

# BLOOD FLOW RESTRICTION TRAINING





## ANALYSIS

What you need to know about  
**BLOOD FLOW RESTRICTION**  
**(BFR) TRAINING**



## AT A GLANCE

- Blood flow restriction (BFR) training involves very slightly restricting arterial inflow and enabling moderation (or “slowing”) of venous outflow at the top of the arms or legs while exercising either the arm, leg or core muscles with very low weights but high repetition to failure.
- BFR allows you to significantly enhance strength and increase muscle mass using as little as 20-30% of your single-rep max (1 RM) weight compared to conventional strength training that used 70-85% of your 1 RM. Alternatively, for those who cannot or do not want to use weights, you can contract your muscles and move them very slowly with the BFR bands on.
- Use of lighter weights makes BFR far safer than conventional strength training and makes it available to a much broader range of individuals, including the elderly and patients with disabilities or injuries.



## AT A GLANCE

- Venous blood flow restriction is achieved by wrapping the extremity being exercised with an inflatable cuff or band. The band needs to be tight enough to reduce the normal level of venous return to the heart, while being loose enough to allow arterial flow-through.
- BFR is actually a form of high intensity training, as the Type I slow twitch muscle fibers become highly fatigued during the first set, thus necessitating the recruitment of Type II fast twitch muscle fibers as the exercise progresses, which is likely for many of the metabolic benefits of BFR.



<https://www.youtube.com/watch?v=KP40-496-N8&feature=youtu.be>

## By Dr. Mercola

The origins of blood flow restriction (BFR) training, also known as vascular occlusion training, was developed by the pioneering professor Yoshiaki Sato of Japan over 50 years ago. In Japan, where it is widely practiced, the technique is called KAATSU, meaning "additional pressure" and was generically defined as BFM (blood flow moderation) by Dr. Sato.

As explained in a recent exercise position paper, BFR involves "partially slowing" arterial inflow and partially modifying venous outflow" of the exercising muscle on the extremities.

With this exercise innovation, you're able to significantly enhance your strength and muscle mass using a fraction of the weight used in conventional strength training, in about half the time it would normally take. Because the weight is so low, the risk for injuries is radically reduced.

Research also shows it stimulates the production of endogenous hormones, such as human growth hormone and IGF-1, commonly referred to as "the fitness hormones."

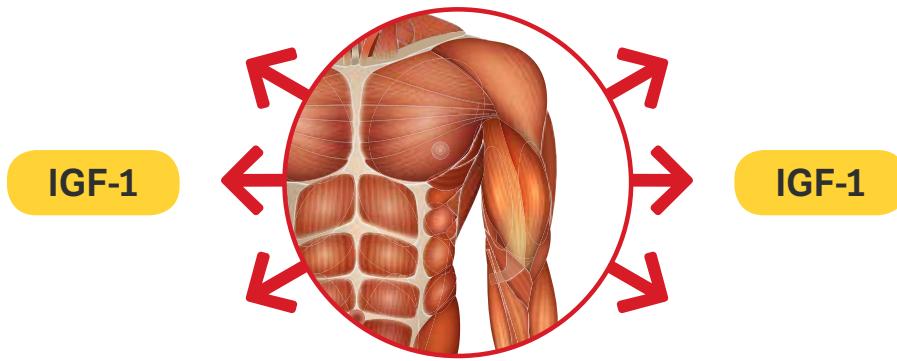


Dr. Sato, the 73 year old inventor of KAATSU

# Increased IGF in the Muscle is Actually Good

IGF-1 is typically secreted from the liver which is the largest contributor to circulating IGF-1 and when the liver secretes IGF-1 it will not act on those tissues that have capabilities of producing the hormone themselves, such as skeletal muscle.

Interestingly, it is not the circulating levels of IGF-1 in your blood that causes your muscles to grow but the intrinsic secretion of IGF-1 produced by your muscle when you engage in exercises like BFR that is the key determinant for switching on anabolic muscle building pathways.



This is an important distinction as it is well documented that high circulating levels of IGF-1 in your blood will inhibit autophagy and decrease your longevity. This does not appear to be the case when you increase IGF-1 in your muscle as a result of exercise. This IGF-1 does not leak out into your blood to suppress autophagy and additionally will serve to activate AMPK, another powerful pro-longevity signal.

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Importantly, the use of lighter weights also makes resistance training available to a much broader range of individuals, including the elderly and patients with various medical conditions or injuries. Since these results can also be achieved without weights, the possibilities for use by nearly everyone is exciting.

This is clearly one of the best strategies available to address the epidemic of muscle loss with aging, called sarcopenia, that has an estimated prevalence of 25% in adults older than 60 years, rising to 50% in adults older than 80 years.



## How BFR Works

BFR's ability to achieve such remarkable physiological benefits is directly related to slowing venous blood flow from the muscle group being engaged and creating a relatively hypoxic environment or low oxygen pressures in the exercising muscle.

Venous flow moderation is optimally achieved by wrapping the extremity being exercised with an inflatable cuff or band. The band needs to be tight enough to slow venous return to the heart, allowing venous blood to "pool" in the region of the limb that is being exercised, while loose enough to allow arterial blood to flow-through.

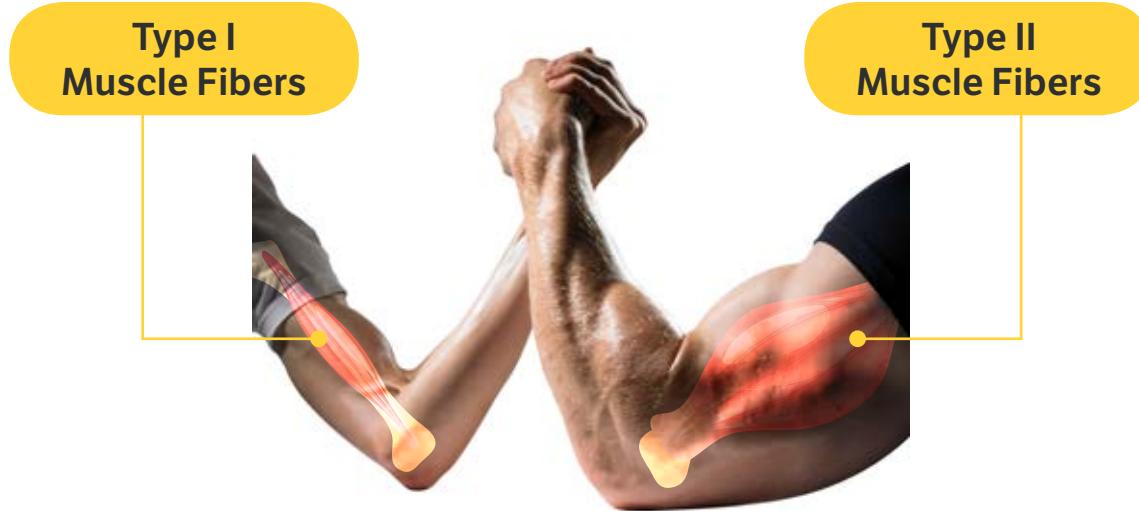
With very light exercise, and in about 15-20 minutes, you get an exhaustive workout that sends a signal to your brain that says, 'Hey, I've done something really hard here — you better help me recover and adapt to it.'

Your brain then sends out a wide variety of powerful hormonal responses that cause your muscles and blood vessels to grow. Most would think that such light weights would be insufficient to provide any muscle strength improvements, but studies show nearly a 40% increase in muscle strength after only 12 weeks, depending on your load and health.

## BFR Mimics Heavy Weight Training Without any of the Risks

BFR training is frequently misunderstood as simply a conventional resistance training program with the addition of resistance bands. Nothing could be further from the truth.

Because the exercise is done with such low weights, there's far less muscle fiber trauma and damage; especially relative to conventional strength training. This means you are able to recover much quicker, so you don't have to dig yourself out of a hole the next few days. In most cases, you can exercise different body parts nearly every day and rapidly attain the metabolic and physical benefits.



High-intensity training such as sprinting or heavy weight training have typically been recommended for increasing muscle size because they activate the fast twitch Type II muscle fibers.

In order to increase muscle mass and strength, it is important to activate fast twitch Type II muscle fibers during training, since these fibers have been shown to be more responsive to increasing muscle size than Type I fibers and these fibers are generally much larger.

Weight training using low weights without resistance bands will not activate Type II fibers. The reason for this is because the slow twitch Type I fibers become exhausted in the hypoxic conditions created by BFR, which then allow the Type II fibers to kick in and generate high levels of lactate, which are responsible for much of the metabolic magic.

During BFR training, the Type I fibers become highly fatigued during the first set due to the lack of oxygen, thus necessitating the recruitment of Type II fibers that create energy without oxygen as the exercise progresses.

Simply moving light weights with high repetition without BFR will not engage Type II fibers because there is plenty of oxygen for the Type I fibers to work. Hence the fast-twitch Type II fibers just aren't called into action.

BFR is the type of training that will not only add solid muscle mass, but also significantly increase your strength and endurance, while reducing your body fat. For most people who are not competitive athletes, it's really the only form of resistance training they need.

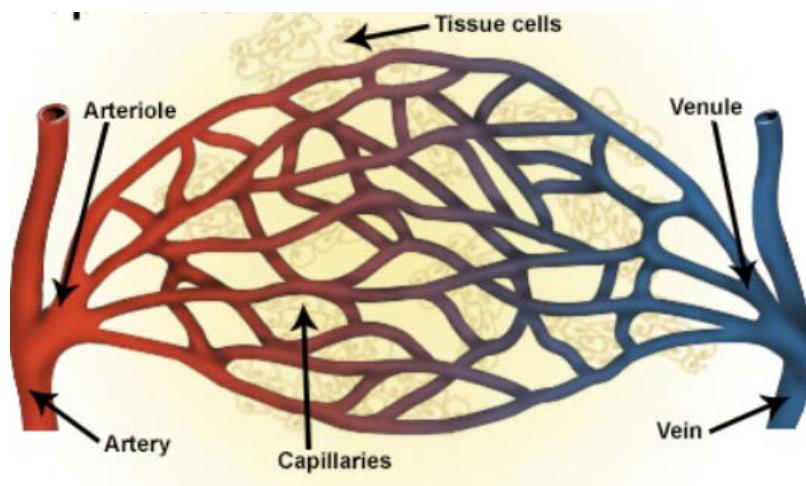
Competitive athletes also seem to benefit from BFR but they would need to combine it with conventional strength training. In short, BFR works on a very simple principle: It tricks your body into believing that it is moving far heavier weights than

you're actually using, and as a result, generates many powerful compensatory metabolic responses detailed below.

## Local and Systemic Effects of BFR

If you are elderly, what is really amazing is that your muscle growth with BFR is beyond what strength training with heavy weights can do. This is because you need good blood flow to your Type II muscle fiber stem cells, and virtually everyone's microcirculation decreases with age. So even if you send the signal to grow by doing conventional strength training, it won't work as well if there isn't enough capillary supply to your Type II fiber stem cells.

BFR increases your microcirculation, your capillaries and venules and arterioles that are associated with them (*see image below*), largely because your muscles are working in a hypoxic (low oxygen) environment.



**Microcirculation**

This low oxygen tension cause the release of hypoxia-inducible factor-1 alpha (HIF-1 alpha), that then increases the hormone vascular endothelial growth factor (VEGF), which is one of the most powerful angiogenic or blood vessel producing signals in your body. BFR has been shown to raise VEGF levels by 410% in young adults.

An interesting aside is that the Nobel Prize in physiology and medicine was awarded for pioneering work in HIF-1 alpha and VEGF in early October 2019.

Essentially VEGF acts as “fertilizer” for growing new blood vessels and capillaries to your muscle stem cells. BFR training has been shown to increase muscle stem cells by 300% after eight days of training.

But it gets even better as VEGF not only increases microcirculation in your muscle stem cells but also in your brain and heart. In Japan, BFR is frequently used for stroke and cardiac rehab precisely for this purpose.

BFR not only stimulates VEGF but also increases the production of the important regulatory free radical, nitric oxide, which further contributes to an increase in VEGF. Nitric oxide is an important signaling molecule produced at high levels in muscle by neuronal nitric oxide synthase (nNOS). BFR, by way of increasing nitric oxide, has been found to stimulate muscle satellite stem cells and proliferation.

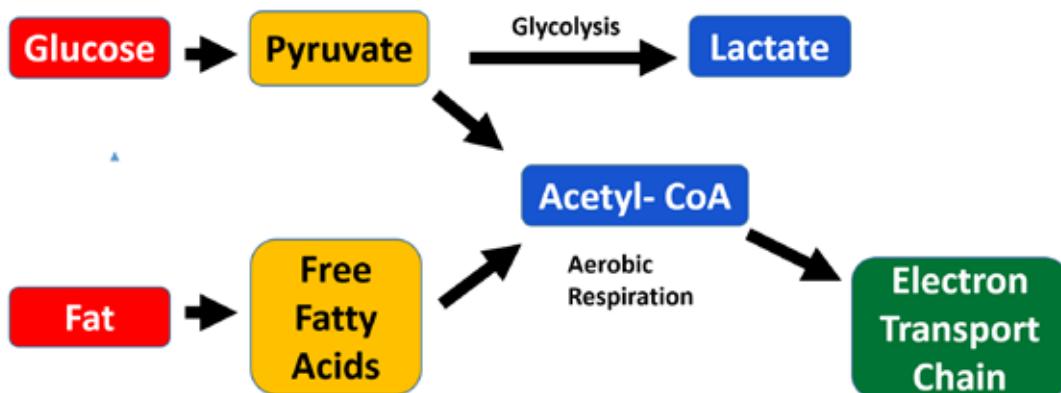
## BFR Is a Powerful Myostatin Inhibitor

But here's the real winner: BFR also downregulates a hormone called myostatin, which is a negative regulator of muscle growth and mass. In other words when your myostatin levels are high you simply are unable to grow muscle.

This is important because the elderly typically have myostatin levels twice as high as the young which makes it really difficult to increase muscle size and strength.

In the past, lactate was traditionally viewed as a metabolic waste product, but today it is understood that lactate is an important molecule that is responsible for many metabolic processes and results in many structural adaptations. It is even referred to as a pseudo-hormone.

When you apply the bands and engorge the working muscle, the Type I muscle fibers which require oxygen, glucose and fat to create energy in the mitochondria rapidly give out and your muscle switches to Type II fibers that run on burning glucose without oxygen by the glycolysis pathway illustrated below.



The lactate that your Type II muscle fibers generate during BFR actually down-regulates the production of myostatin and helps improve skeletal muscle loss. Amazingly, BFR can decrease your myostatin levels by 50% which has been shown to increase muscle protein synthesis.

But the benefits from the lactate don't stop there. Once you release the bands, the lactate travels from your muscles and is released into your blood stream, travels to your brain, where a monocarboxylate transporter then shuttles it into your brain to use for fuel.

Once the lactate reaches your brain it increases a powerful hormone called brain derived neurotropic factor (BDNF). BDNF is a member of brain growth factors that contribute to neuroplasticity, which greatly enhances cognitive performance.

## Correct Band Pressure Is Crucial

As mentioned previously, the restriction bands need to be tight enough to lower the oxygen level in the exercising muscles. Arterial occlusion pressure (AOP) is defined as the pressure needed to restrict 100% of the blood flow from the limb, which is essentially a tourniquet. This is a dangerous scenario and needs to be avoided.

Recent research has shown the pressure only needs to be 60% of the AOP. Pressures higher than this don't seem to provide any additional benefits and can be associated with increased risk for injury. The level needs to be at least 40% of AOP, otherwise, the level of muscle oxygenation and deoxygenation is not substantially different from that seen during non-BFR exercise.

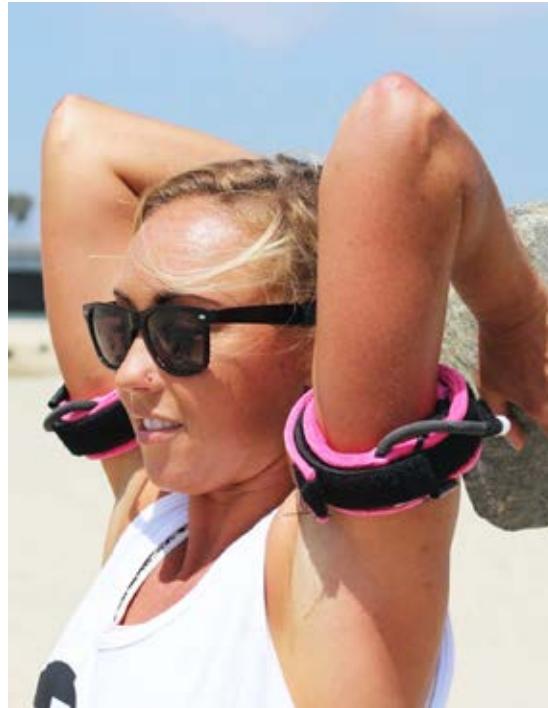


Recent studies suggest that the ideal range is about 60% of AOP, although this is highly dependent on numerous factors such as fundamental vascular elasticity and the type of exercise being performed (e.g., anaerobic vs. aerobic). There are no additional benefits of combining higher exercise intensities with higher occlusion pressures to muscle hypertrophy.

Again, the bands should not be too tight as you definitely must avoid cutting off the arterial supply to your muscles. They need to be loose enough to supply your muscle with sufficient blood flow and oxygen.

When manually applying the bands, tighten them so your skin color becomes more

pink or red compared to your normal skin tone. You may also see your veins become slightly distended (popping out a bit). They should not feel uncomfortable and your skin color must not become whiter or have a bluish or grayish tone; this means that arterial flow is being restricted. It is important to realize that your arms will swell during the exercise, which will actually tighten the bands more. Remember, another simple way to determine good “base pressure” is to have the bands tight enough that you cannot fit two fingers under the band, but loose enough that you CAN squeeze one finger under the band.



However, if the pressure is below 40% of AOP you will not occlude your veins. This will prevent the lactic acid produced during your exercise from accumulating, and you will not get the benefits.

One of the ways you can confirm that your bands are tight enough is to measure the circumference of your limb before and after the exercise. You should notice an increase of at least a 1/2 inch to 1 inch after your exercise, up to as much as three or four times that.



## How to Confirm Proper Pressures

If the bands are too tight you can actually cause damage to your muscle. It's important to carefully monitor your capillary refill times to confirm you are getting enough blood flow to your exercising limb.

You can confirm that you have enough arterial flow by checking your capillary refill time. When checking proper band pressure on your arm, it is most easily determined by pressing your index



finger firmly into the palm of the opposite hand (on the arm that is under restriction) into the area just under your thumb, then quickly releasing and seeing how long the white blanched area takes to turn pink.

If it takes longer than three seconds, the bands are too tight. If the white spot turns pink immediately while the pneumatic bands are inflated (i.e., under 1 second), the band tightness is close to optimal. You can also check the capillary refill time on the tissue right above your knee while the pneumatic bands on your legs are inflated. Ideally it should be about two to three seconds.

If you have peripheral artery disease, this could affect these readings. If it is less than two seconds the bands are likely too loose, if the time is greater than three seconds the bands are likely too tight.



Only put the bands on the extremities you're actually exercising, and remove them before moving on to the next area. In other words, you must not conduct simultaneous BFR on both your arms and legs, as this could decrease your blood pressure enough that you might pass out.

Remember, whatever bands you use, KAATSU or less expensive BFR bands, the pressure that the cuff is inflated or tightened to should not be painful or cause any numbness or tingling. You will know if it is too tight as they will

likely hurt. They are not supposed to shut down your arterial supply. If it is too tight you need to lower the pressure or loosen the bands.

## How to Determine Your Ideal Level of Resistance

Instead of using heavy weights that can increase your risk of injury during conventional strength training, BFR is much safer, since it requires just 20% to 33% of the resistance used in conventional resistance training. This light weight is then combined with a high volume of repetitions while externally applied compression mildly restricts blood flow to the active skeletal muscles in the legs or arms.

As for weight, your goal is to find the “sweet” spot. If you are elderly or have not been exercising regularly, this may mean no weights at all. Ideally, you would have access to a variety of progressively increasing resistance movements to choose from including body weight exercises. You typically won’t need to go higher than 25 pounds though.

Once you have access to the weights you can find the heaviest weight you can do just one repetition of your planned exercise with. This is your one rep max (1RM). Then you divide that weight by five (20%), four (25%) or three (33%). For example, if your max weight for a bicep curl is 25 pounds, you would select a five pound dumbbell to start.

If you don’t know your one rep maximum than it is always better to start too low, especially if this is your first time as your tissues will need time to adapt to these pressures and movements. Eventually you will want to increase your weight so you notice the following signs during your BFR session:

## Signs that You Are Using the Correct Weight



- 1** You are sweating profusely. In fact you should be sweating so much that you need a towel.
- 2** Your heart rate and breathing can significantly increase, especially if you do intense BFR or any kind of vigorous aerobic exercise.



**3** The first two signs are an indication that you have activated your sympathetic nervous system by firing your Type II muscle fibers. This is because properly performed BFR is a high intensity exercise.

**4** You can measure the circumference of your limb before and after the exercise. You should notice an increase of at least  $\frac{1}{2}$  inch and possibly one inch or more - or alternatively, the muscle will most certainly feel tighter and appear more toned.

**5** Another great indication is that you will be able to do 30 reps the first set and then 15-20 reps the next, and most likely, are unable to do 5-10 reps in the last set because you are in muscle failure. It is important though to not fool yourself and stop just because it is hard. Muscle failure means that you are unable to do another rep if your life depended on it.



Unless you are just starting (see warning box below), it is best to start by limiting your weight to only 20% of your one rep max and build up from there if your goal is muscle hypertrophy. By starting at a lighter weight it will give your body a chance to adjust to BFR and avoid potential injuries.

An additional benefit is that if you stick with lighter weights you can train more frequently, because you won't cause as much muscle damage. For those interested in greater strength or muscle gains, you can increase to





**WARNING FOR FIRST TIME USERS**

THE only exception to these weight recommendations and initial pressure of the bands are is when you are first starting out. It is important to realize that your tissues need time to adjust to BFR training. For the first session you want to start with a light pressure, likely under 40%, and use only 10% of your 1 RM. Then over the next two sessions increase to the minimum recommendations.

one-quarter and then to one-third the weight of your 1RM. If you are doing the exercises correctly it will likely take you about three months to progress up to 33% of your 1RM. There is no need to go any higher than this.

If you don't know your 1 RM, then all you have to do is pick a weight you believe you can easily do 30 reps with and start there. If you can easily do all three sets at that weight, then it's clearly too low a weight and you would benefit from increasing the resistance, especially if you don't notice an increase of at least  $\frac{1}{2}$  inch in the circumference of your biceps after the exercise. Conversely, if you are unable to complete 20 repetitions on your first set, the resistance is likely too high and needs to be decreased.

### **Important. You Need to Push Hard to Get the Benefits**

It is important to recognize though that the level of intensity you use is key. Muscle growth is highly dependent on metabolic factors, and training sets are ideally done to failure to achieve this. The number of repetitions completed during a training session is less important to cause long term changes in hypertrophy and strength than doing repetitions to failure which likely causes greater metabolic stress.



Perceived exertion is a major element here. You really need to push hard to muscle failure. This is a very subjective determination but I hope the featured video will give you an idea of the amount of intensity and effort one needs to put into this short exercise.

You can also notice if you are sweating and you are out of breath. Since BFR is a high intensity exercise and stimulates your sympathetic nervous system if done properly this is precisely what you should be experiencing when you do BFR training.

A recent study in the elderly showed that physical weakness in aging may be due, at least in part, to impairments in brain and nerve function, rather than changes in the muscles themselves.

The researchers did the study by asking participants to push to failure and once they said they had, they stimulated the muscle electrically and where still get the muscle to contract which indicated that the muscle was not at full failure. In fact in most cases the muscle was still able to contract about 25% more.

If you are unable to push to failure, you will not receive the maximum benefits possible from BFR. Also, shorter recovery periods between exercises and sets will heighten the metabolic stimulus to enhance your body's ability to build muscle and strength.

Remember, you can start slowly and work your way up over time. Building muscle is a marathon, not a sprint. This is especially important if you are elderly or if you have been mostly sedentary, you will likely not need to use any weights.

You can start with just the weight of your body and gradually progress to 1 and 2 pound weights. But if you really are interested in triggering the benefits of reversing sarcopenia, then it is key to push hard otherwise you will not achieve all the wonderful metabolic benefits that BFR has to offer you.

## General BFR workout guidance



Although you can adapt BFR training to many types of resistance training including machines, it seems the ideal way to implement it is by using simple dumbbells. Because you are using such low weights, it is unlikely you will need weights more than 25 pounds. If you are elderly and weak you may only need a set of weights under 5-10 pounds.

Please be certain that you can increase weights in very small increments. You will not want to increase an exercise from 5 pounds to 10. That is a 100% increase in weight. It is far better to go up by 1 or 2 pounds.





## Number of Repetitions in Each Set

<b>SET</b>	<b>REPS</b>	<b>ARMS</b>	<b>LEGS</b>
<b>1st</b>	30	20 secs rest	20 secs rest
<b>2nd</b>	20 - 30	20 secs rest	20 secs rest
<b>3rd</b>	10 - 20	20 secs rest	20 secs rest
<b>4th</b>	1 - 10	20 secs rest and 60 seconds maximum before moving to next exercise	



A common beginner mistake is to remove or loosen the band during the workout to allow the blood to flow back to your muscle and then tightening it again. This does not improve results, and in fact decreases your results, so it is best to leave the band on during the entire workout.

Just remember to remove the bands after 15 minutes on your arms and 20 minutes on your legs. You can reapply

the bands after a minute and exercise if you want to do more exercises.

If there is pain or numbness or a whiter appearance in your skin color, of course you'll want to remove or loosen the band at once, but that should be unusual if you have done your preparation properly and paid careful attention to these instructions.

Typically, upon starting BFR, you will notice a high perceived degree of difficulty. However, over a few weeks this perception of difficulty dampens as adaptation to training occurs. At that point, it becomes important to continue to push with the same level of intensity.

## Training frequency

One of the major advantages of BFR versus high load resistance training is that you cause far less muscle damage and this allows you to train more frequently. The frequency of training needs to be individualized as it varies widely. It can range from as little as twice a week up to three times a day, depending on your fitness and training goals.

Typically, the lower the percentage of 1RM used, the more frequently BFR can be done. Heart rate variability and the Oura ring can also be used to determine your ideal recovery periods. The Oura ring measures your heart rate all night and will tell you not only your lowest heart rate but also at what time it occurs. The higher your heart rate and the closer your lowest heart rate time is to awakening, the more recovery you need.

This is also an indication you likely need to lower your training frequency. Oura also provides a comprehensive recovery score called the Readiness score, and the higher that number on a scale of zero to 100, the better. I highly recommend the Oura ring if you don't have one already. I have used one for many years and find it to be a very valuable tool.



You can order the Oura ring [here](#)

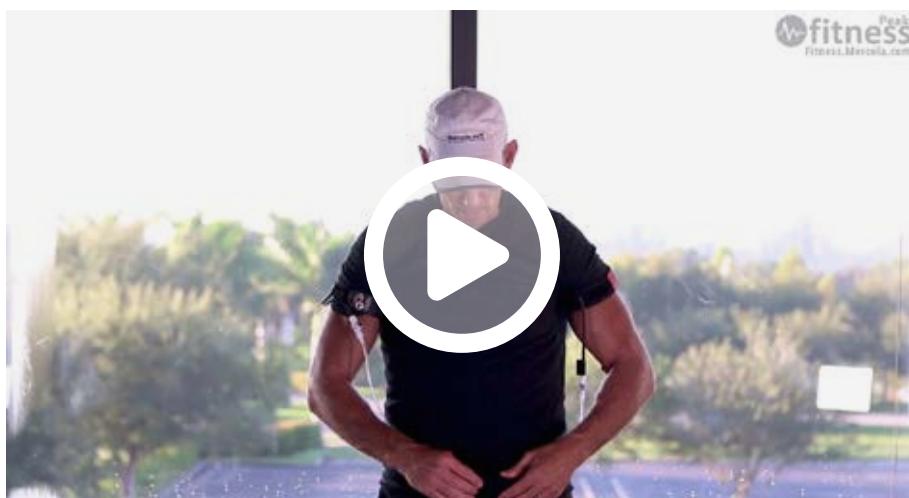


## Less expensive alternatives

Although KAATSU was the pioneer in BFR, their units are relatively expensive. The advanced KAATSU Master unit used by professional teams, the U.S. military, hospitals and medical professionals costs up to \$6,000, while their newest consumer version is available beginning at \$899.

This is because they use thin, algorithm-controlled, pneumatic bands that automatically pressurize around your upper arms and legs to slow the amount of blood flowing back from the muscles in your extremities. These bands may look like very thin blood pressure cuffs but they serve an opposite function.

The major advantage of the KAATSU automated system is that it can do cycle compressions — compressing the limb for 30 seconds and then relaxing for five seconds. Over the course of eight rounds of compressions, the device will progressively increase the pressure for each cycle. The pressures can also be easily adjusted from very low to high.



[https://www.youtube.com/watch?v=5o\\_D7xwedrE&feature=youtu.be](https://www.youtube.com/watch?v=5o_D7xwedrE&feature=youtu.be)

If you can afford the KAATSU set, that would be ideal as it is far easier to dial in to the correct pressures. With the KAATSU system you can control the tightness in two ways. The initial tightness is after you manually tighten the bands.

This is the base pressure and typically around 10 to 25 mm/Hg for the arms and 15 to 35 mm/Hg for the legs depending on your age, vascular elasticity, and physical condition. The inflation pressure is what you set the compressor to pump the cuff up to. This ranges from 80 to 400 mm/Hg for both the arms and legs.



You can pick up the \$899 Kaatsu cycle system [here](#)





If the KAATSU system is outside your budget, there are a wide range of inexpensive BFR bands available. Just beware there are many inferior versions out there. You need to be careful and make sure the material is elastic and can stretch. Additionally, make sure that the bands are only 1 ½ inch wide for the arm bands and 2 inches for the leg bands.

Remember, while there are many 2-inch BFR bands for the arms for sale. These bands are too wide and may cause ischemic injury and must be avoided. Also, wider cuffs require significantly less pressure to achieve arterial occlusion pressure, so it's easy to end up with excessive arterial occlusion with wider cuffs which, again, is not recommended.

The other danger of using bands that don't stretch or are too wide is that they will increase your blood pressure far higher. Under these circumstances BFR can be dangerous and increase your blood pressure too high and may actually cause a stroke.

No worry though, because if you use the elastic stretchy bands that are the correct width (1½ inch for the arms, two inches for the legs), there is essentially no risk of stroke. This is because correctly performed BFR will actually lower your blood pressure. It is the finest exercise I know of to release nitric oxide and is far more effective than the nitric oxide dump I used to do.

## How to perform BFR

Begin by applying the bands to your upper arms, very close to your armpit, just where your biceps muscle begins and deltoid muscle ends. On your legs, you can apply them right below your hips at the top of your quads, close to your groin.

There are misconceptions that you need to put the bands close to the muscle you are seeking to focus on, but this is unnecessary and a mistake. There is a crossover training effect and your muscles that aren't blood flow restricted will also receive benefit once you release the bands after training. In other words, you will gain

benefits in your chest muscles even though you are only restricting your arm muscles.

Also, do not put the bands over your knees or elbows, as this could cause nerve damage. Only put the bands on your body as described above because the goal of BFR is to increase your vascular elasticity and elicit a metabolic and hormonal response that ultimately leads to aesthetic and muscular improvement.

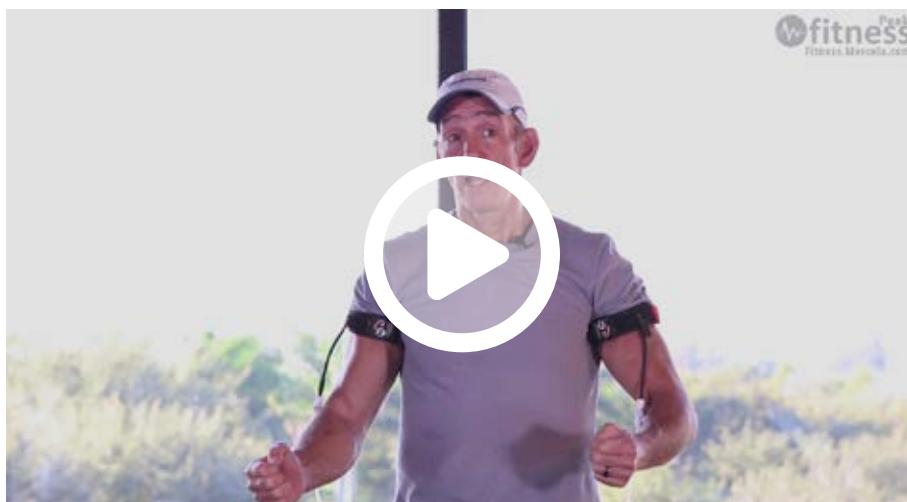
When you engage in the exercise properly, lactic acid will accumulate in the muscle, which will be associated with a burning-like pain due to the excess hydrogen ions being produced. It will clearly be uncomfortable, especially as you push to muscle fatigue. It is important to understand that this subjective sensation of discomfort will improve with time.

It will likely take four to six weeks to develop the strength and hypertrophy gains, although most people notice a dramatic difference even in the first two weeks.

Once achieved, a study in elderly showed that doing BFR training twice a week was sufficient to maintain the gains. When training decreased to once a week, the gains failed to be maintained.

If you are able to there is benefit to doing BFR every day. You can just vary the number of exercises you do per day. It could be as simple as applying the bands to your legs and walking for thirty minutes, or putting them on your arms and swimming. It doesn't have to involve weights as you can also use them in your favorite sport, you just need to use the same time restrictions discussed above.

## Sample workout



<https://youtu.be/7Q9go8yqvil>

You will exercise your arms for 15 minutes, which gives you enough time for three

different exercises as each set of exercises — if done properly — will take about five minutes.

Again, it's not recommended to simultaneously use the bands on both arms and legs. In this case, too much blood becomes engorged in your limbs and there is an unsafe amount of blood in the rest of your body.

For example, a good and simple exercise to start with are bicep curls, triceps and shoulder presses, but any exercise that you can do 30 reps of while you have the bands on would work.



Ideally, it is best to combine agonist and antagonist muscles in the same workout. So, do biceps and triceps together, and chest presses and bent-over rows for your back. You could do walking lunges, squats, calf raises and deadlifts for your legs. I demonstrate and provide a number of suggestions in my video but there are many other combinations you can use.



As your lactic acid concentration builds toward the end of your first set of reps, you will notice some burning and a slight amount of discomfort. This is normal and is actually what you're trying to achieve. If you don't notice this, you are likely not doing the exercise correctly. It is important to push as hard as you can. If you are unable to do 30 reps on the first set, the weight you selected is likely too high and you need to decrease it.

I provide some other recommendations in the video above, but recognize that there are hundreds if not thousands of options, and these are only a few examples. As long as you are following the guidelines above you will be safe and obtain the benefits of BFR.

You do not even need to lift weights with your legs as simply walking with the bands on can improve cardiac autonomic control by improving your heart rate variability, and has been shown to increase thigh muscle size and strength in both the young and elderly adults.

## Conclusion

Without a doubt, in my opinion BFR is the most incredible innovation to improve your health that I have learned about in quite some time. It has the most significant potential to increase your healthful life span and help you maintain full range of your mental and physical capacities than anything that I know of.

I have spent six months compiling these recommendations but it is likely I will revise them in the future so please be sure to check back periodically for any updates. I am very excited for you to reap the benefits of this magnificent tool.

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