

Amino Acids Supplements: Sports Update

G. Douglas Andersen, DC, DACBSP, CCN

As chiropractic acceptance with the public, press, and traditional health care providers increases, the scientific eye will probe deeper into what we do. I hope the majority of doctors will encourage greater research to seek the truth. Furthermore, if quality studies prove that some aspect of a given technique or adjunctive therapy is not what we thought, practitioners will make the appropriate adaptations. The same can be said for nutritional supplements.

Amino acids have been used by the weightlifting community, power lifters, body builders, Olympic lifters, and by athletes in sports where strength is particularly important, such as football and track and field. When athletes are asked why they take amino acids, the most common reasons are for growth and recovery.

The supplement industry heavily advertises the fact that amino acids are the legal ergogenic substances of choice for the serious athlete. Commonly quoted studies by Bucci, Hickson, et al.,¹ showed that ingestion of 12 grams of L-ornithine increased serum human growth hormone (hGH). Isidori² did a study that has not yet been duplicated and showed that a 2.4 gm dose of L-arginine and L-lysine increased human growth hormone and insulin. Intravenous studies have demonstrated that arginine³ and ornithine⁴ also increase human growth hormone and insulin. It should be noted that in all of these studies increases were observed less than two hours after supplementation. Furthermore, there is very little data on the effects of amino acids on normal exercising humans.⁵

We will now review three new studies on amino acids and athletes. The first study looked at a group of 11 experienced male weightlifters, with a mean age of 25 years, over a four day period. This was a double-blind, placebo controlled, crossover study. The groups were divided so that one group received 1 gm of L-arginine, 1 gram of L-ornithine, and 1 mg of L-lysine two times per day, at 1 and 9 p.m. The second group ingested 3 gm of placebo capsules two times per day. Diets for both groups were controlled with a caloric intake of 3,500 calories. Each day they worked out for 90 minutes. There was a one month washout period where the weightlifters continued normal training and then the experiment was repeated with the first group receiving placebo and the second group receiving amino acids. On the fourth day of training, lifters were monitored over a 24 hour period with 14 blood samples drawn including tests for growth hormone and insulin.

The authors stated: "There is no justifiable reason for recommending amino acids to promote muscle growth in male strength athletes."⁶ They further commented that: 1) The high protein diet athletes were consuming (19 percent) could, in theory, mask the effects of amino acid supplementation for the purposes of endocrine stimulation; and 2) In the two studies where oral amino acid dosing did alter blood serum hGH levels, the subjects took their amino acids in the morning on an empty stomach.

Comment: Granted, the results of the above experiment are not very impressive, but I feel it is premature (and may indicate bias) when the authors state that based on this study there is no reason to recommend amino acids for strength athletes. This statement is even more surprising

considering that: 1) the authors admitted that eating a high protein diet may mask the effects of low to moderate dose amino acids; and 2) in their studies the amino acids were not taken on an empty stomach. If one is going to supplement with amino acids, it makes no sense to take them on anything but an empty stomach. A more reasonable conclusion would have been that if athletes are on high protein diets, they may not need amino acids and further research should be done for those on low calorie diets with low to medium protein intake, or athletes who diet to stay at a desirable weight, i.e., wrestlers, boxers, body builders, and gymnasts.

In the second study, seven male body builders presented to the lab once per week for a five week period. After an eight hour fast they were given either 2.4 gm of arginine and lysine, 1.1 gm of ornithine with 750 mg of tyrosine, 750 mg of vitamin B6, and 125 mg of vitamin C, or a protein drink which contained 438 mg of arginine, 362 mg of leucine, 312 mg valine, 238 mg of phenylalanine, and 200 mg of isoleucine or placebo. On the final week they received an infusion of growth hormone releasing hormone (GHRH). The authors concluded: "There is no apparent reason why these supplements (substances taken in weeks one through three) should be effective as ergogenic aids."⁷

In the final study, 28 male weightlifters of the United States Junior National Weightlifting camp volunteered for this double blind, placebo controlled, crossover study. The mean age was 17 years. They had all finished no less than third in their weight classes in national competition. One group of weightlifters consumed lactose capsules while the other group consumed a 2.4 gm serving of a multiple amino acid formula three times per day and a 2.1 gm serving of a branch chain amino acid formula before each workout (9.3 gm per day total). The amount of dietary protein consumed was both high at 1 gm per pound of body weight and moderate at 14-15 percent of total calories consumed. This is because the caloric intake was close to 4000 per day for the athletes tested. Testosterone, cortisol, human growth hormone, and lactate levels were tested with blood drawn three times, at 7 a.m. and then just before and just after each workout. The subjects were tested, trained for seven days, and then were retested. With the results in, the authors concluded: "For this study at least, amino acid supplementation had no effect on physical performance or endocrine responses, and further direct study using other experimental manipulations is warranted."⁸

Comment: Of the three studies, the authors' conclusion in this third study was far more reasonable than the first two. I think it is safe to say that if you have an athlete who is consuming a very high protein diet, the addition of low to moderate amounts of amino acids for a short period of time (one week or less) most likely would not make a significant impact on performance. The results of these studies will cause a rare alignment between companies who manufacture and sell amino acids and the FDA which wants to ban them. For very different reasons, neither group will want to attract attention to these outcomes.

My personal rule of thumb on recommending amino acids or any ergogenic aid to an athlete, is that I do not consider supplementation past adequate vitamin and mineral intake unless a problem exists. When situations such as undesired weight loss, strength loss, prolonged plateau, or injury occur, then ergogenic aids may be recommended. Remember also that nutrition is just one of many factors that may need modification or change when an athlete's performance is unsatisfactory.

References

1. Bucci, Hickson, et al. Ornithine ingestion and growth hormone release in body builders. *Nutrition Research*. Vol 10, 239-245.1990.

2. Isidori and Monaco, et al. A study of growth hormone release in man after oral administration of amino acids. *Curr. Med. Res. Opin.* Vol 7, 475-481. 1981.
3. Ghigomaccario, et al. Interactions of alanine and arginine on growth hormone, prolactin, and insulin secretion in man. *The Journal of Metabolism.* No 41, 85-89. 1992.
4. Krassowski, Rousselle, et al. The effect of ornithine alpha ketoglutarate on insulin and glucagon secretion in normal subjects. *Acta Endocrinol.* No 98, 252-255. 1981.
5. Bucci. *Nutrients as Ergogenic Aids for Sports and Exercise.* CRC Press, Boca Raton, Florida. 1993.
6. Fogel, Holm, and Naveri, et al. Low dose amino acid supplementation: No effects on serum human growth hormone and insulin in male weight lifters. *Internal Journal of Sport Nutrition.* Vol 3, 290-297. 1993.
7. Lambert, Hefer, et al. The failure of commercial oral amino acid supplements to increase serum growth hormone concentrations in male body builders. *Internal Journal of Sport Nutrition.* Vol 3. 1993.
8. Fry, Kraemer, et al. Endocrine performance responses to higher volume training and amino acid supplementation in elite junior weight lifters. *Internal Journal of Sport Nutrition.* Vol 3, 306-322. 1993.

FEBRUARY 1994