

DIRT & MUD

Winter 2003

Weight Training 101

By

Dave Holes

Over the past ten years, weight training has become mainstream for both women and men exercisers. It can be very effective in shaping and strengthening our bodies and preventing disease. But probably the main reason people indulge in weight training is to improve their appearance. Whatever the reason, many are confused as to what they should do when they strength train and how many sets and reps are required to reach their goal. The following information should give you better insight on developing your optimum training program to meet your goals.

First, we must set forth guidelines so that we are all talking the same lingo. Most of us have had experience with the terms sets, reps, and rest periods but I am going to define them here. A **repetition** is the single completion of a movement. It can be as simple as bending your arm up and down as in a curl or it can be a complete body motion as in a snatch. When repetitions are grouped together it is referred to as a **set**. Repetitions can range from 0 to an infinite number although most programs do not have reps exceeding 20 per set. **Rest period** is the amount of time between sets and usually varies from 15 seconds to 10 minutes depending on goal. The forgotten factor in weight training

terminology is **tempo**. Tempo is the amount of time each repetition is performed. It is divided into a lifting and lowering phase. For instance, a tempo written 1,3 means that the weight should be lifted in 1 second and lowered in 3. Most people perform tempo at warp speed with very little control of the weight in the lowering phase. Research suggests that the amount of time the muscle is under eccentric tension (lowering the weight), the greater the muscle building and strength training potential. However, there is a diminishing return to muscle tension with sets lasting greater than 60 seconds. When sets last for more than a minute, more emphasis is placed on muscular endurance and less on muscle growth. So, if you perform an exercise with a tempo of 1,3 then the maximum number of reps performed for that set should equal 15. (4 seconds per set x 15 reps = 60 seconds).

In addition to tempo, another

element of weight training that needs to be closely monitored is the volume of exercise performed for each workout. **Volume** is the amount of work being performed each session and is the product of sets, reps, and weight. An example would be doing one set of 15 reps at 100 lbs. The total volume of this workout would be 1500 lbs. The importance of this variable is that the more total work being performed, the greater likelihood of overtraining. Since the amount of weight lifted is dependent on the individual and the types of exercise being performed, it is better to look at sets and reps when providing general guidelines. Furthermore, when establishing such guidelines, the intensity must be defined. **Intensity** does not pertain to how hard an individual feels the workout is, but rather refers to the stress placed on the neuromuscular system. Getting a muscle 'pump' or feeling the 'burn' may feel like you are having a great workout, but it is not classified as an intense

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workout. Lifting a weight that you can do for only 1-4 reps is actually an intense workout. The reason being is that lifting very heavy loads places tremendous stress on the central nervous system and the connective tissues. Continually attempting to lift in this manner several times per week will severely overtax the body and lead to neural fatigue.

Now that we have laid the foundation with some basic terminology, we are going to apply them in designing a program. Now, there are many ways to train and many people have had success incorporating many different methods into their training programs. However, one common mistake often made by even the most experienced lifter is overtraining. The following program we etch out here is designed to minimize the risk of overtraining for the beginning lifter and help experienced lifters avoid plateaus that kill your progress. So here we go!

The first law of gaining strength and increasing muscle size is **progressive overload**. If you do not expose your muscular system to greater stimuli then there is no need for the muscle to adapt. Lifting heavier weight or slowing the lifting tempo are effective ways to overload the muscle. The more muscle involved in an exercise the greater the stimulation of the neuromuscular and endocrine systems. This is important since the neural system is involved in maximizing the number of muscle fibers used while the endocrine system supplies the hormones necessary for growth.

Research has shown that compound exercises such as squat, leg press, deadlift stress the body more so than single joint exercises such as tricep extension, barbell curl, etc. This means that focusing on

exercises that involve larger muscle groups (back, legs, chest) is an effective way to build overall size and strength. This is not to say to avoid single joint exercises, it's just that the core of your routine should be steered to using the large muscle groups if your goal is size and strength.

If we know the exercises in our program, how many sets and reps should we do and at what tempo? This is where most of us get in trouble. There are quite a few schools of thought on training and each can support itself through research. However, an effective approach, especially for individuals with less than one year of consistent training, is to focus on relatively frequent but low volume training. This means training large muscle groups such as legs, back, and chest twice per week and biceps, triceps, shoulders, calves no more than three times per week. This may seem like a lot of work but the key here is keeping the total sets very low. Choose only one to two exercises per body part, doing only 1 to 2 sets per exercise. Thus, if you choose incline dumbbell press for chest do only two sets at the specified rep range and tempo. Then continue on to your other exercises. Your total workout should only consist of a maximum of 10-12 total sets per workout.

You may be wondering about the effectiveness of this approach. But for relatively inexperienced lifters, strength gains are more from neural improvements rather than protein synthesis. If overloaded with high volume workouts, the beginner lifter is very susceptible to overtraining. Even many individuals who have been lifting for a number of years are overtrained and need a period of deconditioning in order to begin to make new gains. This is an effective program for these individuals as well. Also, research

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indicates that the muscle building effect of a workout returns to baseline levels in 48 hours. If the neural system is not overtrained, then training the muscular system every 48 hours might be an effective manner for increasing the muscle building effect of the workout. Doing too many sets every couple of days will strain the neural system. That is why we are keeping the sets in the 1-2 range per exercise.

So what might be a sample workout using the above principles. This would be a 3 day a week workout.

Monday sets x reps x tempo

Squat	2 x 15 x
2,2	
Leg Press	1 x 15 x
2,2	
Calf Raise	2 x 12 x
1,3	
DB Chest Press	2 x 6 x
1,3	
DB Row	2 x 8 x
1,2	
Pullup	1x max
x 1,1	
Barbell Curl	2 x 8 x
1,4	

Wednesday x tempo sets x reps

Leg Curl	2 x 12 x
1,4	
Calf Raise	2 x 12 x
,2	
Incline DB Press	2 x 8x
1,3	
DB Row	2 x 8 x
1,2	
Lying Tricep Ext.	2 x 8
x1,1	

3

Friday x tempo

sets x reps

Leg Curl 1,4	2 x 12 x
Squat 2,2	2 x 10 x
Calf Raise 1,3	2 x 12 x
Incline DB Press 1,3	2 x 8 x
DB Row 1,2	2 x 8 x
DB Curl	2 x 8 x 1,

You can also periodize the workout so that every 2-4 weeks the rep scheme or tempo changes. Exercises can be changed as well, but they do not have to be changed every workout. For size and strength gains it is important to keep exercises such as leg press and squats that focus on large muscle groups in your workout routine.

Exercise and High Blood Pressure: Can You Take Control?

by

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High blood pressure is very common. One out of four Americans have it. One of the most important things you can do to control your blood pressure is to become more active. Physical activity is crucial to controlling your blood pressure. You can take control.

What is blood pressure? This term refers to two processes or two numbers. These numbers (example 120/80) are measured in millimeters of mercury or mmHg that is read by a gauge. The top number or systolic pressure

represents the force that is created when the heart pumps the blood through the arteries. Therefore it's the pressure that is exerted on those arteries by the pumping (actual beat) action of the heart. The bottom number represents the heart at rest or the resting phase of the heart. In other words the quiet interval in between beats.

According to the American Heart Association "blood pressure of less than 140 over 90 is considered a normal reading for adults. A systolic pressure of 130 to 139 or a diastolic pressure of 85 to 89 needs to be watched carefully. A blood pressure reading equal to or greater than 140 over 90 is considered elevated (high).¹ A consistent blood pressure reading of 140/90 mm Hg or greater is considered high blood pressure, another term for hypertension. Having high blood pressure is a health risk. It increases your chances of heart attack, stroke, kidney failure and blindness. There are steps you can take to keep high blood pressure under control.

High Blood Pressure can be controlled with exercise as well as medication, diet and weight control. For purposes of this article we will briefly discuss the benefits of exercise. If you have been diagnosed with high blood pressure you should consult your physician before starting any exercise program. Perhaps you and your physician can discuss an exercise program that's right for you.

Physical activity may enable you to reduce or eliminate some of your blood pressure medication needs. Talk to your doctor before making any medication changes. Physical activity may help your blood pressure medications work more effectively. According to the Mayo Foundation for Medical Education and Research (MFMER) "Regular

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physical activity can lower your blood pressure by 5-10 millimeters of mercury (mm Hg) which is the same as what many blood pressure medications can do".²

Total fitness involves three components, to include aerobic activity, which improves the heart and lung capacity; flexibility, which improves smooth movement in your joints; and strengthening exercises that maintain bone and muscle mass. Aerobic activity however is the best at controlling high blood pressure and reducing stress.

Some common physical activities range from those which require fairly light effort such as: cleaning the house, playing golf, raking leaves, shoveling snow, and walking, to those that require somewhat hard effort which include: bicycling, swimming, jogging, Tai-bo, step aerobics, using treadmills, rowing machines, stair climbers and ski machines. Don't do isometric exercises- straining of your muscles without moving. Muscle toning with weights is OK, but the heavy straining of isometrics can significantly increase your blood pressure while doing those exercises.

To help develop a fitness program that's right for you, the Exercise Physiologists and Dietician at Fit To Win/Wellness under the direction of Mark Jacobs are available to give you assistance. Fit To Win also offers a Hypertension class once a month as well as nutrition classes to help you understand high blood pressure better.

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Can Too Little Sun Cause Cancer?

Vitamin D Deficiency Could Increase Cancer Risk

By

Lt Col Steve Vieira, PhD

While more Americans are following the now familiar dermatologic mantra to avoid sun exposure and always wear sunscreen to reduce their risk of skin cancer, there's growing concern that this advice is contributing to another health problem – a vitamin D deficiency.

The important nutrient is best known for building strong bones and teeth – key to preventing osteoporosis – but low levels have also been linked to an increased risk of type 1 diabetes, muscle and bone pain, and perhaps more frightening, a greater chance of cancers of the breast, colon, prostate, ovaries, esophagus, and lymphatic system.

We all recognize that vitamin D is critical for bone

health, but we have not appreciated, although we have known for at least 20 years, that almost every cell in the human body has receptors for activated vitamin D. We need adequate amounts of vitamin D to keep cell growth in check.

In other words, without enough vitamin D, cells can multiply too quickly and promote cancerous tumors. Yet, between 20% and 80% of *all* Americans have low enough levels to classify them as vitamin D-deficient. One reason: most of the body's vitamin D comes from sunlight exposure on bare, unprotected skin.

When wearing sunscreen, you will absolutely prevent the synthesis of vitamin D— even more so than you will prevent skin cancer. In the *British Medical Journal* Cedric Garland, DPH, professor of family and preventative medicine at the University of California at San Diego School of Medicine, writes that avoiding sun exposure is a bad strategy for overall cancer prevention. When weather permits, he recommends getting at least 10 to 15 minutes of sunlight each day on bare shoulders, arms, and legs – without using sunscreen.

Unfortunately, now is an especially difficult time to avoid vitamin D deficiency for many Americans. From November through March, many people can't get enough vitamin D from sunlight, no matter how much exposure they have. This is especially problematic east of the Mississippi River and from Philadelphia north, because there's a lot of sulfur coal in the air, producing what we call 'acid haze,' a precursor of acid rain. It prevents ultraviolet vitamin D getting through the air on days where there's a lot of pollution.

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Pollutants aside, research indicates that during these winter months, there's insufficient vitamin D from sunlight in most of the country north of Atlanta. This may explain, at least in part, why some studies dating back to the 1940s find that after adjusting for other factors, people in New England have a higher overall cancer death rate than those in sunnier climates. More recently, studies have specifically linked vitamin D deficiency, which can be detected with a blood test, to several non-skin cancers. But the problems extend beyond cancer. A study published in the *Mayo Clinic Proceedings* suggests that vitamin D deficiency may be responsible for unexplained bone and joint pain. And two years ago researchers noted that people who got vitamin D supplements through adulthood were 80% less likely to develop type 1 diabetes than their non-supplemented peers.

Physicians do not recommend abandoning sunscreen or baking in the sun for extended periods. Instead, most suggest getting *limited* unprotected sun exposure during sunny months – 15 to 20 minutes a day – and *then* applying sunscreen on exposed skin.

And for this time of year? Unfortunately, unless you're eating three or four servings of salmon a week, there are essentially no foods that provide enough vitamin D to prevent a deficiency during the wither months. You would need to take supplements.

To ensure you get the proper amount of supplements I would recommend taking a daily multivitamin containing at least 400 international units, as well as a separate vitamin D supplement with between 400 and 1,000 IU. Do not take two multivitamins because that will contain too much

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vitamin A, which in high doses can cause nerve damage.

You cannot depend on getting vitamin D from milk. During a study researchers found that 30% of the milk they tested had only 20% of the levels stated on the label. In other words, you'd have to drink 10 glasses of milk or vitamin D-fortified orange juice each day to get enough vitamin D as found in supplements. And what does the American Academy of Dermatology say? People who practice proper sun protection and are concerned that they are not getting enough vitamin D should either take a multivitamin or drink a few glasses of vitamin D-fortified milk every day.

Carbohydrates vs. Calories

By

Kevin Saffer

In the last few years, many diets have flooded the market offering rapid weight loss without taking away many of the delicious foods that we enjoy on a daily basis. Many of these diets revolve around the principle that by greatly reducing the amount of carbohydrates that one consumes, fat will serve as the main source of fuel that our body uses for energy. Another reason for the limitation of carbohydrates, is that sugars alter our blood sugar level to a much greater degree than those foods that contain primarily fat and protein. The rapid rise and fall in blood sugar causes the body to crave food more frequently, which in turn causes one to eat more often. The principles behind the low carbohydrate diet make sense, but there are some very important factors that need to be considered when deciding how one decides to eat.

One very important concept that we have all been taught since kindergarten is how important it is to eat a well balanced diet. We've all seen the food guide pyramid that suggests eating a certain number of breads, fruits, vegetables, meat and dairy products. The reason it is suggested to eat a wide variety of foods is that some groups of foods are rich in certain nutrients that cannot be found in other foods. It is important to remember that when you limit the number of carbohydrates in your diet, you will miss vital nutrients for proper body functioning.

One of the most important things we need in our diet to promote overall health is fiber. The main dietary sources of fiber are breads, and most importantly fruit, both of which derive the majority of their calories from carbohydrate. Fruits are made up completely from simple carbohydrates. So if you are following a low carbohydrate diet, the lack of fiber is definitely an issue. Many people who primarily consume foods high in fat and protein and low in fiber often have poor colon health. The risk of colon cancer and diverticulitis significantly increases when there is insufficient fiber in the diet.

When an individual consumes a normal diet consisting of all the 5 major food groups, carbohydrates are responsible for about 70% of the calories one uses for energy, while fat is responsible for about 25%, and protein only about 5%. If you limit your carbohydrate intake, fat and protein serve as the main sources of fuel for the body.

Since the body is not used to utilizing such a large amount of protein for energy, the body produces phenylketones, which are the byproducts of the used protein which can become very toxic in high concentrations. These ketones cause bad breath, body odor and

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can be very harmful to the kidneys and liver.

When it comes down to deciding which diet if any to follow, the most important factor regarding weight loss or weight management is essentially calories and not just carbohydrates. When you consume more calories than you burn, you will gain weight. It doesn't matter whether the calories come from carbohydrate, fat or protein. For example, if you consume 2,000 calories a day, and burn 2,500 calories a day, you will lose approximately one pound a week whether you consume carbohydrates or not.

The main reason that people lose weight on a high fat and high protein diet, is because they are often low in calories. When you eat a meal high in fat, your stomach will feel more full for a longer period of time compared to a meal high in carbohydrates. As a population, vegetarians are probably the least obese of any group. Their diet consists primarily of carbohydrates found in breads, fruits and vegetables. But the reason they are typically not overweight is that their diet is also low in calories. After all, how many people have become morbidly obese from eating lots of fruits and vegetables? Not many!

As you can see, determining how to eat to meet your weight and fitness goals is not always as cut and dry as many think. It is important to consider what foods you like, how much you typically eat, and what is the best way to reduce the number of calories in your diet. Through exercise and calorie monitoring, it is much more likely that success will occur regardless of your individual goals.

Winter Cross Training

By

Shari Tomasetti

Running and staying in peak condition in the winter can be a challenge for some. Staying in shape through the winter months if you are not a cold weather runner is not as hard as you may think. Varying your running program on a treadmill and cross-training can keep you fit and away from boredom.

Are you going snow skiing this winter? Downhill skiing for one hour if your weight is 154 lb is equivalent to walking for one hour at 3-4.0 miles per hour. See below for other conversions and energy expenditure per hour.

Running (miles/hour)	kcal/hour
9	1008
8	906
7	798
6	696
5	594
4	486
3	384
Alternate Activity	
Skiing downhill	350-560
cross-country	420-840
Dancing social	210-490
Dancing aerobic	280-700
Racquetball	560-840
Cycling	210-560
Basketball	210-840
Tennis	280-630
Swim(per mile)	300-560

Your body will love you for cross-training! Cross-training will help your body use muscles that are not used when running. Your body will develop new muscles, relax the ones that have been overtraining, burn more calories, and get you out of a rut.

Challenging the Winter Weather

For those of you who will be running outside this winter, this can increase your energy expenditure.

It takes more energy for your body to adapt to the cold weather.

Although, choosing what to wear is a little more complicated than running in the sun. Make sure you cover your legs! When the skin gets red, this is because the blood is rushing to the skin of the legs to heat them up. Your concern is to get the blood to the muscles; this will help avoid cold muscle strains and pulls. Wet skin can also take heat away from the body areas that really need it. The best fabrics to wear that will wick away sweat, water, or snow are polypropylene (poly-pro), thermax, and gortex (okay if you don't sweat much).

Always wear a hat and gloves and stay warm!

Women's Health Series

A new series of classes is beginning in February in Fit To Win centered on women's health. The first of the series is Heart Disease and is focused on symptoms, risk factors, diet and physical activity.

The second class is Breast Cancer Awareness with an emphasis on mammography, breast self exam and normal breast anatomy.

The final class of the series, Osteoporosis, will include basic physiology, symptoms and treatment.

A common theme throughout the series will be menopause and its' effects on women's health. A primary focus will be on risk factors that we can change and those that we cannot. Take the time now to join us and learn how to protect yourself now and have a healthy future. ***Attend all 3 classes***

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and take home a 'Fit To Win' t-shirt!

Are You A Runner Or An Athlete?

If you attended the Pentagon Health Fair on January 28th, you were exposed to many services and educational opportunities to improve and maintain your well-being. In this age of specialties and compartmentalization many of us tend to think only in terms of a runner....what shoes do I need?... which foods do I eat? etc. Of course these are important considerations for a proper training program, but the whole picture is incomplete.

There certainly is a physical fitness element for successful running. New Balance and Fit To Win's Running Shoe Clinic had tables at the fair to provide you with guidance in running in the proper shoes. Dave Hole's at his table presented FTW's **TIP** (Training Improvement Program) designed for the intermediate-elite athlete. Body fat and upper body strength screens were also available giving vital information in these areas to runners. The Registered Dietitians at the Nutrition table presented info on the foods and liquids, which fuel your body as you train. The 11th Wing's Hydration Calculation table highlighted the huge element of proper fluid intake to support your training and competitive events. Physical Therapy's table offered sports injury guidance. The feet are the runner's primary body part and the Podiatry table supplied the information every runner should know regarding the health of your feet. The POAC's table provided info on its imminent new facility. These are the most obvious services, which impact runners.

But, one must consider less obvious elements, which build the

foundation for running. In so doing the runner moves from the physical to the more clinical health aspect of one's being. The Men's and Women's Health tables represent your ability to self-screen for potential cancer, cardiovascular and other prevalent diseases. The Cholesterol and Blood Pressure Screens highlight the potential problems in these areas for runners. Information on eye health, skin cancer, medications and osteoporosis are areas, which can complicate training if there is no regard for their health impact on running.

So far, we have talked about the physical and the clinical aspects of running. Let's now transition into the mental and emotional aspects of running. These were represented by the presence of massage and reflexology services. The Acupuncture and Qi Gong table offered information on these complementary health services. The presence of the Pentagon Employees Referral Service and the Pentagon Stress Management Team stresses the impact of good mental and emotional health for the runner. Techniques derived from all of these services as well as from those learned in FTW's Self-Change and Stress Management courses can help the runner not only to plan successful training, but to improve performance in an athletic event in which you are participating.

Although there was no table with information on karate or similar activities, we recommend that the runner consider this sport to enhance mental discipline simultaneously with physical training. Runners need to use mental clarity to know the best strategy to prepare for training and athletic competition. Can you attain a "peaceful mind" while you are working out? Are you focused? Can you control negative thoughts?

Can you clear your mind of worries and stressors?

A few years ago my colleague, Anne Marie Schissler, wrote an article explaining the five principles that embody the values and training of the karateka. In a tribute to her and her achievement of a Black Belt allow me to present this to you. If you combine these five principles along with the challenges of expanding your training into the areas listed above, you will be well on your way to becoming more than a "runner".

1. *Seek perfection of character*

This challenges you through the discipline of running and working out to extend and enhance your character in all aspects of your life. The "runner" will not see life as an extension of running and training. The "athlete" will.

2. *Endeavor*

Do your best workout every time you run or exercise focusing on mental as well as physical fulfillment. The "runner" will focus much more on one or the other. If the "runner" is injured, he/she will not miss a training run because so many miles needs to be logged that day. Or mentally, the guilt from not running of the addiction to running is the driving force to run that day. The "athlete's" perspective is one of balance between the mental and physical.

3. *Be faithful*

Keep your training regular. Otherwise, your skill will never advance or improve. This allows for absences from runs or workouts. What is important here is being faithful to your activity during each year over many years. The "athlete" will be consistent over the years, whereas the "runner" will be compulsive.

4. *Respect others*

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This applies to yourself as well. Examine the manner in which you train. Are you courteous? Do you know how to fail or not achieve a goal? Do you know how to win? Do you follow the rules of good sportsmanship in your training? The "runner" sees only how all of these elements affect him or her. The "athlete" considers the effect of these factors not only on him/her, but also the effect on others.

5. *Refrain from violent behavior*

Do no harm to yourself or others. Train well, not necessarily hard. Instead of doing the same hard workout or run every day...one day do a hard run; another a moderate run; and another an easy run. Know how to rest and recover from your exercise. Know your body and its limits. The "runner" will incorporate all of these some of the time or some of these all of the time. The "athlete" will use moderation and good judgment in training all of the time.

All of these principles will secure for you enriched training with a peaceful mind. By adopting them, you are striving through sport to become a better person...an "athlete."

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