

# HIT 2 FIT

**THE ULTIMATE FAT-BURNING SOLUTION**



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# Introduction

Working at maximal intensity for an extended amount of time is physiologically impossible. So if you think that performing tougher workout routines for longer durations will make you shed fat faster, you may want to change your weight loss strategy.

In fact, there is a much more effective way to experience body transformation in much lesser time. Instead of spending hours grinding it out with traditional workout regimes, there is a better and faster way to reap the full fitness benefits by utilizing high intensity movements in short bursts. By doing so, you grant your body frequent recovery periods to prepare for the next round.

Countless studies prove that high intensity training will facilitate in losing body fat fast while retaining maximal muscle mass. High intensity training can also strengthen the cardio vascular system and improve your endurance for high level of intensity training for a longer period of time.



# CHAPTER 1

## WHAT IS HIIT?





# Chapter 1

## What is HIIT?

Fitness enthusiasts who're looking for effective ways to get shredded should know about the term 'HIIT', also known as High Intensity Interval Training. For most people who are unfamiliar with HIIT, they commonly associate it with panting, sweating along with unfathomable amount of burpees.

Perhaps, you've heard that HIIT has to do with performing intense movements, short breaks and breaking an insane amount of sweat. But the truth of the matter is that HIIT is so much more than that.

Yes, there is an element of high intensity as well as of interval training but having said that, most people never perform HIIT workouts correctly. At the end of the day, they might not even get a single HIIT workout in, even though they thought they did. So to clear out the confusion, here is what HIIT truly looks like.

High intensity interval training or HIIT is a very specific type of training technique where you give everything you have during short

but fierce spurts of exercise. The bursts are alternated with short and occasionally active periods of recovery as opposed to standing still.

This kind of intense training raises and keeps the heart rate up while burning deep into your fat deposits in less time. You can also get the same benefit when you go for a long run by keeping your heart rate up, also known as Moderate Intensity Steady State Cardio (MISS Training). However, the two are very different, as the results produced vary significantly.

The goal of HIIT is not only to raise your heart rate up and making sure that you perform your training at *maximum intensity*. And to truly reap the benefits of HIIT, you have to push your efforts to the limit during every burst by keeping your EPOC (Excess Post-Exercise Oxygen Consumption) high.

This is also why each burst is short, ranging anywhere between 20-90 seconds because even this much time is a lot when you kick the intensity level up to the max.

This key difference separates HIIT from both high intensity and interval training when done on their own. Research shows that all exercise promotes fat burn by burning calories but exercise

performed at a higher intensity creates the after-burn effect that burns more calories over time. That is exactly why HIIT is such a hit.

When compared to other types of cardio, HIIT has also been seen to be a more effective means of getting incredibly shredded fast. It is a workout that is beneficial on multiple fronts since it uses both body weight and added weight that not only spike up the heart rate but also tone muscles.

The other thing that makes HIIT work is the element of rest. The training is comprised of intense bursts of activity followed by active recovery, this is where the element of rest comes in. Resting between each set is an essential part of the workout because if you do not take enough time to recover, you will not be able to push yourself to the limit on the next burst.

Since you are performing at an intense level, you are forcing your body to perform something it is neither used to nor comfortable with. Only by pushing through the limits your muscles demand growth. This explains why HIIT can not only burn fat, but also help you retain muscle mass or even grow in mass – In fact, you won't find this benefit by performing long hours of traditional cardio sessions.

To put it simply, HIIT can help you shred body fat, staying lean, improve endurance while adding more muscle mass.

## **The Science Behind HIIT**

As seen above, HIIT aims to induce overload. That is to say, by going through strenuous exercise, the body fatigues more significantly in the hope for supercompensation. However, supercompensation can only occur when the training overload is supported by significant recovery. Together, the two components aim to bring about physiological adaptations that lead to increased performance above the baseline.

Think of it like a car engine after a long car trip. Once you have reached your destination, your car engine continues to stay warm until it slowly cools to a resting temperature. The same mechanism occurs happens in the body after a HIIT workout.

Just as a car engine stays warm once it has been turned off, your body's metabolism continues to strive even after the workout is done. This physiological effect is known as excess post exercise oxygen consumption or EPOC.

## The EPOC Effect

Also known as the afterburn effect, EPOC helps burn more calories long after finishing your workout. This occurs when the quantity of oxygen consumed after exercise exceeds that of the pre-exercise level.

During recovery, energy resources need to be replenished, blood needs to be re-oxygenated while circulatory hormones need to be restored. Plus, body temperature needs to return to normal along with the breathing and heart rates. All these physiological reactions require oxygen and so EPOC experiences an increase in calories post exercise as compared to pre exercise.

Now, while EPOC is applicable to most types of intense workouts, research indicates that HIIT is the most effective means to trigger the EPOC effect. This is because when you perform your exercises at a higher intensity and demand immediate energy, anaerobic pathways provide the needed ATP at a much faster rate.

This is also the reason why high intensity activity can only be maintained for a brief period of time. So HIIT is effective because high intensity bouts create anaerobically produced ATP and once it is exhausted, it needs to be replenished aerobically.

This also ties in with the fact that EPOC is more affected by the intensity of the workout and not so much by its duration. So even when HIIT workout is done, the body continues to use aerobic energy pathways to replace ATP used up during the session, which boosts the EPOC effect.

The higher the EPOC effect, the more calories you burn at rest and the higher your Resting Metabolic Rate or RER. This spike and recovery pattern is key to making HIIT work flawlessly. Not only does this pattern improve cardiorespiratory endurance but it also allows for greater caloric expenditure during and after the workout when compared to moderate aerobic workouts.

Having said that, it's still crucial to remember that at least 48 hours of recovery time should be allowed between high intensity exercise sessions and should not be performed more than three times a week.



## **Is HIIT Right For You?**

Since HIIT is all about intensity, you need to be in fairly good health with an elementary level of general and core strength along with mobility. You also need to be aware of your personal physical limitations.

People who want to take on HIIT should be willing to try out a number of different exercises and be knowledgeable about performing these moves not only correctly but safely as well. If you are above the age of 55, then it is recommended that you take on HIIT with a doctor's approval.

HIIT is not recommended for anyone with any orthopedic limitations such as knee, back, or shoulder conditions. Likewise anyone suffering from cardiovascular issues like hypertension and heart palpitations should not take on such an aggressive form of exercise.

# CHAPTER 2

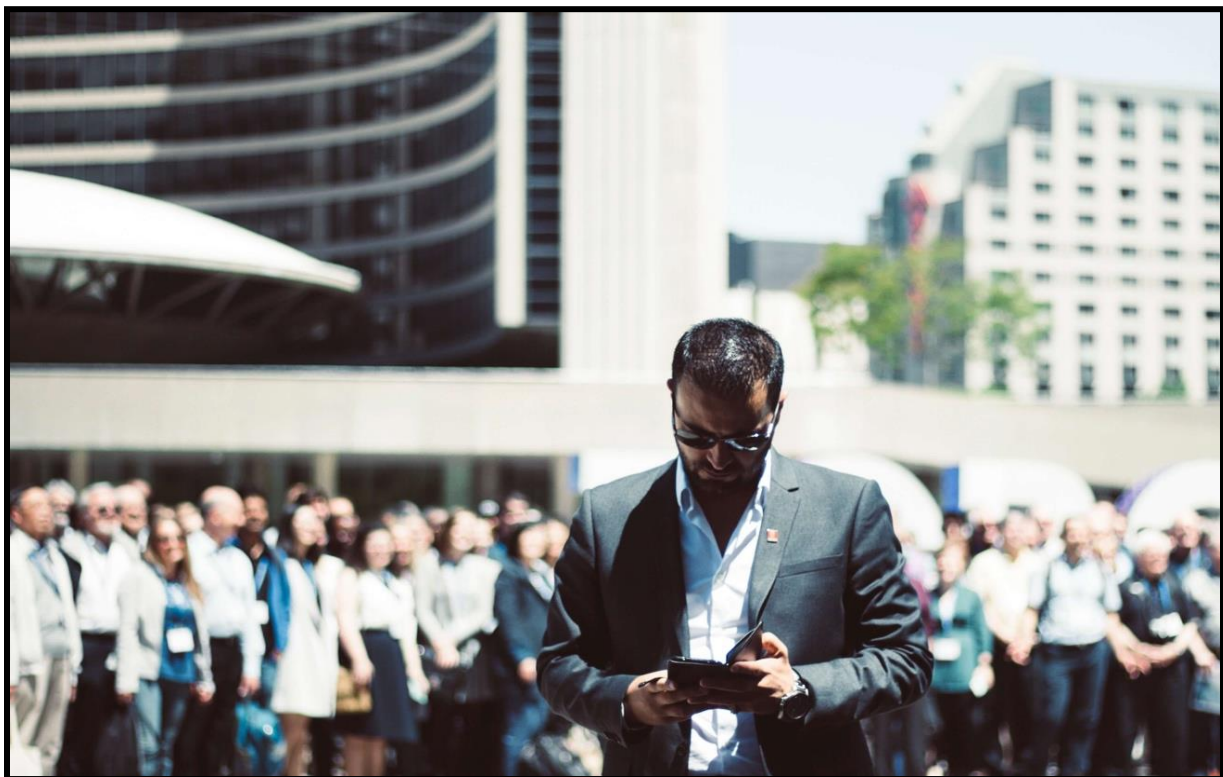
## BENEFITS OF HIIT



## Chapter 2

# Benefits of HIIT

Everyone wants the fastest, most efficient way to get in shape and HIIT delivers. As such, the idea of being able to work out for only a short period of time and still have washboard abs sounds like a no brainer. So when you are pressed for time but want to stay lean and healthy, HIIT training is the ideal way to get the job done quickly and effectively.



That said, HIIT is an ideal solution for anyone who does not have the time to exercise for long durations. Individuals on the go, those with hectic schedules or not willing to invest too much time into fitness can benefit, although effort is non-negotiable.

While additional calorie burn, fat loss, muscle gain and improved endurance are a given with HIIT training- and will be discussed in greater details later on, here are some of the most promising benefits HIIT training can offer:

## **Improves Oxygen Consumption**

In simple terms, oxygen consumption can be described as the ability of the muscles to use oxygen. For non-athletic personnel, typically this is possible only after regularly cycling or running but with HIIT, the benefits can be achieved by anyone and in a much shorter period of time.

HIIT improves the stroke volume which is the volume of blood pumped around the body in one contraction. This volume increases when you exercise given the body's higher need for oxygenated blood.

A study conducted regarding oxygen consumption stated that in a five-week time period, working out four days weekly with 20 minute HIIT workouts led to improved oxygen consumption by almost 9 percent of the subjects. The result is the same as cycling for 40 minutes every day which requires far greater energy consumption.

So HIIT may improve oxygen consumption as much as traditional endurance training, even when you exercise for only half as long.

## **Cardiovascular Benefits**

In terms of health benefits other than weight loss and improved oxygen consumption, HIIT can provide immense cardiovascular health benefits.

Perhaps the most important thing in this regard is lowering resting heart rate and reducing blood pressure.

While it is well known that extreme training delivers extreme results, most people find it hard to push themselves to an anaerobic zone. HIIT training makes it easier to get into the anaerobic zone as it requires you to perform each bursts with maximum intensity

whereby your heart beats faster, you lose your breath more often and then lowering your heart rate during the rest interval that follows. Over time, this training can result in a lower resting heart rate, which also lowers the risk of having heart diseases.

Likewise, HIIT can also help with lowering blood pressure levels as this form of intense exercise can help reduce arterial stiffness. High intensity interval training can also improve endothelial function which is the ability of the arteries to dilate better than moderate intensity training. Good endothelial function is important for blood pressure control and blood vessel health.

Comparative studies have shown that HIIT to be more effective than traditional cardio done at a steady pace in lowering blood pressure readings.

## **Helps Reduce Blood Sugar**

When done over a period of 12 weeks, HIIT can also be beneficial for reducing blood sugar levels. Not only does it improve metabolism but also optimizing insulin resistance.



Patients with diabetes are often asked to exercise to bring their blood glucose levels down. Research now shows that HIIT training rapidly improves diabetics' glucose metabolism in muscles and insulin sensitivity in type 2 diabetes.

Intense muscular contractions during HIIT stimulates muscles to take up glucose from the blood to be used as fuel which lowers glucose concentrations. Interestingly, the same also happens whether insulin is present or not, so the approach can also work with people with type 1 diabetes.

## **Boosts Metabolism**

As mentioned earlier, combining high intensity with interval training brings about EPOC which has the result of speeding the metabolic rate. The effects of this mechanism can be felt for up to 48 hours after a HIIT workout. This means that you will continue to burn fat long after leaving the gym.

Researchers also agree that as compared to jogging or running, HIIT can really push up the metabolic rate. Also, another plus point of this training is that it allows utilization of body fat for energy rather than just carbs alone.

A study concluded that only 2 minutes of high-intensity interval training led to increased metabolism for 24 hours which could easily outweigh the benefits of 30 minutes of jogging.

## **Time Saving Features That Require No Equipment**

With HIIT you no longer have the excuse of not having sufficient time. In fact, HIIT workouts are doable anywhere from your home to a hotel suite and even outside in the park.

Plus workouts are quick and short, with the longest being no more than 30 minutes at most. Who doesn't have time for that!

Another benefit of HIIT is that it doesn't require any specific equipment helping you save money while providing health benefits at the same time.

## **Create Customized Workouts**

If you are not up to using weights or machines for your workout, no worries. HIIT can be customized to your individual level and skills.

The most basic workout may use only body weight as the aim is to get your heart rate up and keep it there. You get to pick any kind of exercise which elevates the heart rate and then create an interval workout.

You also get to change your exercises every session which provides an advantage and allows you to not tire or get bored by doing the same thing again and again.

## **Challenging And Entertaining**

HIIT is a fun and entertaining way to reduce fat and improve overall body health as it allows you to keep changing workouts eradicating the boredom element.

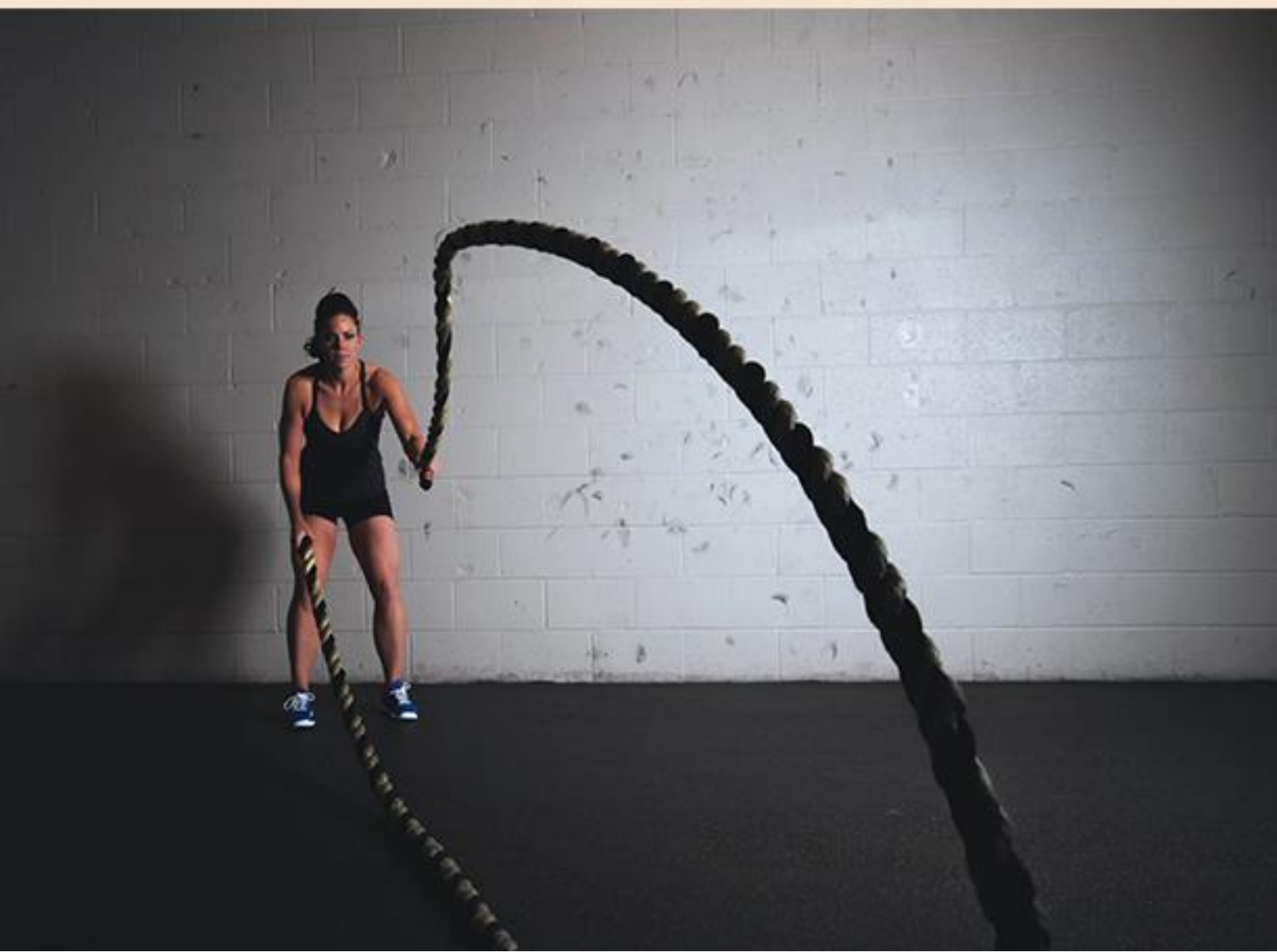
The same also provides a challenge to beginners and newbies by helping them transform and see the changes in their body. It is a challenge to let go of the comfort zone and pursue an exercise that holds massive benefits.

## **HIIT Is Efficient**

If you have a busy schedule and are unable to work out regularly, HIIT is the thing for you. If you have an event coming up for which you want to look gorgeous, try HIIT as it is more effective than a regular workout and can provide noticeable results much faster.

# CHAPTER 3

## THE ESSENTIALS OF HIIT



# **Chapter 3**

## **The Essentials of HIIT**

HIIT Training can give some amazing results if performed correctly. However, there are a few essentials that you need to consider before starting HIIT. For instance, features like the duration of this routine, the equipment you require and the extent to which you need to go in terms of intensity of the workout are important.

### **What Equipment To Use In HIIT?**

Beginner HIIT training can be fairly effective with just your body weight, but as you move along, you may want to introduce some equipment into your routines.



HIIT training can be done using an assortment of methods. You can work with anything from a Stairmaster to a bike or treadmill and even incorporate sprinting, bicycle sprints or elliptical workouts.

But whichever machine or activity you choose, you need to do it hard, fast and only stop when you feel that you can't possibly push any further.

A popular choice for HIIT in this regard is a treadmill. It is best to use a curved treadmill since this provides a full body workout. Another common choice for high intensity workouts is the stationary bike to accelerate heart rate and keep it pounding there.

An arm bike is also a good machine to use during high intensity workouts. Working out on this machine requires maximum effort and wrestlers have been using it for building their strength for a long time.

However, if you do not have the budget for all these machines or a gym membership, you can simply get a jump rope. A jump rope will get your heart rate up and keep it there for the duration of the workout.

If you want to follow a somewhat no-equipment HIIT plan, then stick with moves like jumping jacks, sprinting or sprinting in place, and high knees to get your heart going.

## **How Intense Should The Workouts Be?**

High intensity workouts are cardio workouts that are aimed at getting the maximum effort in a short period of time. The key is to keep the intensity levels at the maximum.

But for the workout to be effective, you need to determine your own intensity level. For a beginner, the intensity of a HIIT routine will be different from someone who has been doing it for a while. The sets are short in duration, ranging from 20 to 90 seconds but they require full body force. If you feel that you can continue a routine for more than 30 minutes, then chances are that you are not working at maximum intensity.

HIIT is more popular as compared to other methods because it burns calories more rapidly. It has been seen through research that the more intense a workout is, more fat is burnt. Normally, fitness experts judge the intensity level suitable for a person using the RPE scale or the rate of perceived exertion scale.

This scale basically has a 1-10 spectrum, with 10 being the point where you give the workout everything you have got. Every person needs to determine where they stand on this spectrum and try to move to 10 by gradually upping the intensity of their workouts.

## **How Restful Should The Rest Periods Be?**

While most people do find this strange, rest periods are imperative in a HIIT workout session. Without rest periods, you cannot get the full benefits of the workout. Once you are done with one set of exercise, your body needs to recover before it can perform the next set.

The mechanism for HIIT is that the body first goes into an anaerobic state during the high intensity workout. During the rest phase, the body is forced to recover to aerobic conditions. This shift between the two conditions consumes a lot of energy and results in fat burning.

The HIIT rest period does not have to be full rest. You can also have an active recovery period, such as a plank or walking in place. The ratio that most fitness experts follow is a one to two ratio. For every

one minute of high intensity workout, you have to take a recovery period of 2 minutes.

To see if your workout is going well, you need to see if you can talk and exercise at the same time. If you have the energy left to talk while working out, then there is something that you are not doing quite right.

As you progress and your body becomes used to high intensity workouts, you can make some changes in the sets and rounds of sets. You can either add another set to your workout plan or you can decrease the recovery period between the sets.

To get maximum benefits, make the recovery periods active. For example, for the two minutes recovery time that you get, spend one in a plank and the other in full rest state.

## **How Long Should The Workouts Be?**

The duration for a HIIT workout will vary from one person to the next. It also depends on the kind of workout you are doing.

For example, a Tabata session lasts for only 4 minutes. This routine was developed by a Japanese scientist and is very popular among the HIIT group. Normally, a high intensity training session can last for up to 30 minutes.

However, you do not have to work out constantly for 30 minutes. Break up your workout session into working time and recovery time or split the workout into two to three workouts. Make every workout for 6 to 7 minutes and incorporate recovery time in between to make the total duration up to half an hour.

If you do not have recovery time in between, you will most probably get bored of doing the same thing again and again. Plus, overdoing high intensity workouts can be problematic since it may result in injury. As such, you have to plan out your workout properly.

## **How Frequently Should You Do HIIT Workouts?**

Just like training any of your muscles, you don't want to train chest every single day. So, you should not perform HIIT workouts daily because it is practically impossible to get maximum results by not allowing your body to recover. If you perform high intensity workouts every single day, it can poses the risk of injury.

This can also happen because you are not giving your muscles and the entire body enough time to repair before diving into another wear and tear session. If you are doing too much of it, your mind will also not be on the same track. You are bound to feel fatigue and that will affect the performance in subsequent workout sessions.

It is advisable to perform HIIT two to three times a week. The key is to give your body a one day recovery time between the sessions. For example, if you are doing intense leg workouts, you will not have sufficient energy to work out the very next day. So, keep the next day for rest or do some light yoga instead.

## **How To Prevent Muscle Burn During HIIT?**

The aim of a HIIT session is to burn fat and not muscle. Therefore, to prevent muscle burn, there are a few things that need to be considered. Firstly, it is absolutely essential to take rest days. These days will give your body and your brain to recharge and prepare for the next workout session.

Another important factor to consider is nutrition. To benefit from any workout, it is important that you're constantly fueled with



proper nutrition. You need to take in ample amounts of proteins as they aid in the repair process of the body. Protein supplements are also a great way of preventing muscle burn. They contain amino acids that are then used by the body as building blocks for repairing damaged muscle fibers or to make new ones.

Fitness pros also recommend getting sufficient sleep. Your body heals itself while you sleep. Proper sleep will keep you active for the next workout and it also gives the body some time to repair itself before the next session.

So to reap the maximum benefits of a HIIT workout session, it is imperative to know the basic dynamics of the routine. The duration, intensity and rest periods are all important factors that need to be kept in mind when performing high intensity workouts. Neglecting even one of these factors may pour all your hard work down the drain.

# CHAPTER 4

## HIIT FOR FAT LOSS AND MUSCLE GAIN



## Chapter 4

### HIIT for Fat Loss and Muscle Gain

HIIT is no doubt a great way to melt off those body fat. The workout aims at quick fat burning and the ultimate reduction of fat cells that store fat reserves. But before moving on to the mechanism of fat burning by high intensity workouts or any other methods, you need to understand the mechanism of fat storage in the body.

When you consume food, some of it is used as glucose for energy expenditure. The extra food is stored in the form of glycogen in the liver. This is the reserve food that is used once the glucose levels in the body become low.

Fats and triglycerides are also used by the body for energy and fats provide the largest amount of energy. Extra fat is stored in cells called adipocytes that are abundant in the flank, thighs and the abdomen region. The aim of any exercise is to signal the body burn these reserve carbs and fats.

But before this happens, the body has to exhaust the glucose and triglycerides that are already present in the body. Once those are used up for fuel, the body starts to use the reserve glycogen and fats.

## **How Does HIIT Cause Fat Loss?**

Metabolism refers to all the processes that take place in the body. These can be of two types.

- **Anabolic**

These are the reactions in which new products are synthesized using the reactants that are present in the body. These things are often extracted from the food we take in, such as proteins and carbs.

- **Catabolic**

These reactions are the ones in which something is broken down into smaller particles or for excretion from the body. These reactions may be fat oxidation in which fats are burnt into their respective components. Other than that, catabolic reactions include carb burning and breaking down of larger nutrients into

their monomers use these building blocks for making something new.

Both these reactions take place side by side and both need energy to function. This energy comes from burning carbs that are already present in the body.

When a person performs a high intensity workout, their metabolic rate is enhanced. Due to this acceleration of the metabolic rate, reactions in the body also take place at a faster rate. Since more reactions occur and at a faster rate, the fat reserves in the body also start being used up for energy.



With HIIT your metabolism remains in action even in the resting stage; HIIT is much better at enhancing resting metabolism than aerobic exercises. It keeps the resting metabolism going on at a significant rate for 24 hours after the workout, which is just in time for the next workout. Therefore, it keeps the body burning fat during the whole day, even when at rest.

## **HIIT And Fat Oxidation**

Fat oxidation is the process in which fats are broken down into triglycerides. In cells, oxidation of fat occurs as a result of which triglycerides are produced. These are used for energy provision or they can be stored in the adipose tissue. Since HIIT induces fat oxidation, it ensures that body fat is being broken down instead of getting stored up.

The liver is the only organ in the body that can dispose of cholesterol. When fat reserves build up on the liver, the liver cannot function properly due to pressure exerted on it by the fat concentration. As a result of HIIT, the fat reserves melt which causes the liver to function properly for disposing off cholesterol.

## **Increase In Growth Hormone Levels**

HIIT has also shown to increase growth hormone levels. This hormone is also involved in the fat burning mechanism in the body along with enhancing metabolism. In the presence of this hormone, the metabolic rate of the body improves and the efficiency of metabolism is also enhanced significantly.

During high intensity workouts, a chemical is produced in the body called catecholamine. This chemical facilitates fat loss since it mobilizes the stored fat. The fat reserves keep increasing in the body until the previous ones are burnt.

In the presence of this chemical, the fat that is stored in the adipose tissue is mobilized so that it can be used as fuel for energy. The primary source for fuel in the body is carbohydrates so the body has to produce some kind of chemical to make the fats available for fuel.

## **How Does HIIT Build Muscle Mass?**

HIIT is also responsible for building muscle mass. This is because HIIT builds endurance and causes more blood flow with better contractility to the muscles. The blood carries oxygen and nutrients to all parts of the body. After high intensity workouts, more oxygen is taken to the muscles. This results in oxidative respiration in the muscle.

Anaerobic conditions cause the production of lactic acid in muscles. This is why the muscles feel fatigued and they get sore. If more oxygen is taken to the muscles, aerobic conditions persist and



oxidation process occurs. As a result, you build more muscle mass in the long run.

Moreover, blood also takes nutrients to the muscles. These nutrients are essential for the muscle growth and development, especially the proteins. Proteins can be used as energy source for growth of the muscles. Also, they are great for repair.

Every time you work out, muscle wear and tear takes place which has to be treated by the body. Proteins play a role in this process and they repair the muscle fibres that have been damaged during intense workouts. Also, they make new muscle fibres using amino acid as building blocks. These amino acids are used for making muscle proteins called actin and myosin which are responsible for muscle contraction and relaxation.

## **Metabolism And Muscle Mass**

HIIT increases the rate of metabolism in the muscles in active stage and keeps metabolic activities going on even in the resting stage. In the anabolic reactions, new products are made for muscles. In this process, muscle mass is also built. Since high intensity workouts keep the anabolic activities going on for 24 hours following the

workout, they ensure that muscle synthesis is taking place at all times.

As such, high intensity workouts are great for burning fat since they increase the metabolic rate and also increase the fat oxidation rate in the body. Plus, it also reduces appetite and increases fat mobility by increasing the amount of catecholamine. Along with fat loss, high intensity workouts are also responsible for increasing lean muscle mass which is a great way for people to get their dream body.

# CHAPTER 5

## HIIT FOR ENDURANCE



# Chapter 5

## HIIT for Endurance

To build endurance, you don't have to spend hours of your daily life training and doing intense exercises. HIIT is a great way for building endurance since it focuses on the major endurance-building points in the body.

One of the main elements of endurance is cardiovascular performance. This refers to the way your heart works and the subsequent working of the circulatory system in response to heart's pumping. The functioning of the heart can be measured by three determinants.

### **1. Heart Rate**

This is the rate of your heart beating per minute. The more your heart beats in a minute, the more blood is pumped to the body and the faster your body moves towards endurance.

## **2. Stroke Volume**

This refers to the blood amount that is pumped every time the heart beats. Since there is a direct relationship between the stroke volume and endurance, a higher stroke volume is beneficial for the body.

## **3. Contractility**

This refers to the force with which your heart pumps blood to the body. The stronger the force, the farther the blood travels. If contractility is higher, an individual has more blood flowing to the exercising muscles. This blood is laden with oxygen and nutrients that are then utilized by the skeletal muscles for strength and repair.

## **How Is Endurance Built?**

Endurance is not only a measurement of how hard your heart is pumping blood. It also refers to the amount of oxygen that can be delivered to your muscles. This variable is called  $VO_2$ . This variable depends on the factors mentioned above as well as on the amount of oxygen that is extracted from the blood that enters the muscles. Not all the oxygen that is taken to the muscles by the blood is taken by the muscles. The oxygen has to be extracted first and the more

oxygen extraction capacity the muscles have, more oxygen they will receive.

Another factor that contributes to endurance is the mitochondrial density. It is common knowledge that mitochondria is the power house of the cell. What this means is that it is involved in the production of energy in the form of ATP. This energy is produced through different cycles that take place in the mitochondria. The higher the mitochondrial density, the more energy is produced for the consumption of the body.

## **How Does HIIT Build Endurance?**

HIIT builds endurance by working on all the variables that are mentioned above. It enhances the stroke volume for ensuring a greater amount of blood flow to the skeletal muscles. Moreover, it also has an effect on contractility and increases the pumping force of the heart.

As far as mitochondrial density is concerned, HIIT is a great alternative to aerobic exercises for increasing your mitochondrial density. If there are more mitochondria in the body, more energy production takes place and that gives the muscles more endurance.

Another way in which HIIT induces endurance is by increasing the number of enzymes present in the mitochondria. As mentioned above, energy is produced in the mitochondria through different cycles. In all the steps of these cycles, different enzymes act on the substrate to form a product. These enzymes have their distinctive activities that are essential for energy production. HIIT leads to an increase in these enzymes and these enzymes then further increase the endurance in skeletal muscles.

When you perform HIIT, it shifts the signalling pathway in the body from a slower to a faster one. For breakdown of nutrients and extraction of energy from them, the mitochondria are activated through a 'switch' in the body called PGCα. During high intensity exercises, the signalling pathway for activation of this switch is a lot faster. As a result of that, the enzymes' activity is enhanced and the mitochondrial density is also increased.

## **HIIT and VO<sub>2</sub>**

As mentioned above, the VO<sub>2</sub> levels in the blood determine how much oxygen is getting to the skeletal muscles and other parts of the body. HIIT has shown to significantly enhance VO<sub>2</sub> levels in the

body and enhances stroke volume. Since the stroke volume is enhanced through high intensity workouts, more blood gets sent to the body every single time the heart contracts. This is a good thing for the skeletal muscles since they start getting more blood.

The circulatory system of the body is responsible for transport of nutrients and oxygen to the muscles and other organs. When the skeletal muscles get more blood, they also get more oxygen and nutrients. This is essential for proper growth and functioning of the muscles.

Using this oxygen, they can respire and release energy using the mitochondria present in them. At the same time, the amino acids in the nutrients are further used for repair and for synthesis of new proteins that are needed for the muscles.

High intensity workouts also increase cardiac contractility which refers to the force with which the heart pumps blood. As the pumping force is increased, the blood reaches all muscles and organs of the body. When skeletal muscles get more blood, they build up endurance. It is due to this excessive endurance that the individual has shorter recovery time and can perform much better in gym sessions.



## **HIIT Builds Endurance In Skeletal Muscles**

High intensity workouts also build endurance in skeletal muscles. When you perform these exercises, the vasculature of the skeletal muscle is changed. The vasculature refers to the size and number of blood vessels that are present in the area. Due to these workouts, tiny blood vessels become apparent in the skeletal muscles.

They enhance the heart stroke by sending more blood to the heart. The muscles, when contracting, send blood back to the left ventricle of the heart. If more blood is being sent to the heart, it means more blood is being oxygenated too. Thus, heart stroke is enhanced and more blood is sent back to the body in oxygenated form. This increases the amount of nutrients getting to the muscles.

HIIT also enhances endurance by increasing the strength of muscle fibres. The muscles fibres are made up on proteins. In high intensity workouts, the blood circulation is enhanced and more of these proteins are being made using the amino acids present in the blood. This enhances the flexibility of the muscle fibres and makes them stronger.

## **Motor Units And HIIT**

The skeletal muscle fibres have something called motor units. These units are important for signalling in the muscles and for building endurance. High intensity workouts increase the number of motor units present in the body. This can aid in two things.

- If more motor units are present in the skeletal muscles, then muscle coordination improves and the person has better endurance.
- Motor units also help to reduce the fatigue time for exercises. As such, anyone with enhanced motor units does not tend to get tired quickly.

## **Does HIIT Affect Qmax?**

Qmax is referred to the maximum amount of blood that your heart can pump to the body in a minute. It has been seen in studies that high intensity workouts have little or no significant effect on Qmax. On the contrary, low intensity workouts such as aerobic workout plans are great for increasing Qmax.

Therefore, HIIT takes cardiovascular pathways to increase endurance. It increases the density of mitochondria in the cells along with enhancing the functioning of mitochondrial enzymes. Furthermore, it strengthens the muscle fibres by giving them more proteins for repair and strength. High intensity workouts also increase endurance by overall increasing the VO<sub>2</sub> max and by keeping the oxygen volume in the blood high at all times, for transfer to the skeletal muscles.

# CHAPTER 6

## COMMON MISTAKES WHEN DOING HIIT



## **Chapter 6**

### **Common Mistakes When Doing HIIT**

HIIT is, beyond doubt, a very effective workout but to get results, it needs to be done correctly. Most people are not used to pushing themselves as hard as necessary for HIIT especially for a workout that is as short as 7- 10 minutes because it is extremely uncomfortable.

That is why many people often start making mistakes during their workouts which can easily sabotage their efforts and diminish their results. Here is a look at some of the most common mistakes to avoid when doing HIIT.

## **Opting For Longer Workouts**

Essentially, a HIIT session can last anywhere from four to twenty minutes, or thirty minutes if stretched to the maximum. If someone is able to push it beyond that, then that is not an achievement.

It is a common error to go for longer sessions during HIIT. The whole point is to push your body to the maximum limit during high intensity periods. This will automatically make your sessions shorter as the body will be too exhausted to work anymore.

## **Not Warming Up**

HIIT training can be tough and strenuous, especially for beginners who are not yet ready to use their body's maximum potential during their workout sessions. Even those who are physically fit and active need to warm up before they start with their HIIT training.

It is a common mistake to directly hit the gym and get going with the session. This will reduce the effects that you are trying to achieve. Without a warm up, the body will not be able to give it's all during the high intensity intervals.

## **Choosing Complex And Complicated Movements**

Experts say that with subsequent sessions of workouts, the body can get too tired to perform a complex movement. During your first session, a complicated movement might not seem that bad at all. But after repeated movements, the body and brain could be overstrained, increasing the chances of an injury such as sprains or falls.

Instead, it is advised to choose movements for HIIT workouts that are easier to perform, without having to put too much thought into which body part goes where and which muscle to stretch more than the other.

Apart from choosing complex movements, another common mistake is not perform the easy ones correctly. As simple as a movement might be, unless you are performing it right, it is not going to be effective.

It is always good to give your mind and body a chance to master a movement first before you start training faster.



## Not Paying Attention To 'Recovery' Intervals

This is one of the most common mistakes during HIIT to reduce the resting or recovery intervals in an attempt to make it 'tougher'. This is the wrong idea.



The recovery period is as important as the high intensity interval, if not more. This is the period where the muscles pay off what is called an 'oxygen debt'. They receive the oxygen that they were deprived of as the workout proceeded and led up to their fatigue. Once they get the oxygen back, they can work just as hard in the



next high intensity period. If ample recovery time is not taken, then muscles are only partially ready for the next hard work.

## **Not Being 'Intense' Enough**

By high intensity during HIIT training, it is meant that you should be extremely breathless, the heart thumping loudly against your chest and your body and brain both screaming that you cannot push any further. If this does not happen to you during your high intensity intervals, you are making the same mistake as many others: not going hard enough.

You need to push yourself to the point where you physically and mentally reach a point beyond which you know you cannot go on. Only then will your HIIT workout be a success.

Most HIIT training sessions involve movements and exercises that are natural and easy. They make the workout more effective and also reduce the chances of an injury. Lifting weights can also be a part of high interval sessions but these weights should not be too heavy. The easier they are to lift, the better.

## **Diet And Clothing Matter**

As good as it might look, wearing clothes that are too tight are only going to bother you during the workout. It is important to invest in proper gym clothes that are made of a breathable material, do not trap sweat against your skin and leave you itchy. It is also necessary to wear proper trainers for your sessions.

In terms of nutrition, first and foremost is to stay hydrated! Drink ample water well before your workout session starts because it's about to get sweaty!

There are many protein shakes available, which can be used. Otherwise a good fibre and lean protein meal works just as fine. Having said that, it is best to be done eating at least an hour before your session. It is a common error to eat right before working out and not pay attention to what you eat either. Fruits and vegetables just before working out are not going to be very helpful.

## **Not Staying Determined Enough**

The last thing your body needs to hear is 'You can't do it!' Yet it hears this a lot during HIIT training. HIIT can be very tough and demanding. It can make the body feel more exhausted than ever.

So it is common to give up. It will feel hard and impossible, and the negative thinking will only make it worse. But sticking to it will allow you to reap some great benefits.

## **Doing HIIT Too Often**

Boasted by the great outcome and result of HIIT training can lead to the mistake of over doing it such as, trying to do it every day. This is not good for the muscles at all. The maximum frequency of a HIIT session should not be more than twice or thrice a week. This is to allow ample recovery time to the body so that it is all set for the next round.

This is primarily why many people have begun to prefer this over long everyday sessions of low intensity workouts. It does not demand too much time from their busy routines.

## **Choosing The Wrong Timing**

Randomly choosing half an hour in the week for HIIT workout is a big mistake. The sessions need to be timed properly. Having a session right after you eat or just before bed is a bad idea.

In fact, the sooner in the day you train, the better. Taking a good but light breakfast early in the morning, an hour before the HIIT session is the best way to go about it. This way your fat reserves will be targeted better. It will also prepare your body to burn the calories you will be munching up throughout the day.

As a matter of fact, working out early and before going to work will also maximize your performance there, as the concentration and productivity will be at its best.

# CHAPTER 7

## THE BEST DIET FOR HIIT



## **Chapter 7**

### **The Best Diet for HIIT**

To benefit from any workout plan to the fullest, it is imperative to have a suitable diet plan, complementing the workout sessions. For HIIT, it is essential to have a diet that is rich in proteins and has sufficient carbs. This ensures that you have enough energy to exercise intermittently without giving in to fatigue. Along with that, an adequate amount of water is also essential for the success of a HIIT workout.

#### **Pre-Workout Nutrition**

HIIT workouts involve short yet extensive workout sessions, which is why it is very important for the pre-workout diet to be high in energy. The human body works all day long and is busy in the processes of muscle-building and repair.

Pre-workout nutrition refers to the diet that you should take about 4 hours before the workout session. If the pre-workout nutrition is

planned strategically, it gives the body ample time and energy to recover and make new muscles.

About 4 hours prior to your workout, it is important to take in sufficient amounts of carbohydrates and proteins. Carbs are the body's major source of energy and they give the body that ultimate fuel which is needed to drive a workout. Proteins, on the other hand, are coupled with carbs for repair and muscle building.

The carb intake should be moderate enough to not overload the body but energize it enough for the workout. Some good pre-workout food options include:

- Dried fruit such as almonds or cashew nuts
- Plain Yoghurt (Preferably, a blend of yoghurt, fruits and some veggies in form of a smoothie)
- Protein powder and Whole wheat toast
- A banana and some strawberries or a smoothie

These meals are a great way to energize the body for the workout by giving it the extra energy it requires. Just an hour or so before the actual workout, the body is in need of a 'boost' of energy. This comes from carbohydrates so the meal plan immediately before the workout needs to be rich in carbohydrates. Some good pre-workout meal options include:

- A bowl of fruit
- A nut energy bar
- Peanut butter toast

Then, just half an hour before the workout, take in a scoop of whey protein. This is important to reduce the recovery time for the body in case of muscle fatigue or any energy loss. Proteins are the ultimate muscle building sources of the body and when the body needs repair, they are at the front.

## **Post Workout Nutrition**

Likewise, after you are done with such an intense workout, it is important to make up for what the body has lost. Firstly, the body has lost its glycogen reserve, which is the form in which glucose is stored in the body. Secondly, during the workout process, the muscles are also broken down. The main nutrient required for their repair is protein.

As such, the post workout diet plan should have more proteins. Immediately after a HIIT workout session, it is not possible to fix yourself a proper meal so you can go for quick fixes that have high protein content. Some options include:



- A Protein shake
- A slice of white bread
- Soy milk and 2 spoons of jelly

These foods are to be taken in before the actual meal for the day or night. You can take this half an hour after the workout. The proper meal after a HIIT workout should be rich in carbs and proteins both, since both are needed. Carbohydrates are needed for glucose, a part of which will be stored as glycogen in the liver again.

On the other hand, proteins are needed for repair of worn out muscles. It has been seen thorough research that the best combination of proteins and carbs is in a 1:3 ratio. After you have finished you session, make sure that you have a proper meal in the 2 hours following your workout session.

Proteins need to be included since they are involved in building up muscles. The amino acids present in your diet are the building blocks used to repair damaged muscle cells. Different cells in the body are involved in the process of using amino acids to make new muscle fibers or to damage the ones that have been severed during intense workouts.

Proteins present in milk products are quite beneficial for the muscle health so snacks for HIIT diet plan are normally scoops of whey protein or casein protein.

- Rice with veggies and chicken
- Pasta and salad (add meat sauce for taste)
- A cup of mixed green salad and some salmon
- A cup of green beans and salmon

It is also important to incorporate some healthy fats into your post-workout meal. This is because fats aid in reducing inflammation that often occurs as a result of high intensity workouts. Inflammation, if it prevails, can hinder the exercising process for subsequent days so it is essential to deal with it from day one.

Along with food, it is important to make up for the water lost during the workout session. Keep drinking water throughout the day, till you go to bed. When you exercise, a lot of water is lost in the form of sweat. This needs to be replaced since a hydrated body sees quicker results in terms of exercise.

### **3 Day Meal Ideas**

As mentioned above, it is absolutely imperative for a good diet plan to complement a workout session for the exercise plan to yield results. A 3 day meal plan with three main courses of the day along with 2 snacks is given below.

#### **Day 1:**

##### **Breakfast**

- 2 whole eggs
- 1 slice low fat cheese
- 2 slices low fat turkey bacon
- 2 slices whole wheat bread

##### **Morning Snack**

A cup of berries or a handful of walnuts

##### **Lunch**

- Spinach
- 5 oz. shrimp
- Half a cup of dried oatmeal
- A table spoon of salad dressing

## **Mid-day Snack**

- A table spoon of peanut butter
- Half a cup of cottage cheese

## **Dinner**

- Barbeque chicken with natural BBQ sauce
- Whole wheat bread
- Cabbage dressing
- 5 oz. kale

## **Day 2**

### **Breakfast**

- An English muffin (whole wheat)
- 3 slices of turkey bacon
- Breakfast sandwich with eggs and a slice of cheese

### **Morning Snack**

- A cup of cottage cheese
- Half a cup of berries

### **Lunch**

- 6 oz. chicken breast
- A cup of zucchini sliced well

### **Mid-day snack**

- A scoop of whey protein
- Handful of any dried fruit

### **Dinner**

- A large baked potato
- Grilled salmon
- Half a cup cheese and a table spoon of Greek yoghurt
- Salt and hot sauce for taste

## **Day 3**

### **Breakfast**

- 3 whole eggs
- Omelet made with reduced-fat cheese and onions

### **Morning snack**

- A cup of spinach
- 2 spoons of salad dressing with olive oil and vinegar

### **Lunch**

- A cup of broccoli chopped well
- A table spoon of salad dressing with olive oil and vinegar
- 8 oz. of chicken breast

## **Mid-day snack**

- Peanut butter on a whole-wheat toast

## **Dinner**

- Canned tuna sandwich
- Half a cup of Green yoghurt
- Celery stalk chopped well with chopped onions

It is only by consuming ample amount of required nutrients that you can benefit from your workouts. If the pre-workout meals and the post-workouts meals are not sufficiently loaded with the right nutrients, you will feel fatigued in no time and it will also decrease the stamina of the body.

Coupled with this meal plan, it is important to drink 8 to 10 glasses of water every single day to keep hydrated. More water equals a better working metabolism which is helpful for a successful workout.

# CHAPTER 8

## SUPPLEMENTS FOR HIIT



# **Chapter 8**

## **Supplements for HIIT**

No matter which workout you are following, most need to couple proper diet with supplements to get the maximum benefits. These supplements are needed for that extra boost of energy and for initiating the repair process in the body. Several supplements are especially suited for HIIT, as they work best for high intensity exercises.

### **Greens Supplement**

Greens Supplement is a great method for increasing strength and power. It gives the user more strength, which is an important factor in high intensity workouts.

When your body undergoes intense workouts, it starts to accumulate acid. This can slow down performance and cause fatigue. During exercise, the body goes into anaerobic state. When the body respire in the absence or limited amount of oxygen, it produces lactic acid.



Due to the accumulation of acid, the pH begins to drop. This makes the working mechanisms in the muscles stop. As a result of all this, the person feels fatigued and does not have the strength require for the next workout session.

Green supplements have alkaline properties that cancel out the acidity in the muscles. So they can be beneficial in increasing the body's power and in reducing fatigue for maximum performance.

## **Creatine Monohydrate**

There has been extensive research on creatine. It has been used in many sports supplements since the first discovery of its benefits. Not only does this supplement increase the performance ability, it also increases the lean muscle mass in the body.

The body needs to maintain homeostasis, which is the state of the body in which every factor is well-regulated. Creatine acts as a pH buffer, keeping the pH of the body regulated at all times.

This ensures that the muscles are present in the right pH conditions for maximum overall performance. Plus, creatine lets you enjoy more reps without getting tired or stripped of energy.

Another reason why Creatine is suitable for HIIT training is due to its ability to ensure faster recovery. In HIIT training session, it is a must to include recovery periods. When a person recovers at a faster rate, they can perform better in the gym and reap the maximum benefits of their workouts.

Creatine is also involved in increasing the number of satellite cells that are present in the body. These cells help to increase muscle mass by linking amino acids together for formation of new proteins. More muscle mass is directly proportional to more workouts and better results.

## **Caffeine**

It should not come as a surprise that caffeine is helpful in increasing alertness in the body. It is responsible for making you more focused and alert during workouts and enhancing performance. Excessive amounts of caffeine can be harmful so it is important to determine your tolerance and make your daily intake according to that.

It is recommended to take 300 grams maximum, of caffeine before an intense workout. This will give you a surge of energy and keep you focused on the workout.

Caffeine activates the sympathetic nervous system, which is activated when the body is in a state of alertness. In this system, the hormone epinephrine is secreted and induces the breakdown of glycogen present in the muscles. Along with that, it also oxidizes fatty acids in skeletal muscles. Both these processes result in energy production that is later utilized for high intensity workouts.

So, caffeine can increase endurance in the body and keep the body in a high-energy state at all times.

## **L-Carnitine L-Tartarate**

Both of these are amino acids that are not commonly present in the body in large amounts. The body has 20 major amino acids that are all present in the L confirmation. L-Carnitine is an uncommon amino acid that has to be taken from external sources since it is not readily present in the body.

This amino acid aids in fat burning by mobilizing the fats present in the body for energy. Along with that, it also reduces the recovery time after a long workout. If you normally take two days off after a HIIT workout session, with the use of this supplement, you will be able to reduce the recovery time to one day. This gives you more time to work out and have a lot more endurance.

L-Carnitine is also involved in increasing glycogen reserves in the muscles. When carbs are taken in, the body uses some of it to form glucose and the excess is stored in the body in form of glycogen. This can be broken down for use when body is in need of energy. By increasing the muscle reserves of glycogen, this supplement ensures that muscles have energy whenever it is required.

Plus, this supplement also prevents the formation of free radicals. Free radicals are the by-products produced as a result of different chemical processes taking place in the body and can significantly harm the body in the long run.

During exercise, muscle tissues are damaged due to wear and tear. L-Carnitine keeps the muscles protected from tissue damage so that there is lesser fatigue. In addition, the use of this supplement also reduces muscle soreness and keeps you energized for the next round of workouts.

Taking about 3 grams of this supplement everyday can give the person following a HIIT workout plenty of benefits.

## **Betaine**

Betaine is a modified form of the amino acid glycine, which occurs naturally in the body. It is also present in many foods including beet, shellfish and spinach. So while it is likely that you are taking some of this supplement in your diet chances are that it may not be enough.

Betaine can form creatine in the body by donating methyl group. And as mentioned above, creatine has plenty of benefits for anyone who works out. Betaine, on its own, also has significant effects on the wellness of skeletal muscles. It keeps lactate levels low and removes this acid and keeps the body energized.

An addition, it increases the rate of protein synthesis in muscle cells. As more proteins are made, more energy is provided to the muscles. Since proteins are involved in body's natural repair mechanism, their ample amount is essential for reducing recovery time.

A study showed that betaine can also lower exhaustion levels. Most athletes and individuals who work out frequently drink water to stay hydrated and reduce exhaustion. When coupled with betaine, water can reduce exhaustion by a factor of 40 times more.

## **Citrulline**

Citrulline is a supplement that plays a role in synthesizing nitric oxide in the body. Nitric oxide is very important for regulating blood flow to muscles and other organs and can enhance blood flow to the muscles.

Blood contains oxygen and nutrients for the wellness and strength of the body. As more blood flows to muscles, more nutrients are present for the muscles to extract energy. Also, in presence of ample oxygen, the muscles can respire aerobically and have lesser production of lactic acid. This contributes to lessened fatigue and more energy.

Citrulline malate also contributes to fat loss. In normal HIIT sessions, the rate of fat loss is 1.2%. However, with usage of Citrulline malate, the fat loss percentage goes up to 2.3%.

Citrulline, when used as citrulline malate also acts as a buffer for ammonia. It counteracts the effects of lactic acid on the body by cancelling out the acidity and increasing the pH. Taking up to 6 grams of citrulline about an hour before exercise can keep the body energized.

All these supplements complement high intensity workouts and make their results much better. Taking controlled amounts of these supplements ensures utmost performance, shorter recovery times and higher energy levels.

## Conclusion

To sum up, whether your goal is fat loss, muscle gain or athletic performance, HIIT can help you achieve all these goals.

You will continue to get results as long as you do the workouts correctly which means building in rest and recovery between the sessions. Pair it up with a good diet and supplements to boost performance and see your body transform with the shortest, most effective workouts out there.