Teaching Rhythm: A Key to Learning Proper Technique in the Power Clean

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SUMMARY

THE “SNATCH” AND “CLEAN AND JERK” ARE THE 2 COMPETITION LIFTS IN THE SPORT OF WEIGHTLIFTING. THE POWER CLEAN IS A VARIATION OF THE CLEAN AND JERK THAT HAS BECOME A USEFUL DEVELOPMENT EXERCISE FOR MANY SPORTS. RHYTHM OR RELATIVE TIMING IS AN IMPORTANT PEDAGOGICAL COMPONENT THAT CONTRIBUTES TO TECHNICAL MASTERY AND CAN BE APPLIED TO THE POWER CLEAN.

INTRODUCTION

The power clean requires an athlete to exert high forces against the ground through a series of rapid movements. That makes the derivative of the clean and jerk an ideal form of exercise to develop high power and explosive abilities and is widely used in many sports (4). The power clean involves a technical movement pattern that is most effectively learned with the instruction of a trained strength and conditioning professional (Figure 1). The relative timing or rhythm of this lift is one of the critical components for successful motor sequencing. Although practitioners encounter rhythm teaching on a daily basis, and rhythm is covered in most certification programs like the United States of America Weightlifting certification program, a literature search on rhythm learning yielded limited results (1, 7, 8, 11). Thus, there is little information available to the strength and conditioning professional on how to teach the correct rhythm for Olympic-style lifting variants, such as the power clean. The purpose of this article is to provide a better understanding of how to incorporate the rhythm method into the pedagogical methodology of teaching the power clean.

WHAT IS RHYTHM?

Rhythm represents the fixed cadence of a motor skill that separates one category of motor skill from another (8). This fixed rhythmic structure is hypothesized to be embedded in all motor skills, regardless of motor skill speed. In a study examining laboratory motor skills, Franks and Stanley (3) found evidence for a fixed rhythmic structure. Franks and Stanley (3) had students perform a tracking exercise using a joystick to follow a computer-generated waveform pathway task and found that a rhythmic pattern of movement was developed by the participants. Studies conducted in practical settings have also demonstrated a “stable and unique timing” structure in sports skills, such as hurdling (6), swimming (10), and volleyball spiking (2). This line of research evidence led to the proposal that mastering the rhythmic component of a skill is a key step toward skill acquisition (8).

ENHANCED RHYTHM LEARNING

Generalized motor program (GMP) theory, which proposes that blue prints of movement execution are stored in the Central Pattern Generator, supports the view that the rhythm of a movement can be enhanced by using constant and blocked practice (9). Constant practice means that the athlete works on technique without adjusting the force parameter (using a consistent light weight until the technique is mastered). In contrast, with the system of varied practice, the learner practices more than one variation of a task, and movement outcomes vary by adjusting parameter values (i.e., force parameters) of the GMP. Whereas, blocked practice of a particular skill involves performing the movement over and over during a training session until it is mastered, with no interruption, before moving on to the next skill. Constant and blocked practice techniques provide learners experience with practicing only one aspect of a skill for a period. However, the absolute timing of the power clean can be further...
advanced by coupling the physical practice with auditory modeling (9).

In particular, auditory modeling is an effective teaching strategy for rhythm learning, especially for beginners, and has been used for the learning of rhythmical dance routines (11), rapid pistol shooting (7), football kicking (1), and swimming (10). The following list summarizes the research recommendations (9) on how to teach and/or learn relative timing/rhythm efficiently:

(I) Direct the athletes' attention to the rhythm of the target skill by demonstrating the skill and providing auditory cues.

(II) Allow time for temporal structure/rhythm building by practicing the target skill with short resting intervals.

(III) Target skills should be practiced and learned one at a time.

(IV) Minimize feedback frequency by limiting comments to positive encouragement of the athlete's general performance and revisiting correct rhythm when appropriate.

(V) Finally, do not interfere with the movement acquisition by introducing other skills.

Organizing practice using these guidelines will produce a learning environment that focuses on the target skill and will help the athlete build the neural circuits associated with the movement. For example, using auditory modeling as part of the teaching progression can be important in both learning the power clean and maximizing training effectiveness and efficiency (5,9).

GUIDELINES FOR TEACHING THE POWER CLEAN

The power clean can be broken down into the following parts: start, first pull, scoop, second pull, catch, and recovery (4). The power clean can be effectively taught using the whole-part-whole method (see Table). The 3-step whole-part-whole method is a process that provides a general execution of the power clean skill first and then shows the individual parts of the exercise followed by another general execution that ends the initial demonstration. Selected parts of the power clean, including the start, first pull, scoop, second pull, catch, and recovery, are demonstrated by the strength and conditioning coach, and another general execution of the entire power clean skill ends the initial demonstration. Keep in mind that a demonstration of each step of the power clean with cues will not be shown to the beginner because this would be too much information.

During the initial demonstration, the athletes should focus on the feet of the demonstrating coach while watching the body weight shift from flat-footed to the ball of the foot during the second pull. The instructor should wear bright colored shoes to help the pupil see the movement. The movement phases, desired body positions, coaching cues, and auditory, visual, and/or verbal cues of the power clean are listed in the Table.

Once the athletes have a visual image of the movement pattern they may encounter difficulties grasping certain parts of the exercise that can be aided by an auditory or verbal cue. Use the verbal descriptors I and II for the start/first pull/scoop phase and III and IV for the second pull/catch/recovery phase. For example, if an athlete has difficulty understanding the scoop, direct the athlete's attention to the rhythm of the movement by having them close their eyes and listen to the sound of the bar grazing the instructor’s thighs as it accelerates into the second pull followed by the small lateral slide of the feet during the catch as the bar is received. But it must be kept in mind that focusing too much on trying to achieve a specific auditory cue of one part of the movement may be at the expense of the many other parts of the power clean that require the athlete's focus. It could also be beneficial for the strength coach to “tap” out the desired rhythm during the execution of the movement much the same as a music instructor might tap out the beat of a piece of music to assist their musicians in grasping the appropriate rhythm of a song. There is a tap for the start, one for the 1st pull, one for the double knee bend/scoop, one for the second pull, one for the catch, and one for recovery. The speed between taps would be reflective of the power clean rhythm with the first pull much slower than the second for example. Verbal and auditory modeling may be effective with certain athletes.

It is important for theoretical and practical reasons for the coach to determine those variables that enhance performance without interfering with other processing that is important to learning.

Start/First Pull/Scoop

When the exercise is introduced to the athlete, the skills should be taught with
an unloaded bar until the correct pattern is learned. The athletes should practice the first pull of the movement for 10 practice sets of 5 repetitions, with 1–2 minutes between each set. After the first pull is mastered, the athlete would repeat the same regimen and work on the scoop. The athlete should first focus on the kinesthetic feel and incorporating the scoop into the complete movement. The athletes would work on rebending the knees under the bar while initiating hip extension and should practice brushing the bar against the middle to the top of the thigh. The same regimen of 10 sets of 5 repetitions is used for the scoop (Figure 2).

After completing numerous practice repetitions, the coach can use an auditory model to help the athlete understand the movement. The athlete would close their eyes and repeat the movement to duplicate the sound of the bar grazing the thighs as demonstrated by the coach earlier. Note the difference between the sound of the bar brushing the thighs as opposed bouncing off of the thighs and moving out of the desired path. A recording of the model brushing sound would be helpful in teaching the athlete. However, as mentioned earlier, the coach needs to keep in mind costs and benefits of over-focusing on 1 cue with novice athletes.

Athletes who are having difficulty grasping the rhythm of the scoop would observe the instructor or another athlete’s demonstration of the scoop into the second pull. Direct attention to the rhythm of the skill and the acceleration of the bar as it brushes against the demonstrator’s thighs. The demonstrating coach repeats the scoop skill rhythm several times and verbally counts “1” for the scoop while rebending the knees under the bar and “2” for the second pull while initiating hip extension into the same rhythm. Executing the scoop to second pull with the eyes closed could be executed by emphasizing a multisensory combination of both the kinesthetic “feel” and auditory “sound” with a verbal cue such

<table>
<thead>
<tr>
<th>Movement phase</th>
<th>Desired body position</th>
<th>Coaching cues</th>
<th>Auditory, visual or verbal cues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting position</td>
<td>Feet hip width apart</td>
<td>Lifting the knee extension and push the platform away</td>
<td>See and feel the body grazing high above the floor</td>
</tr>
<tr>
<td>First pull (start)</td>
<td>Simultaneous hip and knee extension</td>
<td>Keep the torso angle straight</td>
<td>Feel the tension on the shoulders</td>
</tr>
<tr>
<td>First pull (finish)</td>
<td>Hip and knees continue to extend and shoulders are in their farthest position in front of the barbell</td>
<td>Finish the hip and pull the body back against the bar</td>
<td>Feel the balance shift to center part of the foot</td>
</tr>
<tr>
<td>Scoop</td>
<td>Rebounding the knee under the bar while initiating hip extension and brushing the bar against the middle to the top of the thigh</td>
<td>Scoop and jump explosively upward</td>
<td>Visualize and feel the explosive upward jump with a quick pace; however, do not leave the floor</td>
</tr>
<tr>
<td>Second pull</td>
<td>Triple extension of the ankle, knee, and hip joints as the weight shifts toward the back of the feet and arms remain straight as the trapezius muscles contract</td>
<td>Finish the shrug and pull the body down against the sides of the bar</td>
<td>See and feel the elbows holding high as the bar runs on the deltoids</td>
</tr>
<tr>
<td>Catch</td>
<td>Hips under the bar and the torso erect</td>
<td>Rotate elbows forward and under the bar</td>
<td>Eyes to the horizon; the midsection needs to feel firm</td>
</tr>
<tr>
<td>Recovery</td>
<td>Hips under the bar and the torso erect</td>
<td>Rotate elbows forward and under the bar</td>
<td>Eyes to the horizon; the midsection needs to feel firm</td>
</tr>
</tbody>
</table>

Note that the movement pattern of the power clean has 3-part rhythm: long first part (first pull), slightly shorter second part (scoop), and quick (third part) second pull and catch.
as “pull tall.” Using an auditory model with a sequence of tones indicating the goal temporal structure of the response can help enhance relative and absolute timing.

**Second Pull/Catch/Recovery**

First, the athletes must watch the path the bar takes during its ascent and notice that it travels vertically. The athlete would observe the demonstrating coach perform the second pull into the catch and recovery. Second, direct athletes to observe (using multiple vantage points) the coach’s trunk as it becomes increasingly upright as the lower body undergoes or initiates the triple extension of the hips, knees, and ankles on the second pull and then downward and forward, reflexing the knees and hips, to position for the catch and recovery. Emphasize that the bar should be over the anterior deltoids and the forearms approximately parallel to the ground.

Finally, encourage the athletes to observe the simple up and down rhythm that the body goes through during the course of the second pull/catch/recovery. Use the numbers III and IV to signify the catch and recovery. Encourage the athletes to practice the second pull to the catch and recovery, make sure to limit feedback to the simple terms, and be sure to encourage the athlete when the phases are executed properly. Verbally communicate to the athletes the III–IV rhythm of the catch and recovery during execution (Figure 2).

Once the athletes have practiced the stages of the power clean, the demonstrating coach should perform a full power clean from the ground again. Instruct the athletes to watch the changes in tempo during the lift as it is completed in its whole, and how the bar and body interact. Use the verbal descriptors I and II for the start/first pull/scoop phase and III and IV for the second pull/catch/recovery phase. Although the bar is unloaded, the speed of the movement is not maximal when counting. The athletes should then practice the complete movement and be encouraged to use verbal cues during the lift. Instead of providing overly technical feedback, the instructor should focus on simple points based on the rhythm observed. If equipment such as a cell phone with recording function is available, record the athlete’s power clean and provide rapid feedback by comparing with the desired technical model.

Once the athletes have mastered the rhythmic movement pattern of the power clean with an unloaded bar, progressively add weight to the bar and re-evaluate the technical performance. As the weight and speed of the bar increases, counting off the rhythm out loud will become unnecessary.

**CONCLUSION**

Derivatives of the snatch and clean and jerk include a common relative timing structure and adjustable parameters that allow athletes to produce slightly different movement outcomes. Effective training for these weightlifting movements will help an athlete eventually learn to vary movement outcomes by adjusting parameter values of the GMP. Complex skills, such as executing correct form in the power clean, are often difficult to master. Proper rhythm of the movement needs to be taught first. To emphasize the learning of timing/rhythm, provide the learner with both auditory and visual models, introduce target skills one at a time, and teach the target skill with a series of practice and short training intervals.
Teaching Relative Timing and Rhythm

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