H.I.T. HIGH INTENSITY TRAINING
NEWSLETTER
Reliable and Sensible Information on Strength Training and Conditioning
Volume 3 No. 2 1991

The Squat: Part Three

By Dr. Ken E. Leistner

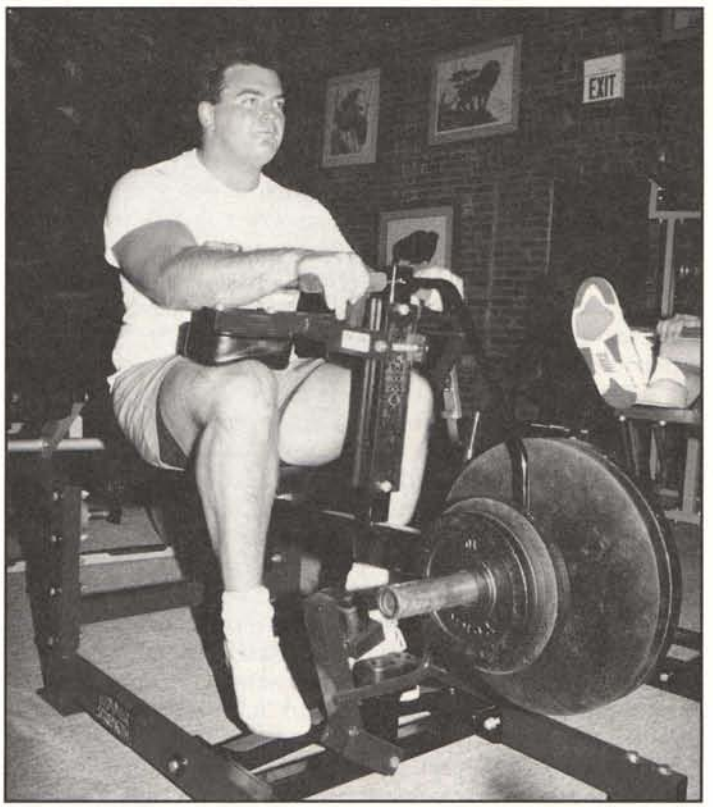
For those who have closed their minds to the possibilities of utilizing the barbell squat as part of the training programs for either themselves or the athletes they are charged with supervising, there is no need to read further. Many have, as was discussed in the last issue of *H.I.T.*, eliminated the full barbell squat from their program. This has been justified where injury was the norm, or when workouts slowly skidded to the depths of a powerlifting contest, negating any positive effects from that particular training session.

For those who understand that the large muscular structures worked by this movement, when done properly, intensely, and for moderate to high repetition schemes can produce tremendous overall gains in strength and muscular body weight, there are alternatives. The most important thing comes with the understanding that the squat, like the deadlift, bench press, row, chin, dip, overhead press, and other basic movements, is an exercise. In fact, it is one of the best basic, multi-joint, muscle stimulating movements one can do, but it must remain an "exercise", not a competitive movement.

The fact that the lift has become a specialized parcel of a competitive athletic event should have nothing to do with the training that is done in a high school or university weightroom, or the home gym of anyone who is not in fact, a competitive powerlifter. If this proviso is respected, and the athlete's bodily leverages and orthopedic history allows, the squat should be done. The problem in viewing the exercise as a competitive lift lies in the need and desire to use very heavy weights, supportive equipment, and low repetition multiple sets as a substitute for highly intense training procedures. While doing three sets of three repetitions with five hundred pounds might be "work", it pales next to the performance of twenty all out reps to momentary muscular failure/fatigue in good form, with three hundred and fifty pounds.

If the squat is to be used as a growth stimulator or a movement designed to increase the lower body strength of a competitive athlete, one has to avoid the pitfall of squat produced injury at all costs. A low back, knee, or hip injury will curtail all training for a lengthy period of time, resulting in frustration and an obvious lack of those qualities the program was initially designed to produce. Thus, one must use weights moderate relative to the athlete's ability to squat a single maximal repetition. If these types of weights are used, compression and shearing injury risk is reduced, but one then has to increase the number of repetitions in any set in order to provide an overload for the involved muscular structures. Obviously, if one has the strength to do a properly performed squat with five hundred pounds, utilizing two hundred for ten reps will do little for any aspect of strength and fitness.

Working from the opposite perspective, a program for the lower extremities that is based upon higher repetition schemes, forces the athlete to use more moderate weights than lower repetitions do, thus insuring that the injury factor is reduced, at least that which might result from the use of "heavy" weights. Higher reps also produces a cardiovascular effect that is missing when doing sets of lower repetitions. While the so called experts can scream that "high reps build endurance and low reps build strength", I disagree. One can get awfully strong if consistent and progressive training results in the performance of twenty squats done with four hundred pounds when the starting poundage



Andy Klare, a 6'1" 270 lbs. nose tackle for Boston College, performing a set on the Hammer Seated Calf Raise. Andy has been training intensely all summer in the Hammer Strength Training Center in Cincinnati, Ohio.

Shoulder H.I.T.

By Matt Brzycki,
Strength Coach, Princeton University

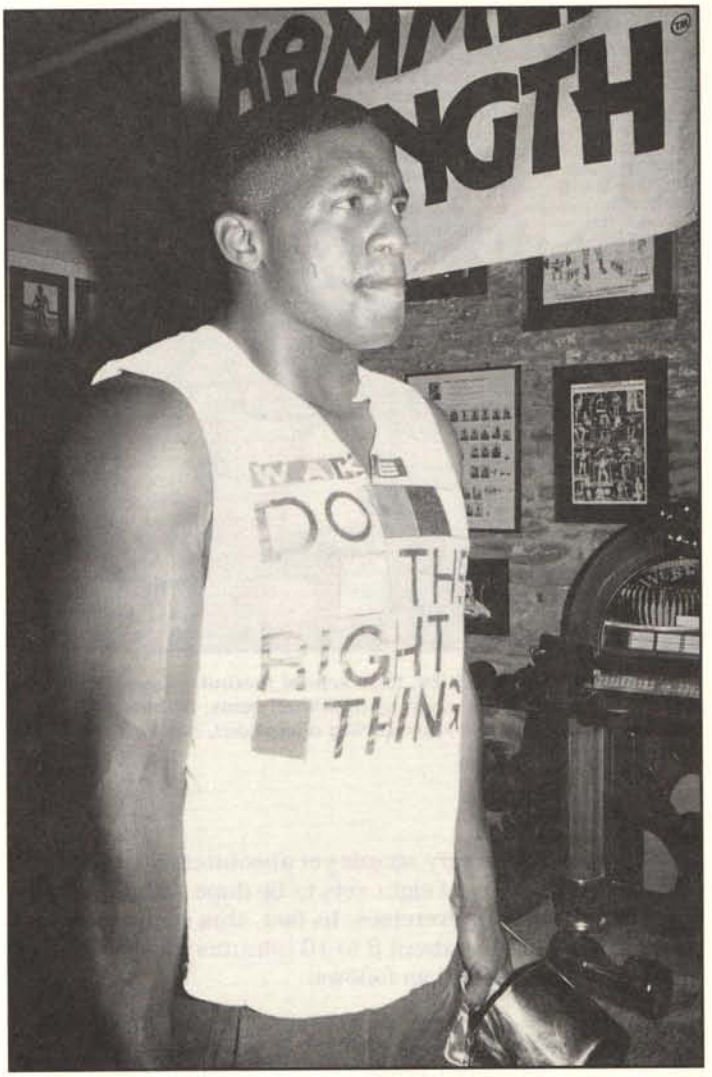
Previous issues of the *H.I.T.* Newsletter have highlighted productive and time-efficient routines for specific bodyparts, such as the lower body and the upper back musculature. This article will detail a specialized workout for the deltoids that can be performed using high intensity training.

Traditional high intensity training involves one set of each exercise performed to the point of concentric muscular failure. Two or three exercises are prescribed for each of the body's major muscle groups. However, many individuals enjoy high intensity training but prefer to do multiple sets. As such, this particular shoulder workout is targeted towards those readers who favor a nontraditional form of high intensity training.

Anatomy and Function

The shoulders are made up of eleven muscles, of which the deltoids are the most important. The "delts" are actually composed of three separate parts or "heads". The anterior deltoid is found on the front part of the shoulder and is used when raising the upper arm forward; the middle deltoid is located on the side of the shoulder and is involved when lifting the upper arm sideways (away from the body); the posterior deltoid resides on the back of the shoulder and draws the upper arm backward.

The trapezius is often considered as part of the shoulder musculature. This trapezoid-shaped muscle covers the upper region of the back as well as the posterior section of the neck. The primary functions of the "traps" are to elevate the shoulders (as in shrugging), to adduct the scapulae (pinch the shoulder blades together) and to extend the head backward.



Brian O'Neal performing a set of dumbbell shrugs. The Penn State program places emphasis on the neck and trapezius musculature.

The Exercises

This particular deltoid routine consists of five different movements—a shoulder press, an upright row, a lateral raise, a bent over raise and a shoulder shrug.

Shoulder Press (barbell or machine): This multiple joint exercise works the anterior portion of the deltoid along with the triceps. To perform this movement, sit down and place your feet flat on the floor. Grasp the bar and space your hands slightly wider than shoulder width apart. The bar should be resting behind your neck on the upper portion of your trapezius. To begin the exercise, push the bar straight up until your arms are just short of locking out. Pause briefly in this position and then return the weight under control to the starting position.

Upright Row (barbell or machine): This multiple joint movement primarily involves the upper portion of the traps, the biceps and the forearms. To perform this exercise, reach down and grasp the bar with your palms down and your hands spaced 8 to 10 inches apart. Stand upright and spread your feet comfortably apart. To begin the movement, pull the bar up until it is directly below your chin. Pause briefly in this position and then lower the weight under control to the starting position.

Lateral Raise (dumbbells or manual resistance): The middle delt and the upper portion of the traps are exercised during this single joint movement. Hold a dumbbell in each hand at your sides with your palms facing your legs. Space your feet comfortably apart. To perform the exercise, keep your arms fairly straight and raise the weights away from your sides until your arms are parallel to the floor. Pause briefly in this position and then return the weights under control to the starting position.

Bent Over Raise (dumbbells or manual resistance): This single joint movement exercises the rear delt and the middle section of the traps. Grasp a dumbbell in each hand and space your feet comfortably apart. Bend over at the waist so that your upper torso is roughly parallel to the floor and your arms are hanging straight down. To perform the movement, keep your arms fairly straight and raise the dumbbells away from each other until your arms are parallel to the floor. Pause briefly in this position and then lower the weights under control to the starting position.

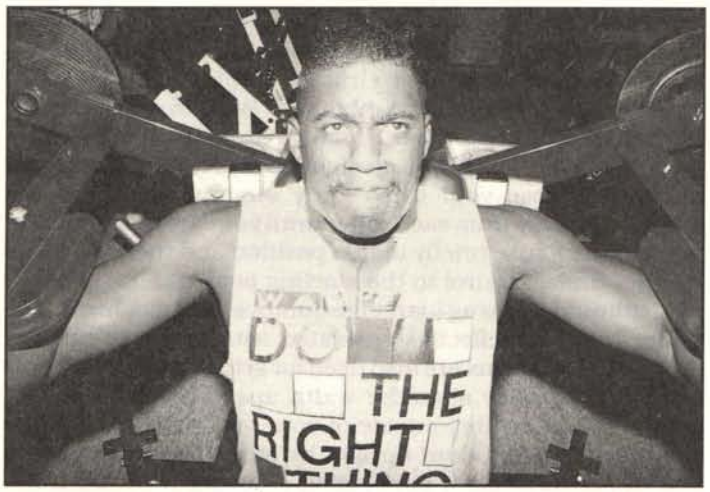
Shoulder Shrug (barbells, dumbbells or machine): The upper traps are effectively isolated with this exercise (although the forearms are also used for gripping). Spread your feet approximately shoulder width apart. Bend down and grasp the bar on the outside of your legs with your palms facing backward. Stand upright by straightening your legs and upper torso (as if performing a deadlift). To begin the exercise, keep your arms straight and pull the bar up trying to touch your shoulders to your ears (as if to say, "I don't know"). Pause briefly in this position and then return the weight under control to the starting position.

Shaun Stolz, a 6'3" 255 lbs. high school football player from Troy H.S. in Ohio performs a set of dumbbell rows. Shaun has bench pressed 225 lbs. for 18 reps during a workout, not bad for a high school player.

The Routine

The routine is very simple yet absolutely brutal if done correctly. It consists of eight sets to be done with little or no rest period between exercises. In fact, this entire shoulder workout should take about 8 to 10 minutes to perform. The routine is summarized as follows:

Exercise	Reps
Shoulder Press	8 - 12
Upright Row	8 - 12
Lateral Raise	8 - 12
Shoulder Shrug	8 - 12
Shoulder Press	8 - 12
Upright Row	8 - 12
Bent Over Raise	8 - 12
Shoulder Shrug	8 - 12



Brian O'Neal in order to "Do the Right Thing" for his deltoids trains his shoulders with a variety of exercises. Brian has been training at the Hammer Strength Training Center in Cincinnati, Ohio this summer with Ted Lambrinides.

Guidelines

Each exercise should be done to the point of concentric muscular failure. Concentric muscular failure should occur within the prescribed repetition ranges. The exercises should be performed throughout a full range of motion. The weight should be raised in about 1 to 2 seconds and lowered in about 3 to 4 seconds. Again, the movements should be done with very little recovery between exercises.

Generally, 2 to 3 exercises performed in a high intensity fashion will provide a sufficient workload for the deltoids. For this reason, this particular program should not be performed during every workout. In fact, it should only be done once every two weeks in order to ensure that an adequate amount of recovery takes place.

Speed of Movement While Strength Training

By Dave Ash, ATC
University of Kentucky

The purpose of the strength and conditioning program is to make careers longer. All components of the program (conditioning, flexibility, strength, nutrition) are administered with this goal in mind. Research studies utilizing the squat exercise have examined the consequences of increasing lifting speed. While the squat can be done safely and productively if basic guidelines are followed (using a weight that allows at least 8-10 slow, controlled repetitions and maintaining proper mechanics such as vertical shin with minimal lumbar curve), problems arise as speed of movement increases. As lifting speed increases, compressive force and antero-posterior shear force at the knee joint increase (1), compressive force, shear force, and peak torque at the L5-S1 intervertebral joint increases (2). Considering the prevalence of patello-femoral problems and the fact that L4-L5 and L5-S1 are the most vulnerable locations for spondylolysis (low back stress fracture) we do not need to expose our athletes to the additional risk that accompanies quick lifting movements. Another study which examined both lower and upper body movements discourages the practice of explosive strength training due to high incidence of injury and high drop out rate (3).

Some recommended movement times are in the range of 2 seconds concentric contraction/4 seconds eccentric contraction (4) and 3 seconds concentric contraction/4 seconds eccentric contraction (5). While it is not intended that you hold a stopwatch over your athletes as they lift, the point is that quick or ballistic strength training movements are avoided.

Research has not shown that athletes who strength train with the safer, slow movements and then practice their sport skills at competition speed will perform at a slower rate than those who use quick movements while lifting. Moving quickly while strength training does not automatically mean that you will move quickly while performing a different task. The only way a football player gets quicker at coming out of his stance is by coming out of his stance at game speed. The only way a basketball player will become more powerful at going to the basket is by working on post moves against live competition (6).

If strength training is performed in a slow controlled manner, the athlete will get as strong as genetics will allow. If game skills are practiced at game speed the athlete will