

Strength training principles courtesy of [Med-X](#).

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The five check points below are an outline of the philosophy of **productive strength training**. Maximum gains result from addressing these 5 check points:

1. Full range of motion exercises – raise and lower the weight through the muscles full range of motion.
2. Allow the muscles to raise the weight – eliminate all arching, bouncing, throwing, and jerking movements while raising the weight.
3. Emphasize the lowering of the weight:
 - A. Lower the weight in a controlled manner, thereby allowing the muscle to lower the weight. Do not drop the weight.
 - B. The muscle that is used to raise the weight is the same muscle used to lower the weight. Use 3-5 seconds as a guideline to lower the weight.
 - C. You can lower approximately 40% more weight than you can raise.
 1. The point of momentary muscular fatigue has been reached when the athlete can no longer properly raise another good repetition. Each set must be performed with an **ALL OUT EFFORT** to momentary muscular fatigue (MMF).
 2. Supervision – Athletes should be paired off so that every repetition of each exercise is supervised to guarantee proper execution. Responsibilities of the spotter include:
 - A. Prevent injury – No arching, bouncing, or jerking of the weights.
 - B. Record all pertinent workout data on a workout card.
 - C. Only record the good reps lifted – not the forced reps.
 - D. Verbally encourage the lifter to exert an **ALL OUT EFFORT** while utilizing the techniques mentioned above.
 - E. Make the workout as hard and intense as possible for the lifter.

The Repetition

Perhaps the hardest idea for most athletes to come to grips with is how simple exercise really is. Conflicting information, both commercial and personal, leave the players confused. The fact is results can come from any type of progressive exercise, which is good because it allows for differences in a coach's abilities and situations to produce at least some results. However, the potential to train people in different ways has athletes swimming through a sea of information based on anecdotal evidence, past experience, "research" publications, and the current program of the "National or World Champs".

Players looking for the "answer" to their strength training problems need only look at the way they actually train. Do you work hard? Do you train consistently? Do you train during the season? Is the training closely supervised? Can you do basic exercises? Can you perform a repetition properly? Before one goes about evaluating programs, set and rep schemes, the "exercise of the month", or the latest in Eastern Block training "secrets", one should make sure that the fundamentals are being done properly. The most basic part of strength training is the properly performed repetition. It is also the most difficult to execute.

Uninformed strength training can be mysterious. There are many "experts" willing to sell their advice. "Magical formulas", buzz words, organizations, and certification tests all serve to make proper exercise appear as something which only a few people know the secret. The purpose of this manual is to show you how simple, practical and effective training can be. You will learn what you need in order to organize and implement effective training, but there are many subtleties, which are difficult to articulate and can only be learned by participating in and supervising workouts.

The fundamentals of exercise are such that you probably know more than you suspect. Too

often we leave common sense to the experts. Consequently, many coaches and athletes do not understand what the immediate consequence of strength training should be. They spend time dreaming up complicated schemes and routines designed to develop nonexistent trainable muscular properties such as "basic strength", "speed strength", "endurance strength", and "explosion". Let's set the record straight once and for all. Despite all the theory, you cannot change the chemical composition of muscle fibres by changing sets, reps, and speed of exercise movement. It is important to understand that strength; power and short-term muscular endurance are different expressions of the same thing and are not separable training entities. If you improve one, you improve all three.

The immediate purpose of strength training exercise is to fatigue the muscles. Think about this point for a moment. Now relate the implications to the way you train. A clear understanding of this point simplifies the evaluation of different exercises, equipment, and training schemes. The best methods produce the greatest amount of fatigue, in the shortest amount of time, and in the safest way possible.

The purpose of a properly performed repetition is to produce tension in the muscle, which repeated for a short period of time would fatigue the muscle. To do this in the most efficient way possible we need to be aware of five coaching points:

1. Minimize momentum.
2. Pause in the contracted position.
3. Emphasize the lowering phase.
4. Body position and leverage.
5. Constant tension.

1st: Minimize Momentum

If you move a weight too quickly, it will increase in speed to the point of actually travelling on its own. The increase in momentum will take tension off the muscle, making the exercise both easier and more dangerous, the two things one tries to avoid when training.

Care must be taken to lift the weight slowly and under control. This does not mean that there will never be a time when you do not try to move the weight with as much effort as possible. As the exercise continues, the muscle gradually fatigues to the point that its force-generating capabilities is not much greater than the weight it must overcome. At this point you can push, or "explode," with as much effort as possible, but the weight will move slowly because of muscle fatigue and ensuing decrease in strength.

Therefore at the beginning of the set, you must hold back somewhat. As the set continues the repetitions will be performed with increasing effort, until the end, when the effort is maximum and speed of movement is very slow or nonexistent.

According to the size principle of muscle fibre recruitment, it is the "intent" to raise the weight fast that is the key to developing explosive power. Not that the weight itself actually moves fast.

In fact, if the weight can be moved fast, it is not heavy enough to stimulate maximum strength and power gains. In practice, this means it should take at least one or two seconds to lift the weight. This will insure safety and minimize momentum. To lift the weight any faster would be throwing it, and throwing weights will not do much to increase strength.

2nd: Pause in the Position of Full Muscle Contraction

Once raised, the weight should be paused momentarily at the highest point, or where the muscles are in the fully contracted position.

This serves two purposes.

First, it helps minimize momentum. Second, because you can hold more weight than you can

lift, it demonstrates to the coach and the athlete that the weight was lifted and not thrown into position.

3rd: Emphasize the Lowering Phase of the Lift

Lifting the weight is one half of the exercise. Lowering the weight is the second half. Because you can lower approximately 40% more than you can lift, you will use fewer muscle fibres in the lowering phase unless you 1) Allow more time to let the weight down or 2) Add more weight during the lowering phase.

A good rule is that it should take three to five seconds to lower the weight. Lowering the weight any faster would be dropping it, and just as throwing a weight up is an inefficient and dangerous way to train, dropping weights will do nothing to develop strength and muscle.

Using the leg extension as an example, the exercise should be started slowly and smoothly and raised at such a speed that the quadriceps are under tension throughout the full range of motion.

At full extension, the athlete should pause for a second. If the weight stack floats, "recoils", or travels on its own past the point of the momentary pause, then the weight was lifted too fast.

After the pause in the contracted position, the trainee should slowly release the tension on the muscle until the weight begins to lower at a constant speed. If the weight begins to accelerate, the speed begins to increase while being lowered, and then the weight is being lowered too fast. When in doubt, lift and lower the weight slower, not faster.

4th: Body Position and Leverage

Body position and leverage are the next important points for safe and efficient exercising of the muscles. Leverage on most exercises can be improved to make the exercise easier. By arching the back, the bench press, seated press, arm curl and front raise exercises can be performed more easily. You can even use more weight and appear to be stronger. Lifting more weight for the sake of lifting more weight, with no regard for how it is lifted, may be fine for the ego, but does not necessarily translate into stronger muscles.

Remember, if the leverage is right, you can lift the world. There are leg machines, which are very leverage dependent. If the seat is adjusted two inches one way or the other, it may cause the athlete to be able to use +/- 50 pounds, and because of this we must be consistent with our seat positions.

The same is true when the body is out of position while performing exercises. Since the goal of exercise is to fatigue the muscles, we should seek to make exercise as hard as possible, which means you should use the leverage or body position which allows for the greatest range of motion, within reason of safety and comfort.

Many athletes are unaware of their body when they lift. They squirm, twist, and use spastic motions while trying to obtain another rep. They adjust their body, seat height, or machine to give them better leverage. All of these adjustments serve to make the repetition easier.

5th: Constant Tension

The final coaching point is constant tension. This is a subtlety that separates skilful trainees from beginners. When performing exercise, the muscle should be forced to work through a full range of motion under a constant load. Too often trainees let their concentration slip as the exercise becomes uncomfortable and they seek relief by resting part way through the repetition or bouncing the plates off the weight stack.

Recalling the leg extension example, when the unskilled trainee begins to lower the weight and the lever arm approaches the lower half of the range of motion, they will sometimes let the tension off the muscle and the weight will accelerate. Then, using this increased momentum, they will bounce the plates off the weight stack in order to get the exercise moving again. The trainee should lower the weight slowly and smoothly and then "turn around" the weight in the same fashion.

Pumping up a tire is an excellent analogy to keeping constant tension on the muscle. If you

where trying to inflate the tire – trying to increase the pressure or tension in the tire to a maximum level – while somebody else was letting a little air out as you worked the tire pump, what would your results be? So it is with training muscles. You may get the job done, but in a much less efficient manner than doing it the right way. This does not mean that we never take the tension off the muscles we are working. It does mean that for as long as possible during a set we will keep constant tension on a muscle.

When we cannot do any more perfect repetitions we may then have to take a few breaths in order to continue. In exercises that involve large muscle structures, such as a leg press, we may have to take several breaths. We will continue to record these reps, as long as the "pit stop" does not become excessive.

Rep Replication

When you begin an exercise the first rep you do is the most important. Your goal is to black out all distractions and perform the perfect rep.

The weight should be raised smoothly, paused in the contracted position and lowered slowly to a full stretch. When you begin the second rep, it is now the most important and should be performed in the exact manner as the first rep. Your goal is to replicate perfect repetitions. If we were to videotape a set of repetitions, we shouldn't be able to notice a difference in the reps when the tape is played back.

Keep in mind that the purpose of a properly performed repetition is to eventually develop a level of strength we do not now have. It is not to demonstrate a level of strength we wish we had.

There are some exercises that have been touted as being great for training athletes that break all three rules of a properly performed repetition. These include power cleans, and a host of other Olympic lift variations. These lifts rely on momentum, leverage, complicated technique, little tension on the involved muscles, no constant tension, and no negative or lowering portion of the exercise. Is this really a productive way to train? Decide for yourself.

Most coaches are result oriented. Some believe the result of strength training should be to make the weights go up and down. Some believe the result should be an athlete who can bench press a certain amount of weight and who can have their name on a record board.

But your muscles do not care if the weights can up or down, or even if there are any weights at all. All the muscle cares about is how hard it is being forced to work. The immediate result of properly performed exercise should be greatly fatigued muscles.

It all starts with the properly performed repetition.

Program Organization

Every time you train you are competitive. You are trying to improve.

You are trying to do better than you have done in the previous workout. You are always trying to get those last, very intense reps. Football is a physical game. You hit people from every possible angle known to man.

Therefore to properly prepare yourself for combat you must perform exercises designed to develop the five major segments of the body:

1. NECK

- A. Flexors
- B. Extensors
- C. Lateral Flexors
- D. Traps

2. HIPS AND LEGS

- A. Buttocks

3. MID-SECTION

- A. Abdominal
- B. Lower Back

4. TORSO

- A. Deltoids
- B. Lats
- C. Pectorals

B. Quadriceps

C. Hamstrings

D. AB/AD – ductors

E. Calves

5. ARM

A. Biceps

B. Triceps

C. Hands & Forearms

Workouts

Our system of strength training ensures all of the following important variables:

1. COMPREHENSIVE TRAINING – All of the major groups will be worked on every training day.

2. INTENSITY OF EFFORT - Our guiding principle on just about everything we perform is follows: "If you could have done another rep with proper form, you should have don it".

3. OVERLOAD – This aspect of training is built in to our system. We expect progress in the number of reps you are performing with a certain weight over a period of time. This applies to all of your exercises, not just the bench press and squat/leg press.

Variety will make your workouts more challenging and enjoyable. Stick to the basics of comprehensive training, intense effort, progressive overload, and a three-day-a-week (non-consecutive) approach regarding frequency, and you will make excellent gains in size and strength. You must be able to design your strength training workouts from the suggestions listed below and the equipment at your disposal.

1. Each area is to be worked every training day.

2. Choose the correct number of exercises listed for each area (the actual exercises for the particular area is your choice)

3. Perform the number of sets, reps, and forced reps indicated for each exercise.

4. Chart every workout, recording the "perfect" reps achieved in each set.

5. Attempt to "beat" the number of perfect reps achieved on a particular exercise on the next workout that exercise is used.

6. When 2 additional reps over the original number of good reps is achieved, add 5-10 lbs. to upper body exercises and 10-20 lbs. to lower body exercises....**OVERLOAD!**