

Denison University Strength & Conditioning

STRENGTH TRAINING OVERVIEW

CONJUGATED PERIODIZATION

Conjugated Periodization is a Russian & Eastern European based training system, which is much different than linear periodization. Most linear periodization has several phases and starts with higher volume and lower intensity in week one and higher intensity and lower volume by week 12 or so. Usually the earlier stages of the summer program are designed to enhance hypertrophy and strength endurance and then evolving to strength and power development later in the summer cycle. With the conjugated system, all of these fitness qualities including maximum strength, explosive power, strength endurance and hypertrophy are all addressed and developed year round. We do not want to neglect any of these qualities during anytime of the year. We do not want to detrain in terms of strength endurance or wait to the end of a cycle to address maximum strength. By running full speed, performing plyometrics, using the maximal effort method requires us to use low volume year round.

MAXIMUM EFFORT METHOD

We use 3 different methods for strength development based on Vladimir Zatsiorsky's research. The Dynamic Effort Method, The Maximum Effort Method, and the Repetition Method. We use the Dynamic Effort mostly with our plyometric, ballistic and Olympic movements. In strength training, we concentrate mostly on the maximum effort method. This means we work up to a repetition maximum for our emphasis movements. An example is working up to a 3-rep max on the barbell back squat by performing 3 reps and increasing the weight until you feel you are at your "3RM". A 3 rep max is the heaviest weight you can lift for 3 reps. We feel this system negates weekly and daily fluctuations in maximum strength and allows more adaptability in the load intensity being used on a given workout.

USING A PERCENT OF A 1-REP MAX

There are a few flaws in a percentage-based system of resistance training. Namely, there are individual differences for each lifter that using percents of a 1-rep max.

- A 1-rep max often changes during the course of a training program. Your 1-rep max can fluctuate every day let alone every week. You may start your percentages based on a 300lb 1-rep max. By week 6, your 1 rep max is not 300lbs anymore. You are using percentages based on a false max. Percentages give a good guideline, but they're not 100% accurate.
- Everyone is stronger at different rep ranges. Two athletes may bench press 300 pounds. One athlete may be able to bench press 270 (90%) 4 times. The second athlete may be able to bench press 270 twice. If you are having the athlete bench press 270 for 3 reps; the 1st athlete is not being pushed and the 2nd is set up for failure.

If you have accurate rep maxes from a previous cycle, it is ok to use percentages of your 1-rep max for a guideline. Just make sure you have the capability to make daily and weekly adjustments to those percentages.

DESCENDING SETS & DROP SETS

There are many workouts that prescribe set and rep schemes that have the athlete perform a static number of sets and reps with the same weight i.e. 3 sets of 3 or 5 sets of 5. What ends up happening is: the first sets are basically warm-ups and even though the last set is very challenging, it is under the athlete's true 3 or 5-rep max. If you are able to do all sets with the prescribed reps, then the weight is not at the true rep-max. The other scenario would be an athlete missing repetitions on the latter sets. This would consequently reduce the total volume. If your first work set is a true rep max, then it will be extremely difficult to achieve the same number of reps for subsequent sets.

In order to maximize the training effect from our emphasis lifts, we will either use a rep range or use descending reps schemes for maximum intensity. If an athlete performs a true 5-rep max, there is little to no chance the athlete will be able to perform 5 reps on a second set. We use a 5% drop in weight or more likely reduce the reps by 2 to avoid over training. We will also use drop sets which will include a 10% drop in weight and an increase in reps by 2. A third method would be using a cluster set which will be explained later.

PERFORMANCE OF A REP

Every rep and every set is extremely important for athletic success. Control each rep on the eccentric (negative) portion of the lift. Without bouncing the weight at the bottom of the lift, execute the concentric portion as quickly and as much force as possible (even on warm-up sets.) This is called Compensatory Acceleration Training invented by Dr. Fred Hatfield. This is important for maximum strength development and prepares the Central Nervous System (CNS) for subsequent sets.

OLYMPIC LIFTS

Olympic lifts are great tools to develop speed-strength and explosive power due to a rapid triple-extension movement in the second pull phase of most of the lifts. But, Olympic lifts are not the only method for building explosive power. Olympic lifts like cleans and snatches are specific skills. Being proficient at a power clean may not necessarily transfer directly to explosiveness on the field. The rate of Force Development (RFD) of the triple extension movement in general terms can have a positive correlation on similar triple extension type movements on the field.

At Denison we always weigh the Risk-to-Reward Ratio on all of our lifts. Our biggest concern is safety, primarily in the catch or rack phase of the clean. We feel because of limited flexibility, improper technique and a lack of proper coaching; there are some postural positions we would like to avoid with this lift.

Overall, we do not want our athletes performing the Olympic lifts without proper coaching, supervision or equipment. We feel there are alternatives with faster learning curves that can be implemented.

CONTRAST METHOD, CLUSTERS, & SUPERSETS

There are many methods not used in summer training that we will now use on occasion at Denison. Because of discrepancies in equipment and logistical difficulties, we kept the summer workouts relatively basic. We will utilize some of these aforementioned methods for optimum power development and regulation of training intensity and volume. In the Contrast Method; we will couple a maximum effort movement with a dynamic effort exercise or plyometric exercise in a complex. Clusters will allow us to execute more reps at higher rep intensities. Clusters will compensate for fatigue and still keep performing range at or above the designated percentage range for that particular exercise. Supersets will allow us to expedite the workouts in a much more efficient manner by combining exercises using antagonistic muscle groups with limited rest in between. Will also pre-exhaust targeted muscle groups to control synergistic dominance and fatigue in a particular exercise.

WHY WE SQUAT PARALLEL AT DENISON

POSTERIOR CHAIN DEVELOPMENT

- The Glutes and Hamstrings are not fully engaged until the athlete attains a parallel position.
- The Glutes play a significant role in hip extension during running and jumping.
- Not squatting parallel can place overemphasis on the quads and de-emphasize the role of the hamstrings

INJURY PREVENTION

- Squatting parallel develops the stabilizing muscles of the knee more efficiently
- Squatting parallel enhances strength at a greater range of motion
- Squatting parallel helps minimize the gap between quad to hamstring strength ratio

LEAN BODY MASS GAIN

- Squatting to parallel means a greater range of motion, thus increasing the:
 - Motor units and muscles fibers being recruited
 - Time under tension, which increases total work done within the same rep
 - Joint Angle, which enhances the stretch reflex and connective tissue strength

WHY WE SQUAT PARALLEL AT DENISON (Cont.)

FLEXIBILITY

- Squatting to parallel can increase the athlete's functional flexibility
- Squatting to parallel helps the athletes become more "comfortable" and confident when bending his/her knees in sport
- Squatting to parallel addresses some problems of "playing low" and enables the athlete to change direction more efficiently

SAFETY

- Squatting with a limited range of motion will increase the weight lifted by the athlete.
 - This in turn, will greatly increase the axial load on the spine
 - This will also place much more stress on the knee due to the limited degree of flexion

Athletes unable to squat parallel because of postural alignment or lack of experience will be labeled as a PUTS athlete. PUTS stands for Physically Unable To Squat. These athletes will be given alternative exercises additional commitments and extended teaching progressions to address these technique and postural discrepancies.

Denison University Strength & Conditioning MULTIPLE SET SYSTEMS

Denison University Max Effort Method 5-Set System

- 1st Set Warm-Up Set 50% of Target Weight
- 2nd Set Warm-Up Set 75% of Target Weight
- 3rd Set Warm-Up Set 90% of Target Weight
- 4th Set Rep Max with Target Weight
- 5th Set Work Set Variation (Choose one of the Following)
 - Same weight with descending reps (2 rep drop-off)
 - Less weight for same repetitions (5% weight drop-off)
 - Less weight for more repetitions (10% weight drop-off)
 - Cluster with same weight and same reps
 - Bonus Set with more weight and same reps (5% increase)

Denison University Dynamic Effort Method 5-Set System

- 1st Set Warm-Up Set 75-90% of Target Weight
- 2nd Set Target Reps with Target Weight
- 3rd Set Work Set Variation
- 4th Set Work Set Variation
 - Same weight with same reps (increase in bar speed)

Denison University Sub-Maximal Effort Method 3-Set System

- 1st Set Warm-Up Set 75-90% of Target Weight
- 2nd Set Rep-Max with Target Weight
- 3rd Set Work Set Variation
 - Same weight with descending reps (2 rep drop-off)
 - Less weight for same repetitions (5% weight drop-off)
 - Less weight for more repetitions (10% weight drop-off)

Denison University Repetition Method 2-Set System

- 1st Set Rep-Max with Target Weight
- 2nd Set Work Set Variation
 - Same weight with descending reps (2 rep drop-off)

Denison Big Red Max Effort Cycles

Max Effort w/ Back-Off Set (Descending Weight, Ascending Reps)

3-5 Warm-up Sets 2 Rep Max Set w/ Target Weight Optional Bonus Set (if 2RM was completed; add 5%) Back-Off Set (Subtract 10% of Max set and Rep to Failure i.e. 2-6 reps)	3-4 Warm-up Sets 3 Rep Max Set w/ Target Weight Optional Bonus Set (if 3RM was completed; add 5%) Back-Off Set (Subtract 10% of Max set and Rep to Failure i.e. 3-7 reps)
2-4 Warm-up Sets 4 Rep Max Set w/ Target Weight Optional Bonus Set (if 4RM was completed; add 5%) Back-Off Set (Subtract 10% of Max set and Rep to Failure i.e. 4-8 reps)	2-3 Warm-up Sets 5 Rep Max Set w/ Target Weight Optional Bonus Set (if 5RM was completed; add 5%) Back-Off Set (Subtract 10% of Max set and Rep to Failure i.e. 5-9 reps)

3RM Ex.

Warm-Up: 150x8, 225x5, 270x3, [50%, 75%, 90%] 3 sets @ minimum

Max Set: 300x3 [on workout sheet]

Bonus Set: 315x2 [300x5%=15lbs] {do not count bonus set as new max because only 2 reps were completed}

Back-Off Set: 270x5 [300x10%-300=270]

Max Effort w/ Cluster (Static Weight, Static Reps)

3-5 Warm-up Sets 2 Rep Max Set w/ Target Weight Optional Bonus Set (if 2RM was completed; add 5%) 2 Rep Cluster (Perform 2 singles w/ Max weight w/ 40 sec. R.I.)	3-4 Warm-up Sets 3 Rep Max Set w/ Target Weight Optional Bonus Set (if 3RM was completed; add 5%) 3 Rep Cluster (Perform 3 singles w/ Max weight w/ 30 sec. R.I.)
2-4 Warm-up Sets 4 Rep Max Set w/ Target Weight Optional Bonus Set (if 4RM was completed; add 5%) 4 Rep Cluster (Perform 4 singles w/ Max weight w/ 20 sec. R.I.)	2-3 Warm-up Sets 5 Rep Max Set w/ Target Weight Optional Bonus Set (if 5RM was completed; add 5%) 5 Rep Cluster (Perform 5 singles w/ Max weight w/ 10 sec. R.I.)

3RM Ex.

Warm-Up: 150x8, 225x5, 270x3, [50%, 75%, 90%] 3 sets @ minimum

Max Set: 300x3 [on workout sheet]

Bonus Set: 315x2 [300x5%=15lbs] {do not count bonus set as new max because only 2 reps were completed}

3 Rep Cluster: 300x1 (rest 30 sec.); 300x1 (rest 30 sec.); 300x1

Max Effort w/ Work Set (Static Weight, Descending Reps)

2-3 Warm-up Sets 4 Max Set w/ Target Weight Bonus Set (if 4RM was completed easily; add 5%) Work Set (Weight is same as Max set & rep to failure for at least 2 reps)	1-3 Warm-up Sets 5 Max Set w/ Target Weight Bonus Set (if 5RM was completed easily; add 5%) Work Set (Weight is same as Max set & rep to failure for at least 3 reps)
1-2 Warm-up Sets 6 Max Set w/ Target Weight Bonus Set (if 6RM was completed easily; add 5%) Work Set (Weight is same as Max set & rep to failure for at least 4 reps)	1 Warm-up Set 8 Max Set w/ Target Weight Bonus Set (if 8RM was completed easily; add 5%) Work Set (Weight is same as Max set & rep to failure for at least 6 reps)

5 RM Ex.

Warm-Up: 150x5, 180x3

Max Set: 200x5 [on workout sheet]

Bonus Set: 210x4 [200x5%=10lbs] {do not count bonus set as new max because only 4 reps were completed}

Work Set: 200x3 (as many as possible)