



The Exercise Technique Column provides detailed explanations of proper exercise technique to optimize performance and safety.

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# The Clean Pull and Snatch Pull: Proper Technique for Weightlifting Movement Derivatives

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## SUMMARY

THE CLEAN PULL AND SNATCH PULL ARE EXERCISES THAT USE THE DOUBLE KNEE BEND AND TRIPLE EXTENSION INVOLVED IN WEIGHTLIFTING MOVEMENTS. AS A RESULT, THESE PULLING MOVEMENTS ARE USED WITH THE PURPOSE OF MAKING AN ATHLETE MORE EFFICIENT AT PRODUCING FORCE WITH AN OVERLOAD STIMULUS. IN ADDITION, THESE EXERCISES CAN BE USED AS A TEACHING MODALITY FOR THE PROGRESSIVE DEVELOPMENT OF THE FULL CLEAN OR SNATCH.

There is evidence to suggest that activities that involve higher rates of force production, such as the clean and snatch are beneficial for improving an athlete's physical preparedness (1–4,6–10). As a result,

weightlifting movements and their derivatives are popular weight training activities that are prescribed by many sport performance practitioners. For this reason, coaches and athletes alike should understand the proper technique of these exercises so that the transfer of training effect is maximized.

### TYPE OF EXERCISE

The clean and snatch pull variations are complex multijoint exercises that promote efficiency of training through the seamless combination of the first and second pulls of their full clean and snatch counterparts. In addition, the clean and snatch pulls use the double knee bend phase and complete body triple extension involved in the weightlifting movements.

### MUSCLES INVOLVED

- Isometric actions of the following muscles are created for initial

stabilization of the acetabulofemoral, glenohumeral, and radiohumeral joints:

- Erector spinae group (iliocostalis, longissimus, and spinalis), deep spinal muscles (rotators, interspinales, multifidus, and intertransversarii), rectus abdominis, transverse abdominis, external obliques, internal obliques, quadratus lumborum, triceps brachii (long head), deltoid, subscapularis, latissimus dorsi, extensor carpi radialis, brachioradialis, trapezius, splenius capitis, splenius cervicis, infraspinatus, serratus posterior inferior, rhomboid major, rhomboid minor, and the supraspinatus.
- Ascending portion of the clean and snatch pull variations:
- Upper extremities—trapezius, splenius capitis, splenius cervicis, levator scapulae, rhomboid minor, rhomboid major, serratus posterior superior, posterior deltoid, teres minor, teres major,

erector spinae group (iliocostalis, longissimus, and spinalis), deep spinal muscles (rotators, interspinales, multifidus, and intertransversarii), rectus abdominis, transverse abdominis, external obliques, and internal obliques.

- Lower extremities—quadriceps group (rectus femoris, vastus lateralis, vastus medialis, and vastus intermedius), gluteus maximus, hamstrings group (biceps femoris, semimembranosus, semitendinosus), gastrocnemius, soleus, tibialis posterior, flexor hallucis longus, flexor digitorum, peroneus longus and the peroneus brevis.

### BENEFITS OF THE EXERCISE

Sport specificity is a term commonly used to explain the degree to which a given exercise transfers to the sport setting. In other words, specificity can be referred to as the level of effectiveness an exercise has at improving an athlete's ability to execute a specific movement or task in their sport. The SAID principle (specific adaptations to imposed demands) is a term that helps explain the relationship between an athlete's training choices and their resultant gains in performance. The SAID principle suggests that that body's neuromuscular system will adapt to the demands imposed upon it (9).

The clean and snatch pull variations are skill transfer exercises for coaches aiming to improve their athlete's development in weightlifting movements. For one, the clean and snatch pulls aid in the strengthening of the musculature used in the execution of the weightlifting movements. In addition, these pulling variations can serve as transitional exercises in learning the full weightlifting movements by integrating the partial movement derivatives (pull to knee and midhigh pull) into a more complete exercise. As such, these pulling movements accompany the short-to-long, or partial to full range of motion, approach to training these movements.

### CLEAN AND SNATCH PULL VARIATIONS VERSUS TRADITIONAL DEADLIFT

The weightlifting movements of the snatch and clean, as well as their

derivatives, require high power outputs to perform and execute properly. They are speed-dependent exercises in which the velocity of the movement determines the level of success. The clean and snatch pulls are multijoint complex exercises that relate well to many sporting movements (3,7).

The traditional deadlift is also a multijoint complex movement that requires large amounts of strength to perform, but power outputs during near-maximal attempts are lower than that of weightlifting derivatives. Observations of maximal and near-maximal deadlift attempts have demonstrated power outputs and energy expenditure levels at approximately 35% of those observed during the Olympic-style lifts. Additionally, even when conducted with lighter loads, the power output of the deadlift is approximately 80% of that produced in weightlifting derivatives (3). Thus, the traditional deadlift's translation to sport does not seem to be as effective as the weightlifting derivatives.

Power is an important indicator of performance in most sport settings, so the selection of exercises that may promote the development of power in the most efficient manner is crucial (5,6). Weightlifting movements and their derivatives are examples of effective exercise choices when a coach is attempting to establish strength, power, and rate of force development for improved performance potential in sporting contexts that require high power outputs.

### STARTING POSITION- PREPARATION

- The athlete should approach the bar on the platform with feet positioned approximately hip width apart. The bar should be situated just above the midfoot while the feet are pointed slightly outwards.
- Once proper foot position has been acquired, the athlete should squat down to grip the bar. The appropriate hand placement for the exercise can be at clean width or snatch width, depending on the variation being performed. The "hook grip" (fingers over

thumb) should be used for both the clean and snatch variations.

- Next, the athlete should attempt to internally rotate the shoulder (glenohumeral) joint to ensure a stable arm position for the active pulling portion of this movement. Specifically, this movement of the upper arm assists in keeping the elbow from prematurely bending during the pulling phase. Telling the athlete to "turn the elbows out" can cue this arm position.
- After the appropriate grip has been established, the athletes should position their shoulders above and slightly over the bar while the upper back remains concave.
- Once the athlete completes the task of ensuring proper foot placement, grip, and positioning of the upper extremity, the athlete must focus on positioning their torso and hips in the proper location. Specifically, the hips should be raised slightly higher than the knees while the shoulders are raised even higher than the hips (Figure 1).
- Before the athlete begins to pull the barbell from the ground, they should have the sensation of remaining tight in the torso by inhaling deeply and bracing the muscles of the midsection, which will result in an inflated



Figure 1. Starting position of pull from floor with clean grip.

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chest. Additionally, the athlete should preserve the concave curvature of the thoracic spine to maintain the appropriate hip angle to maximize the force produced into the platform.

### COMMON MISTAKES OF THE STARTING POSITION

- The athlete may have the hips too high causing a nearly flat back. From a side view, the supervising coach would notice the torso is almost parallel to the floor.
- In addition to having the hips too high, a related error is an athlete will allow the shoulders to pass too far ahead of the bar.
- Last, a common mistake in the starting position is an athlete will allow the back to round (convex) and not maintain a “tight” posture (concave) or body positioning.

### EXECUTION OF FIRST PULL

- The initial movement should begin with a sensation of pushing the knees back (extension).
- The hips should rise minimally and should move back with the knees. This keeps the angle created by the torso and the floor constant throughout the duration of the movement (Figure 2).
- The emphasis should be for the athlete to maintain the concave curvature in the spine by flexing the posterior musculature to “raise” the chest along with extension at the knee.
- The trajectory of the bar during the first pull should be vertical while also moving back, in concert, with the shins. This action will eventually allow the athlete to transition into the second pull once the bar is past the knees at midhigh. Asking the athlete to move the bar “up and in” can cue this movement pattern.

### COMMON MISTAKES OF THE FIRST PULL

- The athlete may initiate the first pull (off the floor) too forward on the balls of the feet and toes.



Figure 2. Finish position of first pull from floor with clean grip.



Figure 3. Midhigh (power) position of clean grip pull from floor.

- The athlete may incorrectly begin the first pull by raising the hips vertically. Instead, the athlete should maintain the angle of the torso to the floor.

### TRANSITION FROM KNEE TO POWER POSITION (DOUBLE KNEE BEND)

- Once the bar moves directly in front of the knee during the execution of the first pull, the lifter must transition into the power position portion of the movement.
- As the bar is being transitioned from the knee to the power position, the path should always be “up and into” the body. This occurs through the extension of the back and movement of the hips and knees forward (double knee bend) at the same instant and tempo.
- The bar should stay as close to the body as possible without touching the thighs until it reaches the power position. This allows for continued acceleration of the bar without any frictional influences to slow it down.
- At the power position, the bar will make a “brushing” contact with the thighs before the musculature of the thigh and hip region extends “up” (Figure 3).

- The path of the bar is only ready to move upward once the shoulder, hips, and heels are inline. Of note, this power position is optimized by a flexed knee angle ranging between 120° and 135°.

### COMMON MISTAKES MADE DURING THE TRANSITION FROM KNEE TO POWER POSITION

- The athlete may keep the chest ahead of the bar by not shifting to an upright position with shoulders, hips, and heels inline before beginning the second pull.
- The athlete may not allow the hips and knees to shift back through (double knee bend), once the barbell passes the knees.
- Last, the athlete may begin the second pull too early. Specifically, the barbell will visually appear to be too low on the thigh by not fully reaching the proper power position.

### EXECUTION OF SECOND PULL

- After the athlete has successfully executed the transition phase, or double knee bend portion of the lift, they are now ready to finalize the movement through completion of the second pull.

- The athlete should remain taut to concentrically extend fully at the hips, knees, and ankles creating triple extension (Figure 4).
- Before triple extension, the bar should be at hip height, which is noted by the vertical positioning of the chest. Small differences in bar placement will be present for the clean and snatch grips, with the snatch grip presenting the bar higher on the thigh because of the wide hand spacing. In addition, athlete anthropometric differences including arm length can create subtle changes in bar placement on the thigh within this segment of the lift.
- Once the athlete has assumed the aforementioned power position, they are now ready to extend the joints of the hip, knee, and ankle. This should be done aggressively and succinctly to maximize barbell velocity. In addition, the athlete should be cued to “pop” the shrug to promote a more complete pull leading into the full clean or shrug.
- In conjunction with the shrug, the athlete should be taught to slightly flex the wrists in. This allows the barbell to stay closer to the athlete’s body.
- Recall that the elbows should remain extended, “long and locked,” and have the appearance of being slightly rotated

outward during the concentric portion of the lift. Prematurely bending of the elbow (humeroulnar) joints prevent the shrug from being fully maximized.

- Last, on the descent from full extension, there should be flexion at the knee when “landing” to withstand the weight on the barbell. Again, the athlete should remain focused on not allowing any slight anterior pelvic tilt.
- The athlete should take the time to fully return to the set position before continuing the next repetition.

### COMMON MISTAKES OF THE SECOND PULL

- The athlete may push the hips too far forward instead of continuing to drive vertically through the heels. This movement of the hips would cause a looping of the barbell away from the athlete’s body.
- The athlete may prematurely transition their body weight to the fore foot, which will prevent the proper vertical transference of force through the heels before extending upward during the triple extension phase.
- The athlete may not finish the full triple extension of the movement through the hips, knees, and ankles.
- The athlete may initiate the shrug before full triple extension.
- The athlete may not aggressively complete the shrug at the top of the second pull.

### PRACTICAL APPLICATION

The clean and snatch pull variations are weight training exercises that can be used in most blocks. The priority of the block will determine the sets and reps scheme. For instance, during a strength endurance block, a sport performance professional may use the clean or snatch pull at a higher repetition range (3 × 10) coinciding with lighter to moderate loads. The prescription of this exercise during this time can improve an athlete’s technique for future heavier blocks, as well as impart power endurance abilities. However, the coach should consider an athlete’s capabilities before prescribing this exercise during a higher volume phase as technique could falter because of fatigue.

In addition, the clean and snatch pull variations can be used in maximal strength as well as strength power blocks through the incorporation of reduced volumes (3 × 5–3 × 3) and increased loads. At this point in the training year, these weightlifting derivatives can provide the athlete an opportunity to stabilize technique before transitioning into future blocks where complete weightlifting movements may occur. In conjunction, using the clean and snatch pulls during a maximal strength or a strength power block will give the athlete a chance to become more efficient at overcoming a load that is greater than what they can successfully clean or snatch.

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Figure 4. Finished pull with complete extension using clean grip.

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