

## **BULGARIAN LEG TRAINING SECRETS**

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Almost a decade ago, a retired Soviet hammer thrower came to the conclusion that traditional forms of squatting were not the best way to strengthen the muscles of the thighs and hips. Many in the Soviet Union considered this heresy, as the squat was the king of leg training in that country just as it was, and is still, in the United States.

Ten years ago, the full squat was the foundation of exercise programs for almost all elite athletes in the Soviet Bloc nations, whether they were weightlifters or not. Soviet athletes - be they wrestlers, runners, fencers, soccer player or swimmers - all squatted. But because the retired hammer thrower had won the gold medal in the 1976 Olympic Games and because he was a respected graduate of the Central Institute for Physical Education and Sport in Moscow, his opinions were taken seriously. His name: Anatoly Bondarchuk. His studies led him to conclude that a particular form of what we'll call the high step-up had two significant advantages over the standard back squat. Bondarchuk concluded that high step-ups, firstly, produce greater gains in thigh and hip power and secondly, cause fewer injuries.

Bondarchuk does his research and coaching in Kiev. His fellow Soviet coaches and sports scientists were skeptical about his conclusions. However, as time passed and he was able to convince a few athletes and coaches, in a variety of sports, to drop squats from their routines and adopt the high step-up, it became clear that he had made a significant breakthrough. Many of the athletes using his "new" exercise began to make gains in power that were far beyond what they had made using only the squat.

We qualify the word "new" because, in one form or another, the step-up has a fairly long history. A review of dozens of pre-1900 books in the Physical Culture Library at the University of Texas revealed that the step-up was commonly practiced before the turn of the century. In fact, Dr. Dudley Allen Sargent, who was for years the director of physical training at Harvard University, used a form of the step-ups as he was devising one of the first known methods of cardiorespiratory testing. Sargent's method, first used over 80 years ago, is called the Harvard Step-Up Test. It involves stepping up, at a timed pace, onto a bench or chair approximately 20 inches high for a set period of time and checking the pulse rate at predetermined intervals.

But the step-up was also used to strengthen and develop the hips and thighs. As weight training grew in popularity in the 1920s and '30s, the step-up with extra weight began to appear in books and magazines of that era. However, the squat with added weight was also given an enormous boost in America during this same era thanks to several crucial factors: Firstly, the wonderful lifting of the young German immigrant "Milo" Steinborn, who could do a full squat with more than 500 pounds, secondly, the publicity given to Milo's world-record-breaking abilities in weightlifting, and finally, the career of Joseph Curtis Hise, who not only gained a great deal of strength and muscle size with high-rep squats but also had the ability to fill other bodybuilders with enthusiasm for this arduous but effective form of training.

Who knows whether the step-up with weights would have become more popular had Steinborn and Hise not appeared on the scene and raised the reputation of the deep knee bend, putting it at the top of any serious trainer's list of "must" exercises? In

any event, the squat became the dominant hip and thigh exercise in America in the 1920s and has remained so ever since.

### **SQUAT-CHALLENGED**

When the Eastern European nations, led by the Soviet Union, began to assert themselves athletically after World War II, one cornerstone of their success was the squat. For a time, they turned to the West, particularly the United States, for training theory; but as the years passed and they developed their own coaches and sports scientists, they began to rely more and more on their own research. It was this tradition of self-reliant research that led Anatoly Bondarchuk to challenge the supremacy of the squat.

One thing Bondarchuk concluded was that the heavy back squat was potentially dangerous to the structure of the lower back. In fact, according to his studies, it can be demonstrated that the back squat places a load on the structure of the lower back that, in the bottom position, is at least twice as heavy as the load on the bar. In other words, if you are lifting 300 pounds in the full squat, your lower back is stressed to an amount equaling at least 600 pounds, usually more. The actual amount depends on the speed of descent and ascent. The faster you descend and the faster you reverse direction and begin to arise from the bottom, the greater the load on the lower back and, according to Bondarchuk, the greater the chance of injury.

Bondarchuk also noticed that athletes who were pushing for those extra few reps on a set of squats almost always sank an extra inch or so at the bottom in order to get a bit of "bounce" to push them through the sticking point of the exercise. For this reason, and because he observed that in no sport did the athlete ever find himself in the normal full-squat position, Bondarchuk concluded that it would be safer to use a form of weighted step-up.

When he began his research, he was unsure of several things. He wasn't sure how high the bench or chair, onto which the athlete would step, should be. As he began to experiment with different heights, he soon realized that he could achieve complete development of the thighs and hips by using varying bench heights, depending on the needs of the individual athlete. Being well-schooled in anatomy and physiology, he understood that the higher the bench, the more stress would be placed on the hamstring muscles on the rear of the thigh. Conversely, he understood that a lower bench would result in more work being required of the quadriceps muscles on the front of the thigh.

Finally, he concluded that the ideal position generally occurred when the athlete was standing on the toes of one foot with the other foot flat on the bench and the top of the raised thigh parallel to the floor. If, however, the athlete was weak in the hamstring area, he should use a slightly higher bench. According to research done by Osse Aura, a professor of biomechanics at the Finnish Institute of Physical Education, the hamstring muscles should be approximately 75% as strong as the quadriceps muscles. If that ratio is not maintained, the chance of injury increases, while the chance of maximum performance decreases. Bondarchuk agrees with Aura's figures and uses a form of the leg curl and leg extension to determine the relative strength of these two muscle groups. If he finds the quadriceps of a certain athlete to be too strong, he will instruct that athlete to use a higher than normal box height and thus place more stress on the hamstrings. If, on the other hand, an athlete's hamstrings are too strong, the box height will be lowered so that the quadriceps may be

stressed more completely.

Obviously, since an athlete cannot do a high step-up with even 50% of the weight he or she can use in the full squat, the problem of the "double loading" stress on the lower back is greatly reduced. The lower back experiences far less stress when an athlete does a high step-up with 100 pounds than when he does a squat with 300 pounds, assuming that both of these lifts are maximum efforts. Also, since it would be impossible for an athlete to "bounce" out of the bottom position in the high step-up, this exercise completely eliminates the problem of the bounce. This is an important consideration since the complete full squat, especially when done with a "bounce," is potentially harmful to the structure of the knee.

### **HOW IT'S DONE**

The high step-up starts out similar to the regular squat. The weight is placed on a standard bar and the bar is placed on a squat rack as would be the case with a squat. But then things are different. Before squatting, normally you step backward, but with the high step-up you move forward, toward the platform onto which you will step. But if your gym isn't set up to allow you to step forward, don't be concerned. Simply be careful as you position yourself for the step-up. You may need to construct a box if you can't find a bench or sturdy chair of the proper height. And if you have a box or chair that's a bit too tall, don't forget that you can use a 100-pound or 45-pound plate under your bottom foot. Or, for that matter, you can use pieces of plywood to achieve the exact position you need. You should also be careful to keep your shoulders more or less over your hips as you step up onto the box or bench; don't bend forward at the waist in order to do the step-up. Also, slightly bend the knee of the leg onto which you lower yourself. It takes some of the shock out of the descent and is a bit safer.

Several years ago the Bulgarian weight lifting team began to drop all back squatting in favor of high step-up. By that time, many Soviet lifters had abandoned squats and made their higher lifts in the snatch and clean and jerk than ever before. Perhaps the most dramatic example of this involves the career of Leonid Taranenko, the current holder of the world record in the clean and jerk in the superheavyweight class. Taranenko has done the clean and jerk with the amazing weight of 586 pounds. Think of it! Almost 600 pounds lifted from the floor to full arms' length overhead. But to many longtime lifters in this country, it is perhaps even more amazing than it has been at least four years since Taranenko has done a back squat of any kind. Besides his practice on the snatch and clean and jerk, the only form of heavy leg training that Taranenko does is the high step-up with weights...Heavy weights. His best in this exercise is three reps with each leg with 396 pounds. Taranenko's coach, Ivan Loginovich, one of the foremost trainers in the Soviet Union, was one of the coaches who worked with Bondarchuk to perfect the high step-up and use it as a replacement for the back squat; and one of the proofs found in this particular pudding is Taranenko's many world records.

One thing coaches in the Soviet Union and Bulgaria noticed was that those athletes, both lifters and those in other sports, who dropped the squat and used the high step-up developed more complete muscularity than those who simply squatted. Many of the coaches say that the legs of those who work hard on the high step-up look more like those of someone who did sprinting and jumping as well as squatting. Apparently, the balance required in the high step-up calls more muscles into play, producing fuller, shapelier development.

## **WORKING THEM IN**

As far as how to work the exercise into your training routine, one way would be simply to eliminate squats and replace them with the high step-up, using the same sets and reps and handling as much weight as you could in the step-up. Another way, if you have a desire to push your strength levels up several notches, would be to do the high step-ups as the Bulgarian National Lifting Team does them, which is as follows (assuming that the athlete can do a maximum of two reps in the high step-up with 170 pounds):

1. Begin with one set of 8-10 reps with no weight, and
2. Proceed to 45 pounds for six reps (45x6), 110x3, 132x3, 150x3, 160x3 for three sets, 135 x6 for three sets and sets of 115x3 to failure.

The Bulgarian team uses the pulse rate as a gauge to let them know how far to take the sets. They believe that each of the moderate to heavy sets should produce a pulse rate of 162-180 beats per minute. The lifter doesn't begin his next set until his pulse has dropped to between 102 and 108. The Bulgarian team does virtually this same workout five or six days a week, along with quite a lot of other leg work that goes with the snatch and the clean and jerk. Unless you are young (21 or below) and in unusually good condition, we don't recommend that you do such a demanding workout without at least one day of rest between sessions.

If these low repetitions don't appeal to you and you'd like to stick with more traditional approach for step-ups, you might simply do several sets of progressively heavier warm-ups, go to three heavy sets of six reps, and finish off with three lighter sets to failure, aiming for 15-20 reps per set. And if that doesn't give you a super pump, you need to have your oil checked.

If you do adopt either of these routines, we suggest you drop all other heavy lower body exercises such as leg presses, front squats and hack squats. You could continue with leg extensions and leg curls and, of course, with calf work, but you should be careful not to overtrain. The trick in all exercise programs is to do enough to stress the muscles so that they become larger and stronger, but not so much that they can't recover in time for the next heavy session.

Give this result-producing exercise a try. It has literally worked wonders with the strength and power athletes in Eastern Europe, and with their bodybuilders as well, most of whom swear by the high step-up. Make no mistake, squats are a wonderful, effective exercise: but perhaps the high step-up can allow you to make even more gains than you could with squats alone. It's worked out that way in the iron game behind the Iron Curtain.