

Weight Training 101: Maximizing Sports Performance

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In recent years weight training or resistance training has become increasingly popular with athletes who are involved in a wide range of sports.

Gone are the days when weight training was exclusive to Olympic Weight Lifters, Body Builders and Muscle Heads. Today, many recreational athletes and fitness-oriented individuals have begun to recognize the performance-enhancing, body-shaping and even medicinal value of incorporating weight training into their lives.

Unfortunately, many conflicting theories and opinions can confuse the newcomer when entering the weight-training world. This article will help you separate fact from fiction and help you understand some fundamental aspects of weight training.

Sports Specific Training

The key to successful weight training is to know what outcome you want. For instance, if you want a body builder's physique, then you would follow a program that maximizes muscle growth and density.

If you're trying to improve the power of your tennis stroke, your slap-shot, your bat speed in baseball, your golf swing, your skating power or your speed and acceleration for soccer or sprinting, then using a body builder's weight training routine may actually slow you down and worsen your performance. You might get bigger, but you'll probably be slower. At the same time, a properly designed weight training program can help you increase speed, power and performance in tennis, golf, baseball, hockey, football, speed skating, soccer, sprinting, gymnastics, and many other sports.

The Strength-Power Tradeoff

An important principle of weight training is that if all the emphasis is placed upon gaining only muscular strength, the muscle will actually lose power. How can this be, you ask? If a muscle becomes stronger, doesn't it automatically have more power? The answer is no.

Muscular strength refers to the ability of the muscle to lift a given weight a given distance, with no regard to the time it takes to move the weight a given distance. In other words, the more weight you can lift when performing a bench press, the stronger you are. As a rule, when you are lifting really heavy weights to increase your strength, the speed of contraction is very slow due to the heaviness of the weight.

This type of heavy weight lifting has proven to increase muscle strength and muscle size. However, it tends to slow down the speed at which the muscle is able to contract and this may actually hinder sports performance where speed and acceleration are critical factors.

In contrast to strength, power is the ability of the muscle to perform a certain amount of work per unit time. Essentially, this means that by performing weight training with a lighter weight, it allows you to contract the muscle faster, which results in increased muscle power.

So, power means that the muscle is stronger and it can contract faster. This in turn puts more zip into your tennis stroke, your slap-shot, bat swing, throwing motion, sprinting ability, swim stroke, golf swing, skating speed and even your left hook if you like to box.

So, although training with lighter weights won't make you as strong and muscular as training with heavier weights, it does increase strength and muscle development, but to a lesser degree. At the same time, this type of training increases power, which is a vital component of most sports. So trading off a little strength for a gain in power is a smart strategy for recreational and elite athletes involved in tennis, hockey, speed skating, baseball, sprinting events, swimming, basketball, martial arts, boxing, soccer, gymnastics and other related sports.

Muscle Adaptations to Weight Training

One of the fundamental adaptations to weight training is an increase in muscle fiber size. An increase in size is called hypertrophy. As a rule, you don't gain an increase in the number of muscle fibers in the muscle. Rather, the muscle fibers that you have simply lay down more protein myofilaments (actin and myosin protein) in the outer layer of your muscle fibers.

A muscle like your biceps, for instance, is made up of thousands of individual muscle fibers (muscle cells) that are each about the diameter of a human hair. As you train these muscles through weight training, they respond by enlarging, thus increasing their cross-sectional area and their density.

As the cross-sectional area of the muscle increases, the maximum force (strength) of the muscle also increases. These adaptations hold true for both men and women.

However, muscle fiber hypertrophy does not occur uniformly among all the muscle fibers in the exercised muscle.

In every muscle, there are Slow Twitch (Type I) and Fast Twitch (Type II) muscle fibers. The Slow Twitch (Type I) fibers are very aerobic in nature and are recruited primarily for long distance or endurance-based activities. In contrast, the Fast Twitch (Type II) fibers are involved in explosive events such as sprinting, the golf swing, tennis stroke, wrist

shot, bat swing, throwing motion, jumping, punching, and acceleration in hockey, soccer, basketball, etc.

Weight training produces hypertrophy in the Type II -- fast twitch fibers much more so than the Type I - slow twitch fibers.

It has been argued that the ultimate potential for muscle growth (hypertrophy) may be limited by the number of Fast Twitch (Type II) fibers within a muscle. This is likely the reason why one person bulks up very easily with a moderate weight-training program, while another person may show only a modest increase in muscle size when following the same program. Some people simply have a greater number of Fast Twitch (Type II) fibers than others. Their inherent potential for explosive speed and acceleration is seen in their natural ability to run fast, skate fast, or hit a baseball or golf ball a country mile.

Sets - Reps and Resistance

Designing a weight-training program involves the number of sets to be done with each exercise, the number of repetitions performed in each set and the amount of resistance you're going to work against.

As a general scheme, body builders, football linemen and individuals who simply want to increase their muscle size and strength (with little regard for power and speed) tend to maximize muscle growth (hypertrophy) by frequently lifting heavy weights. This means that they will often perform only 4-8 repetitions in each set, using a weight that produces near or complete muscular failure by the final repetition in each set.

Once able to lift a given weight 6-8 times in 3-5 consecutive sets, they will increase the weight in their next visit to the gym in order to challenge the muscle further. This is known as the progressive overload principle of weight training; as the muscle becomes stronger, you increase the resistance to force it to adapt further. Over time, you get stronger and stronger.

Once again, this style of heavy weight training increases strength, but may hinder power, which is required by many athletes.

To gain strength and power your best bet is to choose a weight that you can lift 8-12 times. Then perform 3-5 sets of 8-12 repetitions with this weight. It should be heavy enough that you are unable to do more than 12 repetitions in a set. While performing the exercise, contract the muscle as fast as you can when working against the resistance and then lower the weight in a slower, controlled manner so you don't sprain any joint structures. Contracting quickly against the resistance helps to improve muscle power, increasing your speed and acceleration.

With this style of training, you will experience an increase in muscle size, albeit less than heavier forms of weight training, and it will provide the speed and power to enhance

many athletic endeavors. Once you can lift the weight 12 times in each of the 3 or 4 sets at that station, make the weight heavier in your next visit to the gym. Continue to make the weight heavier as your muscles become stronger over time, always performing 8-12 repetitions in each set.

Other Critical Factors That Maximize Weight Training Results

1. Perform at least 2-3 different exercises for each body part (i.e. For chest--Bench Press, Incline Press, Flies)
2. Perform 3-5 sets at each exercise station
3. Work each body part at least 2X per week (allow 48-72 hours for recovery for each body part)
4. For strength and size increase only - focus on heavy weights using 4-8 repetitions per set to muscular failure
5. For power training to enhance many sports - focus on moderate weights using 8-12 repetitions per set to muscular failure
6. To gain muscle protein you must also ingest at least 1.2 grams of protein for every kilogram you weight. Some athletes ingest up to 2.2 grams of protein per kg. As an example, if you weigh 80 kilograms, you should consider ingesting 100 to 150 grams of protein each day to build your muscles.

Sample Program for Most Athletes To Build Muscle Power

OFF-SEASON PROGRAM

DAY 1 - CHEST, BACK and BICEPS

Activity	Sets	Repetitions		
		1st	2nd	3rd
Bench Press	3	4	8	12
Incline Press	3	4	8	12
Flies	3	4	8	12
Lat Pull Downs	3	4	8	12
Seated Rowing	3	4	8	12
Bicep Curls	3	4	8	12

Forearm Wrist Curls Flexion-Extension	3 4	3 4	8 12	8 12
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DAY 2 -LEGS, SHOULDERS and TRICEPS

Activity	Sets	Repetitions		
		1st	2nd	3rd
Squats	3	4	8	12
Knee Extension	3	4	8	12
Hamstring Curl	3	4	8	12
Military Press	3	4	8	12
Lateral Raises	3	4	8	12
Upright Rowing	3	4	8	12
Tricep Extensions	3	4	8	12

Frequency:

Follow Day 1 then Day 2 routine. After Day 2, take a day off from weight training to allow full recovery. Then, start again with Day 1 routine. This gives you a rest every third day from your weight training program.

During Season Routine (In-Season Training)

During the competitive part of the year, it is usually not possible to maintain weight training at the same pace as during the off-season. Research suggests that one training session per week can maintain the strength and power gains achieved during the off-season.

Thus, you may want to perform the following program once or twice per week during the competitive season to maintain your strength and power. Of course, if you are a body-builder, there is no In-Season / Off-Season reconfiguring required.

IN-SEASON PROGRAM (1-2x per week)

Activity	Sets	Repetitions		
		1st	2nd	3rd
Bench Press	3	8-12	8-12	8-12
Incline Press	3	8-12	8-12	8-12
Lat Pull Downs	3	8-12	8-12	8-12
Seated Rowing	3	8-12	8-12	8-12
Squats	3	8-12	8-12	8-12
Knee Extension	3	8-12	8-12	8-12
Hamstring Curl	3	8-12	8-12	8-12
Bicep Curl	3	8-12	8-12	8-12
Tricep Extension	3	8-12	8-12	8-12
Forearm: Extensions (wrist) – Curls (wrist)	2 2	8-12	8-12	8-12

As a final comment, remember that there are many variations of this training method. Consult a personal trainer or a certified sports-specific strength and conditioning coach for more individualized sports-specific programming.

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