



ISOMETRICS: IRON FOSSIL OR SECRET WEAPON?

Scientists dabbled with isometrics, or muscle contractions against stationary objects, as far back as the 1920s. Then in 1953 German scientists Hettinger and Müller shook the muscle world with their study that concluded that you can add 5% to your strength a week by pushing or pulling against a stationary object once a day. Just once, only for six seconds, and at mere two thirds of a max effort!

Weightlifters and martial artists quickly jumped on the bandwagon. The former pushed and pulled empty bars against power rack pins; the latter tried to tear their black belts apart and pushed through walls with backfists.

Enter the Dragon.

But isos went out of fashion around the time of Bruce Lee's mysterious death, for reasons that had nothing to do with the effectiveness of this ingeniously simple method: the emergence of anabolic steroids—and the seep of flakiness and trendiness into the fitness world.

It is time to bring this secret weapon back.

Why isometrics?

Prof. Verkhoshansky (1977) lists the six advantages of isometrics, slightly paraphrased below.

1. Accessibility of isometrics to everyone.

Although certain sport-specific applications of isometrics require specialized equipment such as power racks, generally you can manage with such mundane items as a wall, rope, stick, doorway, or chair.

2. The ability to train any muscle at very precise angles.

A great benefit when you are trying to overcome a sticking point in a lift.

3. Great efficiency.

In the words of Prof. Yuri Verkhoshansky himself, "...a ten minute session of isometric tensions in specially selected exercises will replace a tiring one hour of weight training."

4. Insignificant muscle and bodyweight gains when compared to dynamic exercises.

This may or may not be an advantage from your

point of view. The extent of muscle hypertrophy depends on the training protocol. Recent studies have registered respectable muscle growth from isometrics. For instance, Garfinkel & Cafarelli (1992) found a 14.6% increase in the cross-section of the knee extensors following eight weeks of isometric training. Increasing the duration of the contractions to a minute and longer, as explained below, is likely to yield even greater muscle gains—if you need them.

5. The ability to maintain high levels of speed-strength during important competitions due to the fact that isometrics expend a lot less time and energy than lifting weights.

6. Great for improving and fixing athletic technique.

Quoting Prof. Verkhoshansky, isometrics offer "A better opportunity to memorize the proper positions visually and kinesthetically than the dynamic mode. This makes the isometric method especially valuable for teaching and mistake correction."

I shall extrapolate on this subtle but extremely important point. Let us use the military press as an example. In order to put up the heaviest weight safely you need to 'wedge' yourself between the barbell and the ground, every muscle tight. It is not an easy skill to learn with a live weight but a piece of cake with isometrics. Stand inside a doorway, on a stool if necessary, put your hands up against the molding, and press. You will naturally tense up your legs and waist. Remember that feeling when you press a barbell.

The 'wedge' is just as effective for quick moves. I use it to improve my military and law enforcement clients' striking technique and power. On my *Martial Power: Hard Hitting Combat Secrets* from

the *Russian Special Ops* videos you can see an obvious improvement in a professional kickboxer's kicks and cage fighter's punches after just two days.

What are the disadvantages of isometrics?

Suren Bogdasarov (1991), the coach of Russian weightlifting legend Yuri Vlasov, lists three drawbacks of isometrics. First, they are counter-indicated for people with high blood pressure and heart problems. Second, your muscles could lose their elasticity. The solution is simple: massage your muscles and shake them to relax between sets. Third, it is easy to lose your sense of exertion. Bogdasarov recommends varying the intensity of isometric contractions to address this problem, for instance an easy set followed by an all-out set.

Prof. Alexey Medvedev (1986) urges caution in applying isometric exercises to children and teenagers. He also warns that **strength development plateaus after six to eight weeks of isometric training.** This is not a problem as you are not supposed to train isometrically full time anyway. Go iso for a month or two, then go back to your regular strength training. Summer is the ideal time for an isometric only routine.

How often?

Scientists disagree on a lot of things but not on the frequency of isometric training: **daily training is ideal** (Atha, 1981). It does not mean that you cannot train less frequently; you just will not gain as much. According to Hettinger (1961), training every other day delivers only 80% of the strength gains of daily training and training once a week yields only 40%.





Super-Long Isometric Contractions

Steve Justa: *“they made my muscles dense and super efficient”*

Interestingly, scientists do not appear to have interest in studying very long isometric contractions for strength and muscle growth.

We have learned that two factors are important:

1) total time under tension;

2) continuous time under tension that is high enough to occlude the blood flow.

It seems logical to experiment with a contraction that is just intense enough to occlude the blood flow (about 50%) and holding it for as long as possible, isn't it?

If you look at the so-called Rohmert curve

(see Siff & Verkhoshansky, 1996), you will learn that men can hold a 50% intensity contraction for over a minute and women for almost three minutes. Ironically, people in the trenches such as strength coach Jay Schroeder and strongman author Steve Justa beat the scientists to the punch with their successful experiments with minutes-long isometric contractions.

How much?

According to Verkhoshansky (1977), the duration of a contraction is more important than the contraction's intensity. McDonagh & Davis (1984) reviewed a number of studies of isometric strength training and concluded that the total time under tension, or the time of the combined contractions (e.g., 3 sets x 10 sec = 30 sec or 10 sets x 3 sec = 30 sec), is the loading variable of primary importance in isometric strength and muscle training.

Muscle tension impedes the blood flow and traps various growth factors. According to Smith et al. (1995), the muscle cells' longer exposure to these substances supposedly stimulates their growth. It appears that you should favor more contractions if you emphasize strength and longer contractions if you stress mass gains.

How hard?

Surprisingly, all-out effort does not seem necessary for all-out gains. Hettinger (1961) and Medvedev (1986) recommended 40-50% of perceived max efforts. Incidentally, capillaries do not get completely shut until the intensity of the contraction reaches 50% max. Recall that this blood occlusion is important for bathing the muscle in its metabolites for growth.

Be clear that 50% intensity does not refer to trying half of your best throughout the set. It means you start out with 50% of your max strength and hold it. As you get tired, you will be working harder and harder to maintain that level of force. Just like lifting a 50% 1RM weight for reps.

At what angles?

Strength gains were thought to be highly joint angle specific, that is limited to the position at which you train (Gardner, 1963). A new generation of scientists realized that while most gains indeed occur at the specific training angles, there is a transfer to untrained angles as well. In fact, most carryover of strength takes place in the range of plus-minus twenty degrees from the exercised angle (Knapik, Mawdsley & Ramos, 1983).

Traditionally, isometric exercises are done in three positions: near the bottom of the movement, in the middle, and near the top. In the case of the military press, you would press the bar off your

clavicles, at your eye level (the typical sticking point), and a couple of inches short of the lockout.

If you are short on time, just work the stretched position. In a Russian study by Zatsiorsky & Raitsin (1974) the subjects who isometrically trained the stretched position improved their full squat poundage 50% more than those who did their isos near the lockout. In other words, if you have time to work only one position, make it near the start of the movement.

Another reason to emphasize the stretched position is flexibility. Isometric contractions of shortened muscles have been known to reduce flexibility. Stretch isos, on the other hand, happen to be on top of the list of most effective stretching techniques (refer to my book *Relax into Stretch*).

If you have time to work two positions, work the stretched position and your sticking point.

How should I breathe?

Do not hold your breath. Breathe shallow while keeping your abs hard. I have heard a great expression to describe this type of breathing from Uechi-ryu karate practitioners: “breathe behind the shield”.

Power breathing is an option if you practice very brief, 1-3 sec, contractions.

How many exercises should I do?

You have choices. If your main focus is strength you will do fewer exercises with more sets. For instance, powerlifting coach Louie Simmons recommends an isometric bench press program consisting of three to four sets per position for the total of six positions. Needless to say, after twenty some sets you will be in no mood to do much else.

If you are after all-purpose strength a variety of exercises with fewer contractions per exercise are in order. Bogdasarov's (1991) routine, popular among Russian martial artists, consists of fourteen exercises, each done for two to three sets with one to two minutes of rest between sets.

The important thing is to quit before you get worn out. Verkhoshansky (1977) advises that you wrap up your isometric workout within ten minutes!

Should I explode or go slow?

Slowly build up the tension to the specified level, take two to three seconds. Then release the tension just as gradually. This, by the way, is not the only way to iso, just the most common one. For the record, Siff & Verkhoshansky (1996) classify isometrics as ‘slow’ (what you are about to do), ‘voluntary explosive’, ‘reflexive explosive’, and ‘oscillatory’. This gives you a hint of the hidden wealth of athletic applications of isometrics.

Can I use a live weight?

Yes. A technique popular in the strength world, ‘functional isometrics’, calls for pushing a loaded barbell against power rack pins. The obvious advantage is the ability to exactly gage your progress. The disadvantage is, you need a gym. You can use the resistance of your bodyweight in some static exercises that require no equipment, for instance, one-arm chinups.

Can I combine isometrics with regular lifting?

You bet. There are many ways of doing it: mixing isos into ‘normal’ workouts, alternating them, etc. You may even combine static and dynamic work in one exercise. Following is a powerful RKC leg strength exercise that does just that. It is the kettlebell front squat/renege pistol iso combo.

Squat rock bottom with two light kettlebells in the rack. Shift your weight to one leg and carefully extend the other leg forward as if you are getting ready to do a mutant pistol. Stay tight! Tell yourself that you are ready to explode out of the hole like Steve Cotter. In a couple of seconds—before you lose tension!—bring your free leg underneath you and extend the other one. Finally retract to the front squat position and stand up. That was one rep.

Practice the above combo for singles, doubles, or triples in place of your usual leg workout for a few weeks. Do relaxation exercises such as shaking your limbs, leg swings, and loose jogging between your static sets. Do more relaxation exercises and stretch afterwards. I promise you great strength.