Intensity and volume in strength training
By
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As a former weightlifter I have spent numerous hours training in an attempt to not only maximize my technical proficiency but to also increase my ability to exert maximal force. The numerous years spent training led me to begin a life long quest to better understand how to maximize an athlete’s strength levels. It is very evident that strength is a primary biomotorability that has widespread implications to athletic performance and more recently health and wellness. There are many forms of resistance training that can be used to stimulate physiological adaptations which underpin increases in muscular strength and hypertrophy. Thus the primary question we can ask is how do we manipulate resistance training interventions in order to maximize muscular adaptations?

Fundamentally, resistance training programs can be modified in numerous ways, but the most common method is related to alterations in training volume and intensity. It is well documented that there is an inverse relationship between training load and volume, such that as the load lifted is increased the number of repetitions that can be completed decrease. However, if we consider that training volume can be increased by either reducing the training load to increase the number of repetitions performed in a given set or we can increase the number of sets that can be performed with a given load. Both methods have merit depending upon the targeted training outcomes. For example, recent research suggests that low load training (i.e. 30% of 1 repetition maximum) can be performed to muscular failure and induce significant increases in muscle hypertrophy, without large increases in strength. Conversely, it is also well documented that if higher loads are used (i.e. ~75-80% of 1 repetition maximum) we can increase muscle hypertrophy and strength when sufficient volume (i.e. number of repetitions and sets) are undertaken.

If we consider that the overall workload encountered is a major stimulator for adaptation the question becomes is it the repetitions completed or the intensity of exercise that causes the physiological adaptations? In order to answer this question, we must consider the volume load (sets x repetitions x kg lifted) is representative of the total work completed it is clear that there are a multitude of ways to manipulate training volume and load to stimulate very specific adaptations. For example, if we look at the sport of weightlifting the use of high volume sets (i.e. >5 repetitions) is rarely considered as an effective training tool for these athletes. Instead these athletes tend to lift loads >80% of 1 repetition maximum for multiple sets. As such the training stimulus becomes impacted by the number of sets performed and not the number of repetitions performed in each given set. By structuring their training in this fashion the weightlifter can increase their training volume whilst still training at an intensity that increases their muscular strength. Additionally, the increase in overall training volume then provides a stimulus for increasing muscle hypertrophy in these athletes.

As you read this issue of the International Journal of Applied Exercise Physiology I hope you are able to examine how training volume and intensity interact with one another. The ability to understand this complex interaction is central to our understanding about how resistance training impacts both skeletal muscle and performance capacity.

Sincerely,

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