

Using Cluster Sets

Using cluster sets in training is an excellent way to stress an athlete, especially during phases of considerably intense loading. A cluster set allows for more repetitions to be made at a weight that an athlete would not normally be able to lift two or more times in succession. This type of set requires a short amount of rest to be taken between repetitions in order to restore or partially-restore the short-term energy systems used to produce bursts of highly intense movement (as seen when performing near-maximal lifts in the Back Squat or Snatch). The use of maximum or near-maximum loads stress the systems responsible for neuromuscular coordination, in which the recruitment of faster and larger motor units is increased, rate-coding increases, and the synchronization of motor unit activity becomes optimal for maximum force output. It is therefore beneficial for athletes looking to improve their overall strength levels to train with weights at or near their maximum. However, it can be difficult to perform several repetitions with this type of load in succession, which is where the use of cluster sets becomes warranted.

By including 10 to 30 seconds of rest between repetitions to take place, each repetition is accomplished with maximum or near-maximum energy on the part of the athlete, as opposed to a decreasing amount of energy with each repetition of a continuous set (performing each repetition one-after another without rest in between). This ensures that the athlete is performing more maximum or near-maximum efforts per workout, which may ultimately allow for a greater improvement to take place. The bar should be returned to the floor or rack when resting.

Support for Cluster Sets

In a study by Haff et al, average barbell velocity in the clean pull was significantly higher in the sets which utilized a cluster format, with 30 seconds of recovery between repetitions at both 90% and 120% of maximum than sets performed with a more traditional set-up (each repetition

performed continuously without rest in between). Acute fatigue in the neuromuscular system becomes noticeable when a decrease in force production occurs. The cluster set, with its built-in recovery time in between repetitions, allows for some of the replenishment of phosphocreatine (PCr) energy stores, which are utilized for short and intense movements such as maximal lifts. Traditional set design depletes these stores and does not allow for recovery, leading to lactate production. This reduction in PCr stores and accompanied increases in lactate results in the decrease of muscle force production.

If training with maximum or near-maximum loads is to have the desired effect of improving strength, some rest between repetitions should be implemented in order to ensure that more of these repetitions take place. The more work (or repetitions) that an athlete can perform with these intense loads, the better his or her force producing capabilities may become. Even with as little as 15 seconds of recovery, an individual can perform at near maximum force production capacity. A cluster set allows the athlete to perform greater amounts of work while not experiencing the fatigue and lowered force output normally associated with traditional sets.

Examples

When programming for a particularly intense training session, a coach may decide to use cluster sets in place of more traditional set design. For a workout including the Snatch at 90% of maximum, a coach could use a traditional set format, and prescribe five sets of two repetitions:
 $6 \times 2 @ 90\% = 12$ repetitions at 90%

If the coach wanted to use cluster sets instead, with one-to-two repetitions performed followed by 30 seconds of rest (bar on floor, no hands on bar), the set may appear as follows:
 $6 \times (2+2) @ 90\% = 24$ repetitions at 90% or $6 \times (1+1+1+1) @ 90\% = 24$ repetitions at 90%
The cluster sets could be designated in the program by use of a tempo. In the case of the examples provided the tempo would read:

0:0:0:30

('0' representing the lift phase, catch, and recovery phase of the lift, and the '30' representing how much rest in between reps)

By utilizing cluster sets, the coach can schedule twice the amount of repetitions per set without risking the athlete becoming too fatigued and diminishing his or her force output capacity. The athlete benefits from training with high loads for more repetitions than what could be achieved using traditional set design.