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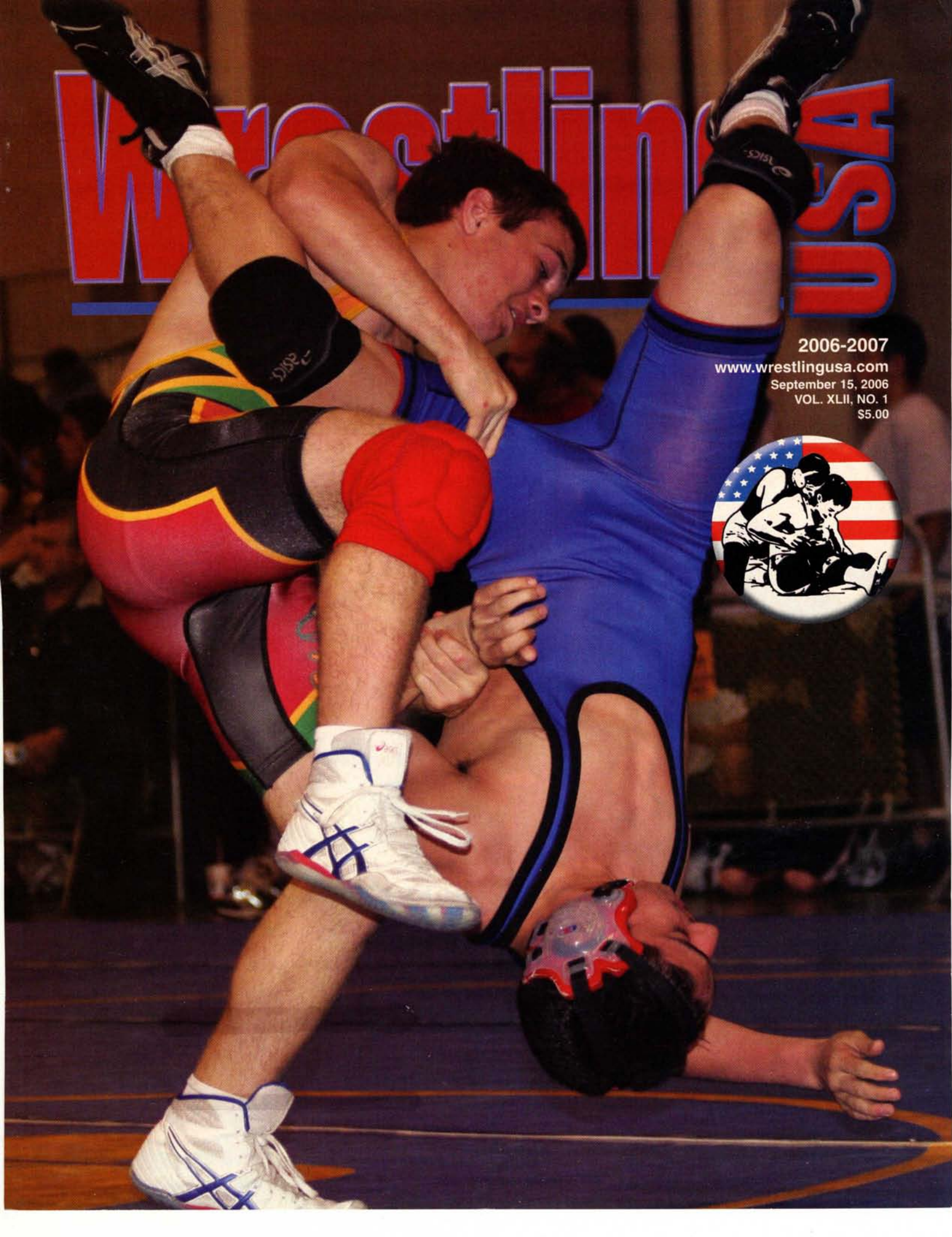
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# The Case Against the Power Clean

By Matt Brzycki

In the weight room, perhaps no other exercise is glorified more than the power clean. And oddly enough, perhaps no other exercise is criticized more than the power clean.

The power clean is basically the initial phase of a competitive, Olympic-style lift known as the "clean and jerk." Dan Riley, the Strength and Conditioning Coach of the Houston Texans, notes that the power clean "is a combination of the squat, deadlift, upright row and [shoulder] shrug."

In discussing the power clean, there is a need to answer the following three questions:

- Is the power clean effective for improving power?
- Is the power clean specific to wrestling skills?
- Is the power clean a safe exercise?

### POWER IMPROVEMENT

It has been believed that the power clean will transfer – or "carry over" – to explosive movements performed on the wrestling mat. But despite an abundance of anecdotal claims, there is simply no scientific evidence that the power clean will contribute to explosive performance.

Understand that lifting weights with rapid speeds of movement is only a demonstration of power not an adaptation. The explosiveness demonstrated during a power clean is only specific to a power clean. Likewise, the explosiveness demonstrated during a double-leg takedown is only specific to a double-leg takedown. Doing a power clean will not improve your explosiveness during a double-leg takedown any more than doing a double-leg takedown will improve your explosiveness during a power clean.

According to Luke Behncke, a teacher of anatomy, kinesiology and biophysics at

RMIT University in Australia, "Current motor control theory suggests that there is no general power ability that can be trained. Each specific skill is a composite of selected innate abilities; thus, practice of specific skills seems to be the most efficient way of eliciting the desired improvements in power." In other words, the best way to improve power during a double-leg takedown is to practice a double-leg takedown.

It is important to note that lifting a weight in an explosive manner requires the use of a light resistance. And using a light resistance is counterproductive for increasing muscular strength. Mike Bradley, a strength and conditioning coach at Florida State University, explains, "In order to overload and progress, the resistance must be increased. But increasing the resistance slows down the speed of movement. There is simply no way you can power clean 200 pounds as fast as 100 pounds. And it is impossible to get stronger by using 100 pounds in the power clean, workout after workout, no matter how fast you lift the weight."

Here is something else to think about: Lifting a weight in an explosive manner is less efficient than lifting a weight in a controlled manner due to the increased involvement of momentum. "The power clean, by definition, is a momentum-assisted lift," says Mark Asanovich, the Strength and Conditioning Coach of the Jacksonville Jaguars. "It is performed by initially applying enough ballistic force to the bar to move it under its own impetus. Once momentum accelerates the bar, muscular force is no longer required for further movement. Without muscular force, there is no tension on the muscle. Without tension on the muscle, there is no fiber recruitment. Without fiber recruitment, there is no overload. Without overload, there is no stimulus for muscular adaptation. Without stimulus, there is no strength training."

### SKILL IMPROVEMENT

It has been believed that the power clean is specific to a wide spectrum of skills.

Over the span of about five years, a variety of articles published in a "journal" that targeted strength coaches stated that the power clean was specific to the following skills (and others): shooting a basketball; long-snapping a football; spiking a volleyball; rowing a boat; fore-handing a tennis ball; pedaling a bicycle; tackling a football player; hitting a golf ball; swimming the backstroke, butterfly and breaststroke; throwing a javelin, discus and hammer; sprinting; putting a shot; playing baseball, Nordic skiing; pole vaulting; and sled racing.

In addition, one of the articles stated that the power clean was specific to wrestling. In fact, the article noted that the power clean "reflects movements common to [wrestling]." Really? How "common" is it for a wrestler to grasp an inanimate object that is resting on the mat and then pull it to shoulder level and drop under it all in one motion?

Obviously, it is impossible for the power clean – or any other exercise, for that matter – to be specific to such a broad range of differing skills. One of the most frequently cited doctrines in motor learning is the Principle of Specificity. This principle states that activities must be specific to an intended skill in order for a maximal transfer of learning to occur. The word "specific" means "exact" or "identical" not "similar" or "just like." So, performing a power clean may be "similar" to executing a double-leg takedown but the truth is that performing a power clean will only help you get better at performing a power clean. "The power clean and double-leg takedown may seem the same as they generate force from the ground up," explains Sam Knopik, the Head Football Coach at Pembroke Hill School in Kansas City (MO), "but the concept of, essentially, tackling your opponent is not the same as raising a straight bar along a vertical plane, let alone throwing it over your head." Remember, it is the Principle of Specificity not the Principle of Similarity.

Weight-room exercises that are similar are not even specific to each other. In a clas-

sic study, 24 subjects performed three sets of five repetitions of the bicep curl in the standing position three times per week for six weeks. At the end of the training period, their strength in the bicep curl increased by 14.38 pounds when measured in the standing position. But their strength in the bicep curl increased by only 3.37 pounds when measured in the supine position. If the bicep curl done in one position is not even specific to the bicep curl done in another position – a nearly identical exercise – then the power clean is not specific to any other exercise that is done in the weight room. And if the power clean is not even specific to any other exercise that is done in the weight room, then it is not specific to any skill that is done in the wrestling room. Simply, there is no exercise done in the weight room – with barbells or machines – that will expedite the learning of a skill on the wrestling mat.

What determines if one skill is specific to another? The two skills must use the exact same muscles, have the exact same movement pattern, use the exact same speed of execution and involve the exact same resistance. In order for a weight-room exercise to be specific to a wrestling skill, all four of these elements must be true. A weight-room exercise may resemble a

wrestling skill in terms of using the exact same muscles, movement pattern, speed of execution and resistance. But at best, a weight-room exercise can only approximate a wrestling skill . . . it cannot duplicate it. Refer back to the laundry list of skills for which the power clean is thought to be specific. The wide range of skills involves different muscles, different movement patterns, different speeds of execution and different resistances. Indeed, just consider the obvious differences between hitting a golf ball and executing a double-leg takedown. Yet, the power clean is somehow specific to these two vastly different skills?

Doing the power clean is, in itself, an extremely complex skill. Like any other complex skill, it takes a lot of time and patience to perfect its specific neuromuscular pattern. Scott Hays, the Strength/Football Coach at Fowlerville High School (MI), asks rhetorically, "How many other movements have to be broken down into different phases to be taught?" Coach Hays adds, "I have a limited amount of time to train our athletes. I would much rather spend that time teaching them basic lifts that work the same muscles as the power clean that are easier to learn."

Clearly, the valuable time and energy that are spent in learning how to properly execute the power clean could be used more effectively elsewhere. For instance, a wrestler could work on perfecting sport-specific techniques and skills that will actually be used on the mat.

To reiterate: Wrestling skills are best developed in the wrestling room not in the weight room. Mike Shibinski, the Strength and Conditioning Coach at Princeton High School (OH), says that his primary job as a strength coach is "to prevent injuries that might occur during competition and practice." He does this by exposing his athletes to an intense strength-training program and an aggressive speed/agility/conditioning program. "I am working on the raw material of an athlete," says Coach Shibinski. "It is the wrestling coach's job, then, to take that raw material and drill to perfect it into a smooth-working skill during practice and meets."

### SAFETY

As noted earlier, the power clean is the initial phase of the clean and jerk which is a competitive, Olympic-style lift. Scientific, athletic and medical professionals have questioned the safety of the Olympic-style

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lifts for years. The American Orthopaedic Society for Sports Medicine, for example, contraindicates the Olympic-style lifts in training regimens. Young individuals are especially vulnerable. The American Academy of Pediatrics recommends that preadolescents should not practice the competitive lifts because of the "high injury rate."

With more than 25 years of experience as a strength and conditioning coach in the National Football League, Dan Riley is the elder statesman of professional strength coaches. According to Coach Riley, "The inherent dangers unique to this movement can make it a potential hazard. In the starting position, the athlete goes from almost no load on the body to sudden impact. It places the muscles, lower back, tendons and joints in a vulnerable position."

Excessive impact forces as a result of "catching" the bar also increase the risk of injury. "The power clean creates unnecessary stress on the muscles, tendons and ligaments due to yanking and jerking actions and consequent acceleration and deceleration of the resistance," says Tom Kelso, the Coordinator of Strength and Conditioning at Saint Louis University.

In particular, there is a heightened concern about the lower back. The power clean causes repetitive, forced hyperextension of the lumbar spine. This forced hyperextension can lead to any number of injuries and defects including lumbar sprain, lumbar strain, disc injury and spondylolysis (a vertebral stress fracture). Interestingly, the occurrence rate for spondylolysis in the general population has been estimated

between 4.2% and 6.0%. On the other hand, one study reported a 30.7% incidence of spondylolysis in a random survey of 26 weightlifters and another study noted a 36.2% occurrence of spondylolysis in 58 weightlifters.

In one study, researchers surveyed 354 junior and senior high-school football players. The study revealed that the most common site of injury was the lower back. The majority of the injuries resulted from three exercises: the power clean, clean and jerk and barbell squat.

Besides having a high potential to cause immediate injuries, the power clean can predispose an athlete to later injuries. Coach Riley notes, "How do we measure the damage caused by the long-term accumulative effect of this exercise?"

The proper performance of any exercise in the weight room requires close supervision. But the power clean needs constant, hands-on attention from a qualified individual who teaches proper technique. In many high schools where a large number of athletes are participating in a strength-training program, it is almost impossible for each wrestler to receive adequate instruction and individual attention. Even if an athlete has very good technique, various types of injuries can result from the power clean.

For Coach Shibinski and Coach Hays, the risks of doing the power clean are unacceptable. Coach Shibinski states, "I choose not to do the power clean in our facility because of potential injury to the athletes; their bones and ligaments are not ready for explosive-training techniques." Coach

Hays adds, "From a safety aspect, the risk-to-benefit ratio of doing the power clean is not very good. The potential risks far outweigh any proposed benefits to the athlete. Our view is that the power clean is not an orthopedically safe exercise for a high-school athlete to perform."

Joe Hadge is an Assistant Wrestling Coach at The College of New Jersey and a former All-American wrestler for Penn State (in 1987 at 142 pounds). "We want our wrestlers to have pop, explosion and drive," says Coach Hadge. "But even if wrestlers could get those benefits from doing the power clean, how frustrating would it be if they do not get a chance to compete because they injured themselves during the performance of the exercise?"

And what do athletes have to say about the power clean? A professional football player was quoted as saying, "The [power clean] bothered my back but I did it because the music was loud and everybody else was doing it."

## THE LAST REP

Are there any advantages of doing the power clean? Because it combines several different exercises, the power clean involves a great deal of muscle mass: the gluteals, quadriceps, hamstrings, lower back, upper back, trapezius, biceps and lower arms. At first glance, this sounds like an enormous advantage. But Coach Kelso points out that the power clean "does not target any muscle group through a full range of motion, with the exception of the trapezius."

Can a wrestler get stronger by doing the power clean? Absolutely. Doing any exercise in which the resistance is increased steadily and systematically can increase strength. But the risks of doing the power clean far outweigh any potential benefits. As Coach Kelso states, "There are safer and more practical ways to increase strength without all Hell breaking loose which can occur when doing the power clean."

The bottom line: The power clean provides little benefit to athletes other than those who are Olympic-style weightlifters.

Matt Brzycki has authored, co-authored or edited 15 books on strength and fitness including *Wrestling Strength: The Competitive Edge*, *Wrestling Strength: Prepare to Win* and *Wrestling Strength: Dare to Excel*. The three wrestling books are available at all major bookstores or through Cardinal Publishers Group (800-296-0481).

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