

## Principles of Training (3)

### Principle of Reversibility

If you have ever heard the term “use it or lose it” then you already know about the principle of reversibility. The principle of reversibility simply states that if a muscle has been trained, once that training is removed the muscle will reverse back to its original state. Remember that a muscle adapts to the demands placed upon it. If no training is taking place, the muscle will lose the previous adaptations gained through training.

Two main concepts contribute to this principle: **Atrophy** and **Detraining**

**Atrophy** occurs when muscles are rarely or never used, like in the case when someone breaks a bone in their arm and a cast is placed on the arm. Because the cast does not allow parts of the arm to move, certain muscles are rarely used. The muscle fibers adapt by decreasing in size and as a result the entire muscle shrinks. Often, after a cast has been removed, one arm will look much smaller than the other.

**Detraining** occurs after a muscle has already been trained. For any number of reasons, like injury, the end of a sport season, or lack of time. The muscle will slowly reverse back to their original untrained state. Professional athletes often schedule periods of detraining (the off-season) into their year as a time to recharge psychologically rather than physically. After several months of intense training, athletes often need time to mentally relax in order to return with the same amount of intensity next season.



### Principle of Diminishing Returns

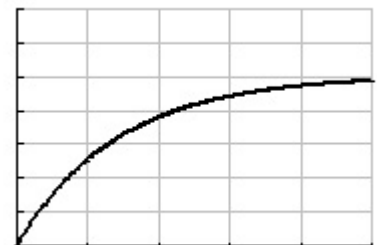
This principle actually describes two parts to training. The first is based on the fact that beginner weight trainers have a long way to go and experienced weight trainers don't. When an individual first starts training, they tend to see large gains in strength in the first few training sessions. This happens in strength training and in cardiovascular conditioning. Long distance runners develop their ability to run further and faster rapidly in the first few years of training. Unfortunately, this can also be frustrating and discouraging for the experienced athlete.

Often, experienced individuals will question why they are not improving at the same rate as they did before. This is the principle of diminishing returns. The muscles of the body adapt greatly during the first periods of training and unfortunately, this means there is little adaptation needed in the future. The graph left shows how a drop of occurs over time.

This principle can also apply to the number of sets an individual performs during a workout. At some point the strength gained from doing more and more sets is not worth the effort that goes into performing those sets. At this point it is time to give the muscle group a rest and come back with a more intense form of training another day. This can be seen in the graph on the right. Large strength gains are seen after only 1 or 2 sets. Adding a 4<sup>th</sup> and 5<sup>th</sup> set will still show a benefit, but not as much. This means that 15 sets of curls on your biceps aren't worth the time or effort.



Relative Strength Gain High High  
Training Experience



Low Strength Gains High 4 5  
Sets

### **Principles of Training 3**

1. In your own words, describe the principle of reversibility.
2. List and describe the two main concepts associated with the principle of reversibility.
3. Is detraining a bad thing? Explain.
4. In your own words, describe the principle of diminishing returns.
5. Why do experienced weight trainers often get frustrated?
6. A grade nine student who is new to working out wonders how many sets they should perform of each exercise? What do you tell them? Explain your reasoning.