

PHILOSOPHY

The purposes of strength and conditioning are to make the athlete stronger (explosive, flexible, aerobically and anaerobically in shape!), to help bring the team together and to help prepare athletes for the challenges of sport and of life. Thereby decreasing the chance of injury and improving performance in the aspects of mental toughness, a greater work capacity, and building a stronger base from which skill can be developed. This is achieved in an environment based on:

Safety

- performing reps in a controlled manner
- not dropping weights (unless on a platform)
- proper room set-up and coaching techniques
- no horse play (wrestling, etc..)

Productivity

- minimal rest between sets
- treating the weight room with a working atmosphere and not that of a social club
- Getting the most out of each rep and each set

Progression

- add weight to the bar
- perform more reps with a given weight
- take less time between sets.

Accountability

- be on time to lift
- wear issued gear
- train hard and expect that your team mates will too!

Supervision/Motivation

- pair up with a lifting partner or coach
 - this helps prevent injury-no arching, bouncing, or jerking weights!!
- Record only good, quality reps
 - Not forced reps, or reps with poor form
- Coach the lifter-don't just spot. Verbally encourage an ALL OUT EFFORT!!
- Make the workout as challenging as possible for the lifter

FUNDAMENTALS

1. Intensity

If you lightly tap a stick of dynamite with a hammer, nothing will happen. If you smash it one time very hard, it will explode! The same applies to strength training. Maximum effort leads to maximum results!

2. Duration

An inverse relationship with intensity. The harder you work, the less time you will be able to work. Consider sprinting a 400 meter race at the pace of a 40 yard dash. As well, there is a point where too much work in a given time becomes useless. Once one reaches the point of fatigue, any more training at that time can be too much and can actually over train the athlete. Once proper growth is stimulated – *get out of the gym!*

3. Frequency

How frequently one lifts weights. More frequency is not always better. The athlete needs to properly recover from a work out before engaging in another to avoid over training. This must be taken into special consideration when athletics is combined with academics, life issues, etc. All these factors produce stress and the body cannot differentiate between them. Stress is stress. The frequency of weight training must be considered against other stress factors.

4. Specificity

One must train towards a goal. As stated previously, the goal of strength training is to make the athlete stronger, improve mental toughness and work capacity, decrease chance of injury, and build a stronger base from which skill can be developed. A stronger athlete has the capacity to generate more force throughout a range of motion provided he is **performing the skill properly**. A skill such as the squat will require much work on technique before heavy weight is applied. Specific skills such as the squat must be developed in the weight room. However, the goal **is not** to improve sport skill. Just because an athlete can squat 600 lb. does not mean he is the best long snapper, pass blocker, that he has attained the ability to run perfect pass routes, or that he has become a better tackler. To improve these skills, he must practice them **exactly as they would occur in competition**.

5. Neurological Efficiency

The ability to recruit muscle into action (Rate of Force Development). If two athletes have the same build, and muscle mass, the athlete who is more neurologically efficient will be stronger. Neurological efficiency can (and must) be developed, this is often done with lower weight and increased velocity. This goes hand in hand with specificity; an athlete can become more neurologically efficient in the squat or the clean and not be very neurologically efficient when it comes to snapping a football. Interestingly enough, the more efficient we are, the more taxing the activity is to our system and the longer we need to recover.

6. Adaptation

Building muscle is the adaptation of the body to the stress of high intensity exercise. This provided the stress (or stressors) is not so great that the body is over trained. The body has a general adaptation syndrome: 1) general alarm reaction 2) stage of resistance and 3) stage of exhaustion (if stress persists). At first, weight lifting will shock the system, then we become sore and uncomfortable. If at this point proper rest is taken, positive adaptation occurs (muscle growth), if not it leads to exhaustion (over training).

7. Progression

Each time an increase is made in strength (adaptation), the intensity must be increased in order to further the development of the muscles. This can be done by adding resistance to the exercise, performing more repetitions with the current resistance, or decreasing the amount of time between sets.

8. The Repetition

The purposes of properly performed repetitions are to, 1) produce tension in the muscle, which repeated for a short period of time will fatigue the muscle(leading to growth) and 2) to practice the skill of a particular exercise thereby increasing neurological efficiency. To do this in the most efficient way possible we need to be aware of six coaching points:

- **Minimize momentum**
- **Pause in the contracted position**
- **Emphasize the lowering phase**
- **Body position and leverage**
- **Constant tension**
- **Repetition replication**

Minimize Momentum.

If you move a weight too quickly, it will increase in speed to the point of actually traveling 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 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 the 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 maximal and speed of movement is very slow or nonexistent. *According to the size principle of muscle fiber 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.

***Two caveats to this are: 1) Olympic style lifts such as the power clean, hang clean, power shrug, snatch, etc... these exercises are designed to transfer power from the ground into the barbell and as an expression of power the barbell will “float” and be caught by the lifter in an athletic position, and 2) variable resistance movements such as adding bands or chains to the barbell and using a prescribed percentage of the athletes 1 rep max so that the athlete explodes from the bottom of the movement with light weight and as the bar travels up, the resistance increases. These methodologies are perfectly sound ways to train provided that the correct form and resistance is used.*

Pause in the Position of Full Muscular 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:

- it forces the muscle to work through a static contraction, which is one third of the exercise
- it helps minimize momentum and demonstrates to the coach and the athlete that the weight was lifted and controlled, not thrown into position (safety).

Emphasize the Lowering Phase of the Lift.

Raising the weight is one third of the exercise and lowering the weight is another third. Because you can lower approximately 40% more weight than you can lift, you will use fewer muscle fibers in the lowering phase unless you:

- Allow more time to let the weight down. - 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
- Add more weight during the lowering phase. – most easily accomplished on manual resistance.

Using the leg extension as an example, the exercise should be started slowly and smoothly and raised at such a speed that the quadriceps is 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, that is, the speed begins to increase while being lowered, then the weight is being lowered too fast. When in doubt, lift and lower the weight slower, not faster.

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 easier. 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 to stronger muscles. Remember, if the leverage is right, you can lift the world. We have a leg machine in our facility that is 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 the exercise as **hard** as possible. You should use the leverage or body position that 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 repetition. They adjust their body, seat height, or machine to give them better leverage. All of these adjustments serve to make the repetition easier.

Constant Tension.

This is a subtlety that separates skillful 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 (or their own body!). 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 raise the weight in the same fashion.

Pumping up a tire is an excellent analogy to keeping constant tension on the muscle. If you were 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 repetitions, as long as the "pit stop" does not become excessive.

Repetition replication.

When you begin an exercise, the **first repetition** you do is the most important. Your goal is to block out all distractions and perform the perfect repetition. The weight should be raised smoothly, paused in the contracted position and lowered slowly to a full stretch. When you begin the second repetition, **it is now the most important** and should be performed in the exact same manner as the first repetition. 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 repetitions 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 have. It is not to demonstrate a level of strength we wish we had. Your muscles do not know if the weights go up or down, or even if there are any weights at all. All the muscle knows about is how hard it is being forced to work. The immediate result of properly performed exercise should be greatly fatigued muscles. Everything you do in the weight room starts with the properly performed repetition.