

**EXERCISE AND NUTRITION NEEDS OF EMERGENCY
RESPONDERS FOR OPTIMUM OUPUT AND
PERFORMANCE**

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ABSTRACT

“Exercise and Nutrition Needs of The Emergency Responder”

Fighting a fire is a very demanding job. The fire fighter's are exposed to high temperatures and demanding work. If they are not properly fueled and trained, their ability to perform is limited. In training fire fighter's across the United States, there are two key aspects I have found which affect their ability to perform their job and recover in time, for the next fire. One is the proper calorie intake in the right relationship of protein, carbohydrates and fats based on an individuals muscle mass and movement and the second is an appropriate aerobic training program.

Maintaining the proper calorie intake on the job and on the fire fighter's days off is usually a problem. Often they work second jobs, which are physically demanding, and they do not eat much. When they come back to the station they are behind on calories and their metabolism has slowed down. The metabolism, which is how the body uses food for fuel, is slowed due to the low calorie average on the previous 2 days. Then on the day they are at the station, they tend to eat more volume and sometimes, not move much. This extreme pattern causes an increase in body fat, resulting in a decrease in performance on the job.

When one's body fat is high, it decreases performance because fat is an inefficient fuel. Blood does not flow through a fat cell as well as muscle. The key to creating an appropriate exercise program is to focus on teaching the body how to burn body fat. The philosophy of “no pain, no gain” is no longer valid. In order to burn body fat, an aerobic program consisting of lower intensity, longer duration activity needs to be the guideline.

If one trains at a high intensity all the time and does not establish a good aerobic base, they will maintain body fat even though they are putting in the same effort. Monitoring the heart rate is a way to establish an appropriate output for each individual. The training zone is adjusted for each individual, based on their age and conditioning level. The progression through the program is continuously changed, due to an increase in efficiency. The result is lower body fat, more overall strength, longer endurance and quicker recovery form fighting a fire.

This presentation allows the participant to evaluate what they are presently doing in their nutrition and exercise program and determine what is and is not working. Then establish appropriate food choice plan for their blood type, body type, muscle mass and activity, along with an exercise program which focuses on fat burning.

The result is a leaner, fit individual who can “have their cake and eat it too!” This lifestyle, which can be managed, is not a lot of work once the shift in thinking occurs on how to balance food choices, in order to obtain optimum mental alertness and have more energy.

This program has been designed to assist you with fine-tuning your nutritional

and exercise needs, so you can achieve higher levels of performance, quicker recoveries and optimum health.

OBJECTIVES

By the end of the session, attendees will be able to:

1. Be challenged with new ways of thinking that allow you to look at “what you are doing that is working and why along with what you are doing that is not working and why” within your present exercise and nutrition program.
2. Determine how much water you need to consume.
3. Determine the appropriate zone to workout in to achieve the optimum level of output.
4. Determine ways to approach your food combinations to affect how you feel. Ultimately it is the relationship between the protein, carbohydrates and fat at each meal for your body type, blood type, activity level and muscle mass.

INTRODUCTION

Within any city government there are two classes of employees who are sworn to serve and protect the citizens. They are the fire and police personnel. These individuals need to be in good health to perform their jobs. The physical demands placed upon them are far greater than those of most other city positions.

The requirements to become a police officer or a fire fighter are quite strict. Once an individual has made the appropriate squad, the requirements for maintaining the job are often not as strict as the pre-employment test. The biggest concern for the fire fighters is they have a job that is not only physical, but has an increased risk exposure due to the added weight of their protective clothing and the exposure to high temperatures while fighting fires.

Maintaining health is critical as a fire fighter because the demands of the job can leave them feeling exhausted upon completion of a fire call, making it difficult to go on additional calls that come in during their shift. To better understand the specific needs of the fire fighters let's look at two key areas of concern for maintaining good health. These areas are the role of nutrition and exercise in your daily schedule.

According to Whitney and Rolfes, nutrition is, "the study of nutrients in foods and of the body's handling of them (including ingestion, digestion, absorption,

transport, metabolism interaction, storage and excretion)." It also encompasses the environment and its affect on the body and how it uses the nutrients as well as the human behavior involved in these processes. This can affect what foods are selected and how the meals are planned at the stations.

Exercise or more commonly called, "physical fitness", is defined by the American College of Sports Medicine as, "a set of attributes that people have or achieve that relates to the ability to perform physical activity." This includes the areas of cardio-respiratory endurance, body composition, muscular strength and endurance and flexibility. All of these are areas of concern to fire fighters so they can be better prepared for the job and can enjoy a greater quality of life when they retire.

Physical fitness is defined in the National Fire Academy (1979) report as the capacity to meet all typical and emergency job-related physical demands efficiently and safely while maintaining a reserve of energy adequate to pursue the leisure activities of one's choice. For the sake of the public they are sworn to protect and serve, for the sake of their loved ones, for their own health and wellness, fire fighters need and deserve ongoing health programs.

The physical fitness aspect alone is not the only area of concern, it is important to evaluate what the fire fighter's are eating on and off the job. The incidence of coronary heart disease is very high among fire fighters since most are largely sedentary when they are not actually fighting a fire. The dietary selections have come a long way but are still not as balanced as they need to be to prevent blockages in the arteries. If the fire fighters are not moving on a daily basis and are consuming a high fat diet, they are at a great exposure to suffer a heart attack on the job due to the nature of the extreme exposures when they are in the course of employment.

When working to develop a wellness program there are a number of parameters which need to be evaluated for overall health standards. Some of these include a lower heart rate, a reduction in blood pressure, a change in the blood lipid profile with a lower coronary risk ratio, a change in body fat composition, an increase in overall strength and flexibility and an improvement in their cardiovascular conditioning.

PHYSICAL FITNESS AND JOB PERFORMANCE

The job of fighting fires is very demanding. Upon arriving and assessing the situation, a fireman may perform many tasks, which include deploying and carrying a charged hose, ladder work, climbing stairs and carrying victims. The added temperature from the fire increases the risk of overheating. The intensity of the work

increases the heart rate substantially putting undue stress on the heart. For an individual who is poorly conditioned, such exertion can be life threatening.

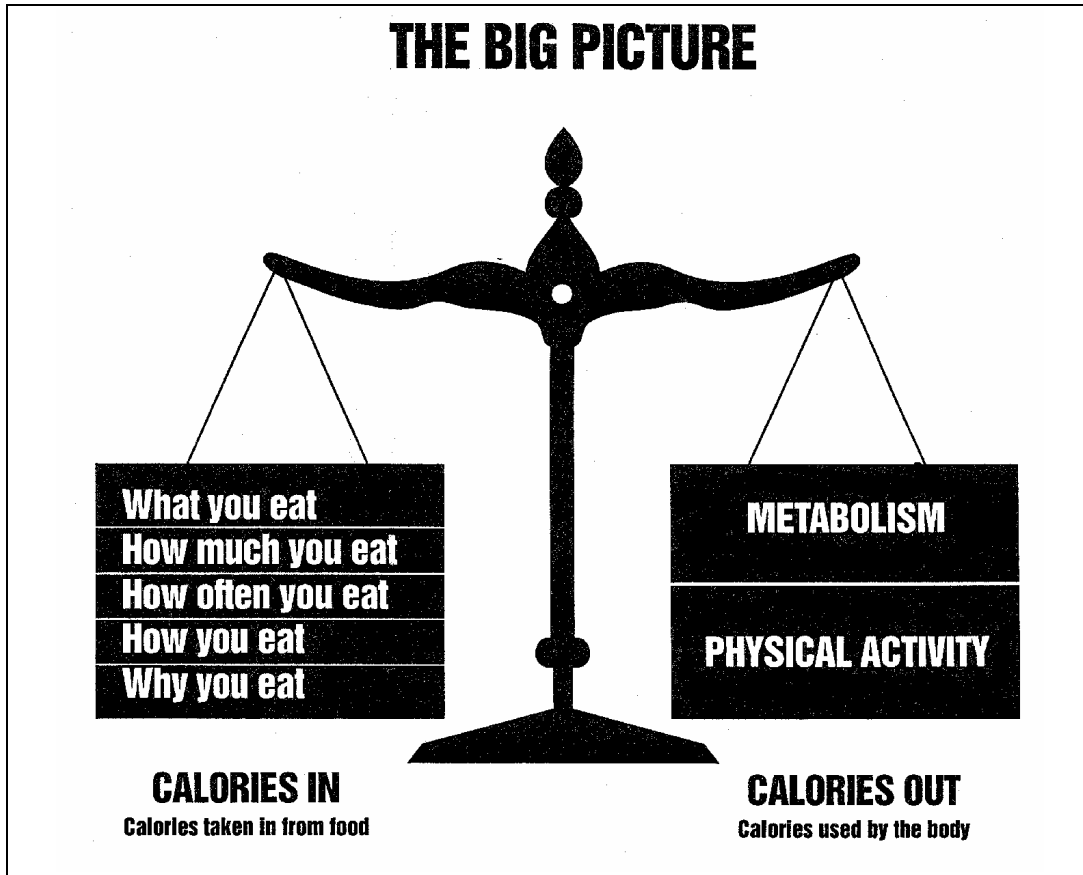
Given these conditions it seems advisable to improve the fitness of the fire fighters. Studies are continuously being done to document the fitness level of the fire fighters versus sedentary males. Unfortunately, the fire fighters did not fare much better than the males in a number of studies. The question becomes, "Can physical fitness programs produce measurable improvements in the work performance of public safety personnel?" As discussed below the answer seems to be yes, fire fighters on a fitness program, worked longer, used less oxygen to perform the task and recovered quicker. After 6 months on an individualized fitness program, the participating fire fighters had increased their fitness in the measured areas.

Health and the Fire Fighter

The implementation of a physical fitness program will not only help with the work production, but also with reducing the risk of coronary heart disease. As previously addressed, the increased exposure to the heat and demands of the job pose a potential safety hazard to fire fighters and their health. Along with dietary habits and a systematic exercise program, a reduction in coronary heart disease can be documented (Leon, Connett, Jacobs, Rauramaa, 1987).

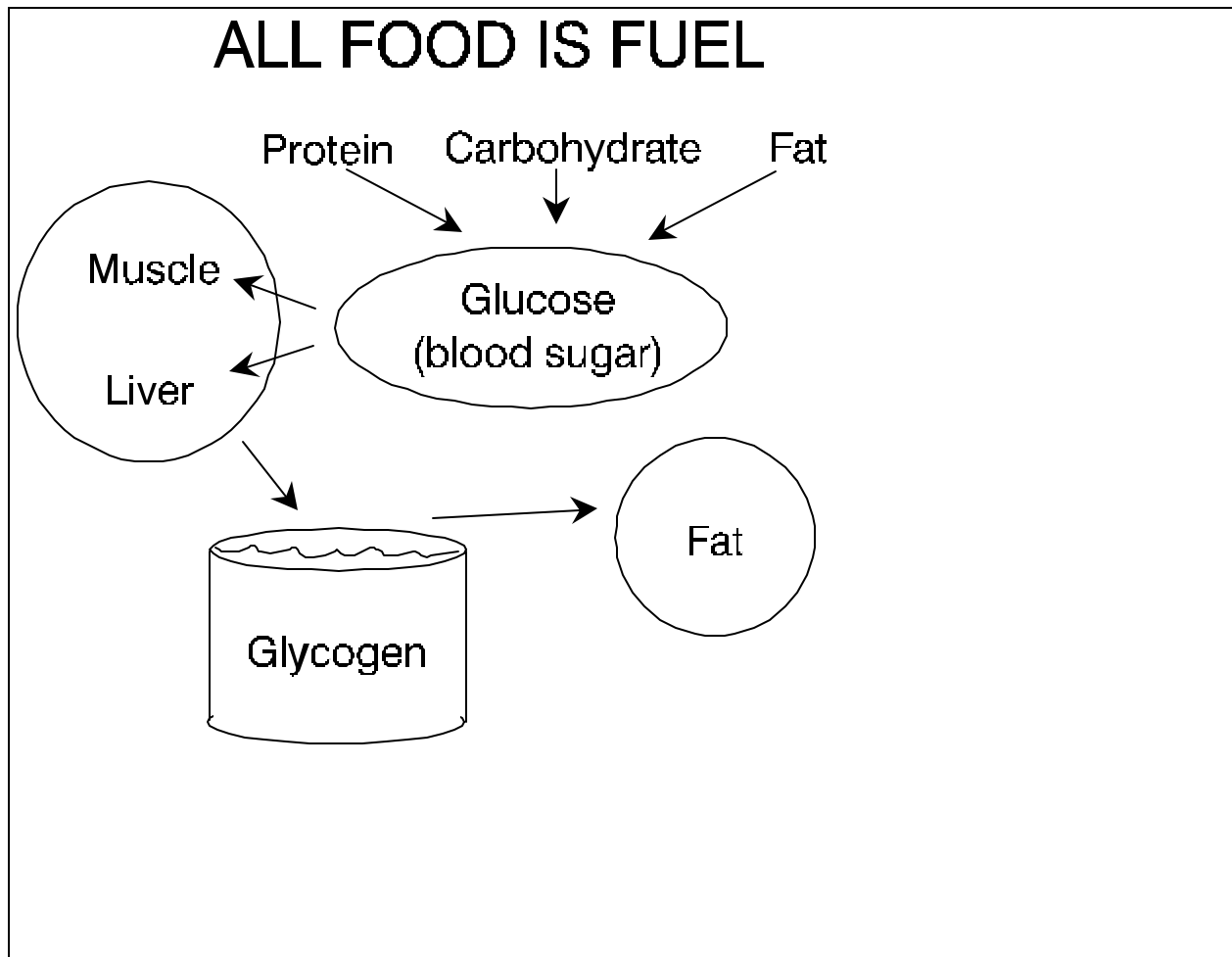
The Big Picture

To make change in the exercise and nutrition areas, we must first look at the big picture.



This is a balanced scale of calories in and calories out. Ideally we would like to get to a point where our body naturally tells us what to eat and when, in relationship to the exercise we did or did not perform that day. The calories in are coming from the food system. The calories out are burned through exercise and our body's metabolism. (Metabolism is simply the way in which the body eats the food for fuel). A calorie is the energy it takes to raise 1 gram of water 1 degrees Celsius.

All food is fuel, there is no such thing as good food and bad food as much as there are better choices. All food over a period of time breaks down into glucose. Glucose travels in our body as blood sugar. The glucose travels around the body and stores in the liver and muscles as glycogen. There is only so much glycogen at any one time we can store. It is about 2000 calories or approximately 45 minutes to one hour of high intensity expenditure.



Once that storage is used, we find ourselves quite tired and sore. We use the glycogen stores through high intensity exercise and low calorie diets, which cause our bodies to experience starvation. As a protection, when the body experiences a starvation mode, it slows down the metabolism (it is not sure when it will be fed again). This triggers the body to store what it is given as food. This is stored as fat. In addition, if the body is slowed down metabolically it will not use the food it does eat as effectively. This leaves the body in a nutrient deficiency, which can lead to internal health problems in the long run.

Since fighting a fire is a very high intensity exercise due to the heat exposure and additional weight from the bunker gear, fuel requirements need to be considered. The additional heat causes the heart rate to elevate quickly. The higher heart rate triggers the body to utilize blood glucose for fuel, consequently stripping the stored glycogen. If additional fuel is not brought into the body during the rehabilitation cycle the performance level will deteriorate over time.

When looking for possible food sources, check the label for glucose polymers and/or fructose as opposed to sucrose or corn syrup. The first two are more stable

and will keep you from going up and down in your blood sugar levels. If you have become depleted, take in a glucose polymer mixture drink to replenish the body within the first 1/2 hour after the exertion so your body can begin to re-synthesize new glycogen within 8 hours. Should you fail to fuel back up, the body takes 20 hours to replenish the stored glycogen. This is the difference in feeling good on your days off versus wiped out.

Dr. Barry Sear's has found that if you bring in some protein and a little fat in addition to the carbohydrates, during the rehabilitation cycle from high intensity exercise, you will recover quicker and maintain a more stable blood sugar level. If the body is actually receiving fuel it will not experience such extreme drop offs and can maintain a stronger immune system while repairing. Not everyone uses the same percentage of protein, carbohydrates and fats. This is often determined by your body type and blood type factors. (More on this later)

SPECIAL FUEL NEEDS FOR THE FIRE FIGHTER

There are many energy drinks and energy bars on the market, which meet these criteria. Some of drinks that have been successfully used by a number of departments are Twin Labs "Ultra Fuel" and "Hydra, "Endurox" (company name I am not sure on) and several products by E-Caps called Hammer Gel and Sustained Energy. They can be reached at 1-800-336-1977. Tell them you are a fire fighter and heard me speak.

Some energy bars to work with might be Balance Outdoor, specifically Outdoor which is different than the regular Balance that come in a shiny foil wrapper. These are available at many grocery stores, health food stores, bike stores, and some Walmart stores. The Biochem Ultimate Protein Bar, which still has some carbohydrates and a little fat in them but is mostly protein, along with Luna Bars and other bars that do not have an excessively high total of carbohydrate grams.

Another product that is very balanced and great to use in rehab or after a hard workout is "Jogmate". It is a tube that has a pudding consistency in chocolate or vanilla flavor. The proteins, carbohydrates and fats are already balanced in the right relationship. Some of these are available in regular stores, health food stores athletic stores or you can contact them at 1 800 277 9566 to check for a location near you and to inquire on pricing for government agencies, reference my name and that you are a emergency medical personnel person. It is important to try different products for flavor and texture because if they do not like the flavor, they will not use the product and then it is not helpful.

HOW DO WE CREATE FAT?

Now there are some other considerations with the use of food fuels in our body. If we train the body to identify fat as a source of fuel, the body will use a higher percentage per minute of the fat even at higher intensity expenditures. There are two key ways in which we create fat as a storage component: 1) we eat more calories than we expend and 2) we do not eat enough and cause the body to sense a starvation mode. In response to a starvation mode, the body begins to store as a protection mechanism and now we're eating less than we were before, trying to exercise, are tired, can not perform and are getting fatter.

There is also some consideration on the types of foods we are presently eating. If the distribution of carbohydrates, proteins, and fats is not appropriate for your chemical make-up, your body will store fat. We are trying to train the body to identify its stored fat for fuel through exercise but are finding that we can also access the fat through the correct hormonal balance of our diet. In Dr. Barry Sears, "Mastering the Zone" or "One Week in the Life of the Zone" books, he discusses this at great lengths and shows you how to set up a customized program based on your lean body mass and activity.

The lean body mass measurement is the most accurate way to determine your calorie need and food choices for an optimum nutritional balance, since your muscle tissue is the more metabolically active. If you properly feed the muscle mass you will not experience starvation and can maintain the existing muscle tissue, allowing more muscle to develop from the weight training and other exercise. This increase in muscle mass will allow you to eat more as the muscle has a higher energy demand for fuel than the fat tissue.

It creates a wonderful cycle due to a higher metabolism. The more you eat the more you develop muscles. The more muscles you have the more strength and energy you have, and you want to do more exercise. The more you exercise the more you need to eat and the cycle repeats itself.

The key is to find out how your body responds to your present eating program and then try some alternative ideas if you are not being successful. Once you find your correct hormonal balance of food choices, you will find that you have more energy, are more stable throughout the day, get leaner, have more capacity on your job and reduce your health risk.

Not everyone balances out to the percentages of "The Zone". It is a good place to start as it sets up the chemistry within the body to start resetting your metabolic weaknesses. To find out more on what percentage you might need, you can try changing the protein, carbohydrate or fat of your meal and see how you feel. If you

want a little more specific guidance go to Cheryl Townsley's web site lifestyleforhealth.com and find the part on metabolic profile. Fill it out and find out if you are a 1,2, or 3. You can then use that information to guide you whether you need higher protein, higher carbohydrates or more balanced combinations.

The other reference that is quite helpful is "Eat Right For Your Type" by D'Adamo. This book is all about your blood type and how the foods you choose may or may not be the optimum ones for you. Under the chapter on your blood type there are three sections for each group of food. They are Highly Beneficial, Neutral and Avoid. The way to look at this information is those foods listed in the Highly Beneficial are your medicinal foods, the Avoids are your poisons and the Neutral are just that. When you review your chapter look at what all you are eating within the avoid column. If you have a lot of those foods in your present plan you are potentially coming up with undigested food particles in your intestinal tract, as your body does not recognize these foods too well. I suggest trying to omit these or rotate them every 3-4 days so your body can get a rest period digestively. Eventually as you balance the body you will find that many of these avoid foods are not the ones you want to eat, as you do will not like how you feel when you do.

When there are undigested food particles in the intestinal system this can weaken the system and allow toxins to get lodged in the tissues, parasites, mold and fungus organism and bacteria to enter the system. Over time this weakens the immune system and can show up as more severe health problems later in life. The best thing is to digest your food effectively by chewing slowing and thoroughly, do not drink beverages with your meal so that you are forced to chew effectively and keep the bowel flora up with some acidophilus, as a supplement or by eating some plain yogurt if it is a choice that is good for your blood type.

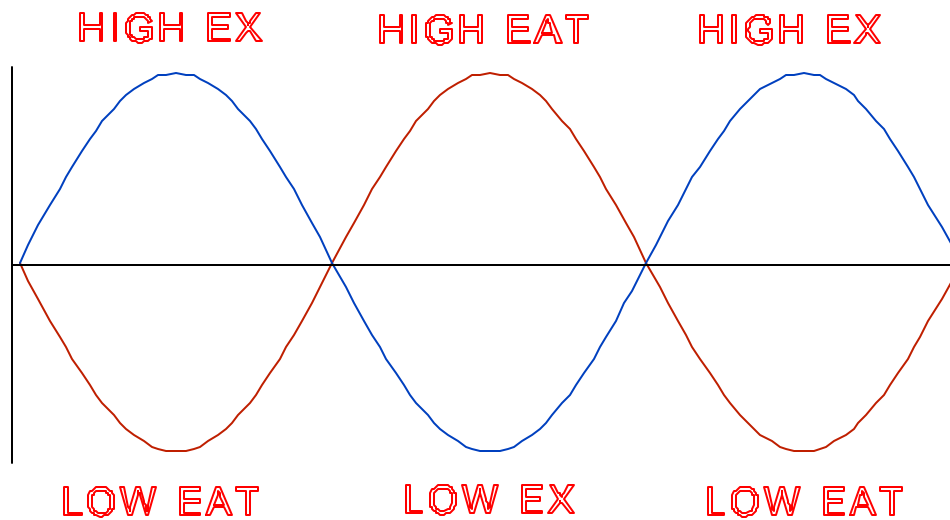
EATING PATTERNS OF FIRE FIGHTERS

The eating pattern of fire fighters is similar no matter what city I go to train them. They typically have a tour, which consists of one day on and a day off for a total of 5 days and then have four days off in a row or have two days off after a 24 hour shift. Many carry a second job which are often quite physical. They get busy on their days off and don't always stop to eat through out the day. By dinner they are quite hungry and are behind on their total calorie intake so they eat too much late in the day and then try to sleep. The system is working so hard to digest it can't repair and heal. They do not sleep well, often waking up feeling like, they have been hit by a truck in the night. Change the relationship in the day of your meals and eat more consistently and you will feel better.

The ability to control their intake is limited because the body is trying to find the appropriate number of calories and it is behind on its total calorie intake from earlier in the day. In addition, most individuals tend to reach for higher fat foods when they are really hungry. It is not a good idea to eat high fat foods late in the day, as there is a greater chance those calories will be stored. If you do mess up on the relationship at night be sure to match the protein and carbohydrates, as you have a better chance of regulating the fat into fuel and not storage.

Now two days of this altered eating pattern have occurred. During the two off days, the eating pattern does not meet the needs of the individual this causes the metabolism to slow down. On the shift day, the fire fighter has two, sometimes three meals planned at the station. Often the calorie consumption is 3000+ calories, which is in line with most fire fighters' calorie needs. Due to the fact that the metabolism shut down during the previous low consumption days, the body can't handle this volume of food and it has a greater chance of storing. It is important to recognize that we eat today for tomorrow's output, and our body works to balance its intake over a 3day period of time. It also takes into account what the activity level has been each day.

Eat today for tomorrow's performance and to replenish yesterday's output



With the large volume of food consumed, on the first shift day, the body is working hard to digest it all. Some of the food stays with the fire fighter into the next day. Now, he is not hungry for breakfast, doesn't eat, and the cycle starts all over again. To turn the system around, we want to try and do breakfast like a king and dinner like a pauper. This lets the body finish digesting the food before retiring so the person wakes up hungry.

To assist in this, one key meal with the Sears program is the evening snack. An hour or so before you go to bed you eat a small "zone favorable" snack. This sets up your hormonal system to access fat during the night. In the morning, you wake up ready to eat but are not starving. Your breakfast then supplies you with energy to function all morning without being tired and lunch is fuel for the afternoon.

If we are eating on the traditional old pattern where we try not to eat much later than 6 or 7 at night we actually set our bodies up for a fast. After 10-12 hours without

eating the body has gone into a metabolic shutdown referenced above and then breakfast is used to replenish the glycogen cup, which got emptied due to starvation. Breakfast is not used for energy and often hunger patterns occur within a few hours of eating. It is like you are always trying to get caught up and the meals you eat do not supply good fuel since you are playing catch-up.

Often I hear, "If I eat breakfast, I am hungry all day". That is exactly what you want to have happen if you are metabolically shutdown. Once you get the system going you want to turn it around and create hormonally stable meals to stabilize the blood sugar levels such that you can go 4-5 hours without hunger. This turns the metabolism on and it then uses the food for fuel instead of storing it as fat.

It is important to take the total number of calories you need for the day and spread them out over the day. We usually need to eat about every 3-5 hours. We don't want to force the food if we are not truly hungry but we also need to consider what type of signs we are given when we are hungry or our blood sugar level is dropping.

There has been growing research into the area of our body type and how it affects our eating and sleep cycles. We do tend to see more split between morning and evening individuals, especially couples. Often opposites attract to one another. IF we do not honor our genetics we can get pulled outside our natural clock pattern and be eating and sleeping against our bodies rhythm. When this happens the metabolism gets fouled up. Often an individual will begin to pick up personalities of the other person and vice versa. Now they are both off kilter.

An example of this is Thyroid body types who eat a snack before going to bed, this may not be the best option for them. They are typically individuals who wake up easy without an alarm, tend to be hungry early in the day, often are more alert in the mornings, lull around 2-4 in the afternoon crave salt more than sugars, like eggs and sometimes eat them if they have not listened to the media, often have low cholesterol between 140 and 170 naturally, metabolically slow down after about 6PM and do not like a lot of food late, they often are in bed by 8:30-9:00PM and if they make it to 9 they might make it to 10PM. This is their genetics that sets up how they eat and sleep. They do better with more food in the morning and tapering the volume down as the day goes on.

There are four basic types and to learn more you can go to Dr. Abravanel's "Body Type Diet" book. This is not an inclusive program as it indicates diet in the title and is not very effective for people who are doing exercise. What it is good for though is to see what Body Type you are, as that is your genetics and then blend some of those choices with the Blood Type factors. Sometimes individuals are a mixture of

two systems as they have gotten out of balance and this has set them up for a confused messaging system. As you work the tools to seek balance it will become more clear as to which body type you are or there are other references to go to. There may be conflict between the various systems so the key is always pay attention to how you feel after you eat. If you get in and need assistance with putting all the pieces together you can contact me to set up a one-on-one consultation appointment, even on the phone.

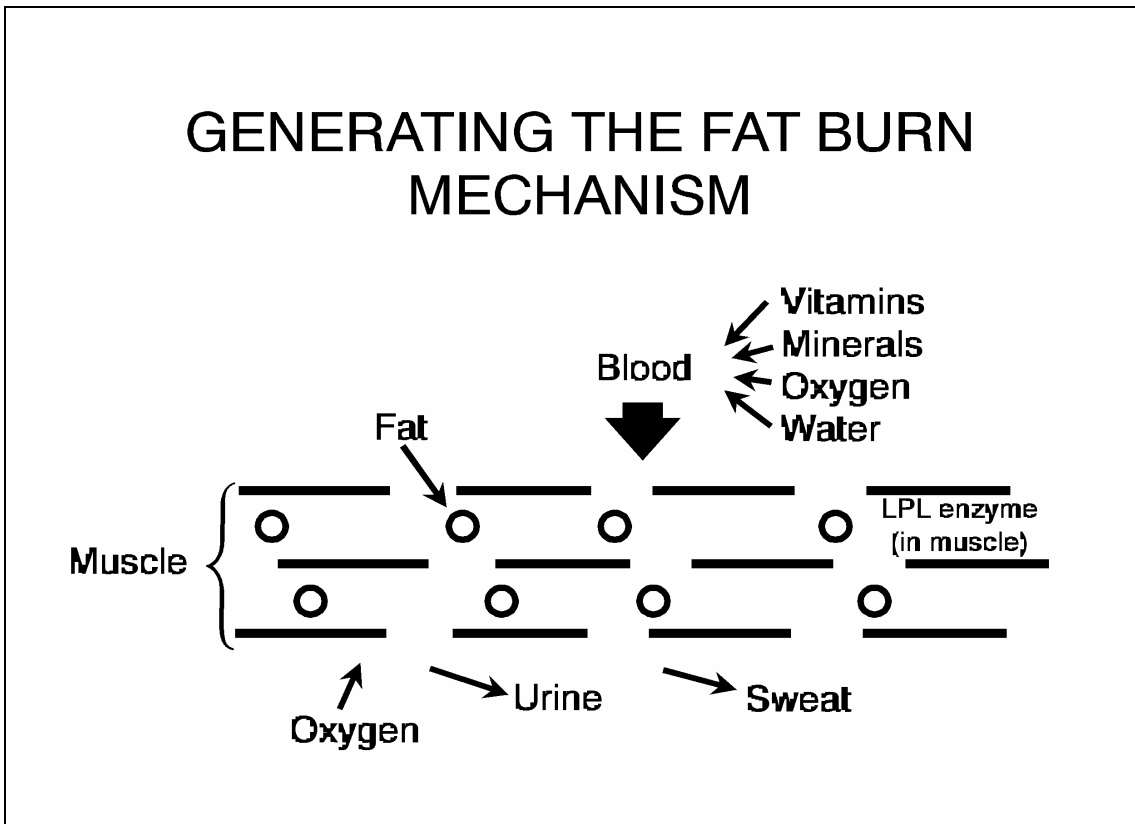
HOW DO WE KNOW WHEN WE ARE HUNGRY?

Hunger does not always give us a growling stomach noise, it can make you tired, lethargic, cause a lack of concentration, cause soreness, and a loss of energy or have you yawning. If you are experiencing one of these indicators, try some water and see if it goes away. If so, you were just dehydrated, the water increases the blood volume so more oxygen could pass throughout the body, increasing your energy and mental alertness. If the water does not give you a boost then you are hungry. Be sure to note what the messenger was because this will be one of the ways your body cues you that it is hungry.

ACTIVATING THE FAT BURN PRINCIPLE

There is one key way to permanently rid the body of body fat - it is to exercise! However, if we exercise too hard, we rid the body of blood glucose stored in the muscles as glycogen. When we do this, we eat the storage and as soon as we consume some food, we begin refilling the cup back up. Unfortunately, very little fat is used in this process. To activate the burning of fat we need to realize that the number of fat cells we have was given to us at birth. The size of the cell is what we can change, not necessarily the number.

GENERATING THE FAT BURN MECHANISM



We burn fat in the muscle belly where there is an enzyme, Lipo-Protein Lipase (LPL), the "pac-man" of fat. When the muscle begins to contract under exercise it sends a message out to the body to start feeding it. If oxygen is readily available, as in low intensity exercise, the body will begin to fuel off the fat. It is brought into the muscle and broken down by the enzyme. The body tries to flush the fat through urine and sweat and bowel. Water for urine and sweat are extracted from the blood flow that is coming through the muscle and if the volume is high there is more flushing that can occur. If the volume is low the fat can stagnate in the muscle fibers and cause a marbling response.

Another key element is the balance of the diet. We have more energy stored in our bodies than we can imagine. It is stored as fat. Each pound of fat is the equivalent of 3500 calories. To access this source of fuel we have to tell the body to use it while exercising and resting. This is done through the proper balance of food choices and exercise intensity. More will be addressed on the dietary choices later in this paper. For now let's see how the role of water affects our ability to flush the fat by-products, which are broken apart through exercise.

HOW MUCH WATER DO YOU NEED TO DRINK?

HOW MUCH WATER DO YOU NEED TO DRINK?

BASE: 8-10 8 ounce glasses a day

ADD: 2-4 ounces for every 15
minutes of exercise

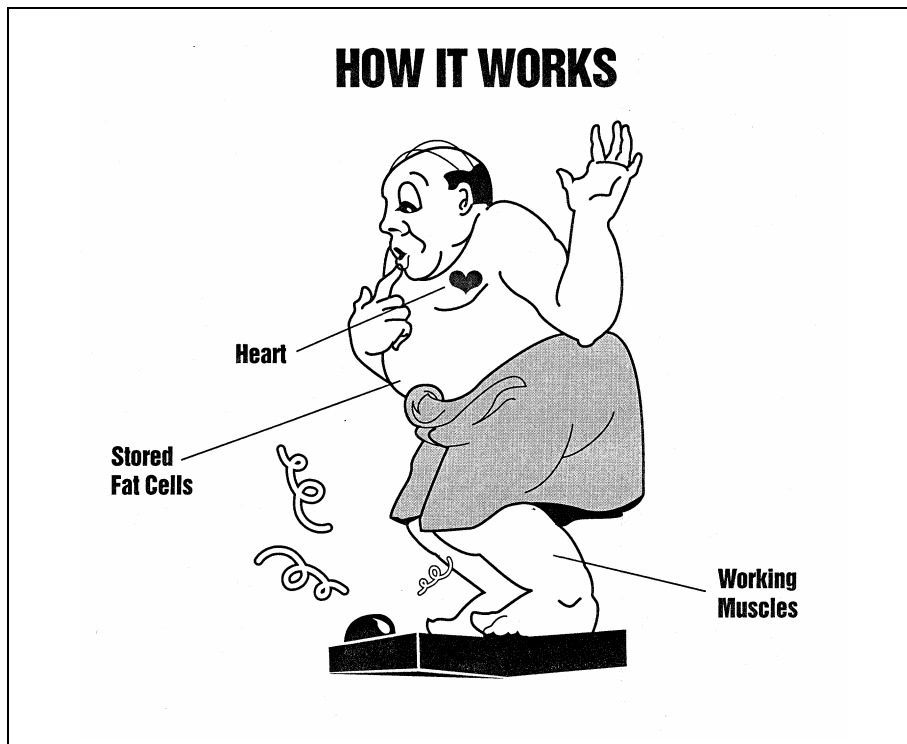
Another rule of thumb is to take your weight and divide by 2, this will give you the approximate ounces of water a day your body needs. The more regulated you keep your water flow the better of a fat burner you can become. If you are not presently drinking at least 8-10 glasses of water a day you may find that you tend to get bloated when you do drink water. Keep drinking water, as the body will adjust once it sees water in is balanced with the water out. Often there is a 3-5 pound change up or down in regards to being hydrated or dehydrated. The weight goes up when one is dehydrated and often the fingers and wrist swell making rings and watches tighter. This is a marker that you are dehydrated from your lack of water the day before. Bringing in the right balance of water is the first step to regulating the metabolism.

The important fact here though is there are no calories in water, so any weight gain you may experience will stabilize once the body sees - water in equals water out. Also, you may experience a need to urinate frequently after your body stops holding the water, because it is releasing the excess. This too will pass.

One thing to think about is if you are a thyroid body type you need salt. I am not necessarily talking about table salt, a good sea salt such as Celtic Sea Salt from the Grain Society. It is a light gray color, which means it is not bleached. All the minerals are more available. If you have taken salt out of your diet and drink a lot of water you may experience signs of dehydration such as a racy heart, constipation, or tight calves and feet and even cramps in the lower legs. This is a marker that your minerals might be off due to diluting them too far. Depending on where you live in the United States

this can be a critical piece of your health picture because humid environments cause you to sweat at a higher rate. You lose your minerals through sweat. Some of the popular mineral drinks on the market are based in sugar and this simply dehydrates the body worse. Find a good mineral drink that does not list sucrose as the base. The other option would be to dilute some true orange juice, not from concentrate.

HOW ALL THIS WORKS



The body has stored fat, usually in the mid-line area for men and hip region for women. Fat is an inefficient form of fuel. It takes a lot of oxygen to break fat cells apart. When you first start exercising you may find that you do not have to do very much to initiate change. This is partially due to the fact that the body is working so hard to get blood to the working muscles. This raises the heart rate rapidly.

As you teach your body to identify fat as a source of fuel it begins to shrink the cell size down and consequently you lose body fat. Now the same effort to move blood to the working muscles is less and the heart rate is staying lower. You need to create a new challenge to meet the same demands in order to continue progressing your fitness level. If you do not change your program, the body establishes a strong memory base, gets bored and you hit a plateau. Once this happens, you too are bored and often do not stick with your exercise program.

LAYING OUT AN APPROPRIATE EXERCISE PROGRAM

To get the best results possible, a program needs to be customized and individualized. Age variation within fire departments needs to be acknowledged when exercise prescriptions are provided. The use of Polar Heart Rate Monitors allows this individualized approach. Each fire fighter can calculate his zone, based on his present conditioning level and age, and then proceed to workout within that zone. The key to developing efficiency is to be patient the first month and respect the zone. The optimum level to burn fat is 60-70% of the age adjusted and conditioning level. This can be calculated using the chart below.

PERSONALIZED TARGET ZONE For Fat Burning		
CONSTANT:	220(Men) 226(Women)	
YOUR AGE:		
Subtract age from constant; this equals estimated maximum heart rate:		
Your Resting Heart Rate: (First thing in morning laying down)		
Subtract resting heart rate from esimated maximum heart rate:		
MULTIPLY BY:	60%	70%
EQUALS:		
Add back in resting heart Rate: (same as above # .)		
Equals Exercise Heart Rate:		
		Fat Burning TARGET ZONE

Mix up the activities you do to be in the zone as much as you like, but stay in that zone. Try to obtain at least 30 minutes per session and preferably 4-5 times per

week. This is what it takes to initiate the fat burn principle. Once your body identifies fat as a source of fuel you can begin challenging your body with higher intensity workouts and rotate between 3-4 workouts a week to maintain. It usually takes about 4-6 weeks to set the base and you need to work in the low zone on all activities you choose to do. If you do a hard workout while laying the base it will set you back a little, not all the way back to square one but you do have to do some repair work from that break down.

Be sure to keep 1-2 workouts still in the fat burn area, these are your easy days. Try to progress the lower intensity workouts by going for a longer period of time. This will help you burn the same amount of calories as the shorter sessions, done at a higher intensity. The higher intensity days are the hard days and it is a

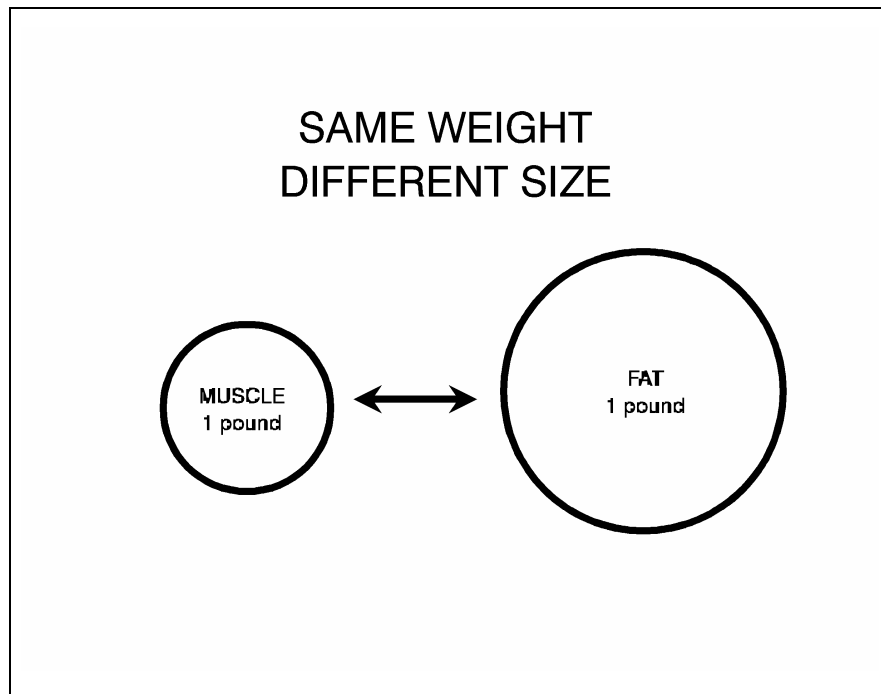
good idea to alternate them as shown below. By going back and forth between these intensities you will notice a continuous improvement in your conditioning.

EXAMPLE:

SUN MON TUES WED THU FRI SAT

HARD	EASY	HARD	OFF	HARD	EASY	OFF
OFF	HARD	EASY	OFF	HARD	EASY	HARD

You might even notice your clothes are fitting better. When you focus on fat burning your body fat goes down. Since a pound of fat takes up more surface area than a pound of muscle, the clothes change more rapidly with a loss of body fat versus a loss of muscle.



In addition, once the fat burn principle has been activated in your body, you can incorporate weights to enhance the muscle mass on your body. As you increase the size of your muscles you may find that you can eat more without gaining weight. This is due to the fact that muscle is more metabolically active. A pound for a pound muscle and fat are the same, but as previously referenced they are different in surface area. If you lose muscle through a dieting process you won't see much change in your clothing and your metabolism may slow down. If you lose body fat you'll feel better and see the difference.

If weight training is your primary activity for fitness, you may not see a marked change in body fat unless you really focus on your diet. In addition, you may have great muscles but internally be at a high risk for cardiovascular disease. Part of this is due to the fact that lifting weights does not burn near as many calories as aerobic activities do in the same amount of time. In addition, weight training does not get the blood flow up in the vessel to help clean the plaque that has developed in the arteries etc. If you blend aerobic activity with weight training, you will get the best results, just wait until the fat burn principle has been identified before making weights your primary activity. Why? You will get an even greater payback from the time you have spent training on the weights.

HOW MANY CALORIES DO YOU NEED?

How many calories do you need?

$$\frac{\text{Body weight (lbs)}}{2.2} = \text{Body weight (kg)}$$

$$\text{Body weight (kg)} * \begin{matrix} 0.9 \text{ (women)} \\ 1.0 \text{ (men)} \end{matrix} = \text{cal/hr}$$

$$\text{cal/hr} * 24 = \text{cal/day (BASE)}$$

$$\text{DIT} = \text{cal/day} * .08 \quad \text{(DIETARY INDUCED THERMOGENICS)}$$

$$\text{ACTIVITY} = \text{typically 350 cal for 30 min}$$

$$\text{TOTAL} = \text{BASE} + \text{DIT} + \text{ACTIVITY}$$

Using the formula above calculate your total need. Figure about 300-400 calories per 30-40 minutes of aerobic activity. Weight training averages about 125 calories for an hour. Once you have the bottom line total adjust for weight management if that is your goal by taking off 200-300 calories from the two totals, (non-exercise and exercise). The non-exercise total is a combination of the Base + the DIT adjustment. Exercise amount is a total of Base + DIT + activity calories burned. This is one way to work with your total calories needed.

As more and more research is done into the relationship of food as drug, it is becoming clearer that it is not just about calories, but more importantly about providing the body the appropriate food choices to establish a balance in the blood sugar levels. Figuring out how much you need to eat depends on your muscle mass and activity, without doing this you may come in underfed or overfed in the various macro-nutrients you need. In Dr. Barry Sear's books he walks you through the formulas on how to calculate your breakdown of protein, carbohydrates and fats for the day and for each meal.

As previously mentioned, not everyone falls into that exact guidelines given, you will need to play with the combinations using some of the other pieces mentioned in this paper or call me to assist you in pulling it all together for you.

Here are the formulas if you already know your body fat, otherwise you can do the circumference technique referenced in his book.

Take your present weight and multiply by the % of Body Fat. This equals your #'s of Body Fat. (Fat Mass-FM)

Take your present weight and subtract the #'s of Body Fat (FM) this equals the Lean Body Mass (LBM)

Take the Lean Body Mass (LBM) and multiply by the activity factor (chart below) to get the grams of protein you need per day.

Once you know your grams of protein you need divide that number by 7 to get the total number of blocks you need to eat per day. If you are going to follow off the zone principles you will take this protein total and spread it across the day based on when you need to eat more or less. Once the protein is figured across the day add the same number of blocks of carbohydrates and fat to it to equal the meal pattern. The books can provide you with ideas to begin the process and then you can fine-tune it using your blood factors or body type ideas. Remember you are only one meal away at any one time, if you screw up on your choices, and you will, just get back on track at the next snack or meal. This is the difference in a lifestyle versus a diet.

ACTIVITY FACTOR

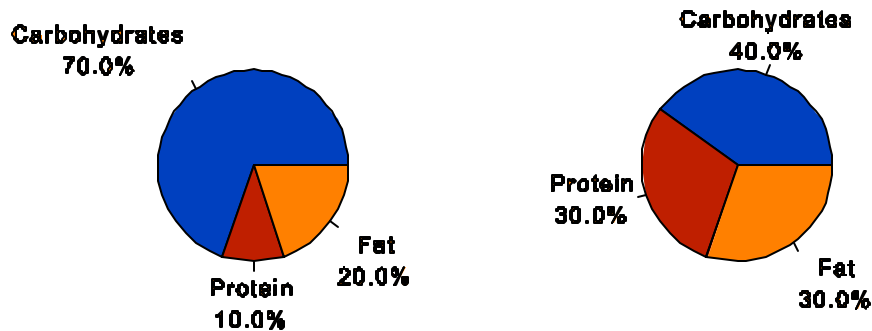
(If you fall between these then use the middle number, ie. (.65), (.75) etc.)

- .6 daily walking
- .7 three times a week exercise at 30-40 minutes/session
- .8 five times a week exercise at 1 hour to 1 hour 15 minutes/session
- .9 ten hours of exercise a week or physical training/week
- 1.0 heavy lifting or training, or physically demanding labor jobs

AN ALTERNATIVE APPROACH TO YOUR DIETARY BALANCE PROGRAM

As previously referenced some individuals do not process a high carbohydrate diet very well. They may even gain weight. Presently in society we are being programmed into a high carbohydrate, low fat, low protein diet. This leaves many people hungry and caught in a vicious eating cycle which leads them to gain weight. Examine the two pie charts below and see if you fall into this pattern.

A COMPARISON OF THE TYPICAL HIGH "CARBO" DIET AND A HORMONALLY STABLE EATING PLAN



If so, use some of the ideas previously addressed and start changing your food choices. The basic idea is to eat a wide variety of foods, of which you choose and simply balance the protein, fat and carbohydrates according to your lean body mass, activity, blood type and body type. It is all about the choices that you make. You don't have to give up any foods, remember some will be better choices than others. Always pay attention to how you feel after you eat as that will let you know if you are getting the right combinations together for your body.

Some ways in which the body lets you know it is balanced are: you are not bloated, just full satisfied, you do not have mucous congestion in your nose, throat or sinus area, you are alert not sleepy, you are not craving sugar or something sweet to finish the meal, you feel strength when you work out and are getting recovered, you are not sore after training, you are not hungry in 1 ½ to 2 hours and you are seeing changes in your clothing, sleeping better often less hours but feeling more recovered, you might notice your finger nails and hair are growing faster and are stronger, your muscles are more defined even if you are not doing a lot of weight training, your bowel movements are more frequent and have better substance and overall you feel

better. Remember you are only one meal away at any time this is a chemical reaction each time you eat. If you mess up just get back on track with the next feeding. Watch the next time how you play with the combinations to be able to feel better so that you will know what works for you in the future.

Portion control in America is out of control we often eat way too much at a meal and walk away uncomfortable. You will notice that the portion sizes are not big per block but you are combining multiple choices to come up with your appropriate meal patterns. In some ways you will be overfed and other ways under fed when you first start putting the combinations together.

Ideally if you could have the right relationship each time you eat that would be great but you often do not. Do the best you can to get some protein, a little carbohydrate and some fat at each meal and that will put you towards the balance better. One thing in general to do is to try to cut out or cut in half the amount of bread as no blood type is designed to process wheat gluten, it sits very heavy in the system and this leaves undigested food particles as referenced before. Try to increase the amount of vegetables and some fruits, mix the protein sources from the choices that are best for your blood type and use the fats that are less saturated, like olive oil, olives, avocado, nuts and nut butters,

For example as a snack, do not eat just one item such as a bagel, carrots, yogurt, crackers, instead try 1/2 cup low-fat plain yogurt with 3/4 tsp. raw peanuts, or a string mozzarella cheese stick and 1/2 of a small apple, or 1/2 orange with a hard boiled egg and 3 olives. These might be a sample snack for a female and an active male would need to double these. Remember this is just a snack and if you are eating 5 times a day with meals and snacks that becomes a pretty good volume of food. I have seen some very lean and highly active fire fighter men who eat 6 times a day and have 3 patterns for their snacks and 4-6 patterns for each meal. This totals 21-26 blocks per day. They often use some bars or shakes in the day to keep the volume and balance where they need it as they are taking out the calories as fast as they are putting them in. (A pattern of 3 would be 3 protein choices combined With 3 carbohydrates and 3 fats). In the back of Dr. Sears Zone books there are some portion references as well on his web site: DrSears.com.

As you can see there is a mixture of protein, fat and carbohydrates in each of these. The fats are primarily mono-unsaturated during the day some saturated forms from dairy products can be included, the goal is moderation and balance through out the day. It is recommended that you do not consume more than 4 whole eggs each week, especially if you are watching cholesterol levels, but if you are a thyroid body type this won't apply to you. You often need to consume 2-4 a day to keep the thyroid in balance. If you are a thyroid person and are eating eggs sparingly due to

high cholesterol you may be manufacturing cholesterol due to not eating the eggs and giving the body what it needs. We have an amazing homeostasis process in the body for everything we do. It is possible you may have a weak endocrine system and are not processing the yolk correctly.

As you can see there is no one piece of the puzzle that fits everyone. This is why it is so difficult to set up plans as a generic process one size fits all. It is not to say that the present media push of information is wrong it is just not a solution for everyone. The key is finding out what you need for you. As a fire fighter your needs on the job can be sustained by using stored fat for fuel, if you train the body on how to do this. In addition, you want to build muscle when you weight train so that you have increased muscular endurance, and a reduction in calories or over training will not allow this to occur.

SUMMARY

Finding the proper balance of nutrition and exercise will allow you to perform on the job and feel better afterwards. To often we have tried diets as a way of reducing weight. Weight is not the issue ultimately the goal is to reduce body fat. Teach your body to be a fat burner with the appropriate exercise intensity and avoid creating additional fat on your body, by watching the grams of fats, calories or combinations of your food choices.

Food is fuel, feed the body the things it needs and other foods won't be craved. This is especially true if you crave sugar. Once you meet the protein your body needs for its muscle mass, activity, blood type and body type you will find that you do not desire it. If you eat more frequently, you will have more energy throughout the day, so you will feel like exercising. As your body responds to the exercise and builds muscle, your metabolism will go up, allowing you to eat even more food. What a great cycle to be on.

Get off the dieting yo-yo and reprogram your body the correct way. Know that you will hit roadblocks and plateaus. Take each one as they come and try to challenge the body with exercise and various calorie amounts. One of these will eventually initiate the change you want.

Place more importance on the recognition of the importance of good nutrition for wellness, and increase your awareness of the problems posed by unbalanced high-fat, high-sugar, low-fiber diets. If your weight isn't changing but your clothes are fitting better, you are becoming a fat burner and may have many exciting changes in

your body over the year. DO NOT FOCUS ON THE SCALE!

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