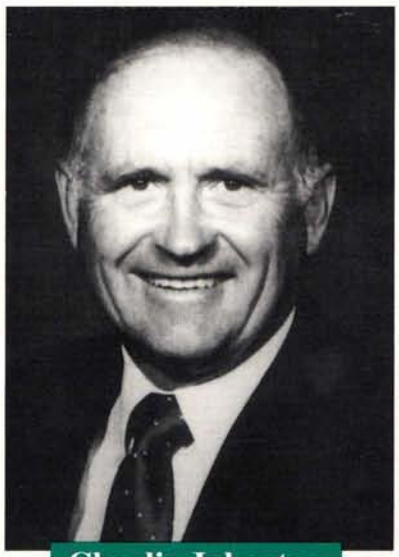
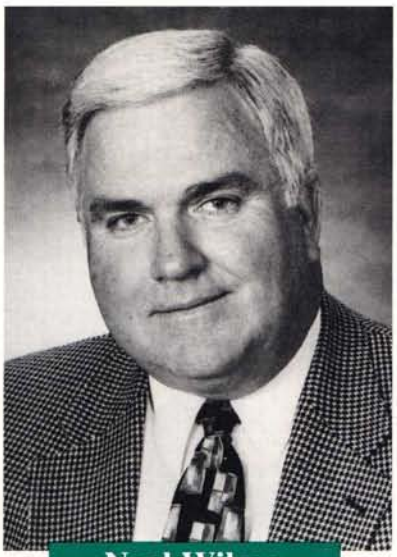
TEXAS
Coach
August 1994

1994 THSCA HALL OF HONOR INDUCTEES



Charlie Johnston



Neal Wilson

Don Coleman

Charles Williams

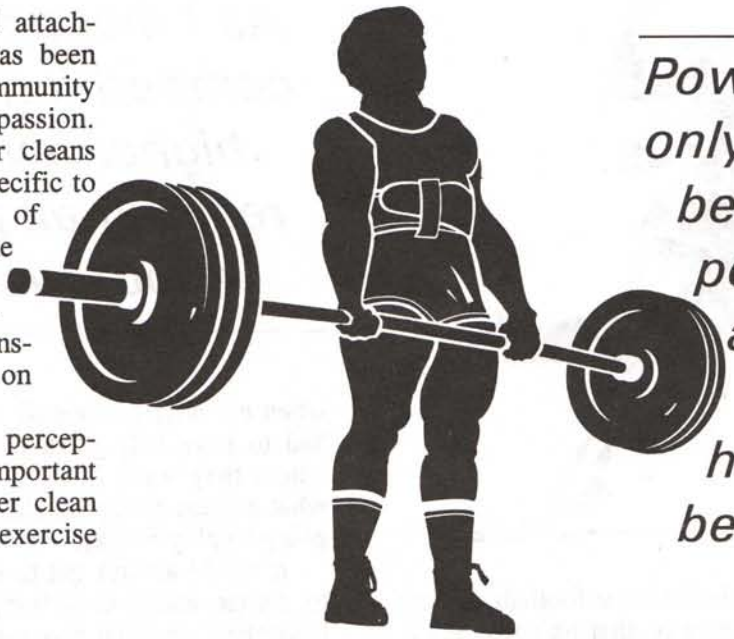
TEXAS HIGH SCHOOL COACHES ASSOCIATION INC.

Richard Flores

The Complete Dirt on the *Power Clean*

Matt Brzycki, Strength Coach
Princeton University

The romantic, emotional attachment to the power clean has been force-fed to the coaching community for years with a religious passion. Among other things, power cleans have been touted as being specific to an incredibly wide range of sport skills. Additionally, the explosive manner used in the execution of this movement has been thought to translate to explosive movements on the athletic field.



Power cleans will only help you get better at doing power cleans and lunges will only help you get better at doing lunges.

Before examining these perceptions in greater detail, it's important to understand how the power clean became such a popular exercise among strength coaches.

HISTORY 101

When universities and professional teams began to seek advice about weight training in the early 1970s, they quickly solicited those individuals who appeared to know something about that subject. The perceived "experts" of that era were the competitive weightlifters. Since Olympic-style weightlifting was more popular in those days than the sport of powerlifting, many of the first strength coaches had a background as Olympic-style weightlifters.

Unfortunately, the initial practice of hiring competitive weightlifters as strength coaches quickly spawned numerous myths and misconceptions about proper strength training. In most cases, competitive weightlifters knew absolutely nothing about the actual physical demands of sports other than weightlifting. A greater problem than that, however, pertained to their weightlifter-inspired methods and mentality. In their new role as strength coaches, competitive weightlifters advocated programs and routines that were most familiar to them -- programs and routines that they themselves used to train for the sport of competitive weightlifting. Olympic-style weightlifters knew how to get strong in order to perform several specific movements: the overhead press, the snatch, and the clean and jerk. These and other related movements -- like the power clean -- required a great deal of time, effort and patience simply to learn and perfect the complex, highly-specialized skills to the point where they could be performed with any degree of proficiency and safety. To make matters worse, a national organization was formed that glorified, hyped and encouraged methods used by the Eastern European weightlifters -- particularly the Soviets, Bulgarians and East Germans. As a result, most athletes in the early 1970s were actually using modified weightlifting programs under the guise of strength training programs.

Today, the knowledge and popularity in weight training has increased tremendously. The coaching fraternity now endorses much safer and more time-efficient methods of training that are based upon scientific investigation and common sense -- not anecdotal evidence and wild speculation.

EXPOSING THE MYSTIQUE

The theory that power cleans would improve explosiveness and expedite skill development has been discredited by logic and legitimate, unbiased research that has no emotional stake in the results. These are some of the traditional notions pertaining to power cleans that have been debunked by the academic community:

Specificity: One well-intended but misguided practice handed down from competitive weightlifters involves the use of weighted objects to practice sports skills. During this "overload training", barbells, dumbbells, and medicine balls are used to simulate or mimic sports movements with the expectation of improving performance. For exam-

ple, power cleans have been considered as being specific to a wide range of skills from the breast stroke to the golf swing to the shot put. However, studies indicate that overload training is not accompanied by a measurable improvement in performance in the skills that have been practiced with weighted objects. The support for overload training is purely anecdotal.

In addition, it's absolutely impossible for one movement to be identical to such a broad group of differing skills. The Principle of Specificity is well-documented in the motor learning literature. Briefly, it states that an activity must be specific to an intended skill in order for maximal improvement -- or "carryover" -- to occur. Specific means exact or identical, not similar or just like. So, performing power cleans may be similar to driving off the line of scrimmage and doing lunges may be just like driving toward the hoop, but power cleans will only help you get better at doing power cleans and lunges will only help you get better at doing lunges. Likewise, tossing medicine balls around is great for improving your skill at tossing medicine balls around and nothing else. Furthermore, there is no exercise done in the weight room -- with barbells or machines -- that will expedite the learning of sports skills.

If there were correlation between power cleans and other sports skills then highly successful weightlifters would excel at literally every sports-related movement they attempted. So, if five members of the Bulgarian National Weightlifting Team were placed on a basketball court, they should easily win every game! Naturally, this wouldn't happen. That's because there is absolutely no "carryover" between power cleans and other athletic skills.

A movement like a power clean is also an extremely complex motor skill. Like any other motor skill, it takes a lot of time and patience to master its specific neuromuscular pattern. This valuable time and energy could be used more effectively elsewhere -- such as perfecting your dribbling or shooting skills.

Explosive Lifting: Because the power clean is performed in a rapid or explosive manner, it was assumed that doing this movement would develop explosiveness. Lifting a weight in a rapid, explosive fashion is ill-advised for two reasons. First of all, explosive lifting introduces momentum into the movement which makes the exercise less productive and less efficient. To illustrate the effects of momentum on muscular tension, imagine you pushed a 100 pound cart a distance of 50 yards at a deliberate, steady pace. In this instance, you maintained a constant tension on your muscles for the entire 50 yards. Now, suppose you were to push the same cart for another 50 yards. This time, however, you accelerated your pace to the point where you were running as fast as possible. If you were to stop pushing the cart after 35 yards, the cart would continue to move by itself because you gave it momentum. So, your muscles had resistance for the first 35 yards...but not for the final 15 yards. The same effect occurs in the weight room. When weights are lifted explosively, there is tension on the muscles for the initial part of the movement...but not the last part. In effect, the requirement for muscular force is lessened and the potential strength gains are reduced accordingly.

Secondly, explosive lifting can also be dangerous. Here's why: Using momentum to lift a weight increases the internal forces encountered by a given joint; the faster the weight is lifted, the greater these forces are amplified -- especially at the point of explosion. When the forces exceed the structural limits of a joint, an injury occurs in the muscles, bones and connective tissue. Dr. Fred Allman, a past president of the American College of Sports Medicine, takes this point one step further, stating, "It is even possible that many injuries...may be the result of weakened connective tissue caused by explosive training in the weight room."

Orthopaedically-Unsafe Exercises: Scientific, athletic and rehabilitative professionals have questioned the inherent risks of certain exercises -- such as power cleans -- for years. Indeed, the potential for injury from power cleans is positively enormous. When performing power cleans, the musculoskeletal system is exposed to repetitive trauma and extreme biomechanical loading. Young athletes are especially vulnerable.

More importantly, a power clean is inherently dangerous because it is performed explosively. Recall that ballistic movements are also inefficient due to the involvement of momentum. Finally, "explosive" lifting does not translate into "explosive" athletic skills.

COMING "CLEAN"

When someone is described as being "explosive" on an athletic field, essentially what we are saying is that the athlete performs, moves or reacts quickly and forcefully. This is primarily due to the fact the athlete's movement patterns for a particular skill are so firmly ingrained in his or her "motor memory" that there is little or no wasted effort. In other words, it's because the athlete is highly efficient at performing the intended sports skill -- not because the athlete practiced explosive movements like the power clean.

The sport of competitive weightlifting carries a certain degree of risk. Competitive weightlifters accept those risks as being part of the sport. However, athletes who aren't competitive weightlifters shouldn't have to assume such an unreasonable risk of injury. For these reasons, power cleans should only be performed by competitive Olympic-style weightlifters -- and only because it relates to their sport.

Matt Brzycki has authored more than 120 articles on strength and fitness including a book, ***A Practical Approach to Strength Training****, which is in its second edition. He has also co-authored the book* ***Conditioning for Basketball*** *with Shaun Brown, Strength Coach for the University of Kentucky basketball team.*