



US Weightlifting Champion Curt White photo by Bruce Klemens

## Contrast Training for Explosive Leg Power

*An advanced lower body training system for developing explosive athletes*

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One of the challenges a strength coach has working with many professional athletes is that they are expected to produce significant results in a short period. If the athlete comes out of a season with injuries, those injuries often must be addressed first before the coach can make the athlete stronger or more powerful. This means there can be no guesswork — the strength coach must use the most effective workout protocols they know to get the athlete in peak condition for the next season.

I do a lot of work with NHL players, athletes who spend little time off the ice. A professional hockey player starts the preseason in September. If they reach the Stanley Cup Finals, they will still be on the ice in June! Do the math and leaves a strength coach just two months to add muscle, increase their strength, and make them more powerful. For these circumstances, I have found the type of training that gives me the most “bang for your buck” is contrast training.

In traditional strength and conditioning programs, plyometrics or jump training exercises are performed early in the workout, when the athlete is fresh. One of the keys to plyometric training is switching from flexion (eccentric) to extension (extension), and this action must be performed quickly to gain any benefit in terms of increasing power. Just as a sprinter wouldn't fatigue themselves with repeat 400m runs before working on the 100m sprint, I wouldn't have a hockey player performing plyometric box jumps after exhausting their legs with a 5x5 squat workout. Contrast training (also known as complex training) effectively deals with this fatigue issue by supersetting strength and plyometric/jump exercises, such as by combining squats with box jumps.

Before getting into the details, let me continue my sales pitch with some science. What contrast training does is use a practical application of post-tetanic potentiation (PTP). PTP theory states that a muscle can contract faster if it is preceded by a strong contraction of that same muscle. What happens is that the strong muscular contraction recruits the more powerful fast-twitch fibers, and these fibers are still activated when another movement is performed. If you have ever been recruited to help someone move heavy boxes of different weights, you'll have experienced the PTP effect when you lift the lighter boxes.

In sports, baseball players use the PTP effect when they warm up with a heavy bat before stepping up to the plate. Sprinters will push sleds for short distances before releasing them and going into a max sprint to take advantage of the PTP effect. Although the resistance is not much when a sprinter runs with a parachute and then releases it, it is still using the PTP effect (and some sprint coaches believe that such training is more sport specific as the mechanics of the sprint more closely approximates what goes on in sprinting compared to pushing a sled).

Any discussion of PTP should recognize the influence of Canadian strongman Doug Ivan Hepburn. Hepburn won the 1953 World Weightlifting Championships was the first man to bench press 500 pounds (about 227 kilos). Hepburn would start his workouts performing low reps with heavy weights, then follow those sets by performing the same exercises for higher reps. (Incidentally, one of my favorite books that introduced me to many powerful training methods is *Strongman: The Doug Hepburn Story* by Tom Thurston. I considered it a must-read for strength coaches and serious students of the Iron Game.)

Taking PTP training to another level was Ivan Abadjiev, head coach of the Bulgarian weightlifting team that became a powerhouse in the sport for several decades. Coach Abadjiev would have his lifters quickly work up to a max single in a snatch or a clean and jerk, then reduce the weight to get in some reps. Interestingly, many US weightlifting coaches were introduced to this method in an article published in the early 70s in Joe Weider's *Muscle Builder/Power* magazine.

Although primarily a bodybuilding magazine, the article discussed the training of Andon

Nikolov, the 1972 Olympic champion in the 198-pound (90 kilos) bodyweight category. In 1974, Nikolov shocked the weightlifting world at the 1974 European Championships when he challenged the great Russian champion David Rigert, breaking the world record snatch twice with a final lift of 385 pounds (175 kilos). Such results, along with other remarkable performances by Bulgarian athletes, had the weightlifting world taking a serious look at this form of contrast training.

One aspect of contrast training I especially like is that the volume of plyometric/jump training is much lower than a program that focuses on plyometric training. Getting back to my pro hockey player example, plyometrics place a lot of stress on the joints, and many strength coaches underestimate how hard this is on the body. There is a running joke that the major reason for having such a long season in hockey is “you need that much time to recover from all the injuries from doing the plyometrics in the off-season!”

Besides overtraining on high-impact exercises, many strength coaches don't allow enough rest time to recover from the exercises – plyometrics is not endurance training! This is one of the criticisms by Russian coaches about US plyometric programs. Although the metabolic system can recover quickly after plyometric exercises such as depth jumps, the nervous system cannot. With contrast training, you can perform significantly more work in the same amount of time as you are combining two exercises in one set, even though I often prescribe as much as five minutes after each superset.

**Warning:** The following workout I am about to share with you is for the advanced athlete only—I wouldn't recommend it for anyone with less than at least a year of training under their weightlifting belt.

The following contrast training workout entails combining a traditional strength exercise with a plyometric exercise and should only be used for short periods (2-3 weeks). It is designed to be performed twice a day, and no more than twice a week, with at least two days of rest between workouts. Trying to do both of these workouts at the same time of day would not be wise, as you would be in such a fatigued state you would not be able to put any significant effort into the later exercises. I would also alternate these workouts each training day, with the PM workout being performed as the AM workout during the next training session.

### **AM Workout**

- A1. One and One-Quarter Barbell Back Squat, 5 x 6, 5010, rest 10 seconds
- A2. Depth Jump from Box, 5 x 6, X0X0, rest 300 seconds (yes, 5 minutes!)
- B1. VMO Incline Leg Press, 5 x 12, 4010, rest 10 seconds
- B2. Walking Lunges with Dumbbells, 5 x 8, 20X0, rest 180 seconds

## PM Workout

A1. Russian Step-Up, 5 x 10-12, 10X0, no rest

A2. Barbell Drop Lunge, 5 x 10-12, 20X0, rest 300 seconds (yes, 5 minutes!)

B1. Barbell Semi-Stiff-Legged Deadlift, 5 x 10-12, 3210, rest 0 seconds

B2. Back Extension at 45 Degrees, 5 x 10-12, 3610, rest 60 seconds

(Pause halfway up with torso parallel to the floor)

Now let's talk about the details.

For maximum effectiveness, there should be little or no rest between the A1 and A2 exercises. However, there should be an extended rest period after the plyometric exercise to allow the nervous system to recover adequately before performing another set.

The barbell drop lunge has a longer eccentric phase than the depth jump, and the hamstrings have to work hard to enable the athlete to decelerate. This is especially important in sports that require rapid changes of direction, such as soccer. For variety, the depth jump can be substituted with hurdle jumps (especially popular with my weightlifting mentor Pierre Roy) or another type of bounding jump.

For the B superset in the second workout, I have the hip extensors being trained at different ranges of the strength curve, such as pausing at the bottom of the deadlift and targeting the mid fibers of the back with the pause at parallel during the back extension variation. This variety creates a great degree of functional hypertrophy, which is the type of muscle mass needed for athletes to achieve physical superiority over their competition.

Finally, for more information about the science behind contrast training and practical workouts for all levels of athletes, an excellent resource is Donald Chu's *Explosive Power and Strength*. Chu has a Ph.D. in physical education/physical education and is one of America's most accomplished track and field coaches, specializing in the jumps.

Time is a critical factor in successful strength coaching, and contrast training is a superior training method that packs a *powerful* punch!

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