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A bodybuilding and powerlifting guide :.

Effects of dehydration during exercise

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The human body responds to exercise in various ways. Within the body, there are complicated chemical processes unfolding in response to training-induced stress. Dehydration is known to dramatically affect physical performance – as well as general health. The more specific effects of fluid loss in resistance training are usually less understood. When trying to increase musculature, or improve body composition, staying properly hydrated is a requirement.

Resistance training can stimulate internal processes to increase muscle density, in response to the applied stress on the muscular systems. However, anabolism must exceed catabolism for the subsequent synthesis of new muscle tissue. Simply put: a bucket without a bottom will never hold water. For optimal exercise prescription, athletes must promote growth and discourage wasting. Current research suggests that dehydration can disrupt the body's muscle-building processes.

In July 2008, the Journal of Applied Physiology presented research into the affects of hydration on endocrine function. Several similar studies have reviewed endurance protocols in the past, but few have examined resistance exercise. Aerobic and anaerobic training utilize different energy systems; each resulting in dramatically different physiological responses. The researchers used healthy resistance-trained men. According to their results, dehydration strongly enhances catabolic hormone production, alters hormonal responses to exercise and increases concentrations of metabolic substrates.

Dehydration, or hypohydration, during training amplifies the exercise-induced production of cortisol and norepinephrine, the primary adrenal stress hormones – as well as epinephrine in some cases. While helpful in limited amounts, overproduction of these chemicals encourages a massive amount of tissue breakdown. As stress increases, training-induced performance inroads consequently lead to greater recovery requirements. If recovery needs are not met, symptoms of overtraining syndrome become immanent in the overall program, compounded through perpetual dehydration spanning over several workouts.

In addition, exercise-induced testosterone secretion is hindered by hypohydration. On

the other hand, growth hormone responses to exercise are not affected; even so, the ratio of exercise-induced GH stimulators and inhibitors does change (they seem to null each other out). Testosterone and GH responses are mostly affected by long workouts (versus brief yet intense training) at elevated core temperatures.

Cascades of indirect responses also occur; for example, decreased cell volume from dehydration has shown to promote insulin resistance in clinical settings. In general, increased cell hydration will stimulate anabolism, whereas cellular dehydration leads to a catabolic situation.

Chronic dehydration increases catabolism and decreases anabolism. Fluids must be administered prior to training, during exercise and then into the post-workout period – in proportion to the amount displace. While training hard and heavy, never ignore the body's most basic requirement: water.

Judelson, A. et al. Effect of hydration state on resistance exercise-induced endocrine markers of anabolism, catabolism, and metabolism. Journal of Applied Physiology. July 10, 2008.

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