



# PERFORMANCE 101: What are the Major Principles of Muscle Growth

Two major principles form the foundation of muscle growth according to the NSCA 2020 NSCA=National Strength and Conditioning Association

- **Overload:** First, muscle must be stimulated to increase in size from an anabolic stimulus. The anabolic stimulus appears to be related to the amount of resistance used in a lift, momentary muscular failure, volume (repetitions and sets), and the associated neural activation in both men and women. Studies suggest that when using only light weights (20-28RM), no hypertrophy of the Type I muscle fibers was seen, which are the fast twitch explosive muscle fiber. Type 2 is the slow twitch oxidative fibers. However, when using heavier resistance (9-11RM and 3-5RM), increases in cross-sectional area of all muscle fiber types were observed with training. In this context, the most prolific stimulus for muscle growth is a well-designed resistance exercise program of sufficient volume and sufficiently high intensity.
- **Nutrition:** Second, increasing muscle size requires energy and the building blocks for new protein growth, both of which come from a properly designed and well-balanced diet that incorporates adequate calories and needed nutrients. The body needs carbohydrate, protein, and fat to repair and remodel muscle. Thus, everyday dietary patterns (including the timing of nutrient intake around the workout), appropriate sleep, and a healthy lifestyle all contribute to the effectiveness of muscle repair and, therefore, muscle growth.
- **Rest :** Another principle of recovery not mentioned by NSCA is REST. Your muscles do not grow when you are training. It may feel that way from the blood flow to the muscle. Some call it a pump (see future article on this). The muscle actually grows during days off from training when you are not using the muscle. We call that recovery. Typically time off is at least 48 hours between training the same muscle. Good nutrition and quality sleep are important all the time especially during recovery. **IF YOUR MUSCLES ARE SORE TO THE TOUCH OR IF YOU FEEL PAIN ESPECIALLY IN THE TENDON OR JOINT THAT AREA SHOULD NOT BE WORKED ESPECIALLY WITH THE EXERCISE THAT IS PROVOKING THE PAIN.**

*If any of these principles is ignored, muscle simply will not adapt optimally for the desired hypertrophy.*