

## Isometric Exercise

### 1. What is an isometric exercise?

An isometric exercise is an exercise in which force is applied to a muscle but the joint angle is not changing. For example, holding a bicep curl at a right angle is an example of an isometric exercise. Allowing a small child to hang from your bent arm is also an example of an isometric exercise.

### 2. Benefits of isometric exercise

- **You can achieve muscular hypertrophy without the use of weights** - You can challenge your muscles without weights by finding ways to push against your own body. For example, doing a wall sit against a wall for as long as you can will eventually lead to bigger quadriceps muscles.
- **Doesn't cause as much muscle damage as concentric or eccentric style training** - Isometric training is easier on your body and will not cause as much damage to your muscles as concentric or eccentric training. This allows you to add more volume to your training without causing much more for your body to recover from. This also makes it great for injury rehab.
- **It is a great way to prime your nervous system for future movements** - Doing isometrics with a muscle you are going to be using for a normal concentric/eccentric style movement will get your body ready to use heavier weights sooner. For example, doing a wall sit can help to get your quads ready to handle more weight than just bodyweight.
- **It is a good way to establish a good mind muscle connection with a muscle which can lead to greater hypertrophy (growth)** - For example, it will be easier to feel your glutes work if you do a 30 second isometric hold/squeeze before you do a glute focused exercise.
- **It is a great way to work weak points in a lift** - You can hold the exercise in the position you are weakest in. This will allow you to not only establish good form in that position but also overload it to improve strength in that position. For example, holding the bottom position of a squat is a great way to get stronger in the bottom portion of the lift as well as coming out of the bottom position which tends to be the most challenging portion of the lift for most people.
- **There is always an isometric portion of every movement so getting stronger in that position will allow you to move between concentric and eccentric more efficiently** - This is beneficial for many reasons but here are a couple. If you were to be walking and have to avoid something quickly you need to be able to quickly stop your forward momentum and quickly change direction. If you do leg isometrics you will be

able to stop and move quicker than someone who does not. Also, for athletes it can allow them to jump higher since they are able to transition from the lowering phase to the upwards phase quicker, stronger, and more efficiently.

- **Good for patellar tendon pain** - Isometric exercises such as the Spanish Squat can impart an analgesic effect (pain relief) on the tendon allowing you to workout at a higher level than if you were in pain.

### 3. Disadvantages of isometric exercise

- **Nervous system fatigue** - When you are constantly pushing against something as hard as you can it will fatigue your nervous system. Signs of nervous system fatigue include brain fog, either being extremely tired all the time or having trouble sleeping, lack of appetite, unusual depression or anxiety, and sickness such as fever or diarrhea.
- **Increased blood pressure** - We have all probably had the sensation of holding our breath and pushing in some way shape or form. We start to feel pressure building up in our heads and bodies, and our face will start to get red. This is the sensation of increasing our blood pressure and this is what can happen with isometric exercise. Luckily this is an acute effect, meaning that it is something that will only happen during that workout and will not raise your blood pressure permanently.
- **You will burn slightly less calories than traditional forms of weight lifting exercise** - Since there is no movement occurring, there will be less calories burned than exercise where you are moving. This will be a small difference since traditional weightlifting doesn't involve that much moving either. I would highly recommend not letting this small difference deter you from trying out isometric exercises.
- **Strength leaks** - You will only get stronger within 15 degrees of the joint angle in which you are isometrically training.

### 4. How to incorporate isometric exercises into routine

There are several ways to incorporate isometrics into your exercise routine. In general, using them as part of your warm up is something that can benefit anyone and can be done before every one of your workouts. Whatever you are going to train that day, start with a normal 5-10 minute cardiovascular warm up such as running or walking on the treadmill, and then add in some isometrics to target the muscles you plan to train. For example, if you really want to get a good chest workout you can start by holding the bottom position of a push up, or pushing horizontally against a pole with each arm for 20-30 seconds to really "turn on", or activate the chest muscles. This increased mind to muscle connection has been shown to increase the activation of the muscles and therefore lead to better results.

If your goal is strength oriented, adding heavier or more intense isometrics can be very beneficial. I would recommend anywhere from 2-3 times a week to add in a very intense isometric exercise for an exercise that you're trying to get stronger at. For example, if you are trying to increase your squat, I would hold a weight that is roughly 70-80% of your one rep max at your most challenging points of your lift for as long as you can. To get the most strength progress however this needs to be intense enough that you can't hold the position for more than

20 seconds. This can be very taxing on your central nervous system due to the intensity of the exercise so I would not recommend doing this more than 2 or 3 times a week for 2-3 sets per workout.

If your goal is hypertrophy focused (muscle building), I believe that you can add isometrics anywhere from 4-6 times per week. When focusing on muscle growth you can back off on the amount of weight used or intensity used and focus more on holding the contraction longer. This isn't as hard on your central nervous system since it is less intense, therefore it can be done more often. This will help to increase your overall volume of your workout without taxing your body too much. A few examples of this can be a wall sit, a 90 degree hold of a barbell in a curl, holding a squat, planks, and holding the bottom portion of a push up for anywhere between 30 seconds to two minutes. The possibilities are endless!

The main difference between a strength focused and a hypertrophy focused isometric exercise lies in its intensity. With a strength focused isometric you are pushing yourself to the limit to where you can only hold that position for 20 seconds max. With a hypertrophy focused isometric you are holding the position for longer and although it should be challenging, you are not reaching the point where you cannot hold that position any longer.

One more useful tool of isometric training is in people with chronic joint pain or even just some nagging knee pain. Isometrics are a great choice for people with arthritis since there is much less, if any, impact that comes from traditional weight lifting with weights. Isometrics can even be done with no weight. Also since the joint is in a fixed position you aren't having any of the pain associated with movement of that specific joint. This is extremely helpful for these people since the pain in these joints can cause cortical inhibition of the surrounding muscles. Basically what this means is that the body guards itself by not allowing the muscles around that joint to fire to their full potential due to the pain in that area. This will lead to muscle atrophy and weakness. Isometrics are a great way around this problem. In someone with a nagging patellar tendon (tendon on the front of your knee) pain, doing some isometric exercises before their workout can drastically help to reduce their pain for their workout. One example of an exercise that can help is the Spanish Squat. I recommend doing this for 5 challenging sets of 45 second holds. These have been scientifically proven to impart an analgesic (pain relieving) effect which allows the person to now train with minimal to no pain which will allow them to workout more effectively.

