

# The Movement Analysis of the Olympic Power Clean Lift

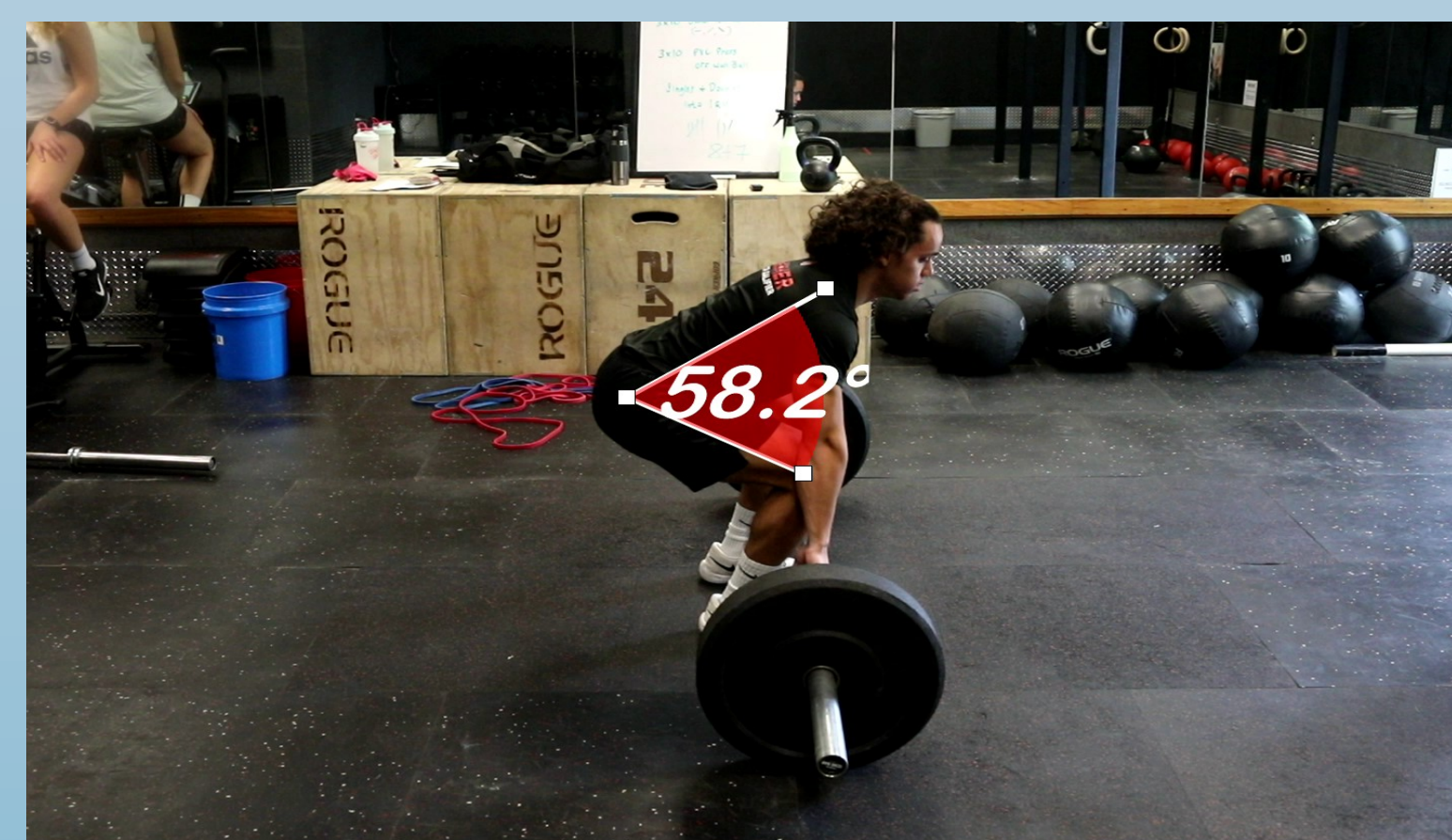
By: Austin Billiot

## Introduction

According to Suchomel et al. (2014), The power clean and its variations are commonly used to train lower body muscular power. By implementing the power clean and its variations into training programs, strength and conditioning practitioners train lower body power, highlighted by the explosive extension of the hip, knee, and ankle joints (Suchomel et al., 2014). Weightlifting movements such as the power clean (PC) closely mirror many unloaded athletic movements as they are ballistic and biomechanically similar to jumping, sprinting, and change of direction tasks (Oranchuk et al., 2019). The power clean contains 6 stages and should be performed as followed: starting position, first pull, transition, second pull, catch, and downward movement (NSCA, 2017).

## Starting Position

The starting position is to get into the athletic position to perform the power clean. According to NSCA (2017), feet are placed shoulder-width apart under the bar. In a squatted position, grasp the bar with a pronated grip. Arms should be outside the knees with elbows fully extended. The bar should be positioned 1 inch in front of the shins and over the balls of the feet (NSCA, 2017). Shoulders should be slightly in front of the bar and the back should be flat with no curvature showing. Exact positions of the torso, hips, knees, and bar are related to the lifter's body segment length and lower body joint flexibility.



## First Pull / Transition

The first pull is the initial movement when the bar begins to move as the subject performs a power clean. By forcefully extending the hips and knees, keeping the chest neutral in relation to the floor, and hips not rising faster than the shoulders. The back will stay neutral or slightly arched depending upon person. Maintain full elbow extension, with the head and spine in line, and shoulders above and slightly over the bar (NSCA, 2017). The bar should be kept as close as possible to the body as it travels up. Once the bar passes the knee, the hips should thrust forward allowing the knees to slightly bend. The lower body should be able to get under the bar. The back should be neutral or slightly arched with elbows extended ready for the second pull.



## Second Pull

The bar is now between the knees and thighs gearing the hips, knees, and ankles to perform the last forceful pull (NSCA, 2017). Keep the bar as close to the torso as possible. This will keep any unwanted movements to a minimum. Shoulders and elbows should be maintained as the lower body joints extend allowing for the subject to rapidly shrug the trapezius and shoulder muscles. As the bar begins to rise, flex the elbows to begin pulling your body underneath the bar to get ready for the catch phase. The upward momentum may cause for the feet to leave the ground and the upper body to hyperextend (NSCA, 2017).



## Catch

According to NSCA (2017), the catch phase of the power clean ends with the bar on the anterior deltoids and clavicles, similar to the arm and bar position of the front squat exercise. As the bar is at maximal height from the second pull and the body rotating underneath the bar, flex the hips and knees into a squatting position. The feet of the subject will land and remain in contact with the ground to provide maximal support and stabilization. A wider stance may occur in comparison with the starting position depending on the person. The bar should be met and caught by the anterior deltoids and clavicle region. The head and neck should be neutral and facing forward. Elbows should be fully extended and wrists hyperextended due to the weight of the bar. Upper arms should be parallel to the floor and feet should be flat on the floor. The torso should be fully erect and shoulders slightly ahead of the buttocks (NSCA, 2017). As momentum stops and stability is achieved, proceed to a standing position.



## Downward Movement

As the movement is completed and control of the weight is achieved, a release of the bar can be done. Rotating the arms back around the bar, releasing the anterior deltoids and clavicles allowing the bar to slowly return down the body (NSCA, 2017). Knees and hips can slightly bend and flex to brace for the weight of the bars momentum. Allowing the legs to return the bar to the floor while maintaining an erect neutral spine.



## Conclusion

In conclusion, the mechanics of the power clean are very detailed and in orderly fashion. Elements such as plane movements, balance, rotational aspects of joints and muscles are all vital to completing a power clean. Many muscle groups allow eccentric and concentric loading and contractions. The power clean in the strength and conditioning setting has relatively little to no information or studies about the biomechanics of a successful or unsuccessful power clean lift attempt (Kristof & Carolyn, 2017).

## References

- Exercise Technique Manual for Resistance Training 3rd Edition with Online Video. "Power Clean." National Strength and Conditioning Association (NSC-A), NSCA, 1 June 2017. [www.nsca.com/education/articles/kinesics/power-clean/](http://www.nsca.com/education/articles/kinesics/power-clean/)
- Suchomel, T. J., Beckham, G. K., & Wright, G. A. (2014). The impact of load on lower body performance variables during the hang power clean. *Sports Biomechanics*, 13(1), 87-95. doi:10.1080/14763141.2013.861012
- Oranchuk, D. J., Draskovatz, E. J., Lindsay, R. S., Helms, E. R., Harbour, E. T., & Storey, A. G. (2019). Improvement of kinetic, kinematic, and qualitative performance variables of the power clean with the hook grip. *International Journal of Sports Physiology and Performance*, 14(3), 378-384. doi:10.1123/ijspp.2018-0777
- Kipp, K., & Meinerz, C. (2017). A biomechanical comparison of successful and unsuccessful power clean attempts. *Sports Biomechanics*, 16(2), 272-282. doi:10.1080/14763141.2016.1249939