The Volume Factor

By Michael Lipowski, CFP

The Intensity Factor article explained how in order to derive the greatest benefit from our workouts we must train with the highest intensity of effort as possible. Particularly performing each set to the point of *momentary muscular failure.* To quickly recap; *intensity* is the possible percentage of momentary muscular and volitional effort exerted. This translates to 'how hard' one is working or the degree of the strain one's muscles are under at any point during an exercise. The process of building muscle begins with stimulating the muscle(s). The stronger the training stimulus—the stronger the response. With this is mind you need to place the muscles under as much strain possible during your workout. This however is only the starting point. How much muscle development that takes place is dependent upon the total demands of the workout and the appropriate amount of recovery time. The purpose of this article is to discuss another contributing factor to the *total demands* of your workout…training volume.

Volume is defined as: the amount of exercise performed in a workout.[1] This refers specifically to the length of each set (Time Under Tension) and the number of sets performed. In many instances a single bout of stimulation (even a very intense bout) may not be adequate in giving the muscles a reason to grow larger or stronger, so we must then determine how much stimulation is necessary to induce growth. The ideal dose of intensity and volume (relative to each individual) is essential to introducing the muscles/body with demands that will produce results.

Anything above what is ideal or necessary to induce growth is superfluous and over time will lead to overtraining. Furthermore, excessive volume, in the form of too many sets, is directly responsible for joint pain, worn cartilage and tendonitis. Because of the potential negative impact of excessive volume it stands to reason that the only logical approach to training should be to perform the least amount of exercise necessary to achieve the best overall results. This is accomplished by training with a high-intensity of effort and as little volume (number of sets) as possible, as per individual needs.

Another component of volume relates to the length of each set, which is known as the TUT. The time under tension is the total time (in minutes/seconds) a set last minus any rest that takes place between reps.[2] Time under tension reflects the amount of time that

[1] Johnston, Brian D. Exercise Science-Theory and Practice. BODYworkx, ON Canada: 2003. p.36, Ch.3
[2] Johnston, Brian D. Exercise Science-Theory and Practice. BODYworkx, ON Canada: 2003. p.10, Ch.2

the muscles are straining (under tension) during a set. An individual's ideal TUT is determined by their muscle fiber type. Some individual's have muscles that are most receptive to set lengths that last over 1 minute while others may be more receptive to sets that last less than 1 minute. By receptive we mean increases in muscular size and strength. To briefly elaborate, fast-twitch (FT) muscle fiber is characterized as being large in size and produces a great deal of power but has poor endurance. Stimulation of FT fibers is responsible for increased muscular size and strength. Slow-twitch (ST) muscle fibers are small in size, have poor strength capabilities but excellent endurance. Most of us possess both fast-twitch and slow-twitch muscle fibers but vary in the degree or amount of each. Consequently those individuals who possess an abundance of FT fibers will find it most easy to build muscle while those who do not will find muscle development most difficult. The way in which fiber-type and rate of fatigue relates to volume is detailed in PURE PHYSIQUE: "How to Maximize Fat-loss and Muscular Development.

Understand that if a muscle or muscle group fails to reach its lower-limit time it will not engage as many fibers as possible and if it is trained beyond its ideal TUT you encounter a situation where the muscle is being overused and ultimately cut into its recovery ability. For this reason it is crucial that each muscle is trained appropriately. Similarly it is just as important that the, proper number of sets are performed so as to not overstimulate or under-stimulate the muscles.

The efficiency, effectiveness, and safety of your workout, depends upon how you balance volume with other training variables (intensity and frequency) and is a fundamental aspect of exercise prescription. Knowing and understanding how much total volume is required for certain muscle groups as well as an entire workout has significant implications. Prescribing the ideal amount of volume will allow you to enjoy a training career that is productive and with a reduced risk of injury.