The Often Forgotten Exercise—Isometrics

When thinking of setting up an exercise routine to promote strength, normally weight lifting or calisthenics are looked at to meet these goals. Both are tried and true programs and give excellent results when applied in a consistent manner. But there is another form of strength training which is often overlooked— isometrics. Isometrics, like dynamic lifting movements, can also create the desired results when applied correctly or incorporated with other strength and power programs. But what really makes them unique is they can be performed almost anywhere, typically require no equipment, and they tend to not cause a lot of sweating since muscles not moving are able to keep internal temperature down.

Isometric exercises are a great addition for tactical athletes. They provide a feasible way to exercise for military personnel, first responders, police officers, or anyone working long irregular hours with no access to a fitness facility. Research has shown that many military and police officers do not get to return to a station to secure their weapon to exercise because they are on patrol, standby, or on desk duty (18,19). Because more traditional avenues to develop strength require a place or equipment, many military and police officers have to do their training while off duty so they can maintain a degree of regular fitness. This can create even more stress since it may mean they will have even less free time for personal use (18,19).

Unfortunately, many discount isometrics and never try incorporating them due to misconceptions regarding how they work. Common misconceptions seen in literature are that they are joint angle specific so they do not help with athletic performance or they do not train muscle endurance or muscle strength. Other misconceptions are that isometrics will not create muscle hypertrophy or muscle power, as well as that they can increase blood pressure to dangerous levels. And we still find people stating they should not be used with young children or the elderly. This is a basic list, but there are published studies out there which help to clear these misconceptions. Of course, isometrics are not an end-all exercise, just like no one exercise is, instead they should be seen as another tool to help maintain strength, speed, and general health.

First and foremost for most strength and conditioning programs is strength and muscle gain; studies have shown that isometrics increase strength and muscle size (2,4,5,9). As far as being joint angle specific, studies have shown the strength increase can extend to approximately 20% in each direction of the held position (5,10). So, if an isometric contraction were to be held at the maximum range of motion (ROM), mid ROM, and minimum ROM of a given muscle joint, then training can be developed through most of a full ROM (4,9). Additionally, there are now studies showing that different joint angles recruit different muscle fibers to varying degrees of intensity (11). Sense there is a difference in muscle recruitment, isometrics can be a good tool to use at these different angles to help influence higher gains in these fibers which are being recruited less (10,15). Other studies have shown that isometrics can also help with speed and power, and may even be safer than plyometric training, yet instill many of the same results (5).

Another area which gets a lot of criticism for isometrics is how they can be dangerous due to how they increase blood pressure. While it is true blood pressure will increase while doing them, blood pressure also increases to higher levels when doing any explosive exercise such as intervals and high-intensity interval training (HIIT) training. But what is unique for isometrics and HIIT training is that they are showing these exercises can actually reduce resting blood pressure (7,14). In fact, isometric studies looking at blood pressure show regular isometric exercise can reduce blood pressure by an average of 10 mcg, which is more than HIIT training (7,14). In terms of elderly using isometric training, studies show that they are having the same effect with increasing muscle strength and reducing blood pressure (3,7,8).

Before implementing isometric exercises, there are a few terms and tips that are useful to know. Firstly, there are two commonly used terms to describe the type of isometric hold being performed: static and yielding holds. A static hold consists of performing the contraction against an immovable object, such as a fixed wall or machine. The yielding hold is performed by holding a contraction against an object that can move, such as holding a weight at a static point and then relaxing. Yielding holds can be a good way to do holds at a lower than maximum contraction. The following exercises are examples of yielding holds. Another factor to consider is the duration of the hold itself. Typically, isometric holds vary from 5 – 20 s in duration, with the explosive holds only being 3 s. As with any exercise, it is recommended to begin at a lower level and work up to a higher level. For strength development, it is recommended to start with 2 – 3 sets of 4 – 10 s at approximately 70% maximal intensity. This is a good way to start to get familiar with the exercises, then the intensity can be increased accordingly. For leg exercises, it may be difficult to see change using only the yielding holds, so whenever possible, static holds may be more beneficial in these instances.

It is also important to remember to breathe during an isometric hold to avoid doing the Valsalva maneuver, which can potentially negatively affect blood pressure, among other aspects. Oftentimes when performing maximum contractions, it is natural for the tactical athlete to hold their breath; similar to trying to pick up a very heavy weight from the floor, for example. By remembering...
to breathe during a maximal lift, these forces can be reduced and it can help make the movement safer (11). Because isometrics are joint angle and fiber length dominant, it is recommended to try the exercises at different ROM to maximize development of the muscles involved. Lastly, because isometrics are done by contracting the muscle at maximum or near maximum force, it is recommended to not perform them on any injured joint or muscle unless a qualified medical doctor has given clearance to do so. Isometrics are used in physical therapy for many injuries, but these are adjusted accordingly per the injury. So like any exercise routine, if there is a preexisting injury or a medical condition which limits strenuous physical activity, it is always recommended to consult with a qualified medical doctor prior to exercise.

The following are 12 isometric exercises that can be used to help maintain or develop strength. Each exercise should be performed for 4 – 10 s of 2 – 3 sets. Force should be below maximum until a level of the tactical athlete is comfortable with the movement. At that point, the tactical facilitator may begin to experiment with maximum contractions, different ROM angles, and more repetitions or sets. The tactical facilitator can also experiment by doing these exercises as a yielding hold then as a static hold to see how this changes the intensity of the exercise itself.

REFERENCES


ABOUT THE AUTHOR

Patrick Conway currently works at the United States Department of Veteran Affairs, establishing fitness and rehabilitation exercise for retired veterans referred by the hospital. Additionally, he helps with overseeing the fitness facility and assisting veterans. Previously, Conway worked as the Fitness Program Manager with the United States Air Force for 14 years. In this time, Conway prescribed modified fitness plans for military personnel on extended medical profiles and determined fitness testing components allowed for military personnel on a medical profile. He also taught and certified all Air Force physical training leaders in the basics of how to conduct and lead squadron physical fitness using classroom and hands-on training. In addition, he trained and certified civilian personnel on how to conduct official fitness testing of military personnel and completed video analysis and screening of personnel to review movement and running patterns to identify areas needing attention or improvement.

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THE OFTEN FORGOTTEN EXERCISE—ISOMETRICS

FIGURE 1. CLOSE CHEST PRESS: PUSH HANDS TOGETHER AND KEEP HANDS CLOSE TO CHEST.

FIGURE 2. CLOSE CHEST PULL: GRASP HANDS TOGETHER AND PULL HANDS APART WHILE KEEPING THEM CLOSE TO THE CHEST.

FIGURE 3. EXTENDED CHEST PRESS: KEEP ARMS EXTENDED AND PUSH HANDS TOGETHER.

FIGURE 4. EXTENDED CHEST PULL: KEEP ARMS EXTENDED AND PULL HANDS APART (THIS ONE PUTS A LOT OF FORCE ON THE SCAPULAE, SO BE SURE TO GET USED TO IT BEFORE MAXING OUT).
FIGURE 5. OVERHEAD PRESS: PUSH HANDS TOGETHER WHILE REMEMBERING TO BREATHE.

FIGURE 6. OVERHEAD EXTENSION: GRASP HANDS AND PULL HANDS APART WHILE REMEMBERING TO BREATHE.

FIGURE 7. BICEPS CURL: FLEX THE BICEPS WHILE KEEPING THE ELBOW AT ABOUT 90 DEGREES AND STATIONARY.

FIGURE 8. TRICEPS EXTENSION: FLEX THE TRICEPS WHILE KEEPING THE ELBOW AT ABOUT 90 DEGREES AND STATIONARY.
THE OFTEN FORGOTTEN EXERCISE—ISOMETRICS

FIGURE 9. STOMACH PUSH-OUT: PUSH STOMACH OUT AND HOLD IT THERE.

FIGURE 10. STOMACH DRAW-IN: PULL STOMACH MUSCLES IN AS FAR AS POSSIBLE. THIS EXERCISE CAN HELP TACTICAL ATHLETES TO TIGHTEN UP ABDOMINALS.

FIGURE 11. WALL SITTING: WITH THE KNEES AT 90-DEGREE ANGLES AND THE BACK NEUTRAL, FLEX THE QUADRICEPS AND PUSH BACK INTO THE WALL AND HOLD. UNLIKE A SIMPLE KNEE EXTENSION WHEN SITTING ON A MACHINE, THIS EXERCISE WORKS THE LEGS MORE BY HAVING THEM PUSH INTO THE WALL.