

Hydropower Water Workouts

What's New at Hydropower

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Well, another year is coming to an end and we are gearing up for another exciting year in 2005.

We are excited about several changes that are on the horizon. We will be adding several new workshops to the ones that we currently have. We are in the process of updating the all of our current workshops and adding a new practical portion to the workshops.

We are also excited to be introducing some on-line CEC programs through AEA.

This will be a new avenue we are using to get CEC programs out to you. We hope that all of you will take advantage of this new and easy way to get some of your CEC's.

So keep checking for these exciting changes as we enter the New Year. We are really looking forward to getting these new programs out there to you.

Also, AEA is unveiling their new fitness certification manual during the first quarter of 2005. You will

definitely want to see the new manual. AEA is also in the process of revamping the personal training certification program. So, look for that program to be launched in 2005 also.

Everyone here at Hydropower Water Workouts wants to wish all of you the very best of holidays and hope we all can start the New Year fresh and ready to face all the challenges that 2005 will bring us.

Good luck and Happy Holidays!!

Certification and Workshop Calendar of Events

For a list and up to date information on events, please visit our web site at www.hydropowerwaterworkouts.com.

Calendar

December 5, 2004

AZ-WIN Meeting and Workshop
Scottsdale, AZ

We are still looking to add dates for 2005. Please contact us to get your facility added.



Caffeine and Exercise

As you drive to the gym in the morning to meet your first client, steering with one hand and guzzling coffee with the other, you are probably more concerned about caffeine's ability to keep you awake than its effect on athletic performance. Indeed, Starbucks and Folgers owe their fortunes, in part, to the fact that so many Americans are sleep deprived. Still, it's been well known for many years that caffeine has many beneficial effects for exercise including increasing strength, power, speed, and endurance, reasons that have won caffeine a place on the Olympics' banned substances list and was dropped down to the monitored list in 2004. But how exactly does caffeine work its magic?

Over the years, there have been a number of different mechanisms proposed to explain caffeine's so-called ergogenic effects on the body, that is, its ability to increase muscle capacity while reducing fatigue. While caffeine's role as a CNS stimulant has long been known, many researchers have considered those effects as insufficient to explain caffeine's athletic benefits, and have sought instead to find a more direct explanation in caffeine's interaction on the cellular level with skeletal muscles.

For example, in studies of muscle cells in the laboratory it's been demonstrated that caffeine will induce muscle contractions, even in the absence of membrane depolarization, and will potentiate both twitch and tetanic force production. As a result, it's been thought that caffeine may improve muscle performance through direct interaction with the calcium channels of the sarcoplasmic reticulum by increasing calcium availability. The weakness in this hypothesis is that the high levels of caffeine required to observe this effect in the test tube (*in vitro*) would be fatal in an actual person (*in vivo*). Therefore, whether some metabolic enhancement occurs at the typical caffeine levels found in humans is uncertain. Still, the theory cannot be dismissed because there are a number of studies that have shown delayed muscle failure and quicker recovery with caffeine, even without CNS involvement, by using electrical stimulation to fatigue the muscles.

If your clients or students ingest caffeine before aerobic exercise, they will be able to exercise longer than without it. They will burn more fat and deplete the glycogen in their muscles at a slower rate than someone who didn't ingest caffeine. Fat metabolism increases because caffeine leads to a rise in adrenal hormones known as catecholamines (e.g., adrenalin, epinephrine), which mobilize fatty acids from adipose tissues. As a result, researchers have sought to show a causal link between caffeine's ergogenic effects and catecholamines. Recent studies of recreational athletes have demonstrated, though, that endurance increases with caffeine ingestion regardless of hormonal or metabolic changes, and even despite an athlete's prior caffeine habituation.

What then can explain caffeine's benefits in exercise? Given the complexity of the human body, it is likely that there is no single mechanism that explains caffeine's ergogenic effects, but recent research supports the notion that these effects may be largely attributable to caffeine's ability to lengthen the time to fatigue (i.e., increase endurance) through its operation on the CNS rather than through direct action on the muscles.

Caffeine is primarily an adenosine neuromodulator antagonist. It blocks the action of adenosine by binding to adenosine receptors on both presynaptic and postsynaptic membranes. When adenosine binds to these receptors neural activity slows down, and you feel tired. Adenosine inhibits excitability within the CNS by inhibiting the release of excitatory neurotransmitters, primarily dopamine and serotonin, and decreasing the firing rate of central neurons. Caffeine has the opposite effect: it increases the release of excitatory neurotransmitters and lowers the threshold for neuronal activation. Drink coffee daily, and the number of adenosine receptors will increase throughout your body.

Since caffeine is a CNS stimulant, it's reasonable to wonder whether caffeine improves muscle performance by increasing contractile efficiency. Human studies show that volunteers who have ingested caffeine will perform at a higher rate of intensity for longer than those who have consumed a placebo. In other words, they are consistently able to do more work. Yet these same studies demonstrate that caffeine does not increase the ability to activate muscles voluntarily and exert peak force either before, during, or after working to exhaustion. There was no change in mass action amplitude, rate of decline in twitch amplitude, time to peak tension, or half relaxation time with or without caffeine. These results suggest then that study participants who took caffeine were either more willing to tolerate discomfort (e.g., they worked "through the pain") or they felt less discomfort (e.g., they felt less tired so they did more work).

In fact, studies show that caffeine reduces both a person's perception of how much force they are exerting during exercise and how much muscle pain they feel. Caffeine's ergogenic effects then, stem not only from being a CNS stimulant, apparently, but also from its role as an analgesic. As a result, it appears that athletes who consume caffeine perform better because they don't realize how hard they are working and they work longer because they don't get tired as quickly.

So, the next time a client struggles through

Diet and Exercise

In dismissing the notion of signing up for an aerobics class, one of my male friends once remarked, "What's the sense of working out if it doesn't help you look good in a t-shirt?" Clients hire personal trainers for a variety of reasons, but the underlying motivation for many people is looking better. While resistance training is an important component for all clients, younger men in particular may be as interested in bigger muscles as in getting stronger. But how do you help your client maximize muscle growth (hypertrophy) aside from a well-designed resistance training program? Both timing and nutrition are key.

Aside from their outward appearance, we tend to think of skeletal muscles only in their ability to provide movement and power: propelling us forward as we run or helping us to lift weights. Yet muscles have several other critical roles to play in the body. Protein is the structural building block of nearly all bodily tissues, and it is the muscles that are responsible for regulating amino acid metabolism, the components from which more complex proteins are formed.

Muscles oxidize branch chain amino acids gathered from food into essential amino acids for use by other tissues, and convert non-carbohydrate precursors into alanine and other amino acids that the liver can transform into glucose, in a process known as gluconeogenesis, to fuel the body in the absence of food. In a cruel irony for fasting dieters, it is the speed of this process, essential for our survival, which quickly robs the body of muscle while fat stores, which are metabolized more slowly, hardly shrink.

The muscles are also great warehouses of protein and energy that continually synthesize new protein from amino acids in the blood stream, while at the same time breaking muscle protein down for re-release. It is the muscles that provide the materials for repair and survival in case of injury, starvation, or disease.

Muscles grow (i.e., hypertrophy) when the anabolic or building process exceeds the rate of the catabolic or breakdown process. Both processes are always active, and the rate of each is affected by both eating and exercise. Studies show that from 1-2% of all skeletal muscle is synthesized or broken down daily. Due to their mass, muscles can account for 30-50% of whole body protein turnover, although the amount varies according to age, diet, and physical health. Even while resting, muscles account for some 20% of the body's energy expenditures, and an even higher percentage in individuals with more lean body mass.

In a healthy individual with an adequate diet, protein synthesis and breakdown are in relative balance. Protein synthesis (anabolism) dominates for 3-4 hours after feeding, and then protein breakdown (catabolism) returns to the lead. In a sedentary individual, the rate of protein breakdown is highest in the morning before breakfast (assuming that they don't snack in the middle of the night).

Research in the early 80's established the fact that muscle protein synthesis increases in the presence of essential amino acids in the bloodstream, even in individuals at rest. If carbohydrates are consumed at the same time, the low level of insulin released by the pancreas boosts the rate further, and slightly suppresses the rate of protein breakdown. If carbohydrates are present, the body doesn't need to go through the chemical cartwheels to turn protein into glucose. Other hormones typically play less of a role in protein synthesis, but as everyone knows well by now high levels of testosterone, anabolic steroids, and possibly human growth hormone can also accelerate the process.

Absent chemical enhancements, though, it is resistance training that sends the process of muscle protein synthesis into overdrive. After exercise, the rate of synthesis rises very quickly, growing to 50% over baseline (i.e., the resting rate) in 2-4 hours, and peaking at as much as 109%, according to one study, at 24 hours. In trained individuals, the rate of synthesis can return to the baseline within 36 hours, but for individuals who are new to resistance training, the rate of protein synthesis can remain elevated for 48 hours or longer.

The rate of increase in protein synthesis is correlated to the relative load of stress on the muscles during exercise. A heavy exercise routine leads to both an increased rate of muscle breakdown and increased muscle synthesis. In trained athletes, the levels of both muscle protein synthesis and muscle protein breakdown are amplified; that is, the baselines for both processes are higher. To boost muscle protein synthesis further and continue to build muscle, therefore requires a person to continually increase the resistance load on their muscles during training or their muscle growth will plateau.

Of course, muscles won't grow unless there are sufficient building blocks available. In other words, a person needs to eat protein (that is, consume essential amino acids) to build muscle. Studies show that muscle protein synthesis is highest about three hours after exercise when combined with a mixed meal of carbohydrates and essential amino acids. In fact, the rate of synthesis can be as high as double the increased rate from either exercise or consuming a mixed protein/carbohydrate meal alone.

The problem that confronts most people trying to gain muscle, though, is not so much that they don't eat enough – Americans in general eat plenty of protein – but that they don't eat often enough. Even when enhanced by training, muscle protein synthesis is an exceedingly slow process. Only a relatively small amount of essential amino acids can be turned into muscle tissue following any single feeding. Eating more will not help. Any excess protein must be converted to glucose, stored as fat, or flushed out through the kidneys; the body has no other place to store it.

The key to maximize muscle growth then is to combine a well-designed resistance training with several (4-6) small meals a day that include both a good source of protein (i.e., one rich in essential amino acids) and complex carbohydrates. Frequent small meals will ensure that the muscles will remain in a positive anabolic state, while ensuring that there will be no excess to gird the waistline.

Hydropower Water Workouts

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About Hydropower Water Workouts...

Hydropower Water Workouts was founded in 1994. When Hydropower first began, the sole purpose was to give everyone the opportunity to enjoy the benefits of a healthier, more active, more enjoyable lifestyle through the comfort and safety of aquatic fitness.

Since that time, Hydropower has expanded to include facility management and programming. Hydropower is also involved in consulting with facilities, fitness professionals and fitness enthusiasts. In 1996, Hydropower relocated from College Station, TX to Phoenix, Arizona. After relocating to The Valley of the Sun, Hydropower expanded once again. Hydropower now dedicates a large portion of its resources to continuing education classes for fitness professionals and the development of a stronger, more credible aquatic fitness industry through education and networking.

Greg Peterson is the founder and owner of Hydropower Water Workouts. He has a B.S. in Kinesiology from Texas A&M University. Greg is a certified personal trainer through AEA, ACE and NASM. He is a certified Fitness Instructor through AEA. Greg has been leading aquatic fitness classes for over 14 years. Over the last 14 years, he has gained considerable experience while teaching to every imaginable population and class format. He has accumulated over 7500 hours of teaching experience. Greg has also been personal training individuals in the pool and on land for over 14 years. His clientele has included everyone from the physically and/or mentally challenged to the elite athlete.

Greg is an Aquatic Training Specialist with the Aquatic Exercise Association, Inc. He has been a Provider for AEA since 1997 and a presenter at the International Aquatic Fitness Conference. Greg is a CEC provider for AEA, ACE and AFAA. His unique

approach to class formatting and choreography has been shared with 1000's of individuals across the country and around the world. He also has a no nonsense approach to personal training that helps trainers of all levels expand their knowledge and programming capabilities.

Greg also won the US Water Fitness Association National Water Aerobic Championship in 1994 and placed 2nd in the International competition in 1995. Greg has been published in an international fitness magazine numerous times and co-authored the AEA Aquatic Personal Training Certification Manual. He was a regular guest on the morning news show talking about aquatic fitness in the mid 90's in central Texas and featured on the morning show in Phoenix in '97. Greg has been in newspapers ranging from the *Bryan/College Station Eagle* to the *New York Times* in regards to aquatic training/programming and land-based personal training.