

TESTOSTERONE

WORKOUT

*Boost Your Testosterone
and Growth Hormone Naturally*

A PROGRAM TO BURN FAT
AND BUILD MUSCLE

By:
Jerry Williams, MD, FACC, FACP
and John Blackwell

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AUTHOR'S ADVICE

This program can make a dramatic change in your health, but it must be supervised by your physician who is familiar with your medical problems and medications that you are taking. Please consult with your physician before starting this program.

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INTRODUCTION

Every day I hear the cries of my patients whose bodies are being destroyed by diabetes, hypertension, heart disease, kidney disease, crippling arthritis, and cancer. As a cardiologist, I have witnessed America's failure of fitness first hand. The health of America has been battered by poor nutrition and improper exercise. Gyms and exercise spas are everywhere, but America is in the worst shape of its life. If we could only eat right and exercise right. This sounds so simple. Why are so many people unsuccessful in following this rule? I ask myself this question every day when I see my patients struggling to live healthy.

When I make rounds in the hospital I see the casualties of poor health. Intensive care units are full of diabetics with infections, kidney disease, blindness and amputations. Dialysis units are overflowing with kidney failure. Mechanical ventilators run 24 hours a day to prolong the lives of patients with respiratory (lung) failure. Sleep labs operate all night to diagnose and treat sleep apnea and snoring. Hospitals are buying larger beds and imaging equipment (CT scans, MRIs) to accommodate the increase in obese patients. Gastric bypass surgery has increased beyond imagination. Today one-third of adults are obese and more than 50% are overweight. Nurses in our hospitals are suffering serious back injuries from taking care of obese patients.

The effect of poor health also extends from the hospital to my office. I watch people struggle to walk and breathe as they come into my examination rooms. They are barely able to put one foot in front of the other or to step up on my examination table. Their

legs want to buckle trying to maintain their weight. You can hear their knees grinding to maintain an upright posture. All of their joints ache with arthritis. Their bodies are slowly being destroyed by their poor health. Sadness and depression is in their faces. They are looking to me to end their spiraling downhill course.

A lot of patients complain of a lack of strength and endurance. Many have had bypass surgery and stents but they continue to experience symptoms such as shortness of breath with exertion and extreme tiredness and fatigue. Commonly we put them through a battery of tests and find no new blockages or heart muscle weakness to explain their symptoms. They have seen their family physician and he informs them that they are just getting old. At this point they just want to give up. They then start looking for miracle cures and try any new advertised gimmick to give them their stamina back. Expensive supplements and potions are then purchased that promise them to get their fountain of youth back. When supplement and gimmicks fail, they turn to processed foods and sugar to get some pleasure. Gradually, over time, they commit slow suicide with a fork.

Other patients resort to more drastic measures. As a cardiologist, I am seeing an increasing number of patients taking prescription testosterone replacement medications. The sales of testosterone have boomed in recent years due to new ways to get it into your body, such as gels, creams and injections with pellets. The problem with taking testosterone is that a lot of patients including men and women are taking testosterone with normal testosterone levels. Many people are unaware that testosterone replacement treatment shuts down your natural production of the hormone. If a person

suddenly stops taking testosterone after using it for a while, they could experience withdrawal symptoms. These symptoms include: low energy, less stamina, low sex drive, irritability and depression. These withdrawal symptoms motivate patients to keep refilling their testosterone prescriptions.

Numerous individuals are taking injectable Human Growth Hormone (HGH). HGH will increase lean muscle mass, decrease body fat and give you higher energy. The Harvard Men's Health Watch publication reported that as many as 100,000 people have injected growth hormone without a valid prescription in one year. The cost of HGH is expensive and the yearly cost can be from \$8,000 to \$10,000. A lot of people are using this as an anti-aging drug or as a way to increase muscle, reduce body fat and increase athletic performance. When you inject a man-made substance into your body every day to achieve quick and easy results, you know there is a long term price to pay on your health. The injection of HGH can cause numerous side effects including: nerve, muscle, or joint pain, carpal tunnel syndrome, numbness and tingling of skin, high cholesterol levels, increased risk of diabetes and increased risk of growth of cancerous tumors.

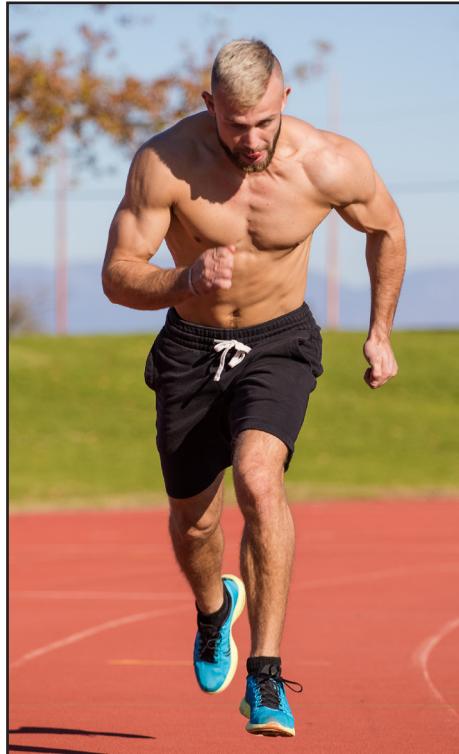
This book is about naturally increasing our testosterone and growth hormone for burning fat and building muscle. Recent discoveries about these hormones are changing the way we think about fitness, health, athletic performance and aging. These hormones are called our "fitness hormones" and help to preserve our fountain of youth. This program can drastically change your body by releasing these hormones through diet and exercise. There is no need for potentially harmful creams, pills, injections or pellets. You will

notice a marked improvement in your endurance, stamina and energy. By reducing body fat and increasing your muscle mass, your appearance will change and you will feel great. You will become a new you. This book can be your first step to fitness and health. Just do it now and change your body forever.

Jerry Williams, MD, FACC, FACP

Which Body is Best for Health and Performance?

In one observational study the health benefits of long distance running seems to diminish among people who ran more than 20 miles per week, more than 6 days per week, or faster than 8 miles per hour. Long distance running that is too excessive creates oxidative stress. Oxidative stress can create free radicals that can bind with cholesterol to create plaque buildup in your arteries. A study of



Sprinter



Marathon Runner

marathon runners in the Boston area showed they have higher risks of hardening of arteries, heart attack and sudden death. In one Harvard study, doctors obtained blood from 80 middle-aged male runners before and after the Boston Marathon. None of the men had any history of heart disease. One day after the race, they developed elevation of their cardiac enzymes which is similar to symptoms that appear during a heart attack.

Previous studies have confirmed that low intensity exercise does not prevent death from heart disease. The Harvard Alumni Health Study found that high intensity exercises were associated with longevity. The Caerphilly study showed that “exercise classified as heavy or vigorous was independently associated with reduced risk of premature death from cardiovascular disease”. Both studies showed that only the highest levels of exercise intensity lowered death rate.

Most of my patients start out on a low to moderate intensity exercise program to lose weight. This program requires a near starvation diet to see any results. Unfortunately, even if you starve yourself, you will eventually gain most of your weight back. If you lose weight with dieting alone, there will be a loss of fat and muscle. The loss of fat is good, but the loss of muscle will reduce your metabolism. The

loss of your metabolism will cause rapid weight regain. Therefore, you must do exercises that activate testosterone and growth hormone which will increase your muscle mass at the same time you are restricting your calories. By increasing your fitness hormones with high intensity exercise, you can have the health and fitness that you always wanted.

Cardio Versus High Intensity Exercises



Exercises are divided into two categories. The first category is low to moderate intensity and is called "Cardio". This is traditional exercise such as going out to jog or taking a long walk. It involves only the aerobic process (with oxygen) and does not activate the anaerobic process (without oxygen). Since the anaerobic process is not activated, there is no increase in the fitness hormones (Testosterone and Growth Hormone). It requires you to exercise for prolonged periods with a near starvation diet in order to lose weight. Unfortunately, due to loss of muscle, there is usually rapid weight regain and failure.

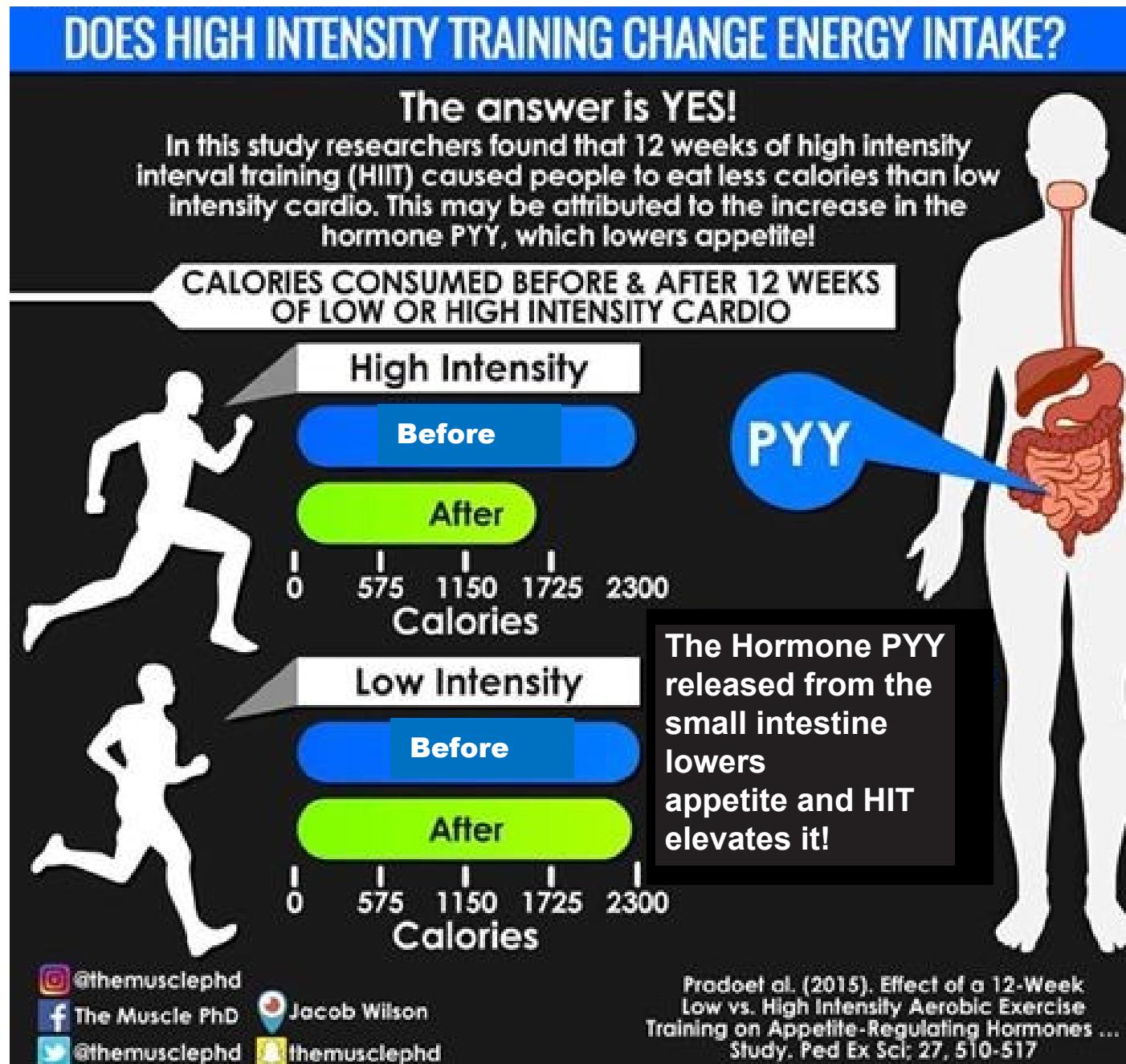


The second category of exercises is high intensity exercise and is divided into two categories: High intensity interval training (HIIT) and Sprint 8 protocol. HIIT is also called "boot camp training" and involves the aerobic process of the heart muscle and does activate some anaerobic processes. The result with HIIT is better than with cardio or low intensity exercise which fails in maintaining weight loss and muscle. HIIT does have increased calorie burning and it does increase your muscle mass which helps to preserve your metabolism.

HIIT does not increase your Growth Hormone and Testosterone levels as high as the Sprint 8 protocol.

Sprint 8 protocol is the ultimate program to increase your fitness hormones (Testosterone and Growth Hormone). The Sprint 8 protocol is unique in that you're only exercising for 20 minutes 3 times per week. It delivers superior results in less time with fewer workouts. The highest level of intensity is for only 30 seconds and only involves 8 different intervals. The 30 seconds of intense exercise is physically tough in that it is an all-out maximum intensity. When people try this protocol

they are surprised how much harder it is when compared to HIIT. Sprint 8 training has led to a significant increase in growth hormone, testosterone, insulin growth factor, IGF binding protein and lactate. This causes increased lean muscle mass, decreased body fat and higher energy. Most exercise protocols for fat loss using



Source: The Muscle PhD Academy

moderate intensity exercise have had negligible results. Boutcher in 2011 reported that high-intensity exercise was more effective at reducing subcutaneous and abdominal body fat than other types of exercise. The one way to know for sure that you are releasing growth hormone and testosterone is that you will be gasping for air when you finish the 30 seconds of exercise.

SUMMARY OF EXERCISES

CARDIO (AEROBIC EXERCISE)

- Low to moderate intensity
- Activated by slow type muscle fibers
- Aerobic process (with oxygen)
- Requires long duration of training and strict dieting
- High chance of failure and weight gain due to muscle loss.

HIGH INTENSITY INTERVAL TRAINING (HITT)

- High intensity
- Activated by slow type and some fast type muscle fibers
- Aerobic process with some anaerobic process
- Better results than cardio since it does increase testosterone and growth hormone

SPRINT 8 PROTOCOL

- High intensity
- Activates all 3 muscle types (slow, fast and super-fast)
- Only one that activates super-fast fibers
- Activates aerobic and anaerobic processes in heart
- It causes the greatest release of testosterone and growth hormone.



THE IMPORTANCE OF MUSCLE COMPOSITION AND FIBER RECRUITMENT

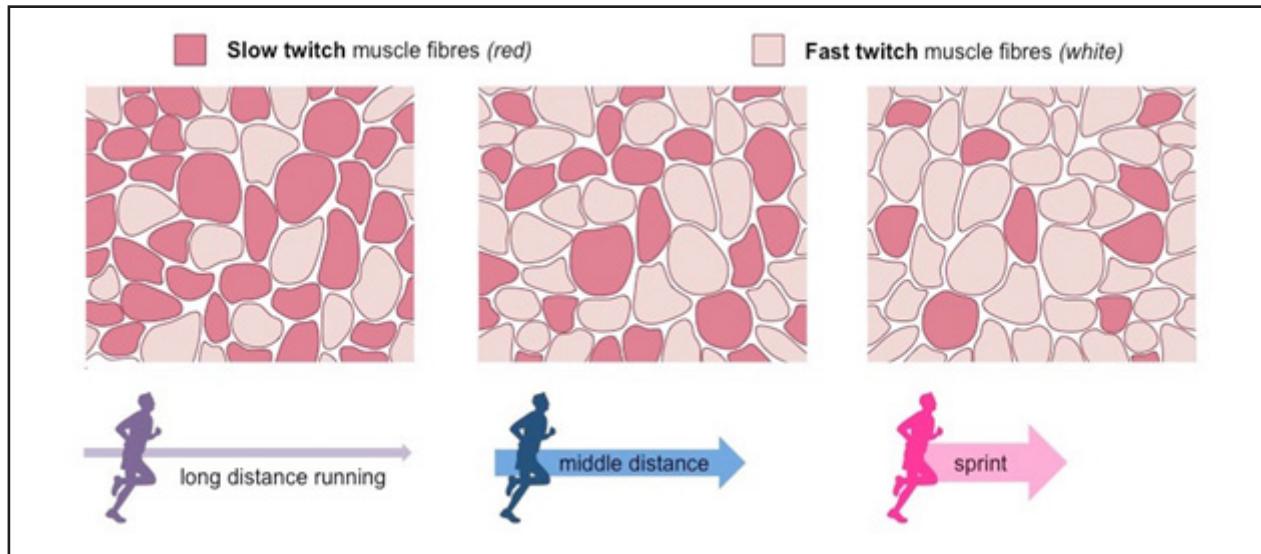
When you exercise, the strength of a movement is determined by how many muscle fibers are called into play during the course of your exercise. If a few fibers are used, this is low intensity and if a lot of fibers are used, this is high intensity. There are three different muscle fibers which are broken down into slow-twitch, fast-twitch and super-fast-twitch fibers. The slow-twitch fibers are called endurance fibers and are used primarily by people engaging in low intensity exercise such as walking and jogging. These fibers fatigue slowly and recover rapidly. The fibers are red and contract under aerobic (with oxygen) conditions. The fast-twitch fibers are activated next followed by the super-fast fibers. The super-fast fibers are only turned on with peak intensity when you are gasping to breathe during the exercise. They are the fibers you use in an emergency to fight off an intruder. These fibers recover slowly and require you to not activate these fibers for exercise unless your muscles have had time to recover. If you increase the intensity of your workout, more time must be allowed for growth and repair of the tissue that was stimulated during the workout. It is the repair process that makes the muscle fibers stronger and bigger.

The fibers are activated in sequence based upon the intensity of the exercise. If you curl a light weight, you will activate the slow-twitch fibers. A moderate weight will activate the fast-twitch fibers and a heavy weight will activate the elusive super-fast twitch fibers if you give an all-out-effort at peak intensity.

If you want to reverse your obesity and have good health, you must exercise and develop all three of your muscle fiber types. The different muscle fiber types include; slow, fast and superfast. The average person has approximately 40% slow-twitch muscle fiber and 60% fast-twitch. The slow-twitch fibers are called type I. There are two types of fast-twitch muscle fibers (fast and super-fast). The fast muscle fiber is called type IIa and the super-fast is called type IIb.

One reason for our obesity epidemic is that we are using only slow-type muscle fibers in our exercise programs. The slow-type muscle fibers are used when doing low to moderate intensity exercises like walking or jogging. Since we are not using our fast muscle fibers, there is atrophy (wasting away) of over 50% of our muscle mass. This loss of fast fibers decreases our production of testosterone and growth hormone. Therefore, the answer for obesity is to recruit and use all 3 muscle fiber

types during exercise. Cardio will recruit the slow muscle fibers. High intensity interval training (HIIT and boot camp training) will recruit the fast-fibers and the Sprint 8 protocol will recruit the super-fast muscle fibers.



SUMMARY OF MUSCLE TYPES DURING EXERCISE

<i>Muscle Type</i>	Slow Type	Fast Type	Super Fast
<i>Intensity</i>	50-75%	75-90%	90-95%
<i>Energy</i>	Aerobic	Aerobic/Anaerobic	Anaerobic
<i>Training</i>	Cardio	HITT	Sprint 8
<i>Oxygen</i>	High	Medium	Low
<i>Capillaries</i>	Many	Many	Few
<i>Muscle Color</i>	Red	White	White
<i>Speed</i>	Slow	Fast	Super Fast

THE IMPORTANCE OF HAVING MORE MUSCLE

The real secret to burning calories is having more muscle. We all remember when we were teenagers and even eating donuts did not make us gain weight. Unfortunately, in our 30s, things began to change. This is the time when our production of testosterone and growth hormone began to decrease. Aging brings on us a natural

tendency to lose muscle, a condition called sarcopenia. The loss of muscle brings down our resting metabolism. In order to maintain our muscle, you will need about 50 calories per pound, per day. If you lose 10 pounds of muscle, you will lose the ability to burn 500 calories per day (10 pounds x 50 = 500 calories). This may not sound like a big deal, but over time it begins to add up. 500 calories burned is equivalent to walking or running 5 miles every day (see below). Most people continue to eat like a teenager even when they have continued to lose muscle mass with aging. This is a recipe for obesity and poor health.



The more muscle you have, the more calories you will burn daily.

heart attack and congestive heart failure. John had been exercising using high intensity for 3 years prior to his critical illness. John's increase in muscle mass saved his life. High intensity training can cause your other organs to increase their functional capacity. Studies have shown that your increased muscle mass can predict how long it will take for your body to reach multisystem organ failure and death. Therefore, everyone needs to preserve and hopefully increase their muscle mass as they age. None of us know when our next health disaster could happen in our lives. Therefore, be prepared by exercising using high-intensity that will increase your fitness hormones (testosterone and growth hormone) and muscle mass.

Having More Muscle Can Save Your Life

Having more muscle can save your life when you are faced with a critical illness. John Blackwell, who is a co-author of this book, suffered a multisystem illness that nearly cost his life. He unfortunately suffered a hip fracture that was followed by the following insults; postoperative bleeding, pneumonia, pulmonary embolus,

PREVENTION OF MUSCLE LOSS



If exercise is too prolonged as in marathon events, glycogen can become depleted and protein from your muscles can be used to maintain glucose. This process of breaking down your protein to form sugar is called gluconeogenesis. This can result in extreme wasting of your muscle tissues. You can prevent muscle breakdown by doing high-intensity exercises that will increase your fitness hormones and muscle.

Cardio can improve your health but it must be combined with high-intensity exercises to maintain fitness and health.

HOW HIGH-INTENSITY TRAINING IMPROVES YOUR METABOLISM

It is important to understand how your body burns calories. Metabolism describes the burning of calories necessary to supply the body with energy it needs to function every day. There are three ways that the body burns calories every day:

- Digestion of Food – Accounts for 10% of calories.
- Exercise – Accounts for 20% of our calories.
- Basal(Resting) Metabolism – Accounts for 70% of calories

Since our metabolism or muscle mass accounts for 70% of our calorie burning, we must try to maintain it at all cost. Normally, after the age of 30 we lose 3-5% of our muscle per decade. This is the reason a lot of obese patients tell me, "I am not eating anything and I am gaining weight". When you restrict your calories for losing weight, you can lower your resting metabolism by 6-20%. This is the reason it is harder to lose weight as you go lower. Your body has a protective mechanism to lower your metabolism when it perceives a decrease in calorie intake. God programmed this in your body to protect you from starvation. To combat this normal loss with aging, we have to do exercises that activate our fitness hormones (tes-

testosterone and growth hormone) to build more muscle. This would include weight training and the Sprint 8 protocol.

Digestion of food only accounts for 10% of calories. The amount of energy used in digestion is called the thermic effect of food. You will burn more calories when you consume carbohydrates and proteins. The cost of converting carbohydrates to fat will burn as much as 30% of carbohydrates consumed. This is only true if you are consuming natural unprocessed carbohydrates that are loaded with fiber, vitamins, minerals and micronutrients. Therefore, carbohydrates and proteins have to be converted to fat which requires your body to burn more calories during digestion. Fat does not have to be broken down and it is easily absorbed into your adipose tissue without burning any calories.

Exercise only accounts for 20% of our calories burned. This is because some individuals are couch potatoes and only burn about 100 calories daily, whereas other individuals are elite athletes and can burn as much as 35% of their calories from exercise. The reason that exercise has not accounted for higher burning of calories is because the majority of individuals are only doing cardio and only activate the slow-twitch muscle fiber. Activation of the fast-twitch fibers can turn your body into a fat-burning machine.

HIGH-INTENSITY EXERCISE LOWERS INSULIN RESISTANCE

The cells of your body use glucose as an energy source. It is like gasoline for your car and is your body's fuel. If glucose is unable to enter your cells, they are deprived of their basic fuel. This loss of your body's fuel results in poor energy with a loss of stamina and endurance.

Insulin is a hormone that moves glucose from your bloodstream into the cells of your body. It acts like a key opening the door to your cells and allows glucose to enter. Insulin attaches to a receptor that opens channels to allow glucose into your cells. Glucose is normally stored as glycogen in your cells. Glycogen is chains of glucose hooked together. Your glycogen is stored in the liver and skeletal muscles. The liver stores approximately 70 grams and your skeletal muscle stores 210 to 220 grams. Storage tanks for glycogen (stored glucose) are in liver and muscle. Liver glycogen helps to maintain blood glucose and muscle glycogen is used for energy in emergency situations (flight or fight response).

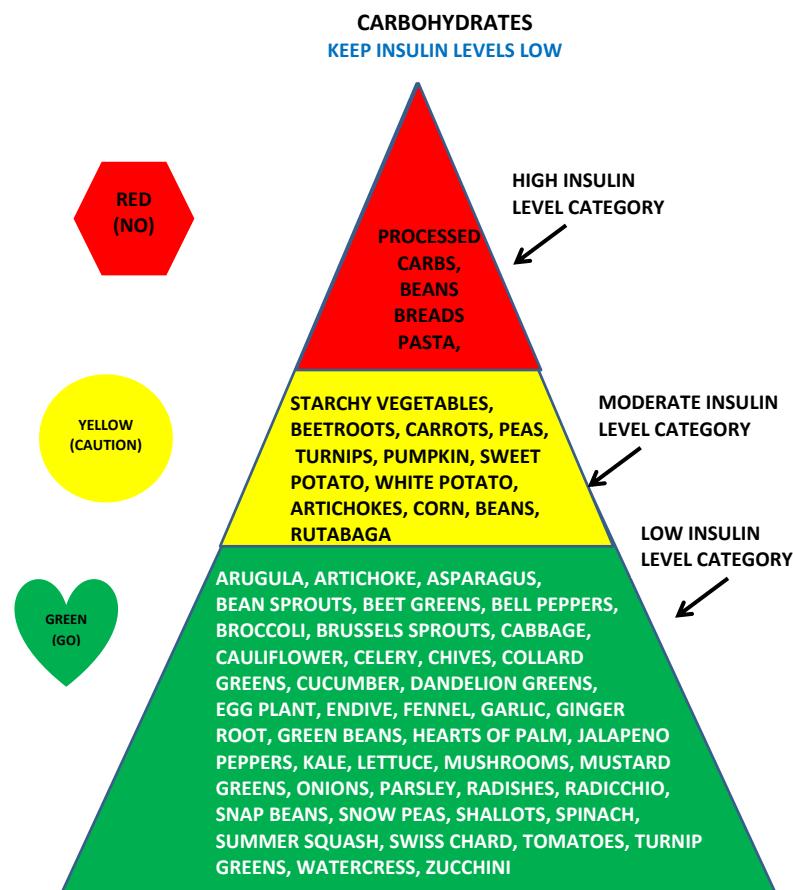
Our ancestors were seldom exposed to simple sugars that would cause a rapid increase in blood glucose. Therefore, their blood glucose levels were rarely elevated, even for short periods of time and the cells were rarely filled with stored glucose. Whatever glucose that was stored was immediately used and was seldom stored as glycogen in the cells. This caused their glucose and insulin levels to stay in a normal range and never rise to high levels. Therefore, this environment prevented the development of insulin resistance and fat storage.

Today we consume too much processed carbohydrates and sugar. Our storage tanks in the liver and muscle are full of glycogen (stored glucose). Since glucose cannot get into our full storage tanks, the glucose stacks up in our blood stream like a garbage dump. Now insulin can no longer open the cells for glucose to enter. This is when you have developed insulin resistance. This causes your pancreas to produce more and more insulin to overcome the resistance. Eventually your pancreas will fail and you will develop diabetes mellitus. Due to the high insulin levels, I have numerous morbidly obese patients who become as hungry as a bear going into hibernation. They want to eat everything in sight. They have what some people have called “internal starvation”. The high insulin levels prevent nutrients from getting into their cells. All of their nutrients are stored as fat in their adipose cells. Therefore, they are literally starving since nutrition cannot get into their cells.

When glucose levels stay high and you have full glycogen stores, this will stimulate production of fatty acids. This occurs in the liver as glucose is converted to fats. Very low-density lipoprotein (VLDL) is produced first which then becomes LDL cholesterol. The LDL cholesterol is a risk factor for coronary artery disease. Also, high blood sugar and insulin give rise to inflammation which can cause plaque buildup in our arteries and can lead to a heart attack. Since the biggest glycogen stores are in the fast-twitch fibers, we need to do exercises that increase testosterone and growth hormone (HIIT and Sprint 8 protocol). This is unlike low-intensity exercise (cardio) which does not empty the storage of glucose in your muscles and liver. Therefore, the excess glucose has to be stored as body fat. This is the reason low-intensity exercise has a greater risk of cardiovascular disease. Low-intensity exercise relies on the aerobic system which uses the oxidative system that produces inflammatory free radicals. Also, because running for prolonged periods of time primarily burns fat, there is no significant reduction in glycogen stores. Therefore, doing low-intensity exercise will increase your risk of heart disease.

During high-intensity exercise, the hormones epinephrine and norepinephrine are released which stimulate the release of glycogen from the muscle. When this occurs, the muscle cell empties itself of a significant amount of glycogen, which means that insulin can act on your receptors of your cells, thus allowing glucose to reenter your muscle. This improves your insulin sensitivity and decreases your storage of fat. Also, high-intensity exercise can stimulate adrenaline which activates hormone-sensitive lipase which helps mobilize fat from your adipocytes. It is your fat buster and helps to move fat out of your cells. Therefore, high intensity exercise does the following things:

- Inhibits glycogen synthesis
- Mobilizes glycogen from your cells
- Inhibits fat synthesis
- Mobilizes fat from your adipocytes



HIGH INTENSITY EXERCISE AND INFLAMMATION

Inflammation in Latin means “to set on fire”. Think of inflammation as the body’s natural response to protect itself against harm. We see inflammation during sore throats and abscess formation in our bodies. Your immune system dispatches an

army of white blood cells to surround and protect the area, creating visible redness and swelling. So in these settings, inflammation is essential. Without it, simple infections could be deadly.

Sometimes, inflammation can be bad when it occurs in inappropriate situations such as with atherosclerosis and heart disease. Inside your coronary arteries, inflammation can initiate atherosclerosis, which is buildup of cholesterol-rich plaque. Your body perceives this plaque as a foreign body, so it attempts to wall off the plaque from the flowing blood. But if the plaque ruptures, the soft-fatty material inside the plaque mingles with the blood and forms a clot that completely blocks the flow of blood. This can result in an acute heart attack.

High-intensity exercise will normally start an inflammatory response in our muscle. It will cause your body to get stronger and push your inflammatory response to higher levels. Just like a thermostat can adjust your temperature higher, your own body can adapt and reset your inflammatory response to higher levels.

A lot of my patients have a bed to chair existence and suffer chronic pain with significant inflammation. Their muscles are very weak and their joints are inflamed from crippling arthritis. They live in a world of chronic inflammation which is slowly destroying their body. If you do high-intensity training, you can push your inflammatory response to higher levels. This will allow you to do normal simple activities of life with less pain and discomfort.

HIGH-INTENSITY EXERCISE ATTACKS CANCER CELLS

Unfortunately, all of us have had someone die in our family with cancer. This does not have to be our fate. High-intensity exercise can decrease your chance of developing cancer. A study published in 2016 found that high intensity exercise reduced tumors in mice by 50%. Researchers showed that high-intensity exercise releases adrenaline, which caused the body of mice to move cancer-killing immune cells to the tumor sites implanted into mice. These natural killer cells are part of your immune system. They are a kind of white blood cell that seeks out and kills tumor cells while sparing healthy cells. The cancer-killing immune cells were then able to attack the tumors in the mice. This study showed that high-intensity exercise can help your body fight cancer.

HIGH-INTENSITY EXERCISE AND MITOCHONDRIA

The fuel in our body is produced in the mitochondria. Mitochondria are described as power plants in our cells. This is the place inside your muscle cells where carbohydrates, fats, and proteins are processed to create fuel for your body. Mitochondria take the food that we eat to make a chemical substance called ATP (Adenosine Triphosphate), which is a powerful fuel for your body.

It is known that mitochondrial function declines with age, and can reduce our ability to burn excess blood sugar. The long term results of less mitochondria leads to metabolic syndrome, insulin resistance and subsequent diabetes mellitus. In the journal Cell Metabolism, it was reported that high-intensity training boosted the ability of the mitochondria to produce energy by 69% in older volunteers and by 49% in the younger group. The high-intensity training causes your body to produce more mitochondria to keep up with the heightened energy requirement.

If you want more energy and stamina, you need more mitochondria. This does not require any supplements or costly injections. You can obtain it free, if you will perform high-intensity training. The best anti-aging exercise is high-intensity training. Start now and take your fat-burning and muscle building to the next level.

HIGH-INTENSITY TRAINING AND HEART MUSCLE IMPROVEMENT

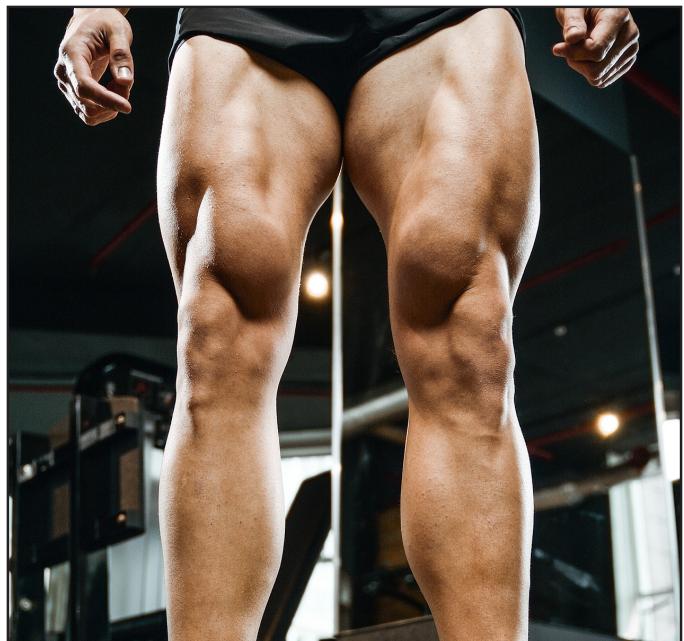
Campbell, in his book, “Sprint 8 Cardio Protocol”, stated that cardio fitness is how hard you can work your heart muscle and how quickly it recovers. He measured the work of your heart by the maximum heart rate. The maximum heart rate is the fastest your heart will beat and pump blood throughout your entire body. A sign of a strong heart is the ability to maintain your maximum heart rate, with a gentle decline with aging. When your maximum heart rate declines too quickly during aging, this means the heart muscle is becoming weaker.

Campbell measured the maximum heart rate response over a 6 month period. A lot of his clients improved their maximum heart rate response proving that their heart muscle was getting stronger. Also, he monitored the amount the heart rate dropped in the recovery period. A greater drop in the heart rate suggested better overall cardio fitness. The clients where the maximum heart rate increased over a 6

month period also showed a marked drop in their heart rate in the recovery period. Therefore, we want to reach higher heart rates and more rapid recovery of our heart rates with high-intensity training.

In the book, “*The Immortality Edge*”, it was reported that high-intensity training can build new capillaries, which enables better oxygen delivery to the muscles. This improved blood supply allowed a better tolerance for the buildup of lactate, and the heart muscle is strengthened. High-intensity training will give you improved vascular health.

LEG MUSCLES ARE YOUR SECONDARY HEART MUSCLE

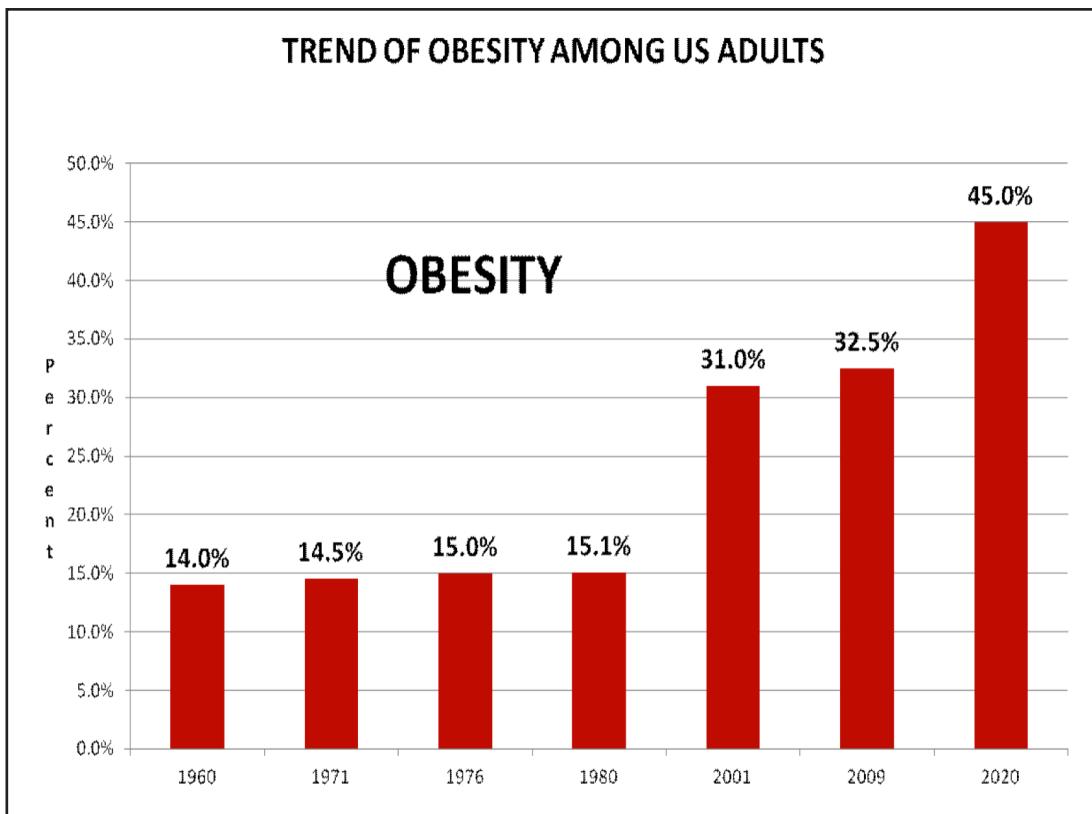


Dr. Mirkin reported that your legs muscles can act as a second heart muscle. This is his explanation; when you run, your heart pumps blood through your body, but it gets lots of help from your legs. When your leg muscles contract, they squeeze veins near them to push blood toward your heart, when your leg muscles relax, the veins near them fill with blood. This alternate contracting and relaxing of your leg muscles serve as a second heart. High-intensity training will strengthen all of the muscle fibers of

your leg to improve the return of blood to your heart.

HIGH INTENSITY TRAINING IMPROVES OBESITY

Just how bad is our obesity epidemic in America? Today, more than 33% of Americans are obese and 66% of Americans are overweight. A look at the graph on the next page will show that our obesity rate went from 15% in 1980 to over 30% today. The obesity rates are increasing at epidemic proportions. At this rate, it is expected that 45% (almost half of Americans) will be obese by 2020. This trend in obesity has become an epidemic and a curse. How did we get this fat, so fast? How did we go from 15% obesity in 1980 to greater than 30% obesity now? How did we go from



wellness to being really sick? What exposure could account for this epidemic of obesity? A perfect storm was started that created our obesity epidemic:

- We changed our food and our environment. Fast food became readily available everywhere and at any time. Fast food is fast preparing, fast eating and fast causing disease. Also, fast food is cheap, portable, no depreciation (very long shelf life) and tastes incredible and we always come back for more.
- Restricted activity (no physical exercise in schools).
- Changes in our dietary standard in 1970s going from a recommended fat percentage of 40% to 30%. This has resulted in the food industry increasing the sugar in our foods to improve the taste after decreasing the fat percentage.
- Increased intake of refined carbohydrates and sugar.
- Introduction of high fructose corn syrup in the late 1970s.

THE OBESE CAN BENEFIT FROM HIGH INTENSITY TRAINING

High intensity training is not just reserved for thinner people. Obese or very overweight women and men are capable of employing this method of exercise. There is probably nobody who stands to benefit from high intensity training more than obese individuals, although they are often the last ones to join in on this type of workout.

Their reluctance is due to their concerns that their body simply will not be able to take the stress from high intensity training. They do not want to pass out or have a heart attack, which is a major concern for people who are obese and out of shape. I often tell obese patients that high intensity training is possible if they obtain clearance from their doctor. Unless they have serious coexistent illnesses with their obesity, most individuals will be able to perform high intensity training safely.

A lot of people think that high intensity training involves running sprints at a high speed. Running is not the only way to perform this super fat burning type of work-out. When it comes to high intensity training, it's all about your effort. You do not have to have a sprinter's speed to have good results. Thus, a good high intensity workout for someone who is obese could be walking as fast as possible up a hill, then turning around and slowly walking back to the starting point to recover, then walking as fast as they can back up the hill. If you do not like the idea of walking, high intensity training can be performed on a stationary bike (recumbent or sitting). This means pedaling as fast as possible for 30 seconds, then pedaling slowly for 90 seconds before resuming pedaling rapidly for another 30 seconds. The bottom line is that you want the 30 seconds of hard pedaling to cause you to be nearly breathless.

HIGH-INTENSITY TRAINING IMPROVES METABOLIC SYNDROME

Many patients that I take care of are struggling with metabolic syndrome. It is characterized by insulin resistance and too much sugar builds up in the bloodstream. It is a disorder of metabolism and turns your body into a fat-producing machine. Metabolic syndrome is present if 3 or more of the following conditions are present:

- High blood pressure – 130/85 or higher
- High blood sugar levels – Fasting blood sugar 100 mg or higher
- High levels of triglycerides in the blood – 150 mg or higher
- Low levels of HDL – Less than 40 in men, less than 50 in women
- Too much body fat around the waist – 35 inches or greater for women and 40 inches or greater for men.

BELLY FAT IS STRONG INDICATOR OF METABOLIC SYNDROME



A waist size greater than 40 inches is associated with a greater chance of having visceral obesity which is associated with chronic diseases such as diabetes, hypertension, hyperlipidemia and heart disease.

An excess of visceral fat in metabolic syndrome is known as central obesity or “belly fat”. Visceral fat (abdominal fat) should be suspected when you have a waist size > 40 inches for men or > 35 inches for women. Also, if you have a high triglyceride or low HDL, you are more likely to have visceral obesity. Excess visceral fat is linked to chronic diseases such as diabetes, hypertension, dyslipidemia and heart disease. An increased waist circumference measurement identifies individuals

who have a tendency to store their body fat in their belly. This simple measurement can identify patients who will more likely develop chronic diseases in the future.

SUBCUTANEOUS FAT VERSUS VISCERAL FAT

Body fat is called adipose tissue. In humans, adipose tissue is located beneath the skin (subcutaneous fat) and around internal organs (visceral fat). Subcutaneous fat storage is not associated with the development of metabolic syndrome. Women normally have more body fat to cover the demands for being a mother and nursing a child. Body fat is stored as fuel to be used in times of need. Women in general have a greater capacity than men to expand the subcutaneous adipose tissue department. Estrogen in women causes the fat to be stored in the buttocks, hips and thighs creating a pear appearance. There is more weight below their waist. When women reach menopause and estrogen declines, fat migrates from the buttocks, hips and thighs to the waist to create belly fat. Men tend to have an apple appearance and tend to store fat above the waist.

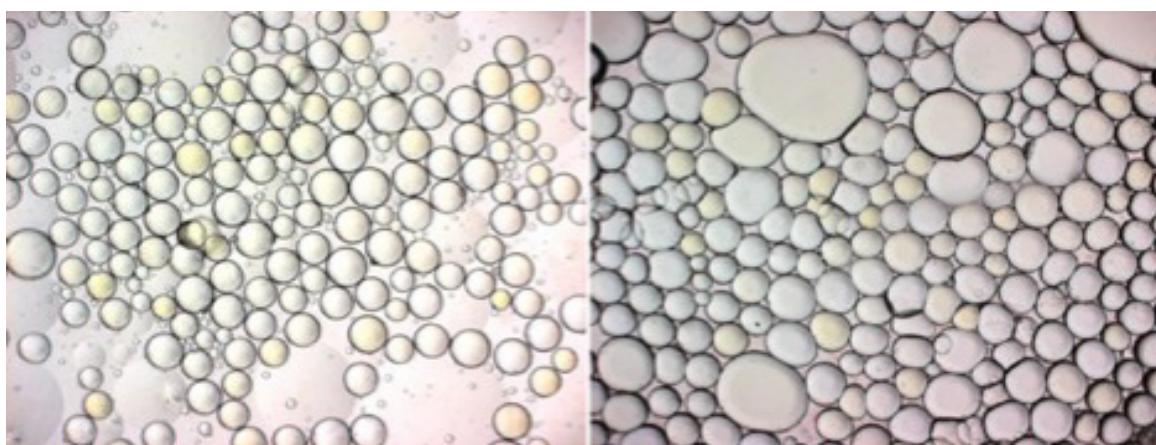
FAT CELLS

Fat cells or adipocytes are like fuel tanks that store energy for later use. Some individuals are genetically predisposed to have more fat cells and women have more fat cells than men. Fat cells can increase during puberty, pregnancy and with morbid obesity. An infant normally has 5-6 billion fat cells. This number increases during early childhood and puberty, and a healthy adult can have around 75 billion fat cells. In cases of severe obesity, fat cells can increase to as high as 250 to 300 billion.

Body fat is a reserve source of energy and fat cells are like the storage tanks. Unlike a gas tank in your car which is fixed in size, fat cells can expand or shrink in size depending on how “filled” they are. They start out as empty fat storage tanks (when you are lean) and when food intake exceeds your needs, your fat cells “fill up” and stretch out like a balloon being blown up with air filled with jelly.

If a person develops severe obesity, the fat cells can increase in size and number as shown in the diagram below. If someone loses abdominal fat, the cells can shrink in size.

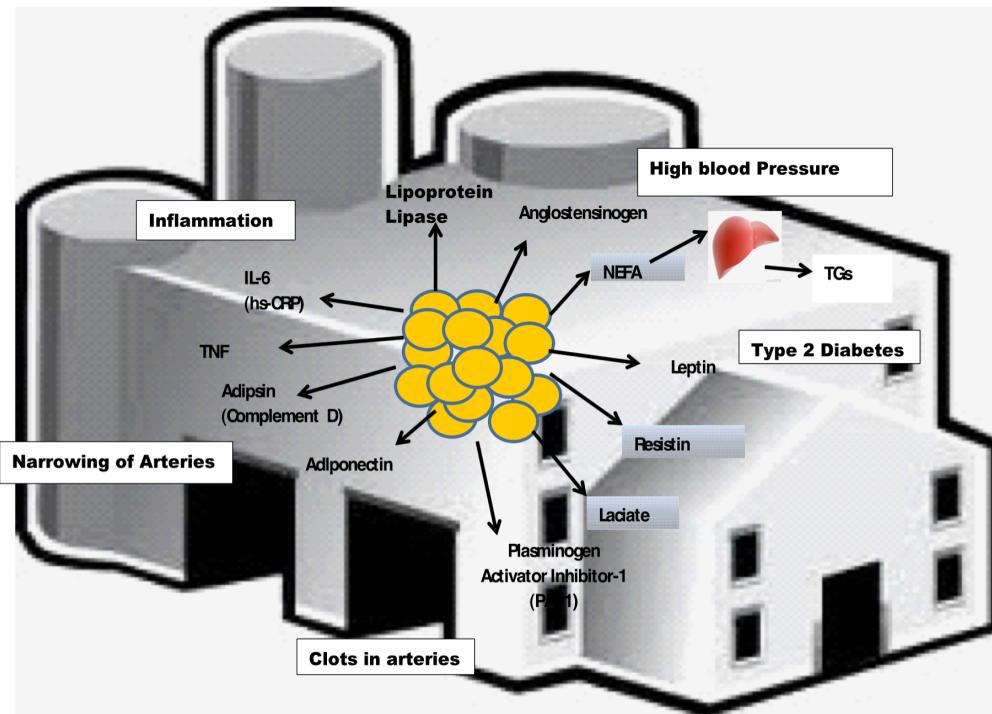
The fat cells of an obese person who is metabolically healthy (left) are much smaller than the engorged cells of an obese person with metabolic health problems (right).



This increase in size of the cells with fat gain prevents you from having six-pack abs. When you lose body fat the fat cell does not disappear, it just shrinks in size. This is the reason why you cannot see muscle “definition” when your body fat is high. Many patients tell me how they have tried numerous diets but they continue to gain more weight. By going from over-weight to lean to overweight again, you

are creating new fat cells with each yo-yo cycle. This increase in fat cells creates more hormones that make us fatter and sicker.

The picture below shows the numerous hormones produced by the adipose tissue. These hormones directly cause high blood pressure, inflammation, diabetes, blood clots and obesity.



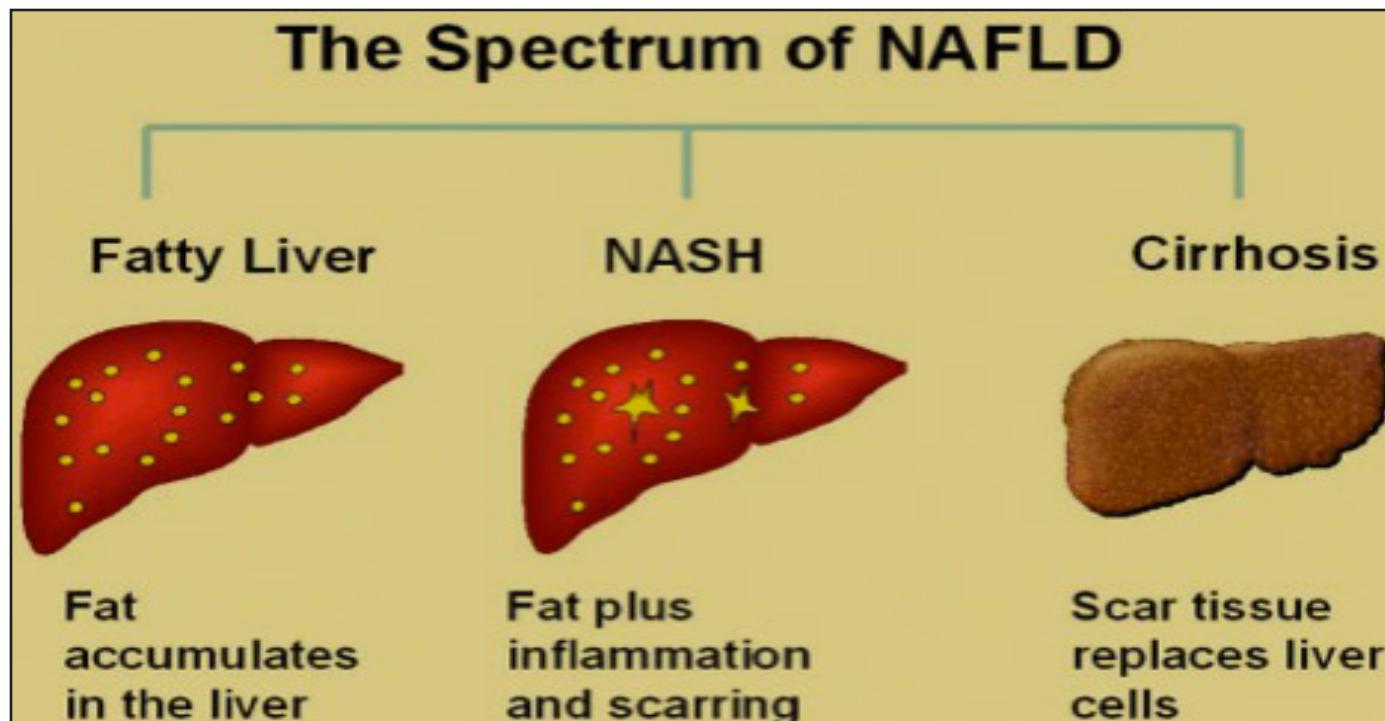
HORMONE FACTORY

Now you can see that when you develop severe obesity with an increase and enlargement of your fat cells, it will take a lot of hard work with diet and exercise to shrink your fat cells. You have to face an uphill battle with more fat cells producing bad hormones that will make you have chronic diseases.

METABOLIC SYNDROME ATTACKS YOUR LIVER FIRST

Metabolic syndrome attacks your liver first. The liver takes up the fat and develops what is called a fatty liver. Initially, a fatty liver causes no symptoms. The only way you know you have this disease is by doing an ultrasound or CT scan of your liver. Also, an elevation of your liver enzymes (ALT) may suggest the possibility of a fatty

liver. Later on, inflammation develops and the fatty liver becomes NASH (nonalcoholic steatohepatitis). NASH is fat plus inflammation and scarring. NASH can also be asymptomatic and can only be diagnosed with a liver biopsy. NASH can turn into cirrhosis, which occurs when the liver cells are replaced by scar tissue and this leads to a non-functioning liver with ascites, bleeding and failure to thrive.



MEDICAL COSTS OF METABOLIC SYNDROME

There are 8 diseases that are directly related to metabolic syndrome that accounts for 75% of global health care costs. These include:

1. Heart Disease
2. Lipid Problems
3. Hypertension
4. Type 2 Diabetes Mellitus
5. Non-alcoholic liver disease
6. Polycystic ovarian disease
7. Cancer
8. Dementia

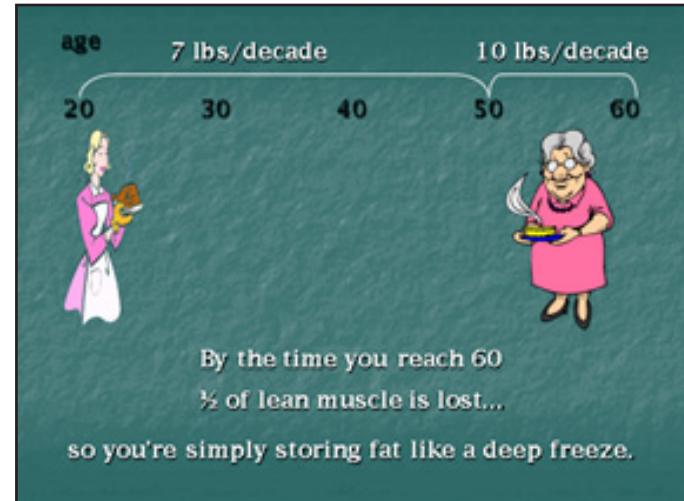
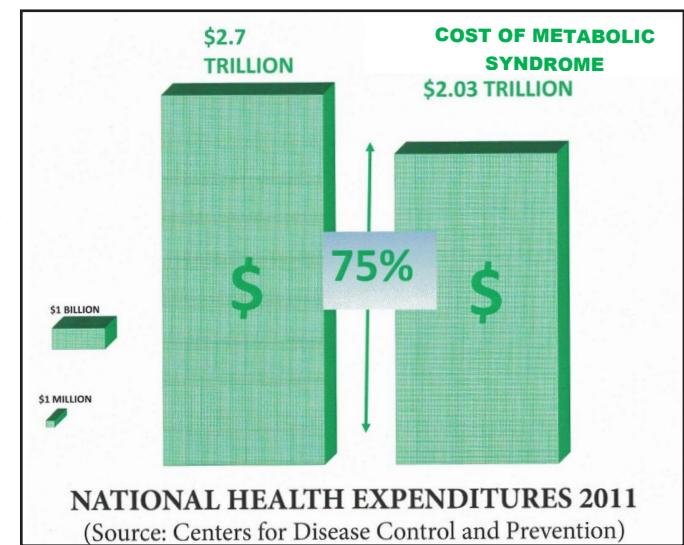
Common belief is that the above diseases are caused by obesity. People do not die of obesity, but they die of diseases that destroy their organs. Obesity is a marker of chronic metabolic disease, known as metabolic syndrome. Obesity and metabolic syndrome overlap, but they are different. Obesity doesn't kill. Metabolic Syndrome kills.

As a cardiologist, I see more and more of my patients developing metabolic syndrome. If you lose muscle with aging (see below) and gain body fat you will develop metabolic syndrome. This loss of muscle is the reason our metabolism falls as we age. This loss of metabolism causes us to gain weight like a bear going into hibernation. This is followed by rapidly increasing insulin resistance. This leads to pre-diabetes and eventually full blown diabetes.

If you see an elevation of triglycerides and a low HDL with a normal or slightly elevated LDL this should suggest to you that this lipid profile may represent metabolic syndrome. This lipid abnormality is associated with a significant risk of cardiovascular disease and is referred to as "atherogenic dyslipidemia".

What does it mean if you have metabolic syndrome?

- You are twice as likely to have a heart attack or stroke.
- Your lifespan will be shortened



Loss of muscle with aging

The ugly curse of metabolic syndrome has gone global and is affecting the entire world. The medical costs for metabolic syndrome accounted for 75% of global health care costs (2 trillion dollars in 2011). This is not only in America, but it is all over the world. This is so true that the United Nations announced that non-communicable diseases (diabetes, heart disease, cancer and dementia) now pose a

greater threat to the developing world than acute infectious disease such as cholera and HIV.

The good news is that metabolic syndrome can be reversed naturally. You do not have to simply manage them with medications. High-intensity training can build muscle and strength and allow you to take control of processing your glucose effectively. This will lower insulin resistance and shift your body back to when you were lean and muscular with normal glucose metabolism. It's time you get started now. Begin high-intensity training and get your health back.

STEPS IN DEVELOPING METABOLIC SYNDROME

1. LEAN AND MUSCULAR WITH NORMAL GLUCOSE METABOLISM
2. LOSS OF MUSCLE AND GAIN OF BODY FAT WITH AGING – FIRST STEP
3. INSULIN RESISTANCE
4. METABOLIC SYNDROME
5. FATTY LIVER
6. PRE-DIABETES WITH PROBLEMS WITH GLUCOSE
7. DIABETES WITH INABILITY TO EFFECTIVELY CLEAR GLUCOSE

The first step in developing metabolic syndrome is the loss of muscle and gain of body fat. This leads to insulin resistance and subsequent development of metabolic syndrome. Since metabolic syndrome kills, it is time to begin high intensity training that can increase your lean muscle and reduce body fat. You do not have to be another bad statistic; just begin high intensity training now.

HIGH-INTENSITY EXERCISE AND YOUR CHROMOSOMES

People are always searching for ways to slow down aging. It is known that our cells don't usually age in the same way. If we have an unhealthy lifestyle, our cells can deteriorate quicker than if we eat right and exercise correctly on a regular basis. A study has shown that high-intensity exercise can allow our cells to age at a slower

rate. This is all linked to your cell's telomeres, which are the protective caps on the end of your chromosomes. They are combinations of DNA and protein that protects the end of your chromosomes. Every time a cell replicates, the telomere length becomes shorter, the structural integrity becomes weaker and the cells age and die faster.

In a study of 5,823 adults, the telomere length was recorded. They found the participants with the shortest telomeres, which were a sign of greater aging, came from those who lived a sedentary lifestyle. Those doing high-intensity exercise had the longest telomeres.

The length of the telomeres indicates the condition of your body. Long telomeres are associated with longevity and good health. Short telomeres indicate premature aging and are associated with many diseases including cancer, stroke, dementia, heart disease, obesity and diabetes. The goal is to make sure your telomeres stay long and try to prevent them from shortening. High-intensity exercises can preserve your telomere length. It's time you get off of the couch and sweat with high-intensity exercises.

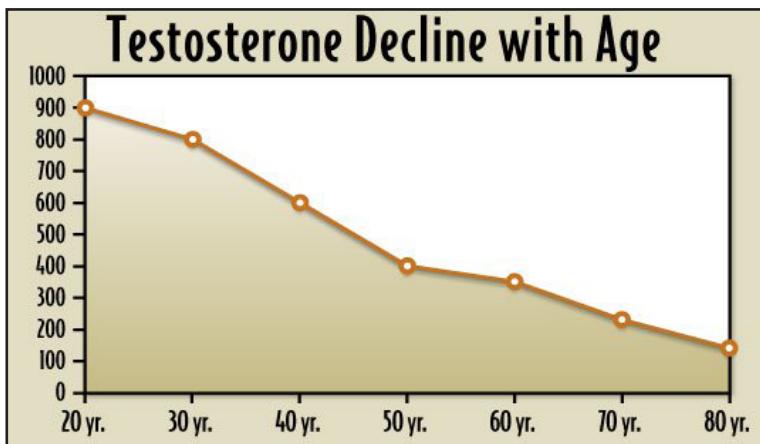
TESTOSTERONE

Testosterone is like jet fuel for a man. It keeps men running and is very important for building muscle and reducing fat gain. Testosterone plays a big role throughout a man's life. It is a driver of puberty, motivation, mental clarity, causes deepening of the voice, growth of hair on face and controls sperm production. Testosterone deficiency can lead to infertility and inability to have children.

Most of the testosterone in men is made in the testes, whereas most of testosterone in women is made in the ovaries. In both men and women, a small amount of testosterone is made in the adrenal gland. Testosterone plays an important role throughout the body in men and women. It affects the bones, brain, muscle mass, fat distribution, the vascular system, energy levels, and sexual function.

Testosterone levels will tend to peak somewhere between age 20 and 30. After this time, testosterone will gradually decrease for the rest of your life. Testosterone levels will decrease by 1 percent annually after age of 30. This explains the loss of muscle mass with fat gain that occurs with aging.

LOW TESTOSTERONE – ALSO KNOWN AS HYPOGONADISM OR LOW T

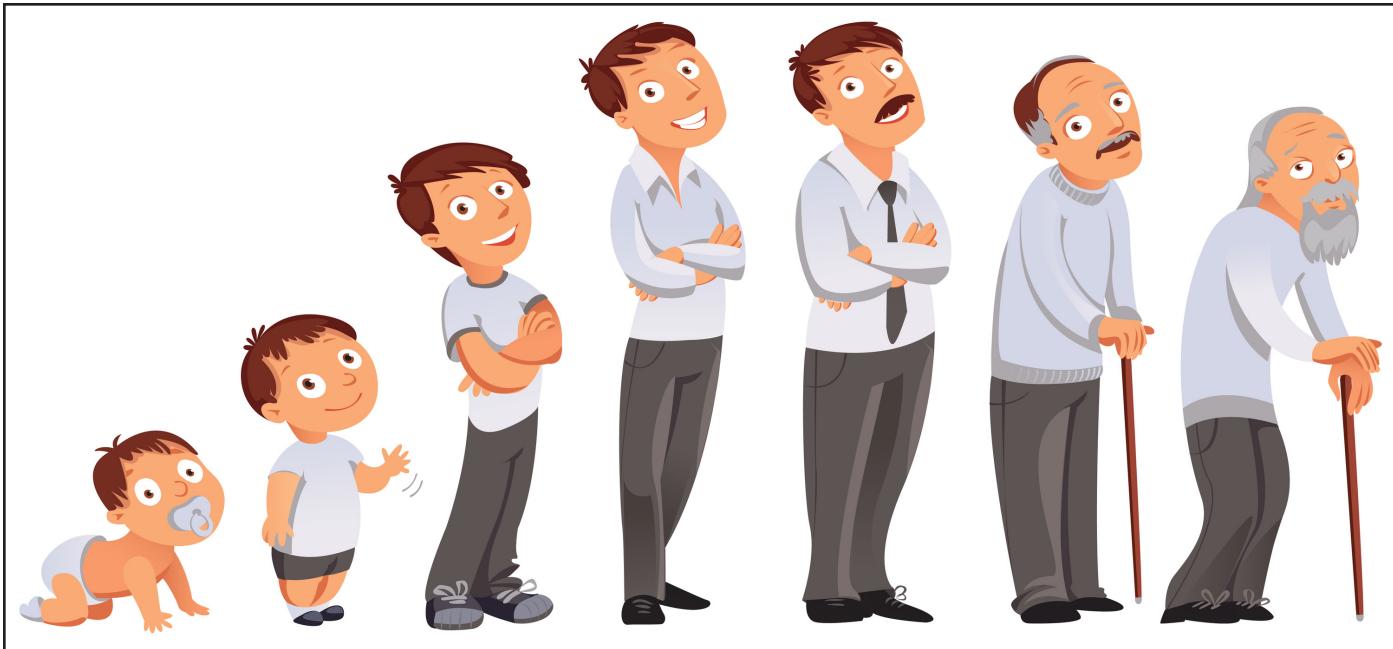


Testosterone levels are measured with a blood test. Guidelines suggest that a normal level is between 300 to 1,000 nanograms per deciliter (ng/dL). About 40% of men over the age of 45 will have levels that are below the reported normal range. At this time there is no universal agreement of a specific blood level

that will tell us which patients have hypogonadism, nor does it predict who will respond to treatment and who will not. A lot of patients can have a low level and have no symptoms. Therefore, the diagnosis of hypogonadism or Low T requires classic symptoms of hypogonadism with a low level.

A slow decrease in testosterone is normal with aging. A lot of men with this have no symptoms. The symptoms and signs with hypogonadism or low T are the following:

- Lower sex drive or desire
- Decreased energy
- Increased fatigue
- Depressed mood
- Erectile dysfunction
- Decreased muscle mass
- Increased fat accumulation
- Inability to have children
- Osteoporosis
- Menopausal-like hot flashes
- Lack of an effect with Viagra for erectile dysfunction
- Decreased spontaneous erections at night
- Increased fractures, low bone mineral density, osteoporosis
- Poor concentration and memory
- Sleep disturbance, increased sleepiness
- Mild anemia (normochromic, normocytic)



Before puberty, the testosterone levels are low. Testosterone increases during puberty and peaks around 30 years old and then falls off gradually with age (decreases 1% annually after 30 years old).

LOW TESTOSTERONE AND THE BODY

Low testosterone can cause visible changes in some men:

Smaller testicles

Larger breasts (Gynecomastia) and breast discomfort

Thinner muscles (occurs slowly over years)

Loss of Body hair (axillary and pubic)

Increased body fat

LOW TESTOSTERONE AFFECTS BONES

Osteoporosis is not just a woman's disease, but it can affect men as well. Low testosterone is a common cause in men. When testosterone levels fall, the bones may get weaker, thinner and more likely to break. The issue is not low testosterone, but low levels of estradiol which is needed to maintain healthy bones. Estradiol levels will be low if testosterone is low, since less testosterone will be converted to estradiol by the aromatase enzyme.



Low Testosterone increases risk of osteoporosis and fractures.

LOW TESTOSTERONE AND SEX

A low testosterone does not always interfere with sex, but it can make it more difficult for your brain and body to get aroused. Some men may notice a drop in desire, while others may lose interest in sex completely. Low testosterone can also make it harder to get or keep an erection.

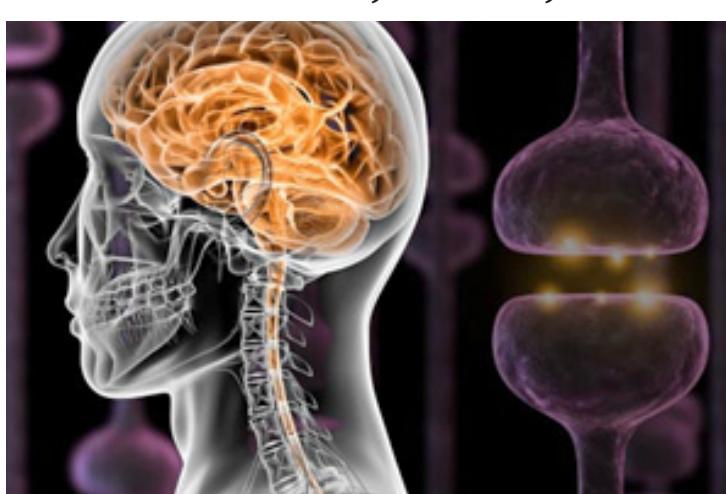
LOW TESTOSTERONE AND ANEMIA

Testosterone can affect blood cell production. If testosterone is low, there is less production of erythropoietin, which can stimulate the bone marrow to produce blood cells. Anemia is common with low testosterone and explains some of their low energy and fatigue. Anemia can lead to palpitations, shortness of breath and dizziness.



Low Testosterone can have negative effects on a marriage.

TESTOSTERONE, MOOD, AND THINKING

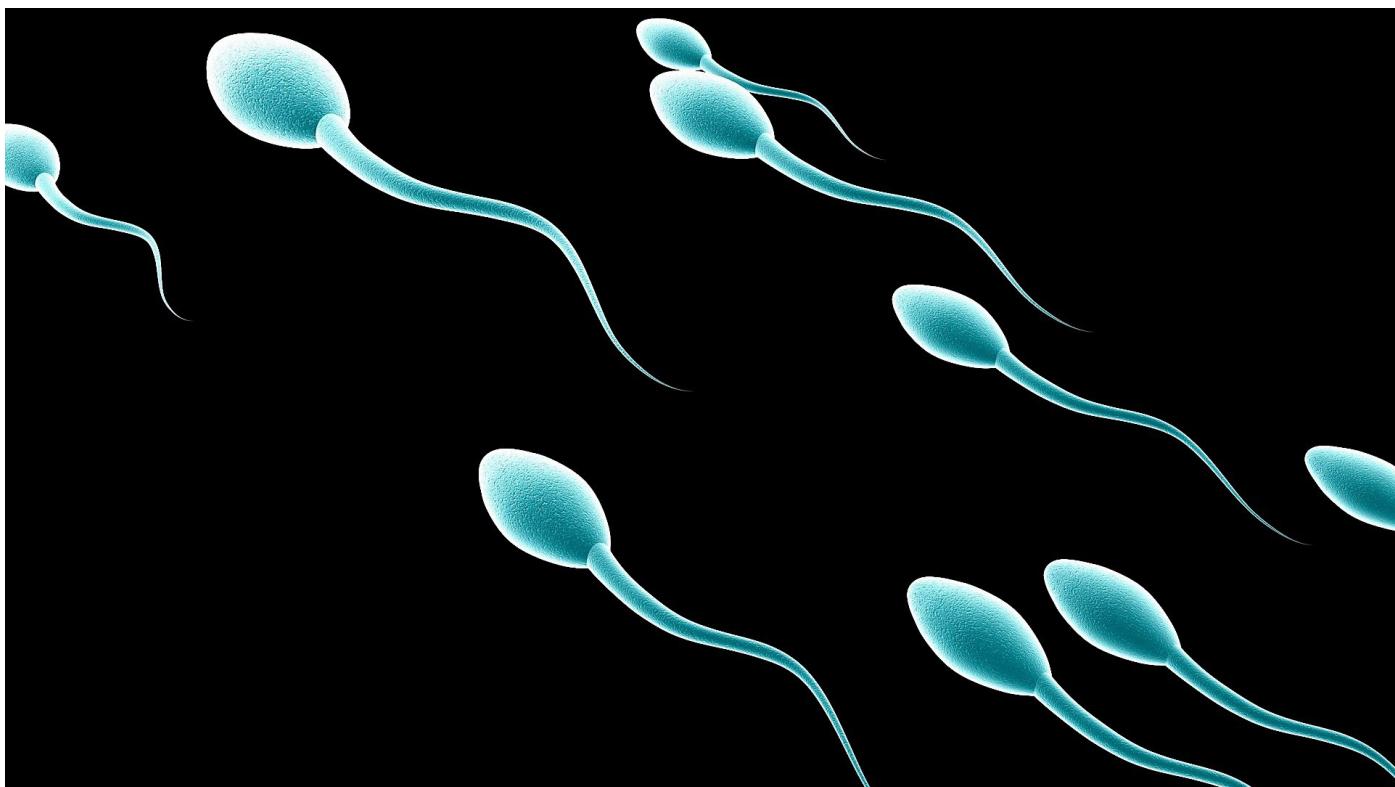


Low Testosterone Can Affect Mood and Concentration

Some men can have subtle problems like mood changes, poor concentration and less energy. Sometimes, my patients feel like they are in a “fog”. These same symptoms can be caused by other illnesses and health problems and requires a medical work-up prior to blaming testosterone deficiency.

LOW TESTOSTERONE AND INFERTILITY

Testosterone helps a man's body make sperm. When levels of testosterone are low, this can cause a low sperm count. If a couple is having trouble with pregnancy, his sperm count may be low and this could be the cause of his infertility.



Low Testosterone can cause low sperm count.

LOW TESTOSTERONE CAUSES OBESITY AND METABOLIC SYNDROME

One epidemiology study found that low testosterone in men was associated with the following cardiac markers:

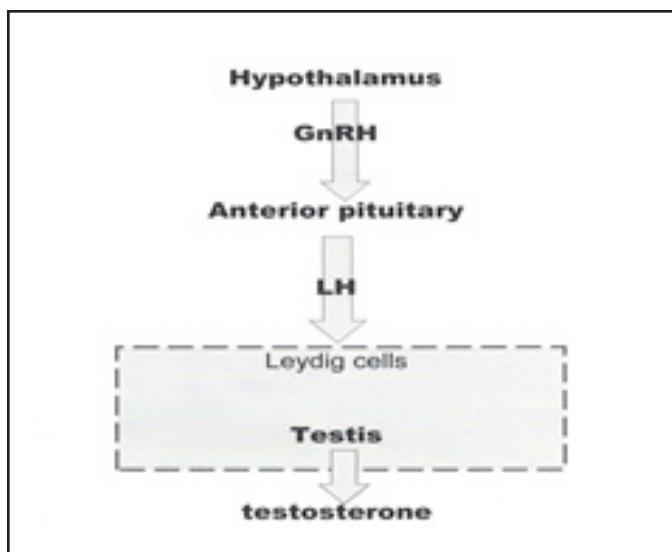
- You are fatter
- You have low HDL
- Higher triglycerides
- Higher blood pressure
- Higher blood glucose

This group of individuals in this study had a 40% higher death rate from all causes. All of these cardiac markers are the same ones found in metabolic syndrome.

LOW TESTOSTERONE CAUSES INSULIN RESISTANCE AND DIABETES

Normally, as testosterone falls, blood glucose and insulin will rise. This can lead to insulin resistance and diabetes.

What Causes Low Testosterone?



Testosterone regulation in men depends upon the interaction between the hypothalamus, pituitary, and testes (see below). The hypothalamus secretes gonadotropin-releasing hormone (GnRH) that acts on the anterior pituitary to produce Luteinizing hormone (LH). LH acts on the testes stimulating them to produce testosterone (see left). Testosterone works by a feedback mechanism to inhibit the secretion of GnRH from the hypothalamus and also the secretion of LH from the pituitary. This tells us that any damage or disease in the hypothalamus, pituitary or testes can cause a low testosterone.

Therefore, there are three types of hypogonadism (low testosterone):

1. Primary or testes-based
2. Secondary or pituitary-based
3. Tertiary or hypothalamus-based

Primary Hypogonadism:

1. It is caused by testicular failure.
2. Characterized by low serum testosterone with high LH and FSH.
3. It can result from testicular injury, tumor, or infections. Also genetic defects affecting testicular development (Klinefelter syndrome) as well as chemotherapy, radiation therapy, or alcohol abuse.

Secondary Hypogonadism:

1. Defects in hypothalamus or pituitary results in low testosterone levels because of inadequate stimulation of the Leydig cells in the testes.
2. It is associated with low or low-normal FSH and LH levels.
3. Patients with secondary hypogonadism can have their fertility restored by hormonal stimulation, whereas those with primary hypogonadism resulting from testicular failure cannot.
4. Secondary hypogonadism can be caused by a number of conditions including hypothalamic and pituitary disorders or lesions, hyperprolactinemia and Kallmann syndrome (which causes a GnRH deficiency). Certain medications and illnesses can also affect the hypothalamic-pituitary system.

Mixed (primary and secondary) hypogonadism:

1. Low testosterone can be caused by a combination of both primary and secondary hypogonadism (also called mixed hypogonadism).
2. This reflects defects in the hypothalamus and or pituitary as well as the testes.
3. This is seen in men with sickle cell disease, thalassemia, alcoholism, steroids, and in older men.
4. This term is not used in US and usually refers to secondary hypogonadism.

Aging is the most common reason that testosterone levels fall. Medical illnesses, drugs and bad habits are sometimes to blame, including:

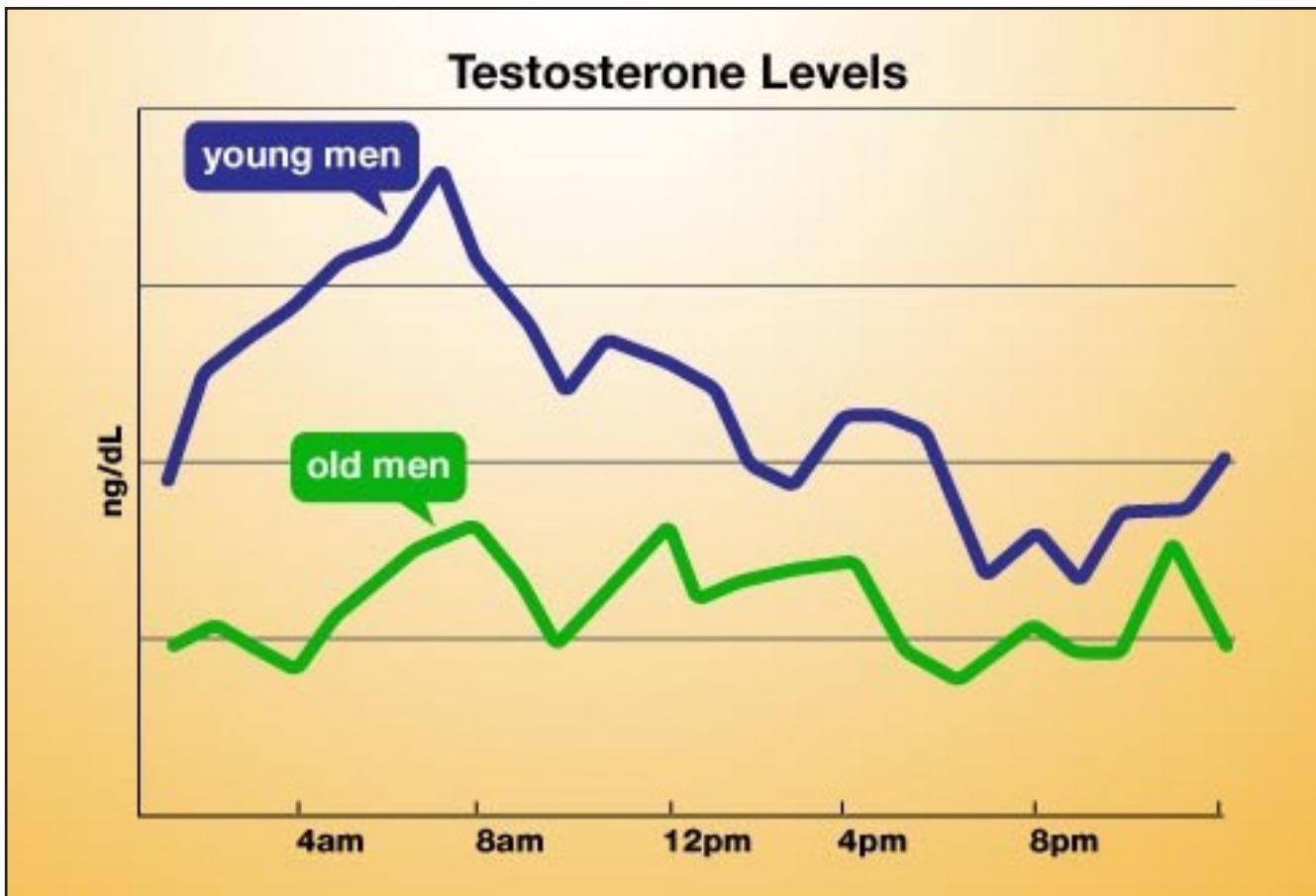
<ul style="list-style-type: none">• Type 2 Diabetes• Liver disease• Obesity• Pituitary gland problems• Opiates	<ul style="list-style-type: none">• Testicle injuries• Tumors• Radiation, chemotherapy• Steroids
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WHO SHOULD BE TESTED FOR LOW TESTOSTERONE?

- Erectile dysfunction
- Lower sex drive
- Low sperm count
- A loss of height, body hair, or muscle size

TESTING FOR LOW TESTOSTERONE

Testosterone is usually measured with a blood test done early in the morning, when levels are highest. Normal levels range from 300 to 1,000 ng/DL. Guidelines suggest running the test for second time before diagnosing low testosterone. The blood test should be obtained between 7:00 am and 10:00 am (see below).



RISKS OF TESTOSTERONE THERAPY

Testosterone therapy has some drawbacks. Some men may develop:

- Too many red blood cells (Polycythemia)
- Peripheral Edema
- An enlarged prostate (Benign Prostatic Hypertrophy)
- Acne
- Infertility (Avoid in men who want to have children)
- Smaller testes
- Hypertension rarely occurs during treatment and requires close monitoring.
- Breast swelling (Gynecomastia) or tenderness.

The risks and benefits of taking testosterone for many years are not known, because large studies haven't been completed yet. Some researchers suggest there might be a higher risk of heart disease. But the evidence is still not conclusive.

The following points were emphasized from the International Expert Consensus on Testosterone Deficiency. These points show that testosterone has negative effects on male sexuality, reproduction, general health, and quality of life

- Male physical function is negatively affected by reducing muscle mass and strength.
- Sexual activity is compromised by reducing sex drive and erectile function.
- It may cause impaired fertility in some individuals.
- Testosterone deficiency has been associated with insulin resistance, inflammation, dyslipidemia, metabolic syndrome and vascular risk.
- It contributes to fat gain, bone loss and anemia.
- Symptoms also include depressed mood, reduced motivation, fatigue and decreased quality of life.
- A lot of evidence indicates that coronary artery disease incidence, mortality and severity is related to the serum testosterone concentration. The lower the serum testosterone level, the greater the risk of heart disease and death.
- There is a high prevalence of low testosterone levels in men with type 2 diabetes, metabolic syndrome, obesity and cardiovascular disease. This causes an adverse cardiovascular risk profile and increased atherosclerotic burden. This results in an increased risk of heart attacks and stroke.

WHO SHOULD NOT TAKE TESTOSTERONE

Men with these conditions shouldn't take testosterone:

- Prostate or breast cancer
- Poorly controlled heart disease
- Untreated sleep apnea
- Too many red blood cells
- Clotting disorders
- Patients with elevated PSA should be referred to urologist before initiating testosterone.

MEDICATIONS THAT CAN INHIBIT TESTOSTERONE

Medications (both prescription and nonprescription) may contribute to erectile dysfunction in as many as 25% of men who present for evaluation.

Medications and Substances That May Cause or Contribute to Erectile Dysfunction	
MEDICATION CLASS OR SUBSTANCE	EXAMPLES
Analgesics	Opiates
Anticholinergics	Tricyclic antidepressants
Anticonvulsants	Phenytoin (Dilantin), phenobarbital
Antidepressants	Lithium, monoamine oxidase inhibitors, selective serotonin reuptake inhibitors, tricyclic antidepressants
Antihistamines	Dimenhydrinate, diphenhydramine (Benadryl), hydroxyzine (Vistaril), meclizine (Antivert), promethazine (Phenergan)
Antihypertensives	Alpha blockers, beta blockers, calcium channel blockers, clonidine (Catapres), methyldopa, reserpine
Anti-Parkinson agents	Bromocriptine (Parlodel), levodopa, trihexyphenidyl
Cardiovascular agents	Digoxin, disopyramide (Norpace), gemfibrozil (Lopid)
Cytotoxic agents	Methotrexate
Diuretics	Spironolactone (Aldactone), thiazides
Hormones	5-alpha reductase inhibitors, corticosteroids, estrogens, luteinizing hormone-releasing hormone agonists, progesterone
Illicit drugs, alcohol, and nicotine	Amphetamines, barbiturates, cocaine, heroin, marijuana
Immunomodulators	Interferon-alfa
Tranquilizers	Benzodiazepines, butyrophenones, phenothiazines

Source: www.aafp.org/afp/2010/0201/p305.html

GROWTH HORMONE

Growth hormone is one of the most powerful hormones in your body. It is your natural defense against aging and maintaining your fountain of youth. Growth hor-

mone increases your lean muscle, decreases body fat, prevents wrinkles and gives you a higher energy level.

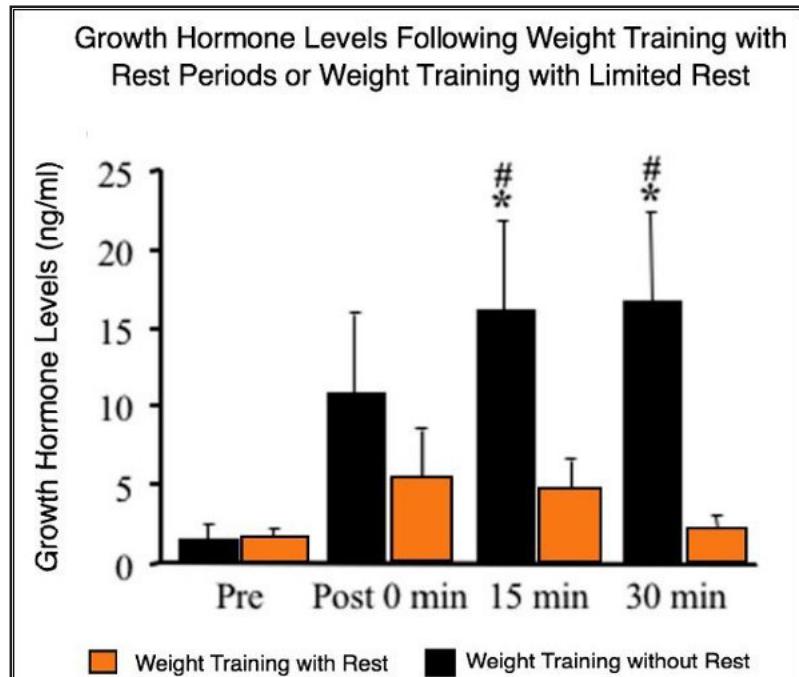
When you are young, growth hormone is abundant and your metabolism is in full force. Ever wonder why a teenager can eat horribly and have a wonderful physique without belly fat? Growth hormone is the reason why.

After your late teens, growth hormone drops rapidly, and continues to decrease as you age. The decline in growth hormone in your body is very similar to the decline in testosterone that occurs with aging. After 30 years old, there is a rapid drop off that has a bad effect of adding fat and decreasing your muscle mass. This also increases your risk of heart disease by increasing LDL, decreasing HDL, and increasing triglycerides. The loss of muscle leads to abdominal obesity with metabolic syndrome and insulin resistance.

Belly fat has been shown to have a dramatic effect on growth hormone. It has been reported that individuals with 3 times the amount of abdominal fat had less than half the amount of growth hormone as lean individuals. Individuals with more abdominal fat had a large decrease in the 24- hour release of growth hormone.

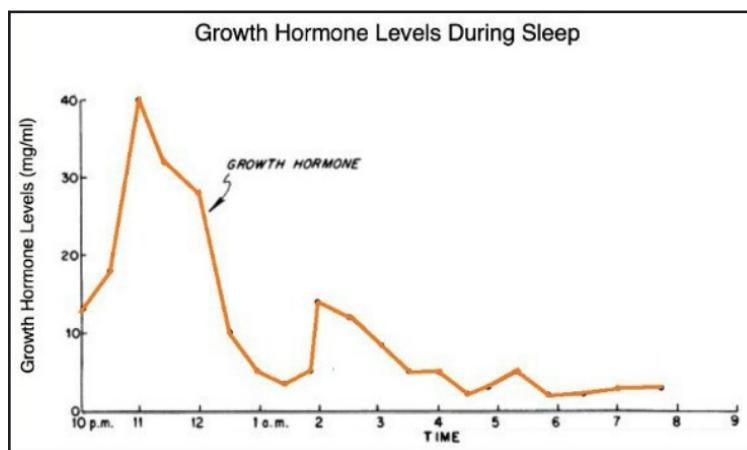
Reducing the intake of sugar and processed carbohydrates is critical to maintaining your growth hormone. When you increase the intake of sugar, this causes an increase in insulin. Insulin is a destroyer of your growth hormone production. One study reported that healthy non-diabetic individuals had 3-4 times higher growth hormone levels than diabetics who have insulin resistance and high insulin levels.

A good rule is to avoid eating sugar and processed carbs before bedtime. This is because your body normally releases a lot of growth hormone at night. If you must have a snack prior to bed-



time, the best choice would be a protein or healthy fats which are not associated with a large increase in insulin. For example, a handful of walnuts or almonds or small piece of lean protein would be healthy choices.

Exercise with high intensity is one of the most effective ways to raise your growth hormone levels. All forms of exercise are beneficial, but high intensity exercise will increase growth hormone the most. You can perform sprints, interval training, weight training and the Sprint 8 protocol. As illustrated in the graph on the previous page, very large increases in growth hormone were seen in a weight lifting session with limited rest periods.



Source: <https://www.healthline.com/nutrition/11-ways-to-increase-hgh#section9>

One key to having good growth hormone levels is optimizing your sleep patterns. You have to focus on having good sleep quality and aim for at least 7-10 hours of sleep per night. The majority of growth hormone is released in “pulses” when you sleep. This is based upon your body’s internal clock or circadian rhythm. As you can see from the graph shown, the largest pulses occur before midnight with some smaller pulses after midnight. This suggests if you get to bed before 10:00 pm, you have a better chance to obtain the natural production of growth hormone that occurs prior to and just after midnight. Individuals who go to bed after midnight will miss the majority of their natural growth hormone production.

Everyone would like to be able to flip on a switch and ignite their growth hormone production. Growth hormone is truly the “fitness hormone” that can put your body into a fat burning mode. The best mode of exercise to obtain the greatest release of growth hormone was described by Phil Campbell as the “Sprint 8” protocol. The Sprint 8 protocol forces your body to recruit, develop and strengthen more muscle fibers than any other form of exercise. Most forms of exercise only recruit the slow muscle fiber, whereas Sprint 8 recruits all 3 muscle fiber types. The three fibers include slow-muscle fiber, fast-muscle fiber, and super-fast muscle fiber. The activation of the super-fast muscle fibers results in the greatest production of growth hormone. Sprint 8 is unique in that it activates the aerobic and anaerobic processes of your heart.

Four Benchmarks Needed to Increase Growth Hormone

Phil Campbell emphasized that you need to reach 4 benchmarks to result in the greatest increase in growth hormone. These include the following:

1. Oxygen debt (out-of-breath response)
2. Lactic acid (muscles burning response)
3. Increased body temperature
4. Release of adrenal hormones (adrenaline) (Marked increase in heart rate)

Oxygen debt means you have exercised to maximum intensity and you cannot breathe. This is high intensity anaerobic training. This is unlike aerobic exercise such as walking where you can breathe normally. The duration of activity is only 30 seconds, but you will be gasping for air. You are exercising as-hard-as-you-can and as fast-as-you-can for 30 seconds.

The muscle burn must occur to verify that you have lactic acidosis in your muscles. Pushing your muscles to extreme creates this painful burning sensation. Growth hormone is released after the muscles burn and lactic acid accumulates. The harder you go after you feel the muscle burning, the greater the release of growth hormone.

Increased body temperature is required to release growth hormone. Researchers have proven that when exercise occurs in a cold room and body temperature does not increase, there will not be a release of growth hormone. Therefore, you must get the body temperature to increase for growth hormone to increase.

The increase in adrenaline (epinephrine) will increase your heart rate. The heart rate response with Sprint 8 is a lot higher than most exercise protocols. As a cardiologist, I am accustomed to exercising patients to 85% of their predicted heart rate ($220 - \text{age} \times 0.85$). Due to the high intensity of Sprint 8, we are obtaining a heart rate closer to 95% of predicted. This increase in heart rate creates energy and endurance. Your heart has to work harder to send blood to meet the increased demand from the high intensity exercise. Also, the increased cardiac demand and recruitment of fast-muscle fibers results in the production of increased mitochondria in your muscle cells. The mitochondria are the power houses of your cells and they produce ATP which is fuel for your cells. Studies performed by Holloszy showed a

50% increase in mitochondria in the muscle cells when performing high intensity exercises that activate the fast muscle fibers.

I have been pleased to notice that your maximum heart rate response with exercise will improve with Sprint 8. Your maximum heart rate is calculated by taking 220 minus your age. This normally declines slowly as we age. When your maximum heart rate declines too rapidly during aging, this means your heart muscle has become weaker. Sprint 8 can increase your maximum heart rate, which is a sign that your heart is getting stronger. This allows your body to adapt to the exercise and it begins to build new capillaries. The building of new capillaries delivers more oxygen to the muscles. Therefore, your heart muscle is strengthened and you have more energy and endurance.

Sprint 8 Can Strengthen Your Skeleton

Sprint 8 can strengthen your skeleton and muscle by working the bones in your legs. Since you have activated all three muscle fiber types, your leg muscles, tendons, ligaments and bones get worked hard so they will adapt by becoming stronger. Sprint 8 does not cause skeletal damage that is done by doing hours and hours of long distance running. The constant pounding on the knees and hips takes its toll over time. I have numerous patients who have had knee and hip replacements from long distance running. A lot of them have severe arthritis with joint pain and limited mobility. I see few patients who are long distance runners that can remain injury free and are able to run long distances at an older age.

Most people do not realize that doing cardio such as walking or jogging only burns calories when you are doing the exercise. Sprint 8 is unique in that it will continue to burn calories after you complete the exercise. This post workout effect occurs because of your activation of the fast muscle fibers which causes a marked increase in the release of growth hormone. Therefore, increasing your growth hormone allows you to burn calories 24/7.

Sprint 8 Slows Down Aging by Affecting Your Chromosomes

Sprint 8 can affect and slow down your aging process by affecting your chromosomes. High intensity exercise works on the end of your chromosomes which are called telomeres. They are like a protective cap on the end of your chromosomes

that prevents the cells from aging too quickly. The length of your telomeres correlates with the health of your body. Long telomeres are associated with longevity. Short telomeres are associated with aging-related disease and include the following: cancer, stroke, dementia, obesity, osteoporosis, diabetes, and cardiovascular disease. Sprint 8 can prolong your telomeres and improve your health.

Sprint 8 Can Reverse Metabolic Syndrome

Nearly 35% of all adults and 50% of those aged 60 and over have metabolic syndrome. It is a disorder of metabolism and turns your body into a fat-producing machine. Metabolic syndrome is present if 3 or more of the following conditions are present:

- High blood pressure – 130/85 or higher
- High blood sugar levels – Fasting blood sugar 100 mg or higher
- High levels of triglycerides in the blood – 150 mg or higher
- Low levels of HDL – Less than 40 in men, less than 50 in women
- Too much body fat around the waist – 35 inches or greater for women and 40 inches or greater for men.

The Sprint 8 protocol can help prevent and reverse metabolic syndrome. The first step in developing metabolic syndrome is the loss of muscle and the development of abdominal fat. Since the Sprint 8 protocol dramatically increases growth hormone, you will be able to burn fat and increase your muscle mass. Sprint 8 could become our new pill-in-a-bottle that could decrease our skyrocketing health care costs due to metabolic syndrome.

Insulin – King of Hormones for Fat Storage

Insulin is the king of hormones in relation to our fat storage. If your insulin level is high it will completely inhibit your fat burning hormones (testosterone and growth hormone). Insulin is produced by the pancreas and regulates the metabolism of carbohydrates, fats and proteins. It is also considered an anabolic hormone since it affects the production of proteins in a wide variety of tissues. Normally, fat is flowing into and out of cells in molecules called “fatty acids”. This is the form that we use to burn as fuel in our body. Once inside the fat cell, fatty acids are turned into triglycerides. Triglycerides, unlike fatty acids, are too big of a molecule to freely

pass through the cell membrane. Therefore, they are stuck in the fat cell unless they are disassembled by hormones in our body. Triglycerides are the form in which we store fat.

The one hormone that dominates storage of fat is insulin. The secretion of insulin occurs primarily when we take in carbohydrates and our blood sugar increases. Insulin functions to bring our blood sugar under control. Also, insulin works to control the storage of fat and protein. It ensures that your muscle cells get enough protein for repair and rebuilding and it makes sure that you store enough fuel (glycogen, fat and protein) for later use.

Insulin accomplishes its job of fat storage by two enzymes. The first enzyme is lipoprotein lipase, which is called LPL. LPL breaks down triglycerides in the bloodstream into fatty acids. Also, LPL shuttles fat from bloodstream into the cells for storage. The higher your insulin goes, the more activity from LPL, which increases fat storage. Insulin also influences another hormone called hormone-sensitive lipase (HSL). HSL works inside the fat cells to break down the triglycerides into their component fatty acids, so that those fatty acids can escape into the circulation. Therefore, LPL works to make us fatter and HSL works to make us leaner.

When we increase insulin levels in our body, we increase the fat we store and decrease the fat we burn. As a cardiologist, I have witnessed patients gain tremendous amounts of weight when they are placed on insulin therapy. Since the insulin level in the bloodstream is determined primarily by the carbohydrates that are consumed, it's the carbohydrates that determine how much fat we accumulate. Below is the sequence of events that lead to stored fat:

1. You eat a meal containing sugar and your insulin increases.
2. The insulin signals your fat cells to shut down the release of fatty acids by inhibiting HSL. At the same time insulin activates LPL to take up more fatty acids from your bloodstream.
3. You get hungrier because your nutrients are inside your cells and not available to be used as fuel for your body.
4. You then begin eating rapidly.
5. You then secrete more insulin.
6. Due to increased blood sugar, your body has to concentrate on burning the

excess sugars in your bloodstream. Finally, your insulin cannot utilize all the sugars in your bloodstream, and the excess is converted into fat in the adipose cells and in the liver.

7. The fat cells get fatter and so do you.

8. The fat stays in the adipose cells until your insulin levels drop.

The bottom line is if we want to be lean and healthy we have to lower our insulin levels. If we want to get fat out of our cells, we have to decrease our insulin levels. When the insulin levels come down, we mobilize fat and use it for fuel.

Normally, we depend on fatty acids for fuel in the hours after a meal or at night, when blood sugars are dropping. After blood sugars fall, the insulin levels decrease and then fatty acids come out of our cells to be used for fuel after meals and at night. When the insulin levels remain high, we have no fuel source to burn in our bodies. The usual fuel source is carbohydrates stored in liver and muscle with protein that is available in our muscle cells. The high insulin levels have locked up our fuel sources (fat and protein) from exiting our cells. The cells themselves are starved for fuel and this causes us to become hungrier. Therefore, high insulin makes us eat more and we become fatter.

Unfortunately, our bodies are getting bigger and our fuel requirements are increasing. Since carbohydrates are the only fuel sources we can burn when our insulin levels are increased, our desire for sugar and processed carbs is never-ending. This creates a vicious cycle of eating more processed carbs, fat accumulation and obesity.

Not All Carbohydrates Are Fattening

Not all carbohydrates are equally fattening. The most fattening carbs are the ones that increase our blood glucose to high levels and result in high levels of insulin. These carbs are rapidly digested and are listed below:

- Refined flour – Pasta, breads and cereals
- Liquid carbohydrates – Fruit juices, soda, beer, wine
- Starches – Rice, potatoes and corn

The carbohydrates in leafy green vegetables like spinach do not result in a large spike in insulin due to their high fiber content. The high fiber content is God's natu-

ral antidote for a rise in insulin. These carbohydrates take longer to digest and are lower in calories. These carbohydrates are less fattening due to lower insulin rise.

Fruits are sweet to taste and do have a sugar in them called fructose. Fructose can be fattening in some individuals. Fruits do have fiber and natural antioxidants which are healthy. The best choice is to eat more berries like blueberries, blackberries, strawberries and raspberries which are lower in calories and cause a lower rise in insulin. Tropical fruits like bananas, mango, and pineapple are more fattening.

The worst carbohydrates are sugar and high-fructose corn syrup. High-fructose corn syrup is found in hundreds of food products. It is bad because our livers convert this rapidly into fat. Fructose is considered the most “lipogenic” carbohydrate, since it’s the one that can be converted to fat most readily.

Alcohol is a fermented sugar and can increase your insulin level and cause fat accumulation. The fat accumulation is in the liver and can cause “alcoholic fatty liver syndrome.” A lot of people have beer bellies and fatty liver due to alcohol intake.

It is important to remember that dieting while cutting back your calories will not work for fat loss unless you restrict your fattening carbs and keep your insulin levels low. The important point is that fattening carbs make us fat and keep us fat. Therefore, foods that are responsible for making us fat are the ones we would never want to live without: breads, pasta, French-fries, sweets and sodas.

Estrogen

Estrogen is to women what testosterone is to men. It is their jet fuel that gives them vitality, endurance and beauty. Estrogens are made primarily in the ovaries with small amounts from the adrenal gland, brain and fat tissue. Estrogen does the following good things for your body:

1. It is a powerful antioxidant.
2. It protects your arteries and reduces the risk of stroke.
3. It lowers the risk of heart attack.
4. It decreases bad cholesterol (LDL) and increases good cholesterol (HDL).
5. It protects your brain and lowers risk of dementia.
6. It improves sleep.

7. It produces collagen and lowers your wrinkles.
8. It helps to prevent osteoporosis.
9. It increases your metabolism and helps to prevent weight gain.
10. It prevents colon cancer.
11. It improves insulin sensitivity and makes your blood sugar more stable.

Estrogen keeps you feeling well and functioning at a high-performance level. If you take away your estrogen (which is what happens during menopause), things begin to decline rapidly. Estrogen is critical for maintaining your fountain of youth.

Insulin Resistance and Estrogen

Estrogen is important for optimizing the function of insulin. Insulin is critical for controlling our blood sugars and fat storage. Therefore, low estrogen levels may lead to insulin resistance and metabolic syndrome. Metabolic syndrome affects about 35% of the population in the United States. It is a cluster of conditions including high blood sugar, abdominal obesity, abnormal lipids, and hypertension.

Metabolic syndrome increases your risk of heart attack and stroke. It makes sense that if estrogen deficiency causes metabolic syndrome, then replacing estrogen with pills or patches could improve insulin sensitivity and prevent metabolic syndrome. However, there are risks in taking exogenous estrogen that is not produced by your body. Estrogen therapy is contraindicated in the following conditions:

1. History of breast cancer
2. Coronary artery disease
3. Previous thromboembolic event (blood clot)
4. Active liver disease
5. Unexplained vaginal bleeding
6. High-risk endometrial cancer
7. Stroke or TIA

The development of metabolic syndrome is associated with abdominal obesity. The abdominal fat has an enzyme called aromatase, which produces more estrogen. The estrogen increases abdominal fat. Normally, prior to menopause, estrogen causes the fat to accumulate in your hips. Accumulation of fat in the hips has no adverse consequences. This is unlike abdominal fat, which is associated with inflammation

and insulin resistance. The fatter we are, the more estrogen we produce. Excess estrogen manifests itself by causing large breasts and abdominal obesity in some men.

Estrogen Exposure from Environment

Estrogen has now infiltrated our food supply. In the United States, we fatten cattle, chicken, turkeys, and farm-raised fish via hormones. We give them estrogen and growth hormones to make them fatter. This means that if we consume meat that is exposed to hormones, it could show up in our bodies later in life. We are seeing young girls start their periods at an increasingly younger age. Also, these same young girls are exhibiting premature breast development. I have seen a lot of patients develop weight gain on birth control pills or on hormone replacement therapy. The exogenous estrogen creates more body fat.

Endocrine disrupters are an environmental poison that mimics, blocks or disrupts the normal function of hormones. Examples of endocrine disrupters are listed below:

1. Pesticides
2. Insecticides
3. Herbicides
4. Fungicides
5. Plastics (plastic water bottles)
6. Heavy metals (arsenic, lead, mercury, cadmium)

Some of the endocrine disrupters have an estrogenic-like effect and can be carcinogenic. These compounds mimic the action of estrogen in your body. The incidence of breast cancer is increasing and women are getting excessive exposure from estrogen in birth control pills, postmenopausal hormonal therapy, and hair product ingredients. This results in an estrogen dominant syndrome, which increases the chance of developing cancer.

Since estrogen therapy is not always safe, the best option is to use high-intensity training which can dramatically increase growth hormone naturally. Growth hormone is our anti-aging hormone that can reverse metabolic syndrome. It can also increase collagen and helps to prevent wrinkles. Growth hormone has a lot of ac-

tions that are similar to estrogen that is produced naturally in our body. Therefore, high intensity exercise can improve our hormones and help us to avoid the weight gain and metabolic syndrome that can develop in the postmenopausal period.

Nutrients That Can Boost Your Testosterone – Vitamin D and Zinc

Testosterone is a vital hormone in your body. It is your jet fuel that plays an important role in building muscle, cardiovascular health, overall hormone balance, mood regulation and boosting your metabolism.

In order to produce testosterone, your body requires two main nutrients. These nutrients are:

- Vitamin D
- Zinc

Vitamin D is crucial for proper growth and functioning of your bones, muscles and nerves. It also influences how the testes work. Your body makes vitamin D after the skin absorbs some of the sun's rays. Your liver converts the vitamin into an active form called 25-hydroxy vitamin D, which is what your doctor will measure if he orders a vitamin D blood test.

What does this mean for me? Low vitamin D appears to equal low T (testosterone). If you do not get enough sunshine, your testosterone levels could drop. This could cause a loss of energy and sex drive. It is important to take this message to heart: Studies suggest that men who are low in both vitamin D and testosterone are more likely to have a cardiovascular-related death.

Optimizing vitamin D is the first priority because of the relationship between this nutrient and testosterone. A previous study showed that men who were deficient in vitamin D (a level below 30 ng/ml) had much lower free testosterone and higher estrogen. These same men had more body fat, less lean muscle mass, greater chance of depression, higher rates of cardiovascular disease, and poorer fertility than men with higher vitamin D levels. The men with normal vitamin D levels (above 30 ng/ml) had more lean muscle, higher free testosterone levels, and better overall health. Vitamin D helps testosterone production by inhibiting the process called aromatization in which testosterone changes into estrogen in men. The solution is to get

your blood levels tested to make sure that your levels are normal. Start supplementation with vitamin D if your level is low (less than 30 ng/ml).

Research has shown that having adequate zinc in the body allows for a greater release of testosterone. Zinc is an essential dietary mineral. You need zinc for your immune system to function properly. Zinc helps enzymes break down food and other nutrients. It also helps enzymes to build proteins. Zinc deficiency is known to be a major malnutrition problem worldwide. Infants, children and pregnant women are most at risk for zinc deficiency. Other groups include vegetarians, endurance athletes, alcoholics, people with gastrointestinal disease, and people taking diuretic medications. It is also vital for maintaining your sense of smell, vision, taste, skin and hair. Deficiency of zinc can lead to diarrhea, impotency, stunted growth, loss of appetite, hair loss, eye and skin lesions and impaired immunity. Zinc plays a role that directly influences all of your hormones and includes the following:

1. Low zinc leads to an increase in estrogen receptors and decrease in androgen receptors.
2. Zinc is necessary for the conversion of androstenedione to testosterone.
3. Low zinc may increase the aromatization of testosterone to estrogen, just like vitamin D.
4. Patients with prostate cancer lack the ability to accumulate zinc, leading to faster spread of cancer in the prostate.
5. Low zinc increases breast cancer risk due to abnormal estrogen action in your body. Also, low levels of zinc can increase inflammation which can cause cell damage.

Since routine blood tests for zinc may not reflect the overall levels in your body, it is important to eat healthy foods that have a lot of zinc which are listed below:

1. Leafy green vegetables - Spinach
2. Meats – beef, chicken, turkey, venison, lamb
3. Shrimp
4. Shellfish – Crabs, clams, lobsters and mussels
5. Seeds – Pumpkin, Sesame, Squash
6. Fruits – Pomegranates, Avocado, and berries
7. Oysters
8. Garlic

9. Lima beans, green beans, peas
10. Nuts – almonds, cashews, peanuts, walnuts, pecans
11. Mushrooms
12. Dark chocolate

Hypothyroidism and Low Testosterone

Hypothyroidism is associated with low testosterone levels. An underactive thyroid has many overlapping symptoms that are found with low testosterone. These include: mental fog, anxiety, low energy and low sex drive. It is definitely important to check your thyroid status if you are struggling with low testosterone.

Foods That Can Increase Testosterone

You can help your body maintain normal testosterone levels by eating certain foods that can help you ignite your hormone production. I see numerous patients who do not think that eating right is important. They do not realize that food can be your medicine and can determine whether you live or die. These foods all have some things in common: they increase nitric oxide, improve blood flow in your vessels and they improve endothelial function. The endothelium is responsible for producing nitrous oxide, which relaxes your arteries and improves blood flow throughout your body. These foods can heal your damaged endothelium and increase your nitric oxide output.

Many of my patients do not realize that these foods work through the same pathway as Viagra. Viagra works by inhibiting an enzyme that breaks down nitric oxide. Therefore, this increases nitric oxide. By eating these foods, you are having the same effect as taking Viagra. The good news is that you are doing this naturally and avoid risks of taking Viagra. These risks include visual disturbance, temporary blindness and hypotension if you are receiving nitrate therapy.

High Nitrate Foods That Produce Nitrous Oxide

High nitrate foods are converted to nitrous oxide by your body. Nitrates are a natural component of many plants and lower blood pressure, improve blood flow and are turned into nitrous oxide in the GI tract. Green leafy vegetables contain great amounts of nitrates. Spinach is considered the number one recommended high ni-

trate food. It is filled with nutrients and powerful antioxidants. The following foods below contain high amounts of nitrates:

- Spinach
- Arugula
- Carrots
- Lettuce
- Cabbage
- Eggplant
- Kale
- Bok Choy
- Celery
- Rhubarb
- Chard
- Cucumber
- Beets

Cruciferous Vegetables

Cruciferous vegetables have flowers that have four petals so they resemble a cross. They help your body increase the excretion of estrogen, which increases the amount of testosterone available to be used by your cells. Below is a list of cruciferous vegetables that are essential for your fat burning and increasing your testosterone levels:

- Arugula
- Bok Choy
- Broccoli
- Brussel sprouts
- Cabbage
- Cauliflower
- Collard greens
- Horseradish
- Kale
- Mustard
- Radish
- Rutabaga
- Turnips
- Wasabi
- Watercress

Healthy Fats That Can Increase Testosterone

Not all fats are bad. Testosterone production relies on fats to form its structure. Steroid hormones like testosterone require fatty acids as vital building blocks. Without enough fats, testosterone production will suffer. Monounsaturated fats (nuts, olives, olive oil, and avocados) will increase testosterone production. Saturated fat from grass fed animals is a good source to increase your testosterone. This requires that you choose meat from animals that feed on grass, not grains. The meats from grass-fed animals have less fat and are more nutrient dense. They are also free of compounds such as estrogen and growth hormones. Wild game (venison, elk, tur-

key and buffalo) are an excellent source of saturated fat that is healthy and can increase your testosterone.

Nuts

Studies have found that men who eat a diet high in monounsaturated fats, the kind found in nuts, have higher levels of testosterone. This is due to higher D-aspartic acid levels that promote the production of testosterone. Almonds, walnuts, peanuts and Brazil nuts increase the production of testosterone.

Eggs

Eggs are a natural source of healthy cholesterol. Eggs are an excellent source of protein since eggs contain all the essential amino acids. The cholesterol from eggs is used as building blocks to make more testosterone.

Olive Oil and Coconut Oil

Olive oil has been a part of Mediterranean cuisine for many years. It is used daily in their meals and the people are healthier with very small risk of developing cardiovascular disease. Olive oil is composed of monounsaturated fats that help boost testosterone production. It promotes greater cellular receptiveness for testosterone and functions as an antioxidant agent to protect cells from free radical damage. Make sure to add 1-2 tablespoons of extra-virgin olive oil to your salads to naturally increase your testosterone.

Coconut Oil

In the past, coconut oil has gotten a lot of bad publicity because it is a saturated fat. There is more evidence now that coconut oil may have some protection against cardiovascular disease. It does raise HDL and lowers LDL and improves the lipid profile. Coconut oil is unique in that the vast majority of the fatty acids are medium-chain triglycerides (MCTs). MCTs are different from other fats, since your body sends them directly to the liver where they can be burned for instant energy. This unique effect of MCTs is likely the cause of its ability to increase metabolic rate. Thus, MCTs can boost testosterone levels and improve your overall health.

Fruits That Increase Your Testosterone

Grapes

Grapes are rich natural source of resveratrol. It is an antioxidant and helps to protect cells from toxins and free radicals. It increases hormone production and sperm production in the body.

Pomegranates

This red fruit has been used as medicine for centuries. It has high levels of antioxidants and vitamins A, C, E and iron. Studies have shown an increase in testosterone. Try to eat the fruit rather than juice which has more fiber and would result in lower insulin response.

Oysters

Oysters are the richest source of zinc, which is crucial to your ability to make testosterone in your body. Oysters are considered a “sea superfood” and they are packed with protein and heart-healthy omega-3 fatty acids.

Foods That Lower Testosterone

Sugar and Processed Carbs

Sugar and processed carbs are a very strong stimulus to insulin production. Insulin elevation can inhibit all of your fat burning hormones, including testosterone. One of the fastest ways to decrease your testosterone is to take in sugar and processed carbs.

Polyunsaturated Vegetable Oils

They are disaster for your testosterone production. Unfortunately, a lot of these oils are associated with a high Omega 6 to Omega 3 ratio, which is associated with systemic inflammation and oxidative stress. This results in deterioration in your health and development of chronic disease. Examples of polyunsaturated vegetable oils are listed below:

1. Soybean oil
2. Safflower oil
3. Cottonseed oil
4. Canola oil
5. Corn oil

Trans-Fats

Trans-fats occur when oils such as soybean and corn are hardened by passing hydrogen atoms through the oil under high pressure. As a result, some of the unsaturated molecules in the raw oils become fully saturated and the oil becomes solid at room temperature. This process is called hydrogenation. If you see the word “hydrogenated” or “partially hydrogenated” on a food label, this suggests this food is a trans-fat. A list of trans-fats is listed below:

1. Industrial vegetable oil shortenings for baking and confections
2. Margarine and vegetable oil spreads
3. Fast-foods
4. Potato chips
5. Muffins and doughnuts
6. Cookies, cakes and frostings

Trans-fats can kill and the FDA has banned their use completely by 2018. Trans-fats increase inflammation, lower testosterone and cause an increase in cardiovascular risk.

Soy Products

Soy has high amounts of phytoestrogens which can elicit a similar effect as estrogen in your body. It can activate the estrogen receptor and down-regulate the androgen receptors. This could result in a decrease in your testosterone.

Alcohol

Drinking alcohol of any kind can lower testosterone and elevate estrogen. I have seen a lot of chronic alcoholics develop breasts and protuberant abdomen. The fatty abdomen converts more testosterone to estrogen and further decreases testosterone levels

The Right Type of Exercise Can Make You Healthier

Earlier you learned the importance of decreasing your intake of sugar and processed carbs that can skyrocket your insulin levels. Since we know that insulin will inhibit your main fat burning hormones (growth hormone and testosterone), this is a recipe for developing metabolic syndrome and an early death. This emphasizes that we have to get our diet right and we have to exercise right.

Exercise can contribute to your being healthy for the following reasons:

1. It can help control your weight.
2. Reduce your risk of cardiovascular disease
3. Reduce your risk for diabetes and metabolic syndrome
4. Reduce your risk of some cancers
5. Strengthen your bones and muscles
6. Improve your mental health and mood
7. Help prevent falls if you are older
8. Increase your chance of living longer

The Risks of Sitting Too Much

Before you begin to consider putting together a good exercise program, look at how much you move throughout the day. This includes your time at work, at home and during off-hours.

What are the risks of sitting too much? Research has linked sitting for prolonged periods of time with a number of health concerns, including obesity and metabolic syndrome. Metabolic syndrome is a cluster of conditions that increases blood pressure, high blood sugar, excess body fat around the waist, and abnormal cholesterol levels. Too much sitting seems to increase the risk from cardiovascular disease and cancer.

Studies have shown that adults who spend less than 2 hours a day in front of the TV are healthier than adults who spend more than 4 hours watching TV. Those individuals who watched TV for greater than 4 hours had the following problems:

1. Nearly a 50% increase in risk of death from any cause.
2. About a 125% increased risk of cardiac events such as chest pain or heart attack.

This risk was separate from the other traditional risk factors for cardiovascular disease such as smoking or high blood pressure. It is important to understand that sitting in front of the TV is not your only concern. Any extended sitting such as behind a desk at work or driving your car can cause your health to decline. More importantly spending a few hours a week at the gym doesn't seem to offset your risk.

The solution seems to be less sitting and more moving overall. You might start by simply standing rather than sitting whenever you have a chance. Try to think about ways to walk while you work. Below are some examples that you can follow.

1. Stand while talking on the phone
2. Consider standing while eating lunch
3. Some of my nurses walk at lunch which is also effective
4. Consider using a standing desk at work
5. Some companies are using standing computers above a treadmill so you can be active all-day long.

The impact on movement can have a profound effect on your health. The muscle activity needed for standing seems to trigger processes related to breakdown of fats and sugars within your body. When you sit, these processes stall and your health risks increase. When you keep moving, you reignite your fat burning and lower your risk of developing metabolic syndrome.

Motorized Scooters – Are They Cardiac Death Traps?

I have patients who sometimes ask, “Can you get me approval for a motorized scooter?” The important question is, does having a motorized scooter increase your cardiovascular risk? In the American Journal of Cardiology in 2010, it was reported that the scooters have detrimental long-term effects by increasing cardiovascular risk, particularly insulin resistance. As you know by now, increasing insulin leads to metabolic syndrome and premature cardiac death. Try not to use a motorized scooter unless there are no other options left.



Benefits of Fitness Trackers

Fitness trackers are a good way to keep a record of your progress. They can track steps, calories, distance traveled, and even heart rate. Fitness trackers cause you to have personal accountability. It encourages you to walk more steps than you did yesterday, to jog faster than you did yesterday, and to reach a higher heart rate for high intensity training. Research has shown that wearing a fitness tracker can increase a user's activity level by 30 percent. Therefore, the fitness tracker is something that can help keep you moving.

EXERCISE PROTOCOLS

In our exercise program, we want you to activate all of your muscle fibers for overall better health. Slow-twitch fibers will be activated by doing cardio such as walking and jogging. Fast-twitch fibers will be activated by doing high intensity weight training and the super-fast fibers will be activated by doing the Sprint 8 protocol. Since our fat burning hormones are only activated with high intensity weight training and the Sprint 8 protocol, we will cover these protocols in detail.

Rest and Recovery

Before we discuss the exercise protocols, we have to emphasize the importance of rest and recovery. High intensity weight training and Sprint 8 can be demanding on your body. Since it is pushing your body to its limits, rest and recovery is an essential ingredient to success.

It is important to remember that when you are doing high intensity exercise, you are not building muscle when you are doing the exercise. During the exercise, you create small micro tears in the muscle. We all have heard that phrase, "No pain, no gain". This is manifest by the burn feeling that you experience during the exercise, which occurs when lactic acid builds up from muscular contraction. This creates an anaerobic process (without oxygen) since the oxygen supply is inadequate to meet the demands of the intense muscular contraction. This creates soreness, fatigue and tiredness. Therefore, we are weaker, more sore and tired when we finish the exercise. But our body adapts to this stress when we have rest and recovery, and allows us to heal the small micro injuries to our muscle. This then allows the muscles to grow bigger and stronger. Therefore, the long term key to a healthy body is to have

enough recovery and rest. Rest seems to be the last thing people concentrate on when they are doing high intensity training. Without rest, you will tear down your body and lead to injury and illness.

High Intensity Interval Training (HIIT)

High intensity interval training (HIIT) is based upon doing high intensity exercise with short periods of rest. HIIT has a lot of benefits shown below that can turn your body into a fat-burning machine:

1. It can increase your fat burning hormones (not as high as the Sprint 8 protocol)
2. Improved heart health with increased blood flow and capillary growth
3. Caloric burn post-exercise
4. Maintain muscle mass while reducing body fat
5. Improved mood, mental health and energy
6. Improved blood pressure, reduced blood sugar levels, and improved lipids.
7. Reduction in incidence of metabolic syndrome.
8. Improved Longevity

High Intensity Weight Training Protocol

Training to complete exhaustion is one of the secrets to weight training that can increase your fat burning hormones. This causes all muscle fibers to be recruited at once to participate in muscle contraction. This causes overload of your muscle for accelerated growth. Try to pick a weight that will allow you to do 4 to 12 reps. If you can do more than 12 reps, you need to add weight to cause more resistance and stress on the muscle. On the other hand, if you cannot perform 4 reps, you need to decrease the amount of weight.

We have divided our workout so that we only exercise a body part every 5 days. This helps to ensure that there has been enough recovery to ensure muscle growth. Also, this helps to prevent overtraining and poor health. Our routine divides the muscle parts into 5 different days as shown below:

1. Monday – Chest exercises
2. Tuesday – Shoulder exercises

3. Wednesday – Back exercises
4. Thursday – Leg exercises
5. Friday – Arm exercises

On each day, we will do 6 different exercises for that particular body part. The duration of the exercise will be only 30 seconds to one minute. This involves using the heaviest weight possible and takes your body to complete failure. The rest between each exercise is only 10-15 seconds (the time it takes you to walk over and start the next exercise). You should have shortness of breath and difficulty breathing when you finish the exercise). If you have no trouble breathing, your intensity is too low and needs to be increased. The total exercise time should be less than 45 minutes.

Breathing During High Intensity Training

Knowing how to breathe is essential in order to be successful with high intensity weight training. Many people will do this backward and inhale when they exert. They are afraid that the weight is going to fall on them, so they will hold their breath when straining to lift the weight. Holding your breath when you lift creates a Valsalva maneuver (increased pressure inside the chest), which may:

1. Reduce blood flow to your heart
2. Reduce blood flow to your brain
3. Cause you to be dizzy and pass out
4. Increase your risk of hernia.

The way to remember how to breathe is to always breathe out with effort. For example, if you are doing a bench press, take a breath in as you lower the weight, and breathe out as you push the weight up.

TESTOSTERONE

WORKOUT

Day 1

CHEST EXERCISES



Day 1 – Chest Exercises

Dumbbell Flat Bench

- Lie down on flat bench
- Keep your feet flat on floor
- Hold a dumbbell in each hand so that the palms face toward your chest
- Lower the weights to the side of your chest (start of exercise)
- Press the weights straight up (finish of the exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 1 – Chest Exercises

Dumbbell Incline Presses

- Lie back on inclined press
- Hold dumbbells at shoulder height with palms facing feet
- Lower weights to your chest (start of exercise)
- Press the weights straight up (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 1 – Chest Exercises

Standing Cable Crossovers

- Step forward with one foot and grab the handles in each hand
- Bend forward and extend your arms straight out to either side (start)
- Then bring your arms around in a hugging motion until your hands cross each other (finish)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 1 – Chest Exercises

Pushups

- Set your hands at a distance slightly wider than shoulder-width apart
- Set your feet at about shoulder-width apart
- Try to get your body aligned in a straight line
- Slowly lower your body until chest touches the floor (start of exercise)
- Then push your body back up to the starting position (finish of exercise)



START
OF
EXERCISE

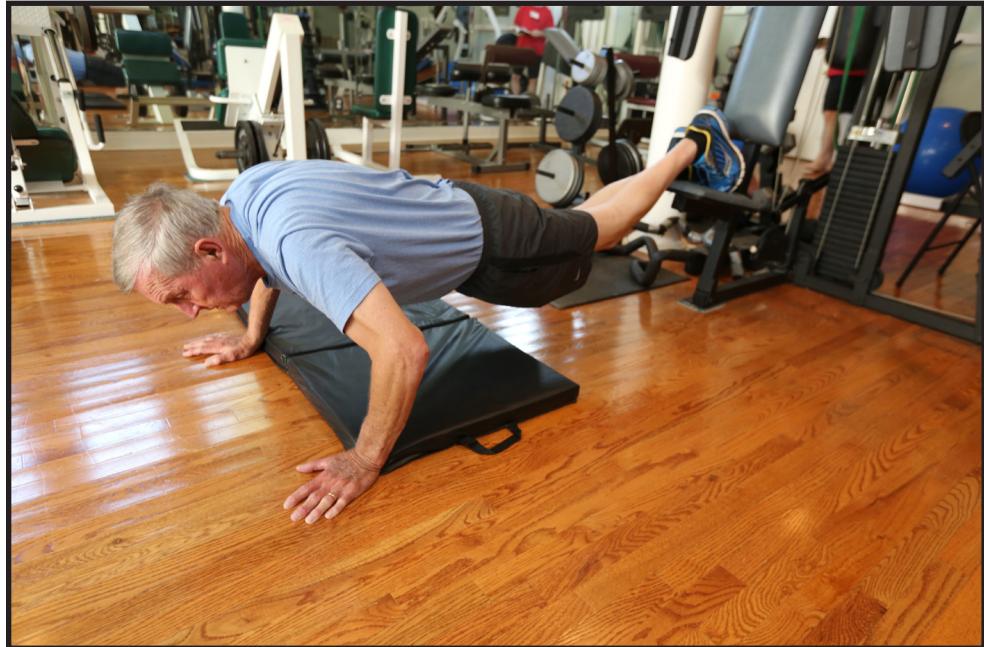
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EXERCISE



Day 1 – Chest Exercises

Decline Pushups

- Same format as regular push up except your feet are elevated
- Lower your body until chest touches the floor (start of exercise)
- Then push your body back to starting position (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



TESTOSTERONE

WORKOUT

Day 2

SHOULDER EXERCISES



Day 2 – Shoulder Exercises

Arnold's Presses

- Raise dumbbells to your shoulder with palms toward you (start of exercise)
- Press dumbbells overhead (finish of exercise)



START
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EXERCISE

FINISH
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EXERCISE



Day 2 – Shoulder Exercises

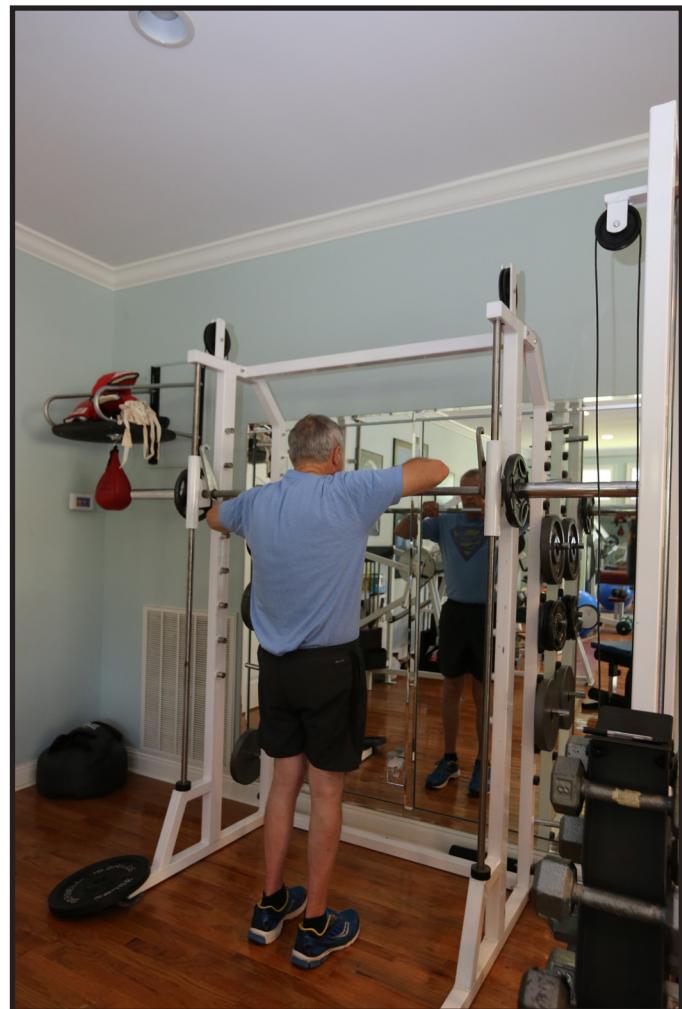
Smith Machine Upright Rows

- Grasp the bar with your arms extended about 10 inches apart (start of exercise)
- Lift it straight up until it touches your chin (finish of exercise)



START
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EXERCISE

FINISH
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EXERCISE



Day 2 – Shoulder Exercises

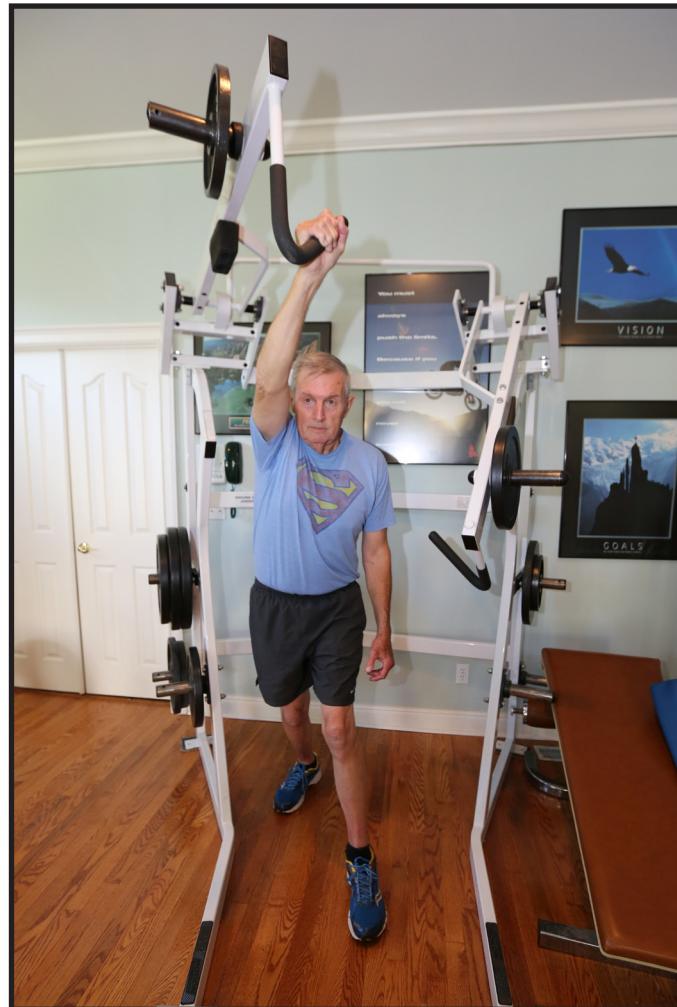
Hammer Strength Shoulder Machine

- Grab the handle at shoulder level (start of exercise)
- Push the weight straight up until your arm is extended (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 2 – Shoulder Exercises

Front Dumbbell Raises

- Stand with dumbbell in each hand (start of exercise)
- Raise one dumbbell at a time parallel to shoulder (finish of exercise)



START
OF
EXERCISE

FINISH
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EXERCISE



Day 2 – Shoulder Exercises

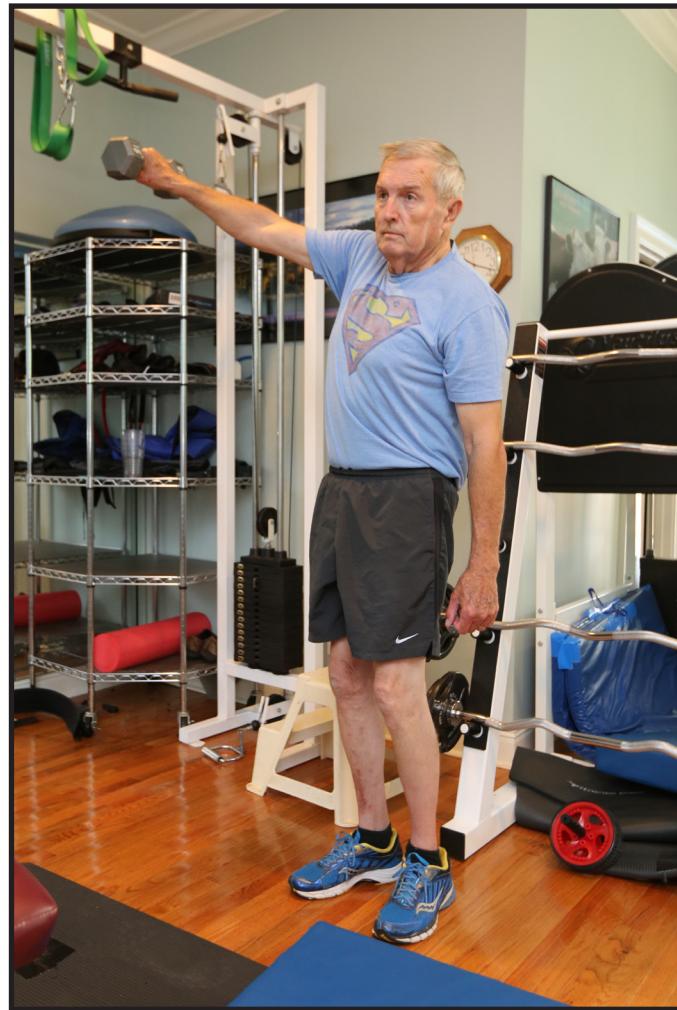
Standing Lateral Raises

- Hold the dumbbells at your side at arm's length (start of exercise)
- Lift the dumbbells out and up to either side and at top of exercise turn your wrists so rear of dumbbell is higher than front (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 2 – Shoulder Exercises

Kettlebell Swing

- Grip the kettlebell with palms facing you and thumbs wrapped around the handle (start of exercise).
- Swing the kettlebell upward as high as you can (finish of exercise).



START
OF
EXERCISE

FINISH
OF
EXERCISE



TESTOSTERONE **WORKOUT**

Day 3

BACK EXERCISES



Day 3 – Back Exercises

Wide Grip Pull-ups to Front

- Use overhead grip with arms extended (start of exercise)
- Pull yourself up and try to touch the top of your chest to the bar (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 3 – Back Exercises

Close Grip Pull-ups

- Grasp handle with arms extended (start of exercise)
- Pull yourself up and try to touch your chest to your hands (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 3 – Back Exercises

Lying T Bar Rows

- Lie down and grasp bar with feet together and arms extended (start of exercise)
- Lift the weight up until it touches your chest (finish of exercise)



START
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EXERCISE

FINISH
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EXERCISE



Day 3 – Back Exercises

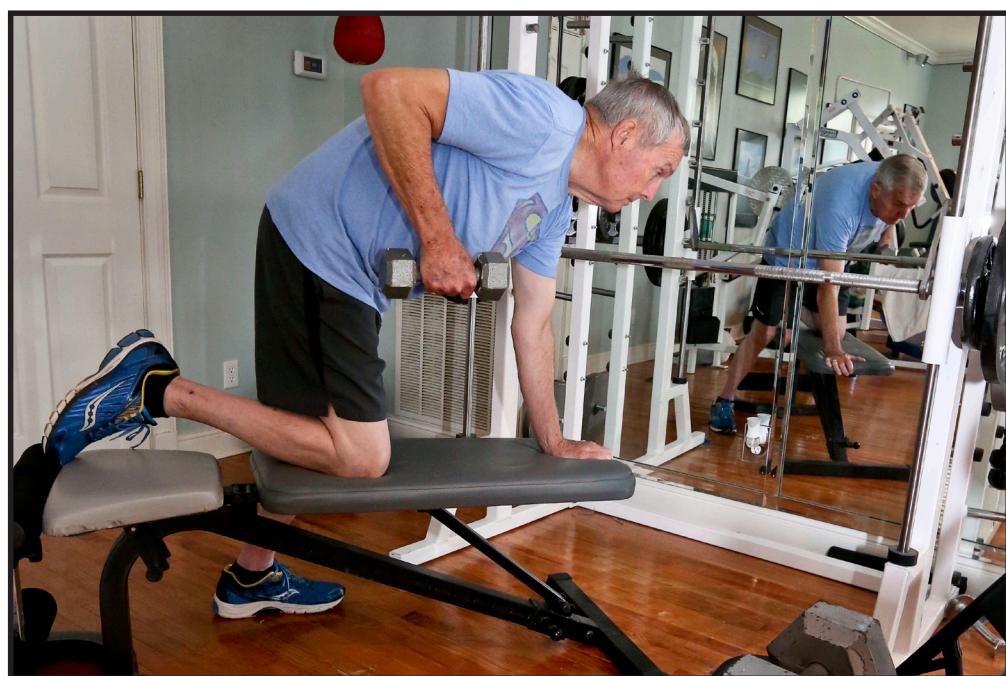
One Arm Dumbbell Rows

- Place one hand and leg on the bench for support
- Take a dumbbell in the other hand and bend forward until your upper body is nearly parallel to floor
- Hold the weight at arm's length with palm inward (start of exercise)
- Lift the weight up to your side (finish of exercise)



START
OF
EXERCISE

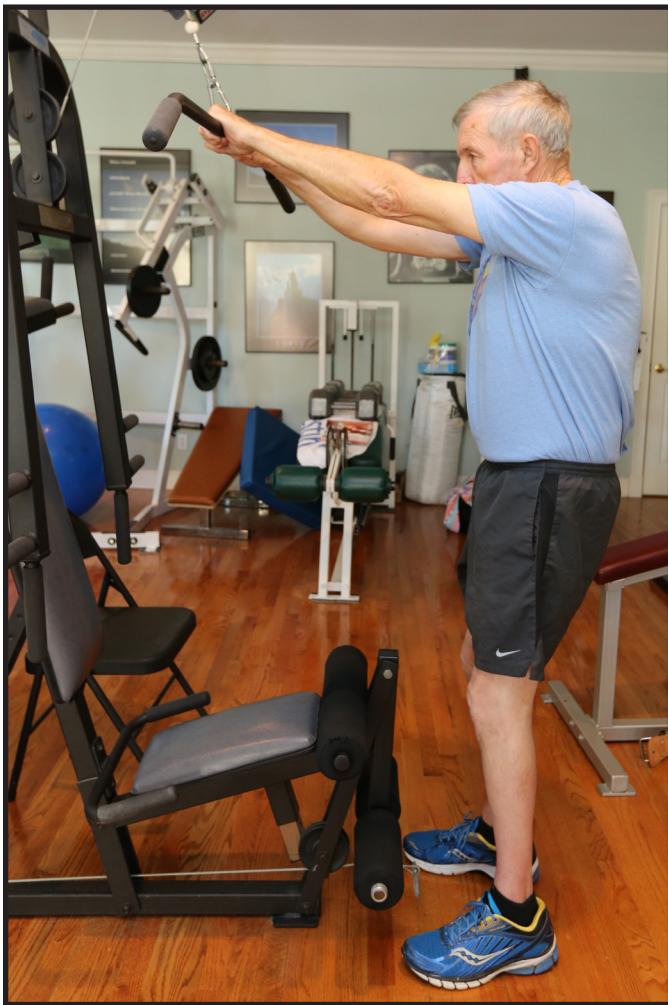
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Day 3 – Back Exercises

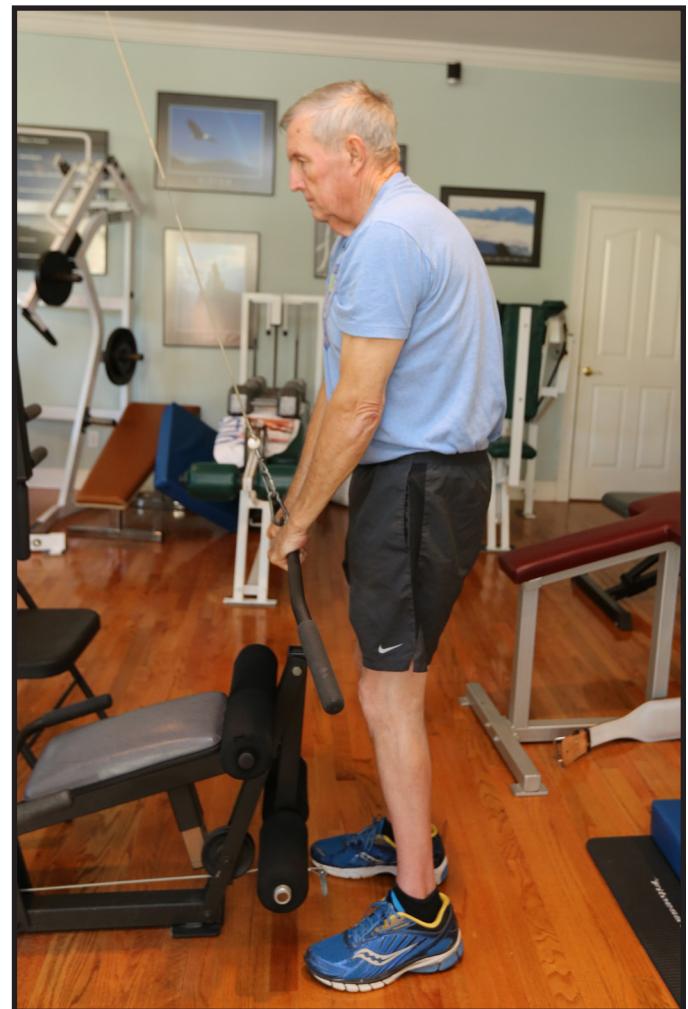
Two Arm Pull-downs

- Grab the bar with both hands about shoulder width apart (start of exercise)
- Drive the bar down until it touches your abdomen (finish of exercise)
- Keeps your arms straight when going down



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 3 – Back Exercises

Machine Pullovers

- Sit down and adjust the seat to meet your needs.
- Place your elbows on the pads provided. Grasp the overhead bar with an overhand grip (start of exercise).
- Then bring your arm straight down, pushing through your elbow (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



TESTOSTERONE **WORKOUT**

Day 4

LEG EXERCISES



Day 4 – Leg Exercises

Dumbbell Squat

- Hold a dumbbell with both hands against your chest
- Push your hips back and bend your knees lowering your body into a squat (start of position)
- Then push back up until you are out of the squatting position (finish of exercise)



START
OF
EXERCISE

FINISH
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EXERCISE



Day 4 – Leg Exercises

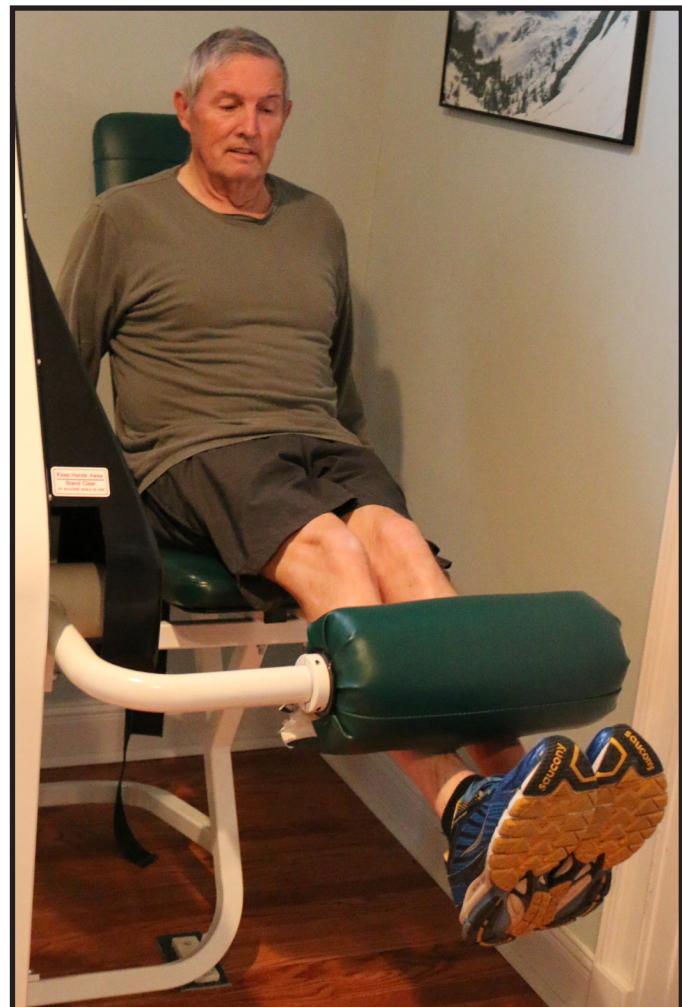
Leg Extensions

- Sit on machine and hook your feet under the padded leg support (start of exercise)
- Extend your legs outward (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 4 – Leg Exercises

Leg Curls

- Lie face down and hook your heels under the padded support (start of exercise)
- Curl your legs up as far as possible (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 4 – Leg Exercises

Lunges

- Step forward with one leg, lowering your hips until both knees are bent at about a 90-degree angle.
- Slowly lower until your knee touches the floor (start of exercise)
- Then push back up to the starting position (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 4 – Leg Exercises

Seated Calf Raises

- Place your knees under the support bar and put your toes on the bottom bar.
- Slowly lower your heels as close to the ground as possible (start of exercise)
- Then press with your toes upward as far as possible (finish of exercise).



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 4 – Leg Exercises

Calf Raises on Leg Press Machine

- Push against the footrest with your toes only
- Bend your knees, and let the weight come back toward you for the greatest stretch of the calf muscle (start of exercise)
- Press the weight up with your toes and straighten your legs (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 4 – Leg Exercises

Stationary Squat

- Hold to a bar in front of you
- Bend your knees until they are a 90-degree angle
- Hold for one minute and then stand up.



START
OF
EXERCISE

FINISH
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EXERCISE



Day 4 – Leg Exercises

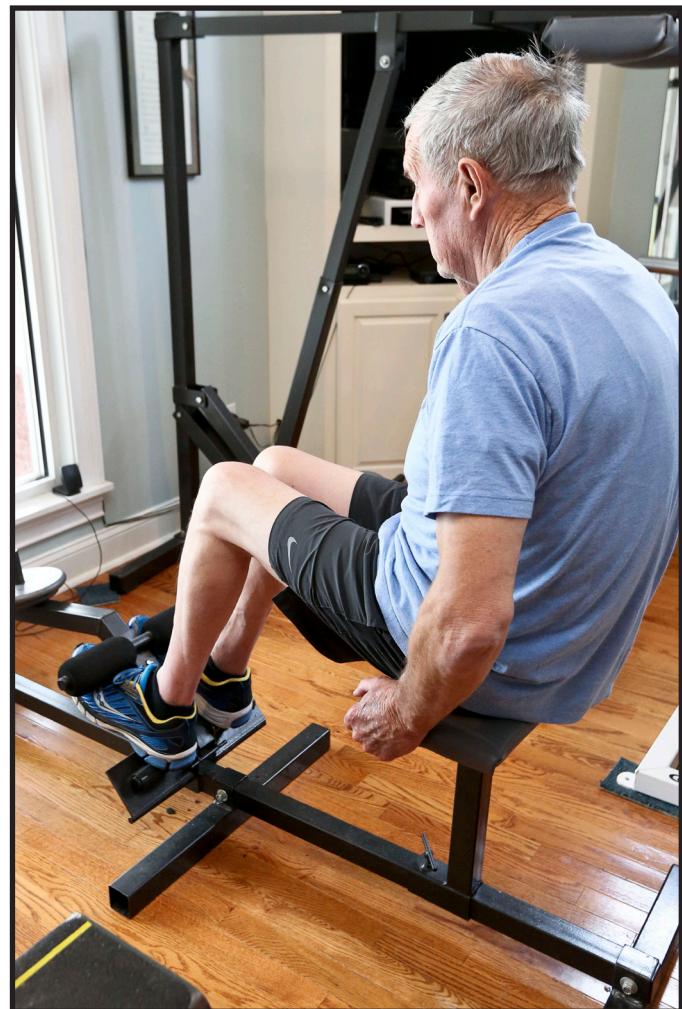
Shin Curls and Extensions

- Sit down and place forefoot under the bar (start of exercise)
- Curl your foot upward toward your body (finish of exercise)



START
OF
EXERCISE

FINISH
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EXERCISE



TESTOSTERONE **WORKOUT**

Day 5

ARM EXERCISES



Day 5 – Arm Exercises

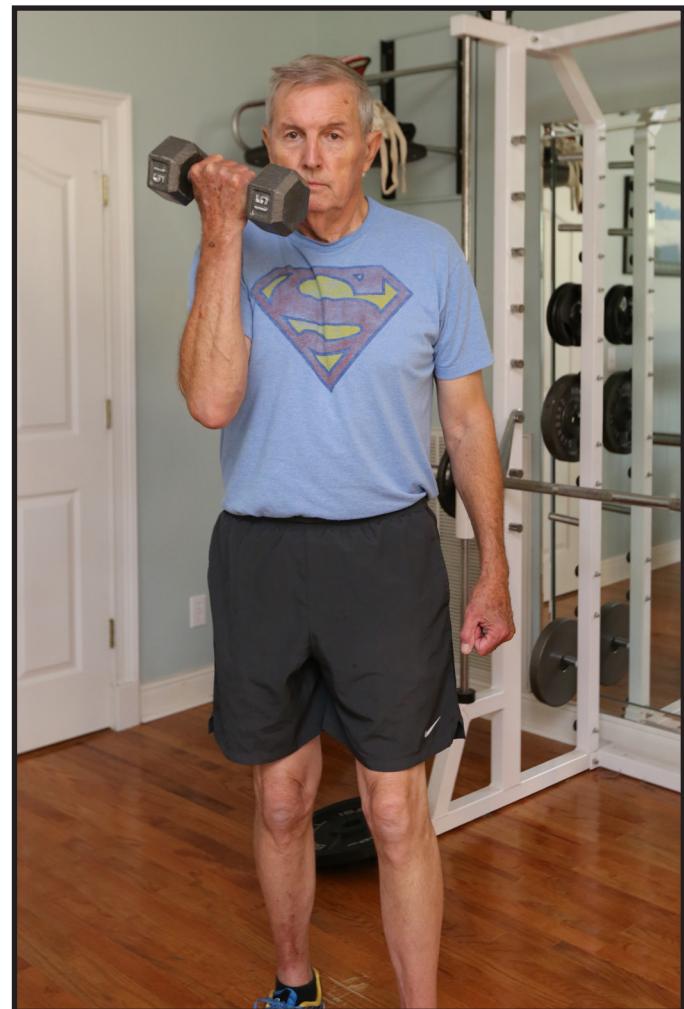
Standing Dumbbell Curls

- Let the dumbbell hang down in front of you (start of exercise)
- Curl the dumbbell upward toward your chest and contract the bicep at the top of the exercise (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 5 – Arm Exercises

Preacher Curls

- Place your chest against the bench; place your arm with the dumbbell over it
- Lower the weight until the arm is fully extended (start of exercise)
- Curl the dumbbell all the way up and contract the bicep (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 5 – Arm Exercises

Cable Curls

- Stand close to the machine
- Start with your arms at your side and palm facing you while you grab the weight (start of exercise)
- Curl upward to the top of your chest (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 5 – Arm Exercises

Dumbbell Kickbacks

- Stand and bend over and place one hand on the bench
- Take a dumbbell in the opposite hand, and raise your elbow to shoulder height.
- Bend your arm and let the dumbbell hang straight down (start of exercise)
- Press the weight back until your forearm is parallel to the floor (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 5 – Arm Exercises

Machine Dips

- Step up on the platform and get a comfortable grip on the bars
- Slowly lower yourself downward and keep your elbows close to your body (start of exercise).
- After reaching bottom of movement downward then push your body back up to the starting position (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Day 5 – Arm Exercises

Bench Dips

- Place a bench behind you and a chair in front of you
- Place your hands on the bench behind you with palms facing down. Then place your feet in the chair in front of you
- Slowly lower your body until there is an angle less than 90-degrees (start of exercise).
- Using your triceps then push yourself back up with arms extended to the starting position (finish of exercise).



START
OF
EXERCISE

FINISH
OF
EXERCISE



SENIOR CITIZENS WORKOUT

Senior citizens can do high intensity weight training even into their 90s. Studies in the elderly have shown that weight training in senior citizens done on a regular basis, not only builds muscle and bone strength, but also counteracts the weakness and frailty that usually comes with aging. Elderly strength training can improve the following things:

- Osteoporosis
- Arthritis
- Balance
- Pulmonary disease
- Obesity
- Diabetes Mellitus
- Back problems

Doug McGuff in his book, “*Body by Science*,” describes a simple high intensity workout program that can be used in senior citizens. The program is called the, “The Big Five” and consists of 5 different compound exercises that work all of the major muscles of the body. These 5 exercises are listed below:

- Seated Row
- Chest press
- Pull-down
- Overhead Press
- Seated Leg Press

These exercises are simple to execute and allows the individual to focus on hard work to build their muscles without injury. No senior citizen wants to risk being pinned under a barbell at the point of muscular failure on free-weight exercises such as bench press or squat. Therefore, in senior citizens only machine exercises will be used to decrease the risk of injury.

Rep Speed

McGuff recommends that you perform these exercises slowly. The reason is that with faster performance, momentum has contributed to the movement of the

weight, as opposed to muscle fiber involvement. Slowing the movement can build more strength by increasing the stimulus for muscle growth. Therefore, this slower speed of lifting eliminates momentum, increases safety, and keeps your muscles under load for the duration of the set.

Higher Intensity Equals Higher Work Load

Thus, the higher the intensity of muscular work load, the higher the degree of cardiovascular and respiratory stimulation. Exposure to lifting heavier weights causes microscopic cellular damage that is later repaired by your body and in so doing increases your muscle mass and bone mineral density.

Frequency of Working Out

McGuff recommends starting out once every 7 days. Some people need to work out twice a week if they have trouble doing all the exercises to complete exhaustion. The amount of resistance you are using should progress in a stepwise manner and become more progressively difficult. If it gets to where you cannot increase the amount of resistance, you may need a longer recovery period.

Rest Periods between Exercises

McGuff recommends no more than 30 seconds to one minute to move to the next exercise. In other words, you want to move fast enough from exercise to exercise that you feel shortness of breath. You do not want to go so fast that you feel dizzy and want to pass out.

Seated Row

- Sit down and reach out and grab the handle bars of the machine (start of exercise)
- Pull the handle bars all the way to your chest (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Pulldown

- Sit down and reach up and grab the bar (start of exercise)
- Pull the bar down to your chest (finish of exercise)



START
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FINISH
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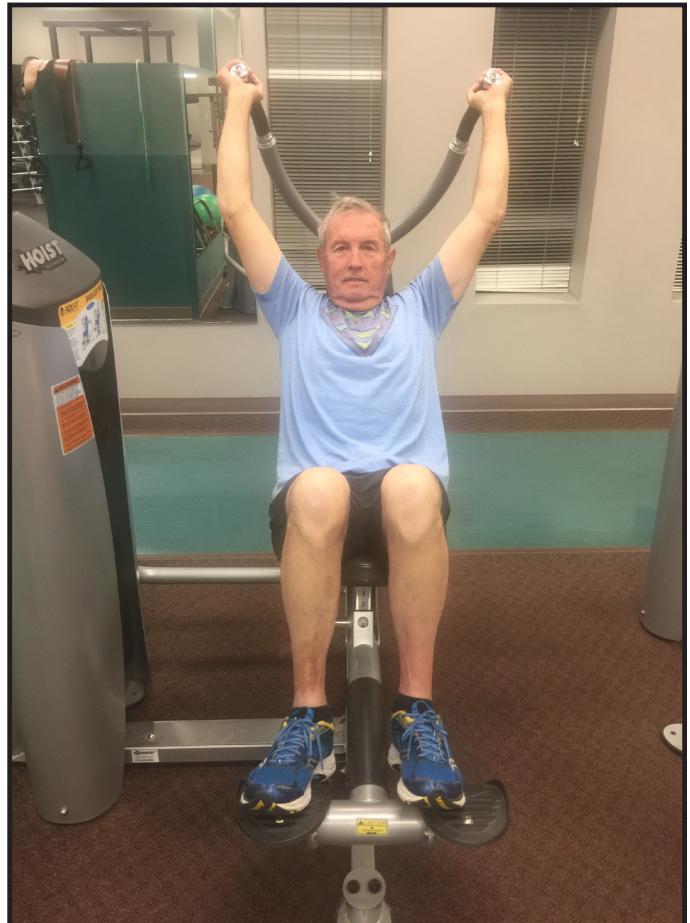
Overhead Press

- Sit down on seat and place your hands on the handles with palms pointing toward your body (start of exercise)
- Press the weight above your head and fully extend your arms (finish of exercise)



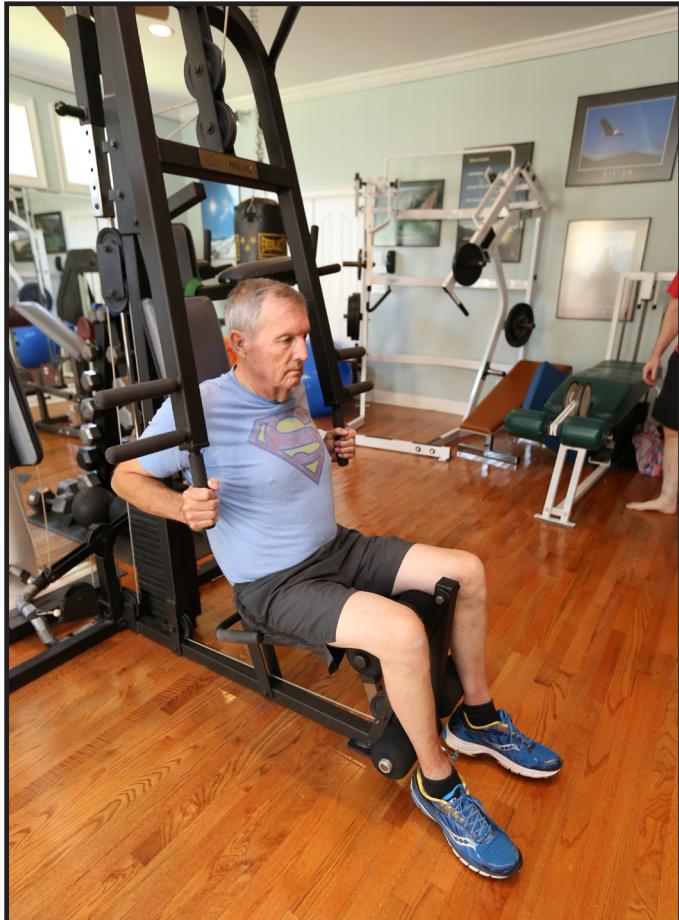
START
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EXERCISE



Chest Press

- Sit down on seat and place your hands on the handles with palms pointing toward your body (start of exercise)
- Press the weight above your head and fully extend your arms (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Leg Press

- Sit comfortably and place your feet on metal plate in front of you (start of exercise)
- Press the weight until your legs are nearly fully extended (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



ABDOMINAL EXERCISES

Keeping your abdominal muscles strong is more important than having six-pack abs. Your core muscles which include the lower back, hip flexors with gluteal muscles and the abdominal muscles keep your body stable and upright. Strong abs contributes to a healthy core and has the following important effects:

1. Reduced back pain. Your abdominals act as an anchor for muscles of the mid and lower back. If your abs are weak, it forces the back muscles to work harder to support your body. Abdominal strength improves the endurance of the muscles of your back so you fatigue less easily and are less vulnerable to strain or injury.
2. Strong abs also keeps your belly from protruding too far forward and altering your center of gravity. If your abs are weak and you are overweight, this forward lean will stress your back.
3. Strong abs prevents an exaggerated anterior tilt to the pelvis. If you have this anterior tilt, it will produce pressure on the lower discs of your back. Strong abs helps to keep your vertebra in alignment.

Therefore, abdominal exercises can build strength and stability that support a healthy back.

Abdominal Exercises are as follows:

- Abdominal Wheel Exercise
- Cable Crunches
- Reverse Crunches on Bench
- Planks

Abdominal Wheel Exercise

- Start from a kneeling position and place the wheel in front of you, under your chest in a spot where you feel balanced (start of exercise).
- Roll slowly outward until your arms are nearly fully extended (finish of exercise)



START
OF
EXERCISE

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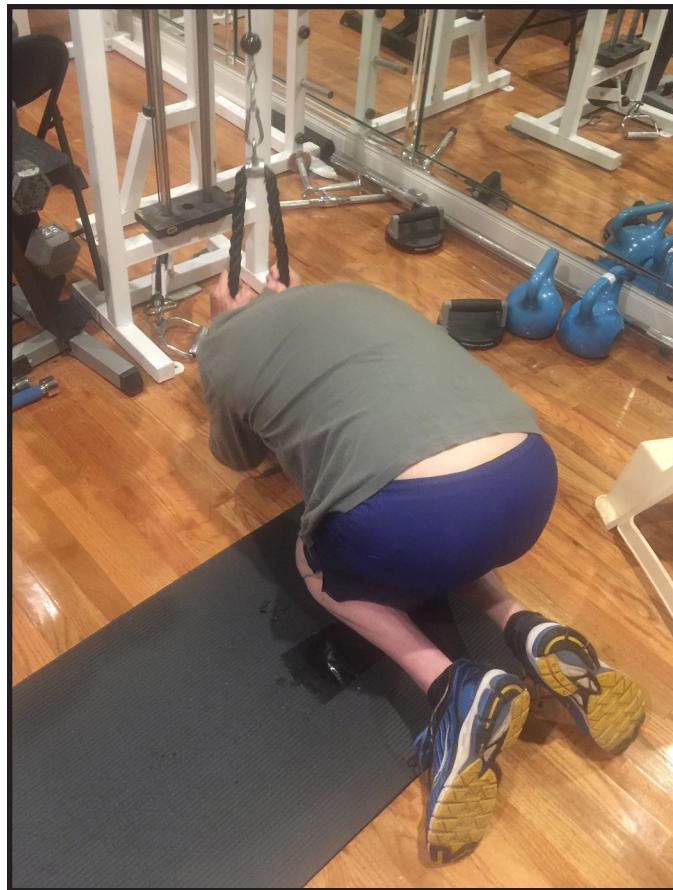
Cable Crunches

- Grab hold of an overhead pulley with both hands (start of exercise)
- Hold the rope in front of your forehead, and curl downward, and bring your head to your knees (finish of exercise)
- Hold the contraction at the bottom of the exercise



START
OF
EXERCISE

FINISH
OF
EXERCISE



Reverse Crunches on Bench

- Lie flat on your back on a bench
- Reach behind your head and hold the bench for support
- Bring your knees up as close to your head as possible, and contract at top of movement (finish of exercise)



START
OF
EXERCISE

FINISH
OF
EXERCISE



Planks

- Do first plank with arms extended for 30 seconds (1)
- Then do plank on elbows for 30 seconds (2)
- Then do left arm plank for 30 seconds (3)
- Then do right arm plank for 30 seconds (4)
- Then repeat plank 1 and plank 2 for a total of 3 minutes



PLANK 1 START



PLANK 2



PLANK 3



PLANK 4

SPRINT 8 PROTOCOL

This was originally described by Phil Campbell in his book, “Ready Set Go”. It is important to understand that all exercise is not created equal. Sprint 8 is the toughest of all exercises and it is the highest on the intensity scale below. Compared to high intensity weight training, Sprint 8 is king of the hill, as shown below. It is all out maximum results with minimum time.

Exercise Intensity Scale – From Lowest to Highest

- Walking – Lowest intensity
- Jogging – Moderate intensity
- HIIT (High-intensity-interval-training) – Severe intensity
- Sprint 8 – Critical intensity (the toughest)

Sprint 8 Protocol on Stationary Recumbent Bike as Described by Phil Campbell

- Warm up for 3 minutes
- Exercise as hard as you can for 30 seconds
- Recover for 90 seconds pedaling at a slow speed
- Repeat the high intensity exercise for another 30 seconds followed by 90 seconds of recovery for a total of 8 times.

If you are out of shape, you should start with only one or two repetitions until your body has time to adjust to the intensity of Sprint 8 protocol. In senior citizens, we will do the exercise with one-half the intensity and only do one or two repetitions when first beginning the Sprint 8 protocol.

Research Study with Sprint 8

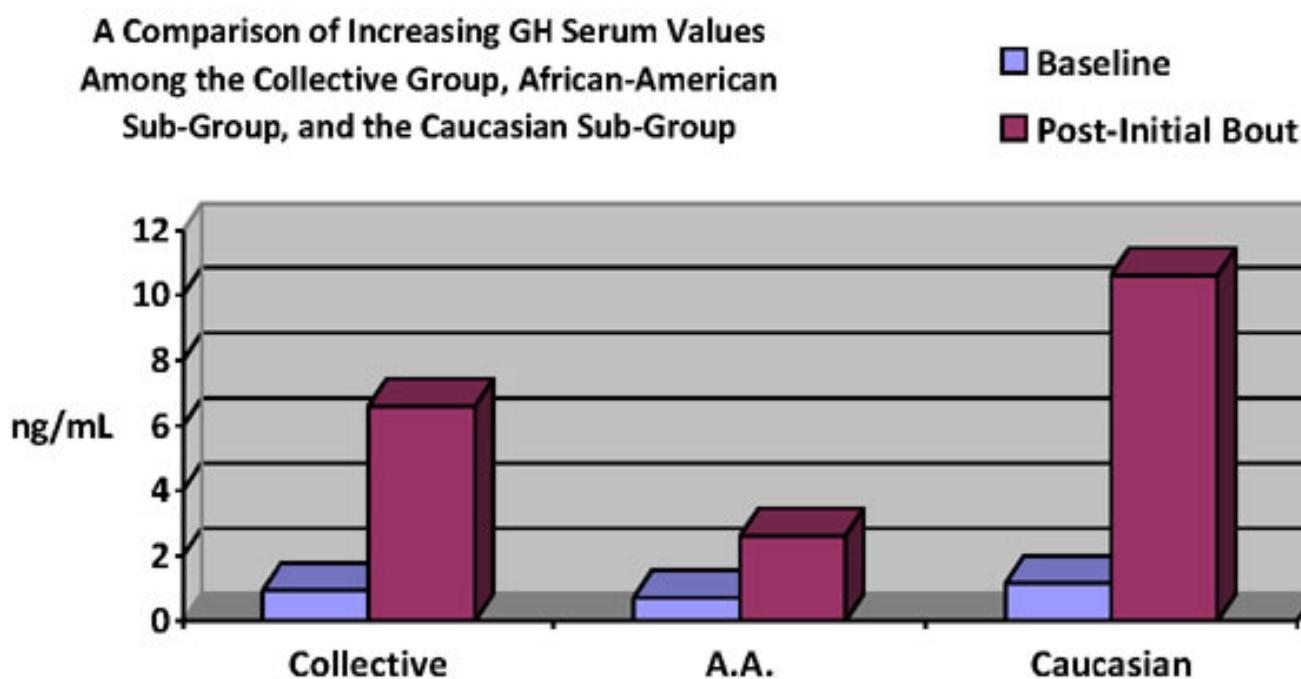
This study was performed in Brookhaven, Mississippi. The state of Mississippi has the highest obesity rate in the United States. The 20-minute, three-days-a-week exercise protocol causes the natural release of Human Growth Hormone. In only 8 weeks exercis-



Sprint 8 Protocol on exercise bike

ing using this protocol without dieting the following results were obtained:

- Body fat decreased 31% in 8 weeks
- BMI decreased 3.9% in 8 weeks
- Total cholesterol decreased 9.6%
- LDL decreased 12.4%
- Triglycerides decreased 16.1%
- HDL increased 2.0%
- Growth hormone values increased 603%



Everyone knows the favorable results produced by Growth Hormone injections. When growth hormone is injected, there is an average decrease of 14.4 % in body fat and an 8.8% gain in lean muscle mass. Growth hormone injections have been banned for athletes because they illegally improve performance. Billions of dollars are spent annually on artificial and supplemental Growth Hormone therapy, both legally and illegally. Numerous side effects are associated with artificial Growth Hormone injections, and they include:

- Arthritis and carpal tunnel syndrome
- Cardiomegaly (enlarged heart)
- Impotence
- Weakened glucose regulation and possible diabetes
- Hyperlipidemia
- Tumor production

This study showed that increasing Growth Hormone naturally was twice as effective as injecting Growth Hormone. Sprint 8 reduced body fat percentage by 31%, whereas injecting Growth Hormone reduced body fat by 14%. It is felt that Growth hormone when released by the pituitary repairs the muscles by:

- Elevating amino acid uptake within the muscle cells
- Increasing muscle cell protein synthesis
- Triggers insulin-like growth factor 1 (IGF-1) which is a potent anabolic hormone. IGF-1 can increase proteins synthesis leading to muscle hypertrophy
- Also, Growth Hormone causes lipolysis in adipose tissue for energy.

Most anti-obesity programs today only utilize slow muscle fibers, which include mostly aerobic activities such as walking or jogging. These activities do not activate your body's natural production of Growth Hormone. These programs usually require a near-starvation diet with the exercises and therefore often fail. This study required no dieting or change in the study participant's medications.

The change in lipid values was an additional plus that could even mimic taking cholesterol medications. If the Sprint 8 program could be linked with a good diet as outlined in our book, even more impressive results could be obtained in body fat percentage and lipid values. Billions of dollars could be saved in health care expenses by decreasing the risk of obtaining metabolic syndrome, which accounts for 75% of our health care costs.

Doing Sprint 8 with Mountain Climbers

We have found that doing Sprint 8 with Mountain Climbers is an awesome exercise. It affects nearly every muscle group in the body and includes; deltoids, biceps, obliques, quads, hamstrings and hip abductors. Doing Sprint 8 with mountain climbers allows you to exercise without having to buy expensive machines. It allows Sprint 8 to be done anywhere because it only requires your bodyweight to do the protocol. You can be on a beautiful beach or you can be in a hotel room and you are able to do the Sprint 8 protocol.

One reason the Mountain Climbers are my favorite for doing Sprint 8 is because you are working in a plank position. By holding the plank position throughout the Mountain Climbers you are increasing core strength better than crunches or sit-

ups. In addition to holding the plank you incorporate the fast motion of the legs, which creates actions from the muscles of your abdominals and lower back. They are forced to pull in and stabilize, which teaches your body to increase its core strength and stability.

In addition to core strength, Mountain Climbers improve your balance, agility, proprioception, and coordination. They benefit muscular and cardiovascular fitness by increasing strength, flexibility and blood circulation. Mountain Climbers require you to engage your upper arm muscles, core and legs. You must have the proper alignment of Mountain Climbers to get the most out of your workout as outlined below:

1. In the plank position, make sure your hands are directly underneath your shoulders, and are shoulder-width apart.
2. The feet are hip-width apart and your toes are curled under.
3. Your legs and arms are straight.
4. Your abdominals are strongly contracted, keeping your back from hyperextending.
5. Your chin is tucked in, and there is straight line from the crown of your head to your heels.

Once you are properly aligned:

Lift one foot off the floor, and then bring your knee up toward your chest while keeping your body in as straight a line as possible. Return to the starting position, and repeat the movement with your opposite leg (see below).



Start



Finish

Sprint 8 can also be performed on Stair Master®, elliptical, rowing machine, treadmill, swimming and sprints. I feel the elliptical, stationary bike and Mountain Climbers are safe to perform and give you an excellent workout. I do not encourage my patients to do the treadmill due to the risk of falling off of the treadmill. It is hard to ramp your speed up and down while doing the protocol. Running sprints is not safe in most of my patients due to risk of pulling a groin muscle or injuring your Achilles tendon. Some of my patients who are wheelchair bound can use the Krankcycle to perform the Sprint 8 protocol. Therefore, even if you are not ambulatory, you can still exercise using the Sprint 8 protocol.



Sprint 8 Protocol on a Krank Cycle



Sprint 8 Protocol on a Stair Master®

MY NUTRITIONAL PLAN

The foundation of my nutritional plan is based upon avoiding foods that can cause a surge in our insulin levels and the subsequent development of insulin resistance. Many individuals are consuming a lot of processed foods high in sugar, liquid calories and carbohydrates like breads and pasta that lead to high blood sugars. Your body has to produce more insulin to keep your blood sugar in a stable range. Eventually your cells become resistant to insulin. The higher your insulin levels are, the

worse your insulin resistance. Insulin resistance is the single most important factor in the development of metabolic syndrome which affects over 50% of people over the age of 65. Therefore, insulin resistance and metabolic syndrome are responsible for our rapid premature aging and all of its resultant diseases which include; heart disease, stroke, hypertension, diabetes, hyperlipidemia, dementia and cancer.

Fasting Blood Sugar Versus Insulin Level

Doctors commonly miss the initial warning signs of insulin resistance by relying upon a person's fasting blood sugar. The blood sugar does not elevate for a long time and diabetes is not diagnosed rapidly. High insulin levels are present years before diabetes is diagnosed by a fasting blood sugar. I see many patients who have normal blood sugar level and have elevated insulin levels and are already feeling symptoms of insulin resistance. This is the reason I like to measure insulin levels to see if my patients are at risk for insulin resistance.

What Is Normal Insulin Level?

Your fasting insulin level should be less than 5 mg/dl. If your insulin level is greater than 5, you are at risk for developing insulin resistance and metabolic syndrome. This requires you to modify your diet and to eat foods that do not cause a rapid surge in your blood sugar and subsequent elevated insulin levels. If your insulin level is greater than 5, you need to avoid the following food categories outlined below:

1. Sugar – Avoid all sugar (except Stevia), high fructose corn syrup, and all artificial sweeteners
2. Avoid processed grains including breads, cereals, pasta, crackers and pizza.
3. Avoid gluten-containing whole grains including wheat, barley, rye, oats, and spelt
4. All dairy
5. Starchy vegetables (See list on next page)
6. High glycemic fruits like melons, dried fruits, raisins and tropical fruits
7. Trans-fats and processed vegetable oils (avoid anything with hydrogenated oils)

Starchy Vegetables

1. Carrots	6. White potato
2. Peas	7. Artichokes
3. Turnips	8. Corn
4. Pumpkin	9. Beans
5. Sweet potato	10. Rutabaga

I have seen numerous patients get a jump start on obtaining faster results when they avoid starchy vegetables, grains, and fruits (except $\frac{1}{2}$ cup of berries daily). This will help decrease those blood sugar spikes and subsequent elevation of insulin levels.

Non-starchy vegetables are one of the healthiest foods on our planet. They are low-glycemic foods and cause a low insulin elevation. They have a lot of fiber and do not have the blood sugar spikes that are seen with other high-glycemic carbs. They help produce nitrous oxide which dilates our blood vessels which improves hypertension and decreases our risk for heart attacks. They can be eaten in unlimited quantities and are listed below:

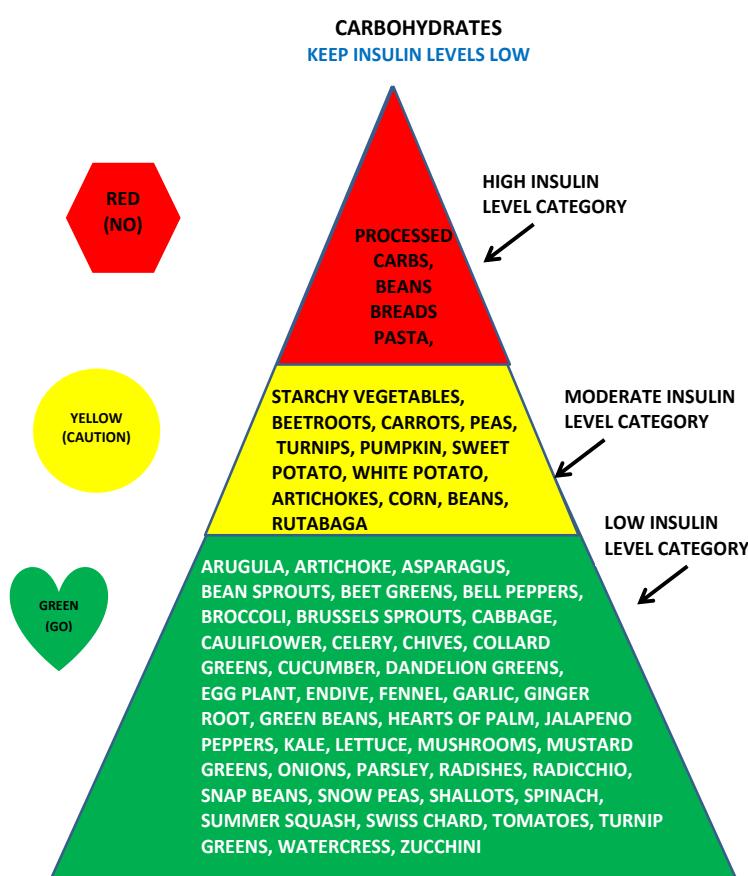
Non-Starchy Low- Glycemic Vegetables

1. Arugula	16. Eggplant
2. Artichoke	17. Endive
3. Asparagus	18. Fennel
4. Bean sprouts	19. Garlic
5. Beet greens	20. Ginger root
6. Bell peppers	21. Green beans
7. Broccoli	22. Jalapeno peppers
8. Brussels sprouts	23. Kale
9. Cabbage	24. Lettuces
10. Cauliflower	25. Mushrooms
11. Celery	26. Mustard greens
12. Chives	27. Onions
13. Collard greens	28. Parsley
14. Cucumber	29. Radishes
15. Dandelion greens	30. Spinach (<i>continued next page</i>)

- 31. Squash
- 33. Tomatoes
- 35. Watercress

- 32. Swiss chard
- 34. Turnip greens
- 36. Zucchini

When it comes to consuming carbs, it is helpful to think of them in terms of a traffic light. Non-starchy carbs are like a green light and you can eat them in unlimited amounts. Gluten-free whole grains (rice, quinoa, amaranth and buckwheat), legumes (peas, beans), and berries should only be eaten in moderation and are like the yellow traffic light. Starchy high-glycemic vegetables, high-glycemic fruits (melons, grapes, pineapples, and mangos) should have limited intake and are represented by the red traffic light. Processed carbs should never be eaten and are the worst food choice for your health. The best carbs are listed in order from the best to the worse as shown below and in our food pyramid.



1. Non-starchy low-glycemic vegetables
2. Berries
3. Legumes (beans, peas, lentils)
4. Gluten-free whole grains
5. Starchy high-glycemic vegetables
6. High-glycemic fruits
7. Processed Carbs

FATS

Fats are like carbohydrates in that there are good and bad fats. Fat is not all bad. In fact, we cannot live without it. Fat stores extra energy and insulates the body, helping to regulate temperature and protect our vital organs. Fat is required to absorb vitamins and is involved in the production of hormones and other compounds needed for bodily functions. Fats are the building blocks of your cell membranes, which are needed for optimum insulin function and blood sugar control.

It is true that taking in too much fat in your diet can lead to weight gain. But you need fats to have a healthy diet.

Monounsaturated Fats

The best fats are monounsaturated fats which have the following benefits:

1. Monounsaturated fats can protect you against heart disease by lowering your risk of metabolic syndrome
2. Lowers your risk of atrial fibrillation
3. Lowers the inflammation in your body
4. Improves insulin sensitivity and therefore lowers insulin resistance. This improves adipose dysfunction and leads to weight loss
5. Improves your mood by reducing anger and improving your resting energy expenditure
6. Strengthens bones by allowing your bones to absorb calcium efficiently, leading to denser bones and less occurrence of osteoporosis
7. May reduce cancer risks
8. Can reduce LDL (“bad”) cholesterol and increase HDL cholesterol

List of Monounsaturated Fats

1. Nuts (almonds, cashews, pecans, peanuts and macadamias)
2. Avocados
3. Olives
4. Olive oil
5. Peanut oil
6. Almond butter

However, don't go overboard on monounsaturated fats. They are high in calories and can cause weight gain. Do not exceed a handful of nuts daily.

Polyunsaturated Fats

There are two types of polyunsaturated fats: omega-3 fatty acids and omega-6 fatty acids. Polyunsaturated fats are essential fats. This means they are required for normal body functions. Since your body cannot make them, you must get them

from food. Polyunsaturated fats can improve your cholesterol profile by lowering LDL (“bad”) cholesterol and triglycerides. Examples of omega-3 fatty acids are salmon, sardines, mackerel, grass-fed beef, flaxseed, walnuts, and chia seeds. Other omega-3 foods used by vegans include Brussels sprouts, cauliflower and seaweed. Foods rich in omega-6 fatty acids include vegetable oils such as safflower, soybean, sunflower, walnut and corn oil.

Omega 3s and omega 6s exist in a ratio to one another. Omegas 6s are inflammatory, while omegas 3s are not. You need both to be healthy, but because of the inflammation factor, it is best to optimize omega 3s and minimize omega 6s.

Omegas 3s are special for the following reasons:

1. Omega 3s help to regulate your heart beat, reduce blood pressure, decrease clot formation and reduce all overall inflammation. This decreases risk of heart attacks and stroke. Also, omega-3s can decrease LDL and triglycerides, and normalize heart rhythms.
2. By suppressing inflammation, omega 3s can reduce the risk and slow the progression of cancer (colon, breast, and prostate).
3. Omega 3s can improve ADHD, Alzheimer, and other forms of cognitive decline and dementia.
4. Omega 3s may help improve symptoms of osteoarthritis and joint pain. Inflammatory bowel disease may also be relieved with omega-3 supplementation. Osteoporosis is improved by slowing bone loss and increasing bone density.

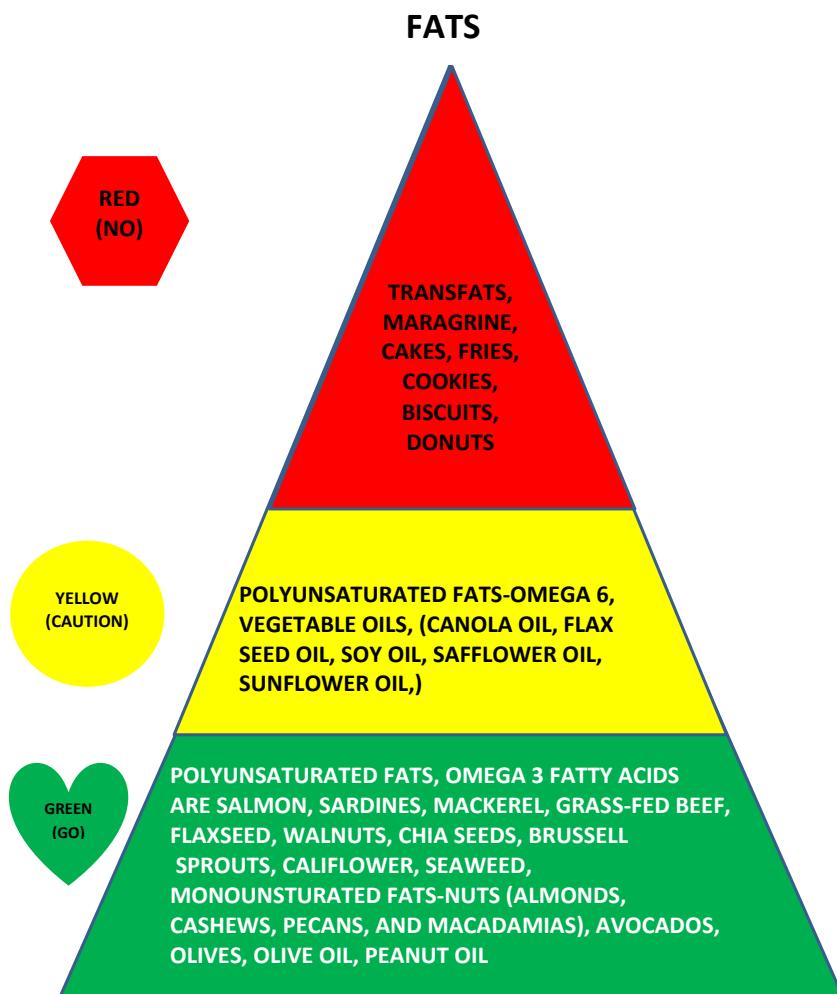
Omega 6 fats are necessary for survival, but they’re not nearly as beneficial as Omega 3s. Omega 6 fats help with brain function, muscle growth, and hormone production, but they cause inflammation. The idea is to not eat too much of omega-6s which can cause you to be unhealthy. For most people the ideal ratio of omega-6s to omega-3s is about 4:1. The average American eats a ratio of 12:1 to 25:1, which is not good.

The reason for the skewed ratio in the U.S. is the types of oils in our foods. The most common source of omega 6s is found in corn oil, soybean oil, safflower oil, cottonseed oil, and sunflower oil. These oils are cheap to produce and are used in processed foods like candy, cookies, crackers, popcorn, granola, margarine, pizza

and other snacks. Many of these oils are genetically modified and produced with unhealthy solvents.

Omega 6 oils are unstable because they are made of polyunsaturated fats that have multiple binding sites that are exposed and vulnerable to oxidation. Cooking at high temperatures, microwaving or frying can oxidize the fats. This can cause inflammation, damage your DNA, and increase your risk for cancer.

These vegetable oils can undergo a process called hydrogenation so they can be used to prolong the shelf life of packaged foods. Hydrogenation takes already harmful fats and converts them into trans-fat. Trans fats are called the “heart attack fat” and they increase LDL (“bad”) cholesterol and lower the good (HDL) cholesterol. They increase the risk of heart disease and stroke, and raise the risk of diabetes. There are no nutritional benefits and there are obvious adverse metabolic consequences. The Food and Drug Administration has ruled that food companies must remove hydrogenated oils and trans- fats from their products by June 2018. The food pyramid for fats is shown to the right.



PROTEINS

The word protein comes from the Greek word “protos” meaning first. Proteins are essential for the functioning and structure of all living cells. It is important to eat high quality protein for blood sugar and insulin balance and hunger control. The high quality proteins are listed on the following page and are a green color on our

food pyramid:

1. Nuts (almonds, walnuts, and pecans)
2. Free range eggs
3. Wild fish such as salmon, sardines, herring and small halibut)
4. Mercury free shrimp and scallops
5. Organic grass fed and hormone free poultry and cattle
6. Wild venison, elk, buffalo, and turkey

Red meat (beef, lamb, and pork) is given a yellow color (caution) because it is not as healthy as the proteins listed above. It is recommended that you only consume this once a week. Try not to eat a serving of meat larger than a deck of cards.

Processed meats (bacon, sausage, hot dogs, deli meats and fast food sandwiches) are colored a red on our food pyramid. Processed meat has more preservatives, more fat and calories and four times the salt. People who eat processed meat daily have a higher risk of heart disease and diabetes. The food pyramid for proteins is shown at right:

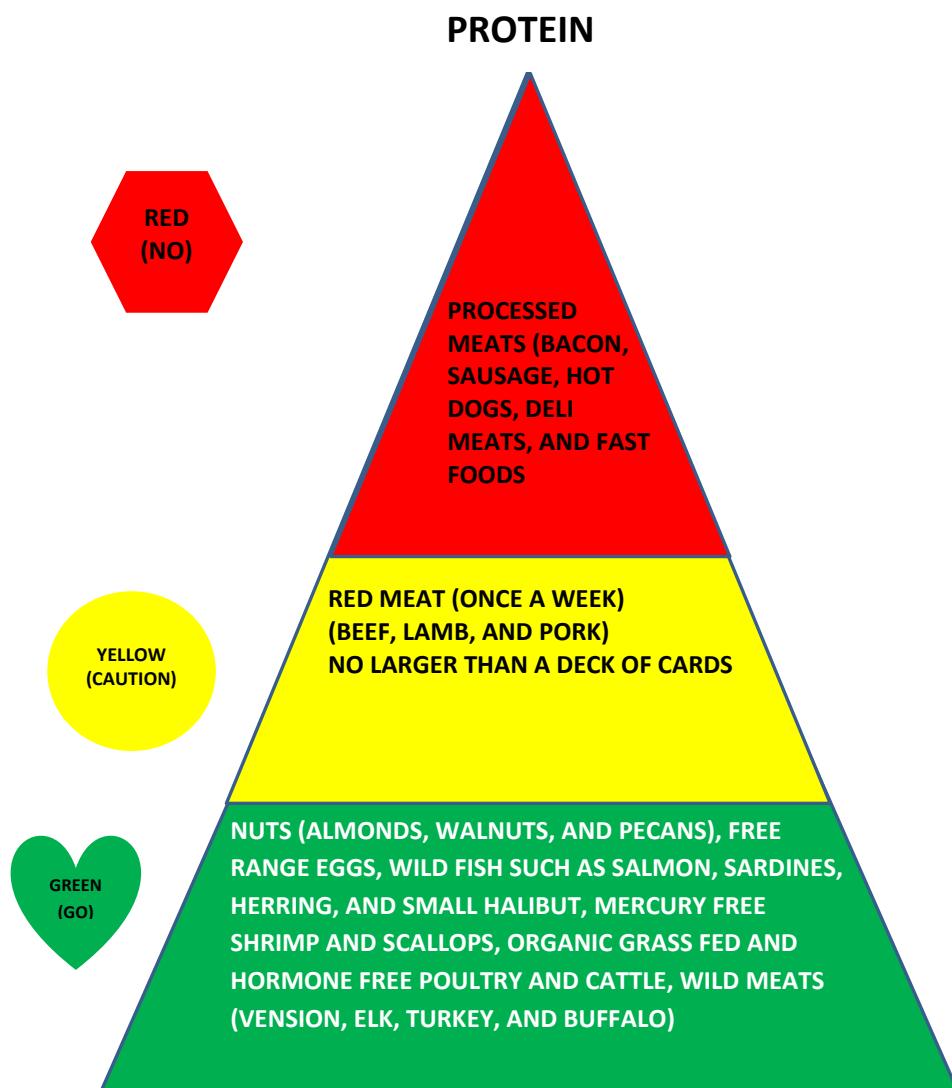
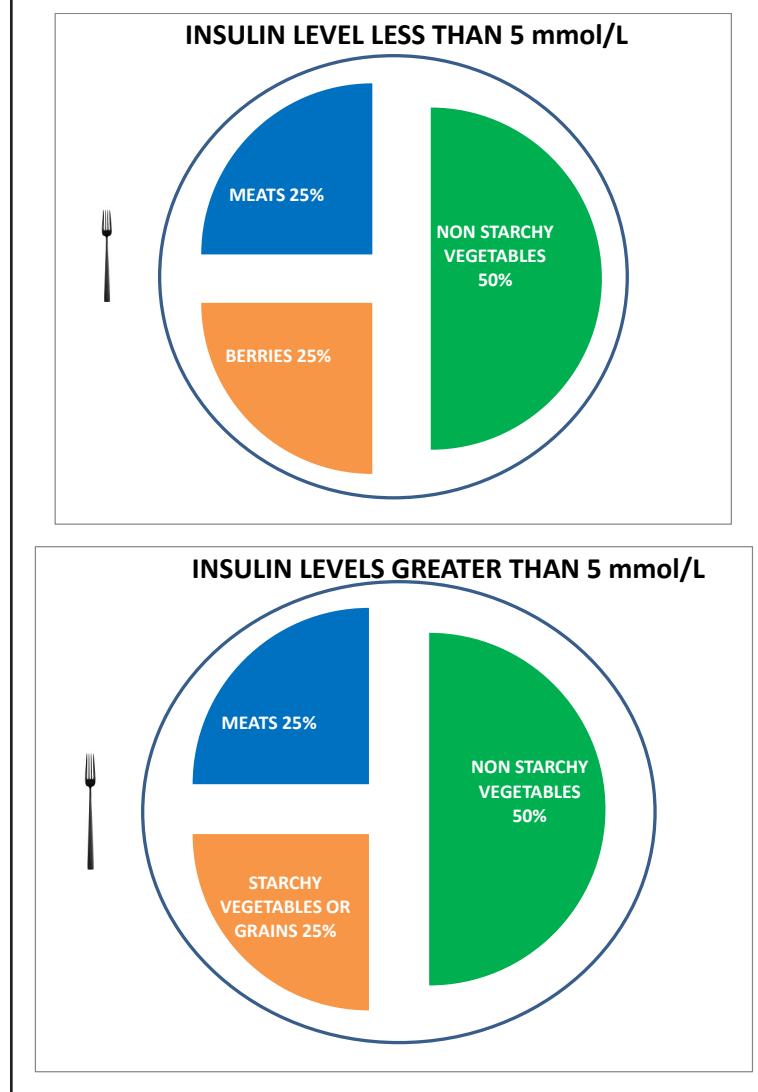


PLATE PORTIONS

The plate portions based upon insulin levels is illustrated on the next page. This is a modified version of the government's plate portions called "my plate."

THE PLATE PORTIONS BASED UPON INSULIN LEVELS



help warn you of trouble ahead. The insulin level can be elevated years before your blood sugar becomes elevated.

The higher your insulin levels are, the worse your insulin resistance. As your insulin resistance worsens, your body starts to lose muscle and gain fat, which is the first sign of metabolic syndrome. This is followed by inflammation and oxidative stress. The initial insult leads to the following downstream effects:

- High blood pressure
- High cholesterol
- Low HDL
- High triglycerides
- Poor sex drive

Check Your Insulin Level – It Could Save Your Life

As a cardiologist for the last 30 years, I now realize that pre-diabetes can kill. One study showed that about two-thirds of all patients admitted to the emergency room with heart attacks had pre-diabetes or undiagnosed diabetes. Another study found that the risk of heart attack increases with any increase in average blood sugar, even for those who do not have diabetes.

Pre-diabetes is really metabolic syndrome with insulin resistance. A lot of people think pre-diabetes is just a warning sign, but it can kill you even before you become a full blown diabetic. Just like the above study, a lot of people have heart attacks that are pre-diabetic. Therefore, obtaining an insulin level can

- Infertility
- Thickening of blood (blood clots)
- Increased risk of cancer
- Increased risk of heart attack and stroke
- Increased dementia
- Increased depression

Lowering Your Blood Sugar is Not the Only Answer

As we learned from the ACCORD study in the New England Journal of Medicine in 2008, lowering your blood sugar may not make you live longer. Surprisingly, the patients who had their blood sugar lowered the most had a higher risk of death. The study was stopped early due to more deaths and heart attacks.

Lowering Your Insulin Level is the Answer

The problem with treating an elevated blood sugar is that a lot of times we increase insulin levels in order to lower our blood sugars. We sometimes start people on insulin or oral hypoglycemic agents which do help lower our blood sugar. Unfortunately, they do increase our insulin levels. Since insulin is our fat storage hormone, we rapidly drive fat storage and subsequent obesity and metabolic syndrome. Therefore, the answer is to avoid increasing insulin by the following methods:

Avoid drugs that increase insulin production (see below) unless there are no other options.

- Use Metformin which improves insulin sensitivity
- Avoid foods that rapidly increase blood sugar and subsequent insulin levels.
- Try to eat green leafy vegetables which have lower insulin levels.
- Avoid grains, starchy vegetables, sugar and processed carbs. Avoid gluten and dairy.
- For fruits use berries which have lower calories and glycemic index. Avoid melons and tropical fruits due to higher insulin response.
- Try to limit protein intake to size of deck of cards and use natural wild high quality protein such as deer, elk, turkey and bison. Eat grass fed cattle and chicken. Limit steak to once a week. Eat fish like salmon, halibut, herring and

sardines that have omega-3 fatty acids.

- Avoid omega-6 fatty acids found in vegetable oils
- For fats take in healthy nuts like walnuts, almonds, pecans and macadamia nuts. Use olive oil and coconut oil for oils.
- Exercise to lower insulin resistance with high-intensity weight training and Sprint 8.

Drugs That Increase Insulin Production

Amylin Mimetics

Amylin mimetics are injectable drugs that stimulate the release of insulin. These medications are used in combination with injectable insulin. They're used when symptoms of type 1 diabetes don't improve with insulin injections alone. An example of this type of medication is pramlintide (SymlinPen).

Sodium Glucose Transporter 2 Inhibitors

Sodium glucose transporter 2 inhibitors (SGLT2s) are injectable medications that help increase the production of insulin in the body. They're sometimes prescribed along with other medication to people with type 2 diabetes. An example of an SGLT2 is canagliflozin (Invokana).

Incretin Mimetics

Incretin mimetics are another class of injectable insulin-increasing drugs. Like SGLT2s, they're often prescribed along with other types of medication to help manage glucose levels. Types of incretin mimetics include:

- exenatide immediate-release (Byetta)
- exenatide extended-release (Bydureon)
- liraglutide (Victoza)

Dipeptidyl-peptidase 4 Inhibitors

Dipeptidyl peptidase 4 inhibitors (DPP-4s) are oral pills that increase the release of insulin from the pancreas. These drugs are often combined with other types of

medications to treat people with type 2 diabetes. Examples of DPP-4s include:

- saxagliptin (Onglyza)
- sitagliptin (Januvia)
- linagliptin (Tradjenta)

Sulfonylureas

Sulfonylureas are an older class of medication used to treat people with diabetes. They're usually given orally to those who are unable to control their blood glucose levels through diet and exercise. They work by increasing the release of insulin from the pancreas to reduce blood glucose levels. Examples of sulfonylureas include:

- glyburide (Micronase)
- glipizide (Glucotrol)
- glimepiride (Amaryl)
- chlorpropamide (generic only in U.S.)
- tolazamide (generic only in U.S.)
- tolbutamide (generic only in U.S.)

Glinides

Glinides are oral insulin-increasing drugs given to people with type 2 diabetes. They usually take effect more quickly than other medications. However, they don't last long and need to be taken multiple times per day. They're often prescribed with another medication, especially if symptoms don't improve with diet and lifestyle changes. Examples of glinides include:

- nateglinide (Starlix)
- repaglinide (Prandin)

SUMMARY

1. Obtain a fasting insulin level.
2. If your insulin level is abnormal (greater than 5), then you are at risk for obesity, hypertension, diabetes, hyperlipidemia (increased triglycerides, low HDL), heart attack, stroke, dementia, fatty liver, polycystic ovarian syndrome, and cancer.
3. If you eat food that spikes your insulin level, you will gain weight and become sick. If you eat food that reduces your insulin level, you will lose weight and become healthy.
4. An insulin level greater than 5 requires that you avoid the intake of fattening carbohydrates which includes: sugar, processed carbohydrates, grains, dairy, gluten, and starchy vegetables. Also, fruits should be restricted except for berries.
5. You must avoid the following liquid calories: fruit juices, sports drinks, sodas, and diet drinks which are associated with weight gain and diabetes.
6. Take in healthy fats such as olive oil, avocados, nuts, fish (wild salmon, sardines, herring, and halibut), organic coconut oil, and omega-3 fats from grass-fed animals.
7. Take in healthy protein which includes: Nuts (Almonds, Walnuts, and Peanuts), free range eggs, wild fish such as salmon, sardines, herring, and small halibut, mercury free shrimp and scallops, organic grass fed and hormone free poultry and cattle, wild venison, elk, turkey, and buffalo.
8. Eat freely of leafy green, non-starchy vegetables which have a low insulin response. They are full of nitrates that can produce nitrous oxide which improves blood pressure and sexual dysfunction. They naturally help to detoxify the liver and have anti-cancer and anti-estrogen effects: arugula, artichoke, asparagus, bean sprouts, beet greens, bell peppers, broccoli, brussels sprouts, cabbage, cauliflower, celery, chives, collards greens, cucumber, dandelion greens, eggplant, endive, fennel, garlic, ginger root, green beans, hearts of palm, jalapeno peppers, kale, lettuce, mushrooms, mustard greens, onions, parsley, radishes, radicchio, snap beans, snow peas, shallots, spinach, summer squash, swiss chard, tomatoes, turnip greens, watercress, zucchini.
9. You must reduce inflammation in your body by avoiding sugar, processed carbs, too many processed omega-6 plant oils (soybean oil, corn oil), trans-fats, food allergies due to gluten in grains, imbalances in gut bacteria with overuse of antibiotics, stress, and sedentary lifestyle.

10. Avoid eating within 3 hours of bedtime to decrease insulin levels.
11. Get 7-8 hours of sleep to decrease sugar and carb cravings and to maintain your testosterone and growth hormones. Get in bed before 10:00 p.m., since the greatest amount of growth hormone is produced naturally between 10:00 p.m. and 12:00 p.m.
12. Avoid gluten and dairy if your insulin levels are high.
13. Avoid alcohol which can increase triglycerides, elevate blood pressure, impair gut function, interrupt sleep, impair liver function, and add additional worthless calories.
14. Never eat carbs alone. Combine carbs with protein and fats at every meal or snack. For example, eat an apple with some nuts. This lowers your insulin response.
15. Gluten free whole grains (brown rice, quinoa, amaranth, and teff) can be eaten if insulin levels are normal. Avoid wheat, barley, rye, spelt, kamut, and triticale which have gluten.
16. Organic dairy and yogurt can be eaten with normal insulin levels. Milk can increase insulin levels and should be avoided with high insulin levels.
17. Eat healthy proteins, which include: free-range eggs, fish (wild salmon, sardines, herring and halibut), shrimp, scallops, and lean organic grass-fed beef and poultry. Wild deer, elk, and turkeys are excellent choices of protein.
18. Supplements that have been proven to improve insulin sensitivity and metabolic syndrome are Vitamin D and fish oil. Get your Vitamin D level checked by a physician and you will need to obtain therapeutic levels to improve your health. Take 1 gram of high quality fish oil daily that has no mercury contamination to lower triglycerides, reduce inflammation, prevent blood clots and lower your risk of heart attack.
19. Exercise is one of the best treatments to lower insulin resistance. It is important that we avoid sitting as much as possible. Always keep moving and try to recruit all three muscle fiber types during exercise. Walking will activate the slow muscle fiber and can provide health benefits. Try to use a pedometer and obtain 10,000 steps daily. You will be activating your fast muscle fibers with high-intensity weight training which can cause some elevation of testosterone and growth hormone. Sprint 8 training activates the super-fast fibers which are the main fiber for causing massive surges in your testosterone and growth hormone. When you activate your super-fast fibers, you turn your body into a fat-burning, muscle building machine.

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