Maximizing Muscle Recovery after Resistance Exercise

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Introduction

Optimal muscle recovery after resistance exercise is just as critical as the exercise program itself, if not more so. Without adequate recovery, your clients will fail to experience maximum gains or results, which could ultimately interfere with their willingness to stick to a training program. While recovery is a multi-faceted issue, the three main aspects of recovery are rest, nutrition and sleep. In order to experience maximal muscle recovery and get the most out of their training, your clients must do their best to excel in all three areas.

Rest

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Research by Hackney, et al. (3) found both untrained and trained subjects showed an increase in resting energy expenditure 24, 48 and 72 hours after a high-intensity strength training workout. Another study by McLester and colleagues (4), found that after performing eight resistance training exercises for three sets of 10 repetitions, subjects displayed the lowest strength levels 24 hours after the session; back to normal strength levels 48 hours after the session; and maximum strength levels 72 to 96 hours after the training session. These findings suggest that at least 72 hours of rest between sessions is perhaps necessary to allow for all muscle remodeling processes to take place and complete muscle recovery to occur.

Despite these outcomes, another large-scale study demonstrated that the current recommendations may be on point. Westcott, et al. (5) looked at more than 1,600 previously untrained subjects who performed the same resistance training program. However, the group was divided into three sub-groups with one training once per week, one training twice per week and the third training three times per week. The groups who trained two to three times per week gained an average of 3.1 pounds of lean muscle mass while the group who trained once per week gained an average of 0.7 pounds of lean muscle mass.

The question remains, how much recovery time is necessary between resistance training sessions? The answer should be based off of each client's training

experience, exercise prescription, and age. In the Hackney study (3), resting energy expenditure and indicators of delayed onset muscle soreness was higher in the untrained group compared to the trained group, indicating untrained clients will require more recovery time than their trained counterparts. In terms of exercise prescription, the higher the intensity (i.e. volume, load, etc.), the more time is necessary for total muscle recovery. Lastly, as suggested by the National Strength and Conditioning Association (2) and as exhibited in the McLester study (4), the recovery process may take longer in older adults, making one to two training sessions per week sufficient.

Nutrition

Adequate nutrition is essential for maximum muscle recovery after exercise. Clients who fail to meet nutritional demands imposed upon them by each training session will likely not experience the level of recovery and results as those clients who make nutrition a priority. While it is easy to focus on post-exercise nutrition, what your client consumes throughout the entirety of each day is going to be the deciding factor. Yes, a protein shake immediately after the training session is great, however, if that's the only protein consumed that day, it's simply not enough.

The recommended protein intake for adults by the NSCA is 0.8g/kg of body weight for both men and women (2). However, if your clientele includes athletes, this number needs to increase to 1.5 to 2.0 g/kg (2). The higher training demands of athletes require they consume more sources of amino acids to facilitate tissue repair and maintain a positive nitrogen balance.

Although the amount of protein needed for optimal muscle recovery is fairly straight forward, when your client should ingest it is not. For some time, there has been a debate between the use of nutrient timing, in which nutrients are consumed strategically around each training session, or simply ensuring adequate nutrition throughout the day.

Some researches and trainers hold the belief that an "anabolic window of opportunity" exists and by consuming the nutrients during this time, it initiates the rebuilding of muscle tissue and restores energy reserves. Studies have shown that making sufficient amounts of protein and carbohydrates available close to the training session can decrease the protein degradation that occurs post-workout and increase protein synthesis (6, 7) both of which create a favorable environment for muscle growth and recovery. On the other hand, evidence opposing the window of opportunity exists that shows enhanced amino acid sensitivity occurs after a strength training session and can last 24 hours or more afterward(8), making the narrow time frame of the window obsolete.

What does this mean for your clients? While a protein feeding directly after each workout may not be necessary, it will by no means do harm. A client who trains first thing in the morning in a fasted state would benefit from a supplement or meal directly after a training session as would a client who has a difficult time consuming adequate calories throughout the day. Clients training shortly before or after breakfast, lunch or dinner would likely be fine to hold off until their next meal.

Sleep

While nutrition and rest days are vital, quantity and quality of sleep is a fundamental part of optimal recovery due to the hormone activity that takes place. Sleep cycles occur approximately every 90 minutes, with deep sleep and REM sleep occurring near the end of each cycle. Deep sleep is of upmost importance when considering recovery; this is when metabolic activity is at its lowest point and when the endocrine system increases the secretion of androgens and growth hormone (9), which are both essential for muscle repair, muscle building and promoting fat oxidation (11). Simply stated, deep sleep is when all other processes are put on hold and the body is able to divert all its attention to growth and repair.

If a client sleeps too little or the sleep cycle is interrupted on a regular basis, he or she will fail to receive all the recovery effects of sleep and may have to rely more heavily on nutrition and rest days in order to recover fully. These factors need to be taken into account when working with a parent of young children, a busy professional with high levels of travel/stress, and older adults who often have difficulty sleeping (10). While seven hours is the general recommendation (11), sleep is not a one-size fits all approach and your clients may have to do some experimenting to determine exactly how much he or she needs in order to feel rested and energized as well as physically and mentally prepared to take on the next training session.

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