ACUPUNCTURE today

NUTRITION / DETOXIFICATION

Nutritional Training, Part 1

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As acupuncturists, we must be aware of more than just Chinese medicine when it comes to taking care of the athlete, and a large part of this includes being aware of proper nutrition to get optimal performance. We'll talk more specifically about the role of traditional Chinese medicine in nutrition for athletes in another part of this series, but let's start with the nutritional basics so that you can understand the specific needs of the athlete who comes to you as a patient.

Many athletes focus on their physical training and tend to neglect their nutritional and mental training. Nutritional training focuses on the athlete's ability to be consciously aware of incorporating optimal nutrients into their training regiment, not only to perform physiologically, but also to maintain athletic abilities, create optimal recovery and allow athletic preservation. This prevents overuse injuries and enhances performance, enabling athletic career longevity.

Biochemically, nutrition has two primary components, macronutrients and micronutrients. Nutritionally, athletes require three primary fuel sources (considered macronutrients) and include carbohydrates, proteins, fats and water. Micronutrients are vitamins and minerals (this will be addressed in a later article). A major factor in optimal athletic performance is using the right fuel, at the right time, in the right amount. The body uses these macronutrients by breaking them down and putting energy into ATP (adenosinetriphosphate) which is the body's fuel source. Eating the right foods assists the athlete in maintaining desirable body weight, fitness level, and establishing optimal neuromuscular reflexes.

However, there is a lot of misinformation regarding what is considered the best nutrition for athletes and exercise training. Nutritional training is individually based and a variety of factors come into play when addressing the athlete's needs (e.g., age, fitness level, training/competition stress, weight, weather conditions and acclimatization levels). Therefore, individual circumstances require flexibility. The point here is that there is a peak "window of opportunity" to replenish nutrients right after the athlete's training. This is the most optimal time for absorption of fluids, macronutrients and micronutrients for recovery.

Carbohydrates

This is the primary fuel source for athletes. Carbohydrates contain sugars and starches and are classified by the number of sugar molecules they contain. Once ingested, these are converted in glucose (sugar circulating in the bloodstream). This is what cells use to create ATP. Glucose can also be stored in the form of glycogen in the muscles and liver. There are three types of carbs in the form of sugars: monosaccharides; disaccharides (combination of two sugars); and polysaccharides (combination of two or more sugars).

Of course, after hard training and the depletion of glycogen stores, the body will not care too much between complex sugars or simple sugars (except fructose) for muscle recovery. Complex carbs are still the better choice primarily due to the high glycemic index (GI) of simple sugars. The GI rates the speed at which the body breaks down carbs into glucose and absorbs it in the blood. So, the

lower the GI, the slower the process and thus the more stable the energy release is. Thus, complex carbs provide a greater caloric volume compared to the simple sugar carbs.

Complex carbs and starches (polysaccharides) are the most efficient sugars. Typically, athletes that use products containing simple sugars (energy drinks, gels, powder mixes) as replenishment tend to get gastrointestinal complaints resulting in reduced performance. This is due to an insulin spike from simple sugars, where even small amounts create a quick energy rush then a crash and burn feeling. This then causes a sudden recruitment of insulin, creating a dramatic drop in blood sugar levels sometimes below fasting levels.

An athlete can avoid this by using complex carbs. Polysaccharides do not create these sugar variations because during exercise, the body uses far less insulin due to the steady breakdown and release of glucose through hormonal factors and polymeric sources. Thus, the athlete never drops below the blood glucose baseline, as can happen with simple sugars.

Protein

Eating animal and plant proteins permit their breakdown into amino acids, which are nitrogen-containing molecules. Amino acid functions include developing and repairing tissues, transporting oxygen and nutrients, manufacturing enzymes and hormones, maintaining normal pH and fluid balance, and providing needed nitrogen. Essential proteins are those that the athlete needs to ingest as the part of their daily nutritional training. The essential amino acids are isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptohan and valine.

Depending on the type of sport, athletes have different protein needs. For anaerobic exercise (relatively low volumes of oxygen consumption like strength training), athletes primarily need proteins to increase muscle tissues while aerobic (high-volume oxygen consumption like endurance training) athletes need protein for recovery and repair due to their daily training demands. In long-distance training (60-90 minutes), glycogen stores in the muscles get depleted and will use the muscle itself for energy. This drive is called *gluconeogenesis*. After intense and long training the athlete's degree of soreness and stiffness indicates how much muscle was broken down (catabolized).

An important factor for performance enhancement is differentiating between soy and whey protein. Whey protein produces ammonia, which is the primary cause of muscle fatigue. Therefore, it is better used for recovery than during training. The quality of soy protein is not as high as whey protein because it has a different amino-acid chain structure. Soy proteins are better for athletes that need protein during training. Glutamic acid is another amino acid found in soy that aids in the replenishing of glutamine within the body. Interestingly, glutamine, when ingested orally, creates ammonia. Thus, ingesting glutamine-infused whey will exacerbate ammonia production, increasing muscle fatigue.

When training and competing for two or more hours in length, proteins should be incorporated at a ratio of 8:1 (carbs/protein) by weight. However, remember that the athlete should have the right type of protein. In general, typical protein needs for athletes are as follows: strength-training athletes need 1.4 to 1.8 g/kg per day and endurance athletes need 1.2 to 1.4 g/kg per day.

As mentioned earlier, the Chinese medicine perspective on sports nutrition will be discussed in a later article. For now, let's build the communication between athletes, coaches, trainers, nutritionists, strength and conditioning coaches, and sports medicine specialists. This will provide collaboration within the sports medicine team and can create synergy between mental and physiological training. This will allow an optimal environment for performance enhancement and,

more importantly, provide for injury prevention, a strong immune system and longevity of the athletes' careers.

Resources

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MAY 2010