Sports Supplements That Actually Work

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In the course of daily practice many young, and even older, athletes often ask about the value of certain supplements in regards to enhancing athletic performance, muscle and strength gains, explosive power etc. There are many supplements that are more hype than science, as we all know. However, there are several supplements that have impressive research to support their use as ergogenic aids. Sports supplements such as whey protein powder, sodium bicarbonate (or sodium citrate), creatine, L-glutamine and ornithine and arginine, top the list of legitimate supplements for athletes to use in this regard.

This article highlights the synergistic effects of combining creatine, L-glutamine, ornithine and arginine, to enhance athletic performance, accelerate strength, muscle and explosive power gains, and reduce risk of upper respiratory tract infections in athletes. In short, creatine supplementation is proven to increase strength, explosive performance, and lean mass gains in athletes. Creatine also preserves strength in aging persons, keeping them more functional. It has even been shown to improve strength and functionality in patients with multiple sclerosis, other neurodegenerative diseases, as well as patients with chronic heart failure. L-glutamine has been shown to decrease muscle catabolism during workouts, and has reduced the incidence of upper respiratory tract infections in athletes undergoing heavy training. L-glutamine is the primary fuel for many immune cells. Supplementation with arginine and ornithine - two amino acids - has been shown to boost release of growth hormone from the anterior pituitary gland, and thus, has been shown to accelerate lean mass development in young athletes and preserve lean mass in persons over 40, who typically show an age-related drop off in growth hormone and insulin-like growth factor -1 (IGF-1) blood concentrations.

Micronized Creatine Monohydrate

Creatine is an amino acid that is stored in muscle in the form of creatine phosphate. During explosive or intensive exercise, creatine phosphate is broken down by a specific enzyme to yield creatine, plus phosphate, plus free energy. The free energy released from the breakdown of creatine phosphate is used to regenerate ATP, which is the fuel that powers muscle contraction. (1, 2)

A number of studies have demonstrated that short-term creatine supplementation increases creatine phosphate stores in skeletal muscle by 10% to 40% (3). In combination with proper training, creatine supplementation leads to an increase in muscle mass, which is thought to occur from increased protein synthesis, as the muscle lays down an increased number of contractile myofilaments (protein bands that contract and generate force). Increased muscular fluid retention may also participate in muscle volume gains with creatine use. (4,5,6,7)

It also appears that creatine supplementation may allow athletes to train harder (due to increased available energy for muscle concentration), which promotes strength gains, and increases muscle size due to hypertrophy (larger muscle fiber size). (2,3)

Several studies have shown that creatine supplementation improves performance in repeated bouts of high intensity strength work and repeated sprints, which are primary determinants and requirements for many sports. (8,9,10,11,12,13,14,16,17,18) In short, substantial evidence suggests that creatine supplementation can increase lean body mass, muscular strength, and sprint power.

As an anti-aging consideration, creatine supplementation has also been shown to help preserve strength as individuals age, and is used successfully as an adjunct in the management of various neuromuscular diseases and heart failure. (19, 20, 21,22,23,24)

The established protocol for creatine supplementation used by athletes involves a loading dosage of 20 to 25 grams per day for the first 5 to 7 days. Typically an athlete will mix a heaping teaspoon of creatine monohydrate crystals into a glass of juice to obtain about 5 grams of creatine. During the loading phase, the athlete does this on 4 or 5 occasions throughout the day to achieve an intake of 20-25 grams. After the loading phase is completed, the maintenance daily dosage is usually 5 to 10 grams per day.
Supplementation with creatine monohydrate (best absorbed in the micronized form) has been shown to be the preferred form of creatine supplementation, as it dissolves very well in a glass of juice (e.g., grape juice - no residue at bottom of glass) and is highly absorbable within the gut.

L-Glutamine

L-glutamine is the most abundant amino acid in the bloodstream and in the body. Glutamine is also a main anti-catabolic agent in muscle, which when supplemented, may help preserve muscle tissue (preventing its breakdown), during and after exercise. The heavier one trains, the greater the stress on muscle, and the greater is the breakdown (catabolism) of muscle mass, as the muscles release glutamine into the bloodstream. (25)

During and following exercise or trauma, large amounts of alanine and glutamine are released from muscle. In turn, alanine and glutamine travel through the blood stream to the liver where they can be used to form glucose and glycogen. Glutamine supplementation has been shown to maintain muscle mass in catabolic patients. (26). Thus, athletes often supplement with L-glutamine (1000-2000 mg per day) to decrease muscle breakdown during training. (30)

Glutamine supplementation in endurance athletes has been shown to reduce the incidence of infections in this population, who are known to have their immune system suppressed by excess training of this nature. A double-blind, placebo-controlled study showed that Glutamine supplementation at a dose of 5 gm, taken after the end of exercise, in 151 endurance athletes resulted in a significantly lower incidence of infections (19%) compared to the placebo group (51%), during the study period. (27) It has been suggested that the immune system suppression associated with endurance exercise, may be in part, due to reduction in Glutamine that results from intensive training. Another study, using the same protocol, demonstrated that 81% of athletes taking Glutamine had no subsequent infection during the study period compared to 49% in the placebo group. (28)

Arginine and Ornithine

Arginine and Ornithine are amino acids that have been shown to increase the release of growth hormone (growth hormone secretagogues) when supplemented at a dose of 500 mg each, twice per day, five times per week. These initial studies were performed on young athletes. Acting as growth hormone secretagogues, these two amino acids increase growth hormone release, which in turn, increases synthesis and release of insulin-like growth factor -1 (IGF-1) from the liver. It is IGF-1 that exerts the anabolic and other physiological effects attributed to growth hormone on the tissues of the body.

As we age, growth hormone and IGF-1 levels decline, facilitating breakdown of lean mass and bone mass. Supplementation with arginine and ornithine can help reverse this trend, elevating and preserving IGF-1 levels. This has important anti-aging effects on the musculo-skeletal system. If the individual is performing resistance training and consuming adequate protein, arginine and ornithine supplementation can help enhance lean mass and strength gains, even in older individuals. This helps to keep individuals more functional as they age, elevates their metabolism, and helps to reduce body fat.

L-arginine is also converted to nitric oxide, which dilates blood vessels and feeds muscles additional nutrients and oxygen. This effect has also been shown to enhance athletic performance (29, 30).

Summary

Supplementation with a product that combines creatine monohydrate (ideally micronized creatine), L-glutamine and arginine and ornithine, at scientifically proven dosages, provides athletes, both young and old, with legitimate ergogenic and anti-aging effects, in regards to enhanced muscle, lean mass, strength and explosive power gains, and immune system support. Stirred into a glass of juice (4-6 ounces) on an empty stomach between meals, these nutrients have proven performance effects in young and older athletes. It can help preserve one's functional ability as they age (more strength and lean mass in older subjects) and should also be used in the adjunctive management of many neurodegenerative conditions. The same is true for heart failure patients, who can use this strategy under the supervision and monitoring of their physician or medical specialist.

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