predicted from x-rays of bones in various parts of the body. Chronologically, a youth might be 13 years old but may only be 11½ in terms of skeletal maturation; conversely, another 13 year old might possess the skeleton of a 14½ year old. As you can see, there is no clear cut borderline since everyone "ages" at different rates. In any event, most youngsters are physically mature enough to begin weight training at the age 13 or 14. The best advice, however, is to proceed cautiously and carefully.

THE "GROWTH PLATES"

Some of the concern in adolescent strength training is the potential for various overuse injuries associated with highly repetitious activities. In addition, there is concern in the risk of sustaining Epiphany injuries. The so-called "growth plates" are the structures responsible for longitudinal growth of the immature bone. The growth plates are cartilaginous discs that lie between the central shaft of the bone (or diaphysis) and the ends of the long bone (or epiphysis) until full maturation occurs. Bone growth ceases when these discs are replaced by bone. The diaphysis and epiphysis are united of "fused" and growth in length is no longer possible. Excessive loads on immature bones or extreme weight-bearing activities may interrupt the normal growth patterns or predispose an individual to injury.

IMPLICATIONS OF WEIGHT TRAINING

Several precautionary measures will significantly reduce a



The chin-up is an excellent exercise for preadolescent trainees as well as adolescent trainees.

young individual's risk or injury. Youngsters should perform each exercise throughout the greatest possible range of motion that safety allows. This will promote or maintain flexibility. Also, require your younger athletes to raise and lower weights in a controlled manner. **EXPLOSIVE LIFTING IS DANGEROUS!** If explosive lifting doesn't cause immediate musculoskeletal damage, it will certainly predispose your athletes to future injury.

Avoid movements that place an unreasonable amount of stress on the musculoskeletal system so as not to disturb the growth plates. Potentially dangerous movements that have been identified as being orthopaedically unsafe include barbell squats (which compress the spinal column and create undesirable shear forces in the knee joint), power cleans, snatches and plyometrics (especially those that are performed vertically).

A productive workout need only take 30-40 minutes if it's done right. There's absolutely no reason why an adolescent should spend much more time than this in the weight room. Marathon workouts are generally associated with overuse injuries in the muscles and connective tissues. Remember to emphasize the major muscle groups (hip, legs, upper torso) and the neck (if the athlete is involved in a combative sport such as football or wrestling) as a safeguard against injury. Workout cards are an extremely valuable tool in making a youngster's routine more meaningful and in providing a guide as to what should be accomplished.

Exercises that involve the bodyweight as resistance (e.g.

dips, chins, pushups, situps) along with partner-resisted movements are very productive for building strength. In particular, dips and chins work every major muscle in your upper torso. When selecting exercises, keep in mind that youngsters with relatively small frames may not fit properly on some machines. On the other hand, when it comes to barbells it may be said that "one size fits all!"

"MAXING OUT"

Many of your younger athletes will want to "max out" to see how much weight they can lift for one repetition. Never...and I mean NEVER...have them "max out." In fact, younger athletes should never do less than ten repetitions on any exercise. Have them use slightly higher repetition ranges than your older athletes such as 20-25 for the hips, 15-20 for the legs and 10-15 for the upper torso. The higher repetition ranges will necessitate using somewhat lighter weights which will reduce musculoskeletal stress. Seeing how much you can lift should not be viewed as a "right of passage" into adulthood. "Maxing out" substantially increases your athletes' risk of injury and proves absolutely nothing. Remember, the winner of an athletic event has never been decided by a bench press contest.

INTENSITY

A strength training program will produce excellent results if performed with a high level of intensity. High intensity Training (H.I.T.) is characterized by performing each exercise to the point of muscular failure. To increase the intensity further, a training partner can assist the lifter in performing 3-4 additional post-fatigue reps immediately following muscular exhaustion. These extra reps can either be "forced reps" or "breakdowns."

Needless to say, most young athletes will have a problem handling this level of intensity. There's nothing wrong with having your younger athletes stop a few reps short of muscular failure. Gradually, you can have them train to exhaustion as they mature physically and psychologically. The next step would be to incorporate some form of post-fatigue repetitions. I encourage the use of "breakdowns" instead of "forced reps" with younger athletes. ("Breakdowns" or "stripping the weight stack" is where a training partner quickly reduces the starting weight by about 25-30% and the lifter performs his 3-4 post-fatigue reps with the lighter resistance.)

ONE MORE REP

I encourage all coaches to initiate a strength training program for their younger athletes. In addition to being an injury prevention mechanism, weight training is an excellent way of improving their self-image during the identity-forming years. Strength training can also instill a favorable work ethic at an early age. Make sure your youngsters realize the value of dedication, discipline and hard work as a way of achieving athletic ambitions.

All of this can be accomplished provided that the strength program is designed with safety in mind.

Reference

Brzycki, Matt. *A Practical Approach to Strength Training*, Grand Rapids, Michigan: Masters Press, 1989.

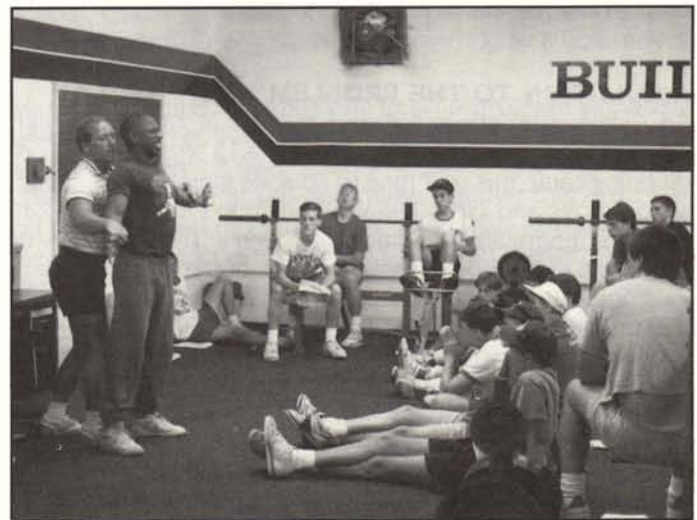
(NOTE: *A Practical Approach to Strength Training* will be available in the Fall of 1989. Please write: Masters Press, 5025 28th Street SE, Grand Rapids, Michigan 49506 or call 1-800-722-2677 for details.)

Strength And Conditioning Camp: Teaching Youngsters The Basics

By Ted Lambrinides
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THE PROBLEM

Junior high and high school athletes are perhaps exploited more so than any other group with respect to strength training and conditioning. Young people who are opportunistic enough to want to improve can easily be misguided. Muscle magazines feed off the insecurities and in some cases the desperateness of new trainees. Young trainees are led to believe that three-hour workouts, Eastern Bloc restoration techniques, hypnosis and exotic food supplements are all necessary for results. If you don't believe me just spend a couple months with high school athletes...believe me.



Mike Shibuski teaches campers the fine points of manual resistance training.



Ken Mannie, strength coach at The University of Toledo, puts a camper through a workout.