The Weightlifting Pull in Power Development

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Introduction

POWER HAS BEEN DEFINED AS “the amount of work produced by the body per unit of time and can be calculated as the product of force and velocity”(9). Another term commonly used for power is speed-strength, which has been described as “any capacity that contains both a force (strength) and speed component to muscular actions”(23). If working with athletes involved in power-oriented sports, speed-strength should be increased if the athlete is to improve performance (9). There are many other factors that contribute to improving performance in power-oriented sports than just increases in speed strength (i.e., technique and skill in the specific sport). The focus of this article is to explain methods of increasing sport-specific power through the use of the weightlifting pull.

Much has been written about improving power in athletes from various disciplines by training with Olympic-style weightlifting movements (2, 4, 8, 12, 15, 17, 21). The weightlifting lifts are the snatch and the clean and jerk. Their variations can be referred to as Olympic-style lifts. Some snatch and clean and jerk variations include, but are not limited to, power snatch from various heights (above knees, knee height, below knees, ground), power clean from various heights, power jerk, snatch pull from various heights, and clean pull from various heights. All of these exercises have the commonality of high velocity.

According to Stone (16), the human body expresses a superior average power output when performing the high velocity weightlifting movements (snatch and clean and jerk) as compared to performing powerlifting movements (squat, bench press, and deadlift) that are generally characterized by lower velocities. Besides the high power output from using weightlifting for the training of other sports, the movement patterns involved are very similar to those of many strength- and power-oriented sports (16).

Although many agree that the weightlifting exercises and the associated lifts are an integral part of a well-designed and periodized power development program, one important component of these lifts may not be given adequate attention during training. This component is the pulling movement, and it is responsible for the majority of the power production in athletes performing the snatch and the clean (16). Because of this, when training for sports other than competitive weightlifting, more emphasis should be placed on developing a proper pull than any other phase of the snatch and clean (e.g., dropping under the bar phase, catch phase, recovery phase). Also, it is suggested that more training be done with the pull alone when attempting to develop sport specific power.

Aspects of the Pull

Because much has been written on the anatomy and teaching of the pull (1, 5, 6, 10, 13, 18), it is beyond the scope of this article to detail the entire pull (i.e., the start, first pull, second knee bend, second pull). But, 2 elements will be discussed in detail: they are the second knee bend (SKB) and the second pull (SP). The SKB (also
known as the double knee bend or the scoop) has received much attention as to both how to teach it (20) and whether or not it can be taught (11, 19). Because the SP of the snatch or clean (which begins once the bar has passed the knees) possesses the highest wattage of any other part of the pull (16), the SKB must be performed in order for optimal power production to occur. The SKB occurs after the first knee extension, which raises the barbell from the ground to knee height and which is known as the first pull (Figure 1). Once the bar is at the height of the knees, the hips extend, which automatically causes the knees to re-bend (Figure 2). At this point, the body is in an ideal position to execute the explosive SP.

Once the SKB is properly executed, the SP can be done with the most advantageous muscle groups working in favor of the athlete. The SP involves violently extending the knees and hips while elevating the shoulders (shrugging) as the arms continue to be kept straight (Figure 3). This rapid extension of the hips and knees along with the shoulder shrug will cause the athlete to rise onto the balls of the feet (5).

If the SKB is not executed (Figure 4), the lumbar spine region will be used to elevate the barbell to its highest point instead of the hip and leg muscles. The safety of the athlete should be considered as a primary reason for properly executing the SKB during the pull (the lumbar spine receiving the brunt of the stress if SKB is not performed). Secondly, the athlete expressing optimal power levels during the pull demonstrates the importance of the SKB (the hips and legs are capable of producing more power than the lumbar spine region alone).

Normally, upon completion of the SP, the athlete drops beneath the bar for the catch into an overhead squat or front squat for the snatch or clean, respectively. However, for the purpose of sole power production, dropping into the catch position may not be necessary. In the snatch pull or clean pull, the lower body extension and shoulder elevation is the final position of the movement. The extended position is then held momentarily before lowering the barbell to the platform. Concentrating on the pulling portion of
the snatch and clean should help to develop proper power production by ensuring complete and rapid extension of the lower body.

- **Implications for Training**
  - **Peak Power Production**

When deciding the weightlifting pull’s place in a training program, peak power production should be addressed first. Peak power refers to the highest amount of power an individual can produce. An athlete who requires very high power outputs in a very short time period would need to train for peak power development. This includes, but is not limited to, track and field throwers and sprinters, American football players, basketball players, and volleyball hitters.

One point to consider in using the snatch and clean pulls in the quest for heightened peak power production lies in the fact that the loads used in training may be greater than the athlete’s 1RM (1 repetition maximum) in the respective classical exercise. According to Yessis (22), an athlete can perform a snatch pull with the barbell starting at approximately knee level and ending at hip level with 110–120% of the maximum weight used in his or her classical snatch. Many times, athletes are unable to use adequate loads to promote peak power production in the snatch, clean, and variations (other than the pulls) due to flaws in technique (i.e., absence of the SKB). These reduced loads may not be enough to stimulate peak power increases in the athlete. Training with pulls may allow the athlete to train at optimal intensities by eliminating apprehension in the drop and catch phases.

- **Power-Endurance Production**

Another quality that can be developed through the use of the pulls is power endurance (PE). PE refers to the ability to exert fairly high power outputs over an extended period of time while resisting fatigue; athletes involved in these types of activities need to have adequate levels of PE (3). Certain sprinters in track and field, rowers, and swimmers are required to work in a PE realm. These athletes can also benefit from the pulling motion being integrated into their
In implementing the pull for PE athletes, the intensity should be low, the execution of the repetitions should be fast, and the volume should be somewhat high. Low intensity strength training can be defined as that which is 60% of 1RM or below (12, 14, 23). In the case of performing the pulls with low intensities, the percentages used should be that of the 1RM classical snatch or clean.

When performing pulls for PE development, another variation to suggest is having the athlete perform each set in a specified time period. In this case, there is no set number of repetitions for the athlete to perform, but rather, the coach times the athlete for a specific time interval, usually a time interval that closely relates to the duration of the athlete’s sport or event. The athlete attempts to complete as many repetitions as possible within the time interval keeping emphasis on proper technique and speed of movement.

This method can be included in the PE athlete’s conversion to power phase in his or her classically periodized strength program. Just before entering the competitive period, the athlete should be involved in a conversion to power phase where previous gains in maximal strength are converted to sport-specific power (3, 12). The use of the pulls performed in rapid succession may prove to be more effective than other traditional strength-training exercises done in rapid succession during the conversion to power phase. For the purposes of this article, traditional strength-training exercises refer to those that are typically performed with a slow speed of movement (i.e., back squat, bench press). The reason that the pulls may prove to be more effective is that traditional strength training exercises done rapidly with lesser intensities cause the athlete to spend much effort decelerating the load at the top of the bar’s path to prevent losing contact with the body (7). This, however, does not pose a problem when performing the pulls in this manner because they are performed explosively regardless of the intensity, whereas traditional strength-training exercises are typically performed in a slow and controlled manner at higher intensities.

The pulls performed in a set time period may assist in the development of PE, which can be an important portion of an athlete’s training program. But one must use extreme caution with its implementation. First of all, the coach must ensure that the athlete’s pulling technique is sound before allowing him or her to attempt the pulls in rapid succession. Also, when performing pulls in a specified time interval, it may not be necessary to replace the barbell on the platform between each repetition, as this will hinder the amount of repetitions that can be done in the allotted time. One suggestion is to have the athlete lower the barbell in a controlled manner to mid-shin level instead of the platform between repetitions (Figure 5). This will reduce the time between repetitions while keeping constant tension on the body during the time interval. Also, lowering the barbell to mid-shin level will allow adequate range of motion through the hips, knees, and ankles.

Another point to consider is the actual time allotted for each pulling bout. The times must be carefully chosen on the basis of readiness of the athlete and average time of the athlete’s sport or event. The times used should follow a gradual and progressive approach. Bompa (3) suggests progressing from performing 8-15 rhythmic and explosive repetitions per set at the beginning of the conversion to power phase to 20-30 repetitions per set during a 4-6-week time period while also increasing the number of sets per repetition.
exercise. In choosing these repetitions to time intervals, the following example may act as a guideline. If a track and field sprinter’s best time is 50 seconds in the 400 m, the coach may want to begin the athlete’s pulling time at 15–20 seconds. As the athlete begins to adapt to the style of training, the times and number of sets should be progressively increased throughout the conversion to power phase until 48–50 seconds is reached. Research is needed to develop normative data on appropriate repetitions per a given time interval.

Due to the high demands being placed on the body in using this style of training, the rest intervals need to be quite long. Bompa (3) recommends an 8–10-minute rest interval between sets during PE training. Using the timed exercise bouts and adequate rest periods allow this method of pulling to be quite sport specific. The time allowed and energy systems used should provide ample stimulus for PE improvement.

High Pull

Whether training for peak power production or PE, another variation that can be added to the pulls involves a high pull. Once the end of the second pull is achieved, the athlete bends the arms by flexing the elbows (Figure 6). An important point to consider in performing the high pull is to make sure that the entire SP is completed before allowing the elbows to bend. The complete lower body extension and shoulder elevation should initiate the arms bending and pulling the barbell to near the clavicle in the snatch high pull or near the nipple line in the clean high pull.

The position of the elbows in the high pull is of importance. The athlete should concentrate on having the elbows pointing straight up at the end point of the high pull. Lack of shoulder flexibility may inhibit the athlete’s ability to elevate the elbows in this manner, but this can be improved over time with the use of the high pulls plus additional shoulder mobility exercises. The high pulls can be used to develop peak power production in athletes where a large range of motion is needed through the shoulders (i.e., wrestlers or baseball pitchers). In addition, the high pulls can be used to develop PE in athletes involved in sports requiring fairly high power outputs through the shoulders in an extended period of time (i.e., rowing or swimming).

Conclusion

Snatch and clean pulls may help to increase sport-specific power for athletes in various sports. They can be used to help improve peak power output and PE when they are adjusted to fit the needs of the athlete. But, the pulls done by themselves should not be a replacement for the classical and power styles of the snatch and clean. The use of the pulls should not replace the “complete” movements but rather be used to complement them. There are many benefits to be gained from the snatch and clean done either in the classical (full squat) or power (partial squat) style other than power/speed-strength development including, but not limited to, balance, coordination, flexibility, and overall athleticism.

As illustrated, there are phases within an athlete’s periodized program where the pulls can be useful (i.e., conversion to power). The use of the pulls can enhance the effectiveness of using weightlifting and the associated Olympic-style lifts in sport development programs by ensuring that optimal power production is achieved. Their use can add variety and specificity to an already sound training program.

References

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