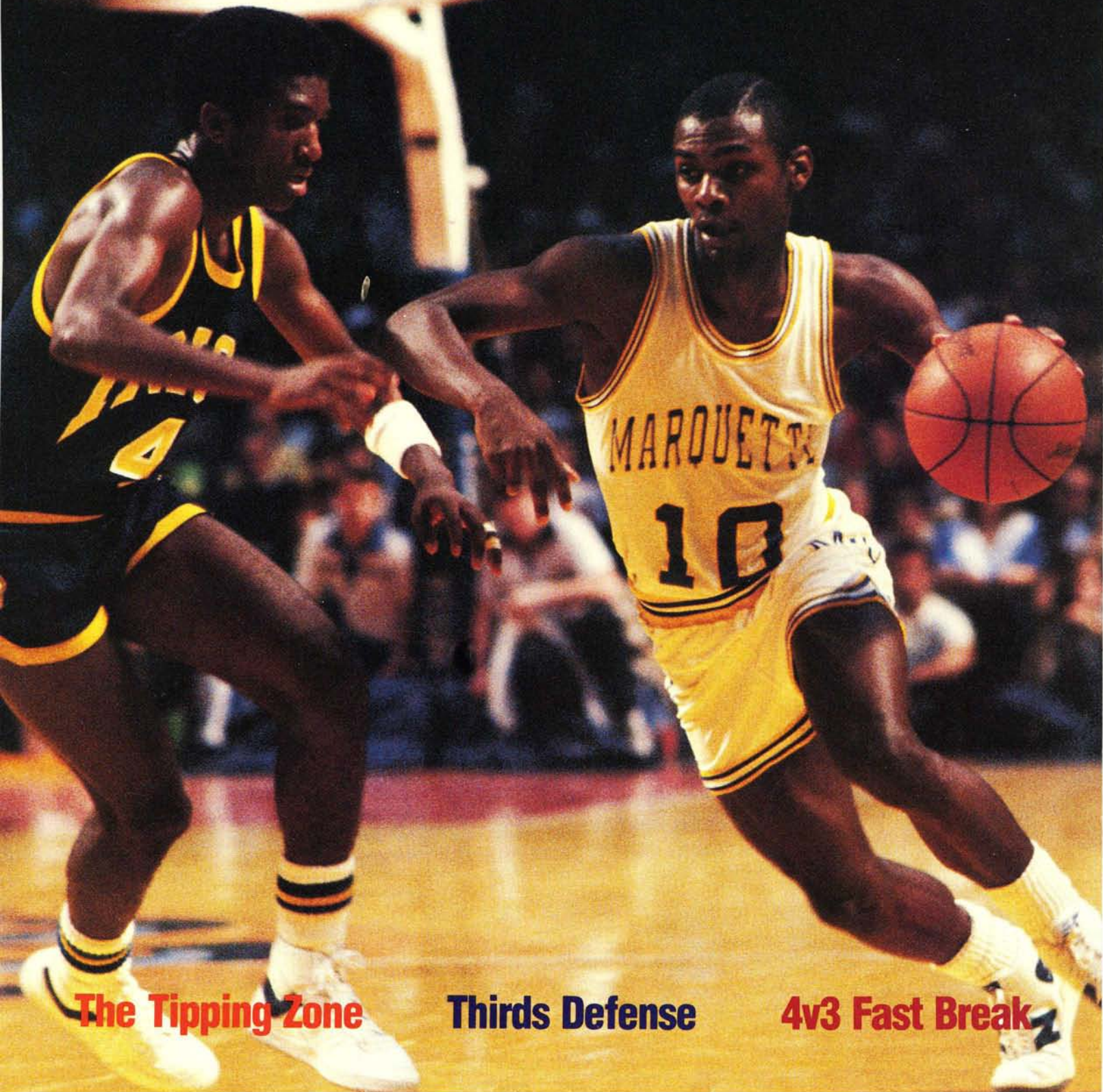


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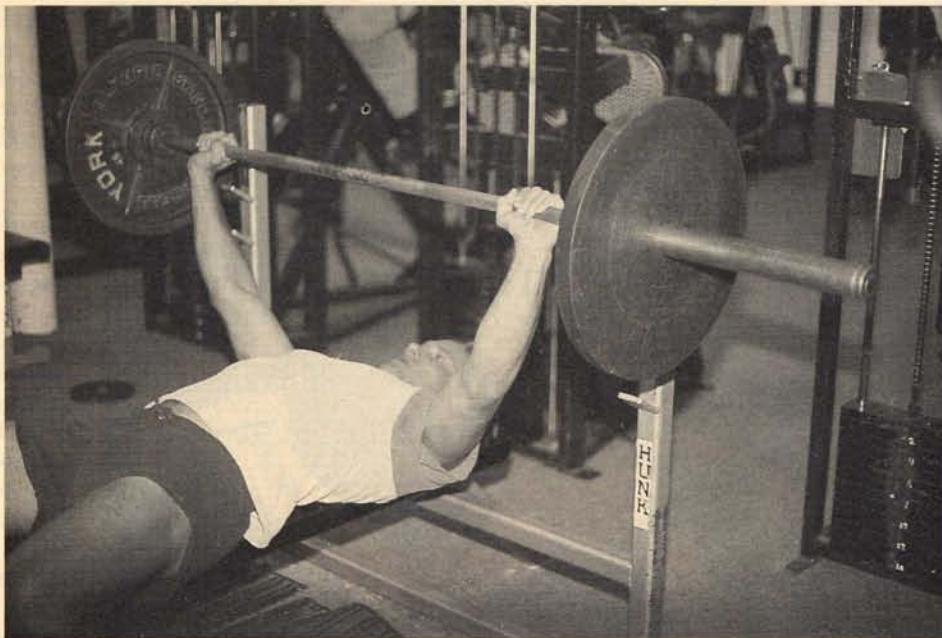
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Weight Training vs. Weight Lifting

Brief sessions of high intensity weight training are more beneficial to the athlete than high risk weight lifting.

By Matt Brzycki

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With the growing acceptance in the value of strength training, it becomes necessary to differentiate between two terms which are often mistakenly used interchangeably - weight training and weight lifting.

The two purposes of weight training are, in order of importance, to reduce the injury potential of your athletes and to increase your athletes' performance potential. Weight training is typified by brief sessions of high inten-

sity exercise performed two to three times per week. Generally, one or two exercises are designated for the body's major muscle groups. Each exercise is performed for a prescribed number of repetitions, usually 10 - 15 for the lower body and 6 - 12 for the upper body. Repetitions are done throughout a full range of motion in a deliberate, controlled manner.

Weight lifting, on the other hand, may be

defined as a type of strength training that is characterized by multiple sets of low repetition movements performed in a rapid, explosive manner. The ultimate goal of weight lifting is to lift as much weight as possible for one repetition. A program of this nature usually consists of those exercises performed by competitive lifters - the clean and jerk, snatch, squat, bench press and deadlift. From these basic lifts, a number of generic derivatives have been conceived such as the power clean, squat clean, push press, push jerk, power pull, snatch pull and hang clean pull.

Most strength coaches, including this author, are former competitive lifters. Therefore, many have advocated programs which are familiar to them, programs which they used successfully as competitive lifters. Unfortunately, many schools across the country are now using weight **lifting** programs under the guise of weight **training** programs. The ability to lift heavy weights for a one repetition maximum is used as a barometer to measure potential achievement on the playing field. For the most part, these schools are turning out weight lifters rather than football players and basketball players.

A few areas of major concern associated with a weight lifting program should be examined in greater detail.

THE POWER CLEAN

One of the typical exercises in a weight lifting program is the power clean. For years, this movement has been used to mimic certain explosive skills (e.g. driving off the line of scrimmage) with the belief that there will be a positive transfer of motor ability to the athletic arena. One athlete I've encountered sincerely believed that there was a direct relationship between power cleans and rowing a boat. If this is true, why can't we take six of our country's elite Olympic lifters, put them in a boat and beat the Finns?

Attempting to duplicate a sports skill with weights is a step in the **wrong** direction. Each time an athlete performs a given sports skill, there is a specific neuromuscular pattern involved which is unique to that movement alone. Introducing anything foreign to the "pattern" (such as weighted footballs, leg weights, barbells, etc.) will only serve to confuse the original neuromuscular pathway, actually creating a negative transfer and a resultant decrease in performance. This phenomenon is well-documented in the motor learning literature.

Likewise, there is absolutely **no** correlation between the ability to power clean and the ability to play football. This certainly holds true for the competitive lifts as well, but coaches still "max test" their athletes with the

notion that they've made better football players when, in fact, they've only made better weight lifters.

Another problem related with the power clean is that it is undoubtedly one of the most complicated things that one can do with a barbell. A high degree of proficiency is also required to perform the competitive lifts. Like learning any other complex motor skill, this means that an athlete must spend a good deal of time developing these specific neuromuscular patterns. One respected strength coach, a former Olympic lifter, has remarked that after nearly 13 years of competitive lifting (which included four state championships) he was still not satisfied with his technique in the power clean! Of course, the time that athletes use practicing the fundamentals of a power clean could be used more economically to learn worthwhile, sports-appropriate skills like pass blocking or a single leg take-down.

The greatest disadvantage in performing power cleans and most of the competitive lifts lies in the inherent risk of injury. Because a power clean can only be performed ex-

Weight training reduces the injury potential of your athletes and increases the performance potential.

plosively, it represents a potentially dangerous exercise which exposes the muscles and connective tissue to excessive forces that can lead to numerous traumatic injuries (e.g. various sprains, strains, etc.). As a frightening example, I've known an experienced competitive lifter who broke both his wrists while attempting to do a power clean.

It should also be noted that placing a weighted bar on one's shoulders (as in a squat) causes compression of the spinal column. Electromyographical activity of six to ten times bodyweight has been recorded in the lumbar region when squatting explosively with as little as 1 to 1½ times bodyweight! Teenage athletes are especially vulnerable because of their relatively immature musculoskeletal systems.

EXPLOSIVE TRAINING

Another characteristic of a weight lifting program is that the movements are performed explosively with the mistaken belief that the body will recruit "fast twitch" muscle fibers.

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Training vs. Lifting

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However, no evidence exists to suggest that the body can modify various histochemical reactions in order to preferentially recruit muscle fibers. Furthermore, an athlete cannot alter genetically predetermined muscle types.

Ironically, explosive training actually inhibits potential muscular strength gains. The faster an athlete lifts a weight, the more momentum is used. The more momentum is used, the less need there is for the muscles to do the work.

Most importantly, training explosively with any type of equipment is inherently dangerous. A proponent of explosive training once argued that doing a repetition with 200 pounds in 2 seconds means moving at 100 pounds per second. His logic was that by taking the same 200 pounds, but this time lifting it in half the time (one second), it would result in twice the output, or 200 pounds per second. Although his mathematics were correct, his common sense was not. What about

the structural integrity of the joint? Can it dissipate the imposed stress? Maybe it can, but what if it cannot? If we are to err, let's err on the side of caution.

So, it would seem that this type of training invites injury rather than prevents their occurrence. Not surprisingly, those who prescribe weight lifting programs are quick to boast of 400 pound bench presses or 18 inch arms, but make little or no mention of minimizing injury potential.

TIME AND INTENSITY

Time refers to the duration of an activity while intensity may be viewed as a percentage of momentary ability of a muscle. A high level of intensity is typified by a low percentage of momentary ability. The higher the intensity, the greater the overload of a muscle and concomitant increases in size and strength.

These two variables, time and intensity, are inversely proportional. In other words, as the length of activity increases, the level of intensity must decrease. Therefore, for a workout to be intense, it must also be brief.

Weight lifting programs are done utilizing some form of multiple sets, such as pyramiding or supersets. Training sessions can last anywhere from 1½ to 3 hours. Obviously, this

type of training is extremely time consuming and sacrifices intensity.

In addition, when a split routine system is employed, an athlete will spend 4 to 6 days per week lifting. Over a period of time, an athlete's recovery ability could be so severely stressed by these marathon workouts that he will be in an overtrained state.

Moreover, a weight lifting program is ill-advised from an administrative standpoint. It seems virtually impossible to service a large number of athletes using this type of regimen.

LIABILITY

Safety in the weight room extends far beyond the scope of spotters and collars. Consider the prototypical competitive lifter who possesses favorable muscle attachments combined with a high degree of mesomorphy - relatively short limbs, wide hips and thick muscles. Contrast these physical characteristics with those of other athletes who may be tall and thin with long torsos, long limbs and narrow hips. Their body types, therefore, dictate that they are at a distinct disadvantage with respect to the desired anatomical leverage necessary for competitive lifting. To require an athlete with these kinds of

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biomechanical limitations to perform barbell squats, for example, is not only ludicrous but criminal. His spine might bend like a sapling in gale winds.

As coaches, we have a legal responsibility to prevent injuries to our athletes. The potential for injuries associated with weight lifting programs is now apparent. A contradiction seems to exist with coaches who continue to implement these programs. Safer and more efficient ways of strengthening the musculature should be adopted. A coach who fails to foresee the inherent danger of a particular activity should be held personally liable for negligence.

Brief sessions of high intensity weight training should be done 2 - 3 times per week. Workouts should consist of one or two exercises performed for a prescribed number of repetitions for each of the body's major muscle groups. All repetitions should be done in a deliberate, controlled manner throughout a full range of movement.

A graduate of Penn State University, Matt Brzycki became the assistant strength coach at Rutgers in September, 1984. A former powerlifter in the 165 lb. class, he served on the health and fitness staff at Princeton University.

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