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Short and Simple—and Effective

Bill Starr explains how to incorporate isontonics and isometrics into your strength program.

By Bill Starr **October 2012**

All images: Mike Warkentin

Those who were around in the '60s can recall quite well when isometrics came on the scene. They were all the rage. Olympic weightlifters, bodybuilders and strength athletes in a wide variety of sports—from swimmers to track and field athletes, but most of all football players—took advantage of this new form of strength training.

The concept was the brainchild of Dr. John Ziegler, a general practitioner from Olney, Md., who specialized in physical rehabilitation. He became interested in this branch of medicine after being severely wounded while serving with the Marines in the Pacific during World War II. He carried around metal plates in his head and leg for the remainder of his life, and he began strength training to help rebuild his broken body.

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Ziegler did a great deal of research on his own behalf and came across some information done by German scientists in the '30s that dealt with pushing or pulling against a stationary object in order to make the muscles and attachments stronger—in other words, an isometric contraction.

Doc Ziegler designed a power rack and tested out the idea. He found that it worked remarkably well and wanted to try it out on some healthy athletes. He considered Olympic lifters to be the strongest athletes in the world, so it was inevitable that he would connect with the York Barbell Company because it was only 90 miles from Olney.

Quickly, he became a part of that world-famous organization. Bob Hoffman, the self-proclaimed Father of American Weightlifting and owner of the York Barbell, was delighted to have Ziegler on board. To have an M.D. on staff would add a great deal of credibility to his writings on training, nutrition and general health.

But when Doc Ziegler began pushing the idea of using isometrics as part of the training for the many Olympic lifters who represented the York Barbell Club, Hoffman balked. What Doc was proposing was too similar to the dynamic tension system that Charles Atlas and George Jowett had been marketing for a great many years. Hoffman had been blasting dynamic tension for years as an inferior method of gaining strength. Hoffman's main incentive in life was to make more money and he saw no way to make a financial gain by promoting isometrics.

In 1959, Dr. C.H. McCloy of Iowa State University, a renowned authority in the field of kinesiology and applied science, conducted a study on isometric exercises. McCloy submitted the study to Hoffman to be used in *Strength and Health* magazine, the home organ for the York Barbell Company. The study concluded that exercising on non-apparatus in an isometric fashion resulted in a marked increase in strength—exactly what Ziegler had been telling him for the past several years.

Hoffman knew that he needed to act fast, so he quickly had Doc Ziegler put together an instruction manual and ordered a shit-load of power racks. And, of course, he began promoting the new form of strength training.

If you're creative, you can find a number of ways to set up a power cage for isometric and isotonic work.

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The Guinea Pigs

Bill March lived near York, was 23 years old and had only recently gotten interested in Olympic weightlifting. He weighed 176 lb. and had won the 1960 Middle Atlantic Title with a three-lift total of 745. When March was first approached with the idea of testing an innovative method of gaining strength, he was not so hot on the idea—especially because it meant driving back and forth to Olney from York five days a week to be put through a workout by Doc Ziegler. If it hadn't been for Dick Smith, the project would never have gotten off the ground. Smitty was the jack-of-all-trades at York Barbell and served as team trainer for the lifters. He volunteered to do all the driving, and the experiment was on.

March's lifts began to improve steadily and at a rate that few could imagine. He shot past the 800-lb. barrier and kept right on going. He moved up to the 198-lb. division and at the 1963 Philly Open pressed 354 for a new world record. He was the poster child for isometrics. He had gone from being a fair-to-middlin' lightweight to a world-class competitor in a very short period of time.

> Isometrics, along with the more advanced combination of isotonics-isometrics, swept across the country almost overnight.

Isometric courses and power racks were selling like hotcakes. While Hoffman was counting his money from the windfall, Ziegler was modifying his isometric rack routine. He believed that an athlete could get much stronger by moving the weighted bar a short distance before locking it in an isometric contraction. This had many advantages over pure isometrics where the bar doesn't move at all. First and foremost, it allowed the lifter to know, for certain, that he was applying his maximum effort. This was a major improvement.

You can use an extra set of pins to pull against, or you can use the guards to create a barrier (pictured). It should be noted that the rack should be bolted to the floor or weighted very, very heavily to prevent tipping.

When first learned how to do isometrics, I was never positive that I was indeed putting out maximum effort. It felt like I was, but how could I be sure? I couldn't, and no one else could either. In fact, Ziegler later stated that no one is capable of exerting a full 100 percent unless his life depends on it.

However, when the short stroke, or isotonic phase, was done prior to the isometric phase, things were clearer. Should the lifter not be capable of holding the weighted bar up against the top pins for the required amount of time, he was trying to use too much weight. Conversely, if he could hold the bar against the top pins for several seconds more than were required, more weight would be added at the next session in the rack.

Ziegler taught this newer method to March and also to the second test subject, Louis Riecke, a 34-year-old Olympic lifter well past his prime. The New Orleans athlete had been competing for over 20 years, and although he was still regarded as one of the top light-heavyweights in the country, his lifts had leveled off. When the 1960 Olympic team was training at York prior to leaving for Rome, Riecke was invited to attend a clinic held for several other top prospects. Riecke came down with a skin rash from new clothes he purchased and went to see Doc Ziegler, the team physician for the Olympic Team, who was staying at the Yorktown Hotel.

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In isotonics, the lifter moves the bar a short distance with perfect technique before locking into a barrier for a max-effort isometric contraction.

After Doc provided Riecke with the ointment, Riecke took the opportunity to ask Doc a host of questions about the new method of training March was using to make such amazing progress. Doc took a liking to the personable, highly intelligent athlete who also had some medical training.

Doc proceeded to teach him the same isotonic-isometric program he was currently using on March, and Riecke started making the same types of gains as March.

I had lifted against Riecke several times because he often came to meets in Dallas and other parts of Texas. In the fall of 1960, I competed against him in Dallas and he did a 255 press, 265 snatch, and 315 clean and jerk as a 18l-er. I was only 20 lb. behind him after the press, did 30 lb. less in the snatch, and out-lifted him by 10 lb. in the clean and jerk. I figured that in a couple of years, or perhaps sooner, I would be able to challenge him because he wasn't improving much and I was.

All thoughts of catching him vanished in a heartbeat the next time I lifted against him. It was March of 1961 at a contest in Houston. He did 295, 285 and 360. I was stunned, as was everyone else in attendance. No one had ever heard of anyone so far past his prime making such amazing gains in such a short span of time. He informed all who asked that he was using the new training method that Doc Ziegler had developed: isotonic-isometric contractions, the same program being used by Bill March.

All the lifters there went home and began doing isometrics, even if they weren't sure what they were doing. Most purchased a manual and either built their own racks or purchased one from York. Every aspiring lifter also read in detail all the articles published on the subject in *Strength and Health*—and there were a lot of them, although none provided all the information needed to make quick gains. The articles were about the fast progress a great many athletes had made in a wide variety of sports by doing isometric contractions.

Rack sales proliferated as more and more coaches got on the bandwagon. Indiana University was the No. 1 swimming team in the country, and head coach Jim Counsilman ordered a large number of racks and started having his athletes go through a series of isometric movements. When they began breaking records at every meet, all the other swimming coaches followed his example and bought racks as well.

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Isometrics were a big hit in other sports, too. Coaches and athletic directors loved the program. It was easy to learn, the racks took up very little space, and there was no clutter because there was no need to have extra plates, or dumbells, or any type of exercise machines. The training system was so streamlined that an entire football team could go through a workout in 30 minutes or less. Perhaps best of all, at least for Hoffman, was that sports-medicine personnel and team trainers pronounced it was a safe form of strength training. These same team doctors and trainers had typically voiced their opinion that they believed lifting weights was detrimental to athletes.

> The bottom line is that when an athlete does an isotonic-isometric program correctly, he will get stronger.

By the Way …

Isotonics-isometrics swept across the country almost overnight. The only thing I can compare it with is the way Nautilus took the country by storm a decade later. Then in the mid-'60s, the isotonics-isometrics bubble exploded. Word had finally leaked out that along with the rack training, both March and Riecke were taking an anabolic steroid. Doc Ziegler was behind this innovation as well. When he learned that the Russian Olympic lifters were experimenting with male hormones, he dug in the research and ended up developing a little pink pill, which he took to CIBA Pharmaceuticals. That's how Dianabol was born.

The isometric craze came to a screeching halt. Soon lifters from all parts of the country were making similar gains to those Riecke and March had made. It didn't matter what kind of routine they used just as long as they were using Dianabol. The consensus was that the rack training had been nothing more than a smokescreen. It was the drug that made the difference, and almost overnight isometric training in any form was abandoned—except for one group of lifters: those at York Barbell. They continued to use the isotonic-isometric routine. Why? Because they knew the system brought results.

By altering starting positions and barrier placement, you can use isotonics at different stages of a lift.

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You should aim for a hold between 8 and 12 seconds. If you can hold longer than 8 but less than 12, use the same weight in the next session. If you can hold longer than 12, add more weight next time. If you can't make the 8 count, reduce the weight for the next session.

The real value of Dianabol was that it helped the athletes to gain muscular body weight rather quickly, and everyone who had been associated with the sport of Olympic lifting knew that the easiest way to get stronger is to gain weight. But once the body weight levels off, which it must for all lifters other than the heavyweights, he must still work harder than his opponents in the weight room because his opponents are taking the drug, too.

It also needs to be pointed out that those sports teams and individual athletes who excelled in their sports when they began using isometric systems were not taking any anabolic steroids. It was the rack training that made the Indiana swimmers faster. Jim Beatty broke the world record in the indoor mile after training with isometrics. Jay Sylvester broke the world record in the discus three times and praised isometrics for his increase in strength. What many coaches liked best about the isometric system was that it allowed their athletes to get stronger without adding any body weight.

The bottom line is that when an athlete does an isotonic-isometric program correctly, and by that I mean the way Ziegler taught it, he will get stronger. The main problem is there aren't many people left who know how to teach young athletes this method of training. A great many who knew the specifics of this form of strength training have departed to the weight room in the sky, and most of the others no longer have anything to do with the sport of Olympic lifting or strength training. Tommy Suggs is an exception. He still teaches athletes he comes in contact with how to do the iso program properly. I do, too, but because I no longer have a large group of athletes to deal with, I now encourage athletes in every sport to incorporate this system of strength training into their routines in my articles.

Hopefully, someone in a position of power will take up the cause and bring isotonic-isometric training back into the mainstream of strength training. Otherwise, it will be lost. But I suspect, not for long. Someone further down the road will come across research and old articles on the subject and be smart enough to resurrect the training system and figure out how to make money from it. It's happened before, many times. Just look at the recent rebirth of kettlebells.

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The Hows and Whys of "Isos"

Some basics: in an isometric contraction, the muscles don't shorten as they do when an exercise is done with a barbell or dumbell. They do shorten when an isotonic exercise is performed. What Ziegler did was combine the two for maximum results. He found out early on that by moving the bar a short distance—usually no more than a couple of inches—before locking it against a set of pins and holding it for an isometric contraction was more productive than doing just an isometric hold.

The first thing you need to do if you want to try this form of strength training is buy a notebook. You must record every workout.

First of all, doing so eliminated the guesswork as to whether the athlete was putting his maximum effort into the movement. With the combination, the loaded bar stayed fixed against the pins or it didn't. So if the athlete was unable to hold the weight for the required period, he needed to lower the poundage. If he was able to hold the weight against the pins for a much longer count than what was required, then he needed to increase the weight on the bar the next time he did that particular position in the rack.

One of the most important advantages of moving the weight isotonically before locking it into an isometric contraction was the athlete could gauge his progress from workout to workout. If, for example, he was using 205 for the middle position for the overhead press a month ago and now he's handling 225 at that same position, he knows he's getting stronger. That's very motivational and something that's lacking in pure isometrics, where there isn't any tangible proof that the athlete is making progress.

Then there is the motivational factor in regards to the psychology of numbers. Strength training is all about numbers: sets, reps, time spent training, rest periods, workload and top-end numbers. It's much more satisfying to be able to lock 365 against the pins while doing a starting position in the clean pull than it is to do the same movement with an isometric contraction.

In addition, an athlete can break form while doing an isometric hold and not even realize it. But when there is a considerable amount of weight on the bar, if he pulls, pushes or squats out of the correct line, he will not be able to lock the bar against the pins for the isometric hold. The isotonic move requires that the athlete control the bar. Because if the bar isn't moved in the exact line it needs to be in, and if the athlete's body is not in the exact position it should be for the exercise he's working on in the rack, that set will be a wash.

When an athlete does an isotonic-isometric movement, he is forced to concentrate much harder on what he's doing than when he does a full range motion for that exercise and also when he just does a pure isometric hold. This forces the nervous system to become involved to a much greater extent. This is why the combination of isotonics and isometrics is so much more demanding than pure isos and why it takes more time to recover from rack work.

The first thing you need to do if you want to try this form of strength training is buy a notebook. You must record every workout. Otherwise you're going to forget exactly where you set the bar in the rack for the various exercises, and you're also going to forget exactly how long you held the bar against the pins for the isometric contraction. Most believe they can remember. They can't. Not unless they write it down. And it's best to do it while you're training, because even a few hours later, not many people recall what hole they used in the rack for the three squat positions they did that day.

It's also a good idea to put small strips of tape next to the holes in the power rack and number the holes. That will save you the time of counting up to the hole you're after at every rack session. Start keeping a record from the very beginning and it will become a regular part of your workout.

Be sure that you're completely warmed up before performing any isos. I will refer to isotonic-isometrics as isos for the rest of this piece.

When I first introduce isos to one of my athletes, usually just those who are advanced and have been training with me for several years, I put them at the end of the workout so they are already warmed up thoroughly. But if you happen to want to start off with an iso, be sure to spend time raising your pulse rate and getting your muscular system ready for the upcoming work.

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I have found that the middle pull for the clean is the best position to teach someone how to do isos. It's a strong position for most athletes and particularly so for Olympic lifters and powerlifters and those who include power cleans in the their programs. Use straps on all pulling movements in the rack. Set the bar a few inches above the knees. Some power racks have holes four or six inches apart, and in order to set the bar where you want it, you need to stand on some blocks. This may seem awkward at first, but with practice you can get used to it.

Strap onto the bar and make sure your body mechanics are absolutely perfect: feet in the right position, back tight, frontal deltoids slightly out in front of the bar. Take a breath, drive your feet down into the platform, then ease the bar up against the top pins. Most attempt to jerk the bar up to the pins, but what usually happens in those cases is the bar will dance away and come crashing back to the lower pins. Squeeze the bar upward and fix it snugly against the top pins. Once you have it securely in place, start your count and begin applying more and more pressure on the bar. When the count hits five, lean into the effort even harder and at that juncture every muscle in your body should be fully contracted, from your feet to your traps. Whenever you do an iso perfectly, you'll feel an electric shock shoot up through your body into your brain. That's what you're after: a maximum contraction.

What you're trying to do is bend the bar. While Doc Ziegler was right about not being able to put out 100 percent, with practice, you can get very close to that percentage of effort. At the end of the iso contraction, take a couple of breaths and lower the bar back to the lower pins in a controlled manner. This provides a bit more work for the target muscles in the form of negative training.

How long should the contraction last? Doc Ziegler believed that a short 6-8-second count was enough. But he was dealing with experienced lifters. Most athletes that I introduce to the iso system are not able to apply themselves fully until they have locked into the iso hold for 5 or 6 seconds. So I have them hold for a slightly longer count: no less than 8 and no longer than 12.

To maintain correct positioning, make sure you ease the bar up rather than jerk it against the guards. Bill Starr recommends using straps for isometric pulling work. Try it with the hook grip and no straps and you'll see why.

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Sets and Reps

Doc's program was for 1 set for 3 different exercises for the back squat, presses and pulls, plus a few auxiliary movements such as calf raises and even good mornings. I teach the isos in a slightly different manner to allow the athletes to get the feel of what they're trying to accomplish. I have them do 3 sets instead of just 1. It goes like this:

My sample athlete is going to do the middle pull and wants to finish with 325 for a count of 8-12. For his first set, he uses 225. He pulls the bar to the top pins but doesn't lock into an iso contraction. He just taps the pins and lowers the bar back to the pins. A second rep is done in the same fashion. The third rep is the money rep, and he holds it for just 5 seconds to get the feel of the iso contraction.

> The time element is far more important than how much weight is on the bar.

Next, he uses 275 and follows the same procedure as he did on the first set: tap, tap, hold for a count of 5. On the third, final set, he will only do 1 rep because he now has the line down and knows how to lock into the iso contraction. He holds for no less than 8 seconds, and if he moves easily past a count of 12, he will load on more weight the next time he does that position. Over time, he will eliminate one or both of those warm-up sets and go directly to the work set, but while learning the technique for this form of exercise, a few warm-up sets help.

Once you have learned how to do isos from the middle pull position, you can do them for any exercise in your routine. They are absolutely the very best way to improve a weak point and an excellent way to find the weakest area in any given exercise.

The one point that Ziegler emphasized over and over was that the time element was far more important than how much weight was on the bar. If a certain poundage could not be held for the required count, less weight should be used. When an athlete did manage to hold a weight for a solid 8 seconds, then he had to stay with that same weight until he could lock it in as an isometric hold for 12 seconds. Then there's no doubt that he is getting stronger in that particular position.

What you're doing is overloading those muscles and attachments in a very short, concentrated expenditure of energy. When done correctly, 1 set of 1 rep is enough. Doc also said that whenever the muscles, tendons and ligaments are pushed to absolute limit, they're through for that day.

Isos are ideal for getting in a total-body workout in a short period of time. Three positions for any form of pressing, three pulls, and three more for the hips and legs and you're finished. If you use your imagination, you can figure out how to do a large number of different exercises using isos, such as bent-over rows, curls and inclines.

It will be well worth your while to take the time to learn how to do isos, if for no other reason than you will be able to teach an aspiring strength athlete how to do them in the future. To me, isos are the ultimate strength exercises and they need to continue to be a part of every athlete's strength routine.

✦

Jody Forster

About the Author

Bill Starr coached at the 1968 Olympics in Mexico City, the 1970 Olympic Weightlifting World Championship in Columbus, Ohio, and the 1975 World Powerlifting Championships in Birmingham, England. He was selected as head coach of the 1969 team that competed in the Tournament of Americas in Mayaguez, Puerto Rico, where the United States won the team title, making him the first active lifter to be head coach of an international Olympic weightlifting team. Starr is the author of the books ***The Strongest Shall Survive: Strength Training for Football*** *and* ***Defying Gravity****, which can be found at The Aasgaard Company Bookstore.*

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