

S C H O L A S T I C

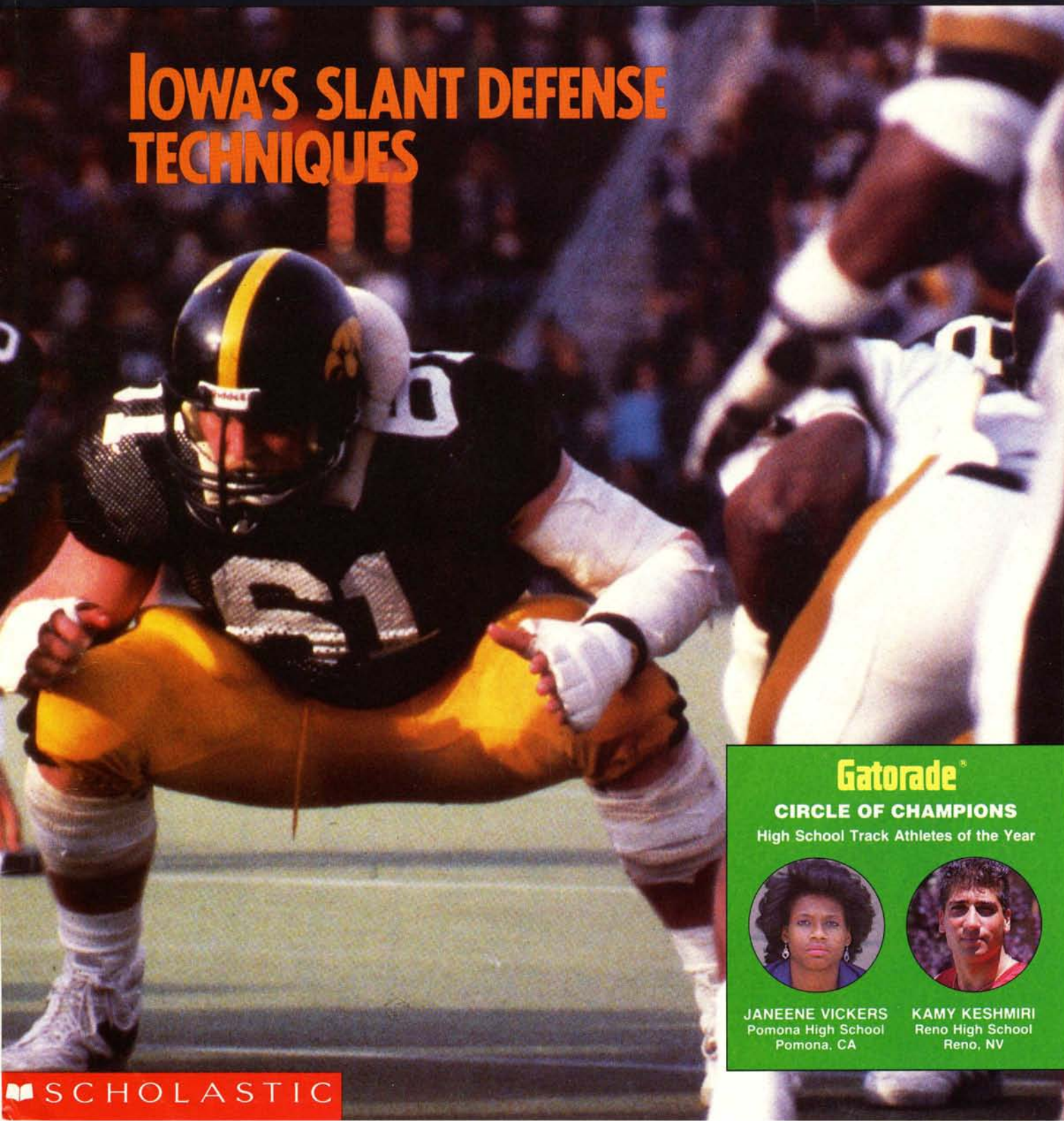
Coach

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High School Track Athletes of the Year



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Rx

FOR A SAFE, PRODUCTIVE STRENGTH PROGRAM

THOUGH coaches agree that strength training offers a valuable way of improving performance and safeguarding against injury, they begin debating when it comes to methodology.

The problem is compounded by the literature. Coaches are literally inundated with the "latest" information on strength and conditioning via magazines, books, research studies, clinics, and daily reports from the Russian laboratories.

Some of this material is sound and safe; just as much of it is illogical and dangerous.

Though there is no "one best method" of training, some obviously are better than others. As a competitive powerlifter, I used to think nothing of spending three to four hours on countless sets of low-repetition exercises at low levels of intensity. It offered a fairly productive way of demonstrating strength, but it did not necessarily help build strength.

The low-repetition movements done with heavy resistance were also potentially dangerous and obviously inefficient in terms of time. It was certainly impractical (if not impossible) to use such a system with large numbers of athletes.

Yet we still found "experts" who wanted us to believe that they were successfully training all of their athletes in this fashion.

Three requirements are necessary for muscular growth:

The first is that a stimulus must be applied to a muscle—a stimulus that is best produced by a system based on brief, high-intensity exercise incorporating a progressive overload.

In simple terms, this means that

the athlete must attempt to perform one more repetition and/or use more resistance than he did in the previous session.

The second requirement is to allow 48 to 72 hours of recovery time between workouts. It is during this recovery period that the muscles adapt to the imposed stimulus. If the training program does not provide for adequate recovery, the athlete will gradually reach an overtrained state and will begin losing size and strength.

The third requirement is to supply the body with the proper fuel for growth.

Whenever these three conditions are met, the muscles will respond by increasing in both size and strength. The *degree* of growth will then become a function of the individual's genetic profile; i.e., insertion points, fiber types, limb length, neurological efficiency, etc.

Athletes need not (and should not) spend large amounts of time on strength-training. The program should stimulate the maximum gains in the least amount of time.

The following guidelines will help the coach organize a safe, efficient, and productive program:

Weight. Choose a weight that will induce the athlete to reach momentary muscular failure (i.e., when further repetitions are impossible) within the prescribed number of reps.

If muscular failure occurs before the athlete achieves the suggested repetition range, the weight is too heavy and should be reduced for his next workout. If the athlete exceeds the upper level of the repetition range before encountering muscle failure, the weight is too light and should be increased for the next workout.

Reps. Most individuals will reach momentary failure within 15 to 20 reps (or 90 to 120 sec.) for the gluteals; 10 to 15 reps (or 60 to 90 sec.) for the rest of the lower body; and 6 to 12 reps (or 36 to 72 sec.) for the upper torso.

This should be followed immediately by 2 to 4 post-fatigue reps (which are positive-assisted and negative-resisted) administered by a training partner or coach.

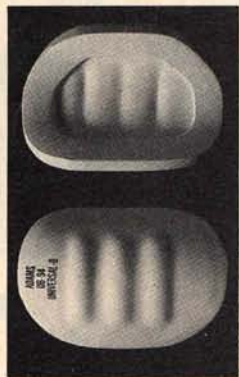
These recommended repetition ranges are not carved in stone. Some athletes, because of their genetic makeup, may require a slightly lower or slightly higher repetition range in order to maximize their response. However, the suggested ranges can still serve as excellent guidelines to provide the impetus for growth.

Sets. Assuming adequate recovery and proper nourishment, **one**



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STRENGTH TRAINING

set of each exercise performed to the point of momentary muscular failure will provide enough stimulus to promote maximum gains in both size and strength. Multiple sets are, therefore, relatively inefficient and not recommended.

Rest. Rest as little as possible between exercises in order to achieve a metabolic conditioning effect. Since rest intervals are difficult to quantify, it's almost impossible to compare workouts in order to measure progress. The entire routine should take no more than 30 to 40 minutes.

Order. Generally speaking, the muscles should be worked from largest to smallest, i.e. gluteals, legs (hamstrings, quadriceps, calves), upper torso (pectorals, latissimus dorsi, deltoids), arms (biceps, triceps, forearms), abdominals, and lower back. The neck may be exercised either at the beginning or at the end of the program.

Frequency. At most, the athlete should strength train three times per week (every other day) in the off-season. Training in this manner will provide his muscles with the required 48 to 72 hour recovery period.

Because of the increased activity level, he should strength-train twice a week in-season: one workout the day after the competition and the other workout no sooner than 48 hours before the next competition.

Volume. No more than 14 to 18 exercises should be performed in any workout, with the focal point for most of them being the gluteals, legs, and upper torso. Doing any more than this will likely cut into the athlete's recovery time and limit his potential gains.

As stated earlier, this type of program will stimulate maximum strength gains in a relatively short period of time and will also produce a high level of metabolic conditioning.

In order to illustrate these effects to a group of incoming freshmen athletes, we had one of our wrestling captains perform a workout

wearing a heart-rate monitor. The athlete weighed 175 pounds and had a resting heart rate of 43 beats per minute, as measured by an electrocardiograph. He performed the exact workout shown in the chart.

EXERCISE	WEIGHT/REPS
Neck Flexion Right.....	62½/12
Neck Flexion Left.....	62½/12
Neck Flexion.....	MR/12
Neck Extension.....	Mr/12
Hip and Back.....	182½/20L,18R
Leg Curl.....	125/14
Leg Extension.....	160/13
Leg Press.....	180/20
Bench Press.....	179/8
Bent Arm Fly.....	MR/12
Pullover.....	150/9
Negative Chins.....	275/-8
Lateral Raise.....	120/9
Seated Press.....	70/8
Bicep Curl.....	MR/12
Negative Dips.....	290/-8
Situps.....	MR/72 sets

Notes: "MR" — manual resistance supplied by a partner — 18 exercises (Hip and Back was done unilaterally) — Workout Time, 30:34 (about 25 seconds between exercises)

It was exhausting to perform and almost frightening to observe, though the entire routine of 17 exercises (18 sets) took only about 30 minutes to complete (30:34). The athlete averaged approximately 25 seconds of rest between movements.

Once he began training his lower body musculature, his heart rate remained between 160 to 180 beats per minute (or 81 to 91% of his age-predicted maximum) until the program was completed. This kind of conditioning effect cannot be approached by traditional lifting programs.

Each repetition was performed through a full range of motion. The resistance was lifted in a deliberate manner without momentum in about 1 to 2 seconds and lowered under control in about 4 seconds.

Each repetition thus took roughly 6 seconds to complete.

When no additional movement was possible, a training partner provided 2 to 4 post-fatigue repetitions.

Conclusion:

The main objectives of any strength-training program are to increase performance and decrease injury potential.