

# Nutritional Supplements and the Teen Athlete

McKenzie Pediatrics 2010

From the time of the early Olympic games, athletes have looked for something to enhance their performance and give them an advantage over the competition. In recent years, adult athletes have developed a growing interest in supplements such as creatine, androstenedione, and amino acids. They are likely popular not only because they are touted as “natural” but because many do not contain banned substances, a concern for athletes at higher levels of competition.

Interest in performing enhancement has started to trickle down to younger athletes at lower levels of competition, as a result of increasing acceptance of the “win-at-all-cost” attitude of American sports, and because so many young athletes are engaged in year-round, single-sport competition at younger ages.

The supplement market has experienced major growth over the past decade. Since the enactment of the Dietary Supplement Health Education Act of 1994, it has been largely unregulated as well, leading to increased availability of nutritional supplements.

Any substance classified as a nutritional or dietary supplement is NOT subject to regulation by the Food and Drug Administration (FDA). There are NO standards for purity, quality, or quantity of active compounds, and a substance cannot be removed from the market until it is proven to be unsafe. Unlike with over-the-counter and prescription medications, manufacturers of supplements do NOT need to publish benefits or precautions.

Supplement use by athletes of all ages has been reported to be anywhere from 30% to 100%. It is important to know that NONE of the most commonly used “performance enhancing” substances have been studied in youths under age 18 years of age. Because the short- and long-term risks of supplements are unknown, kids and teens should be strongly discouraged from using them. There are more important issues related to athletic performance: namely nutrition, genetics, and training. A “performance enhancing” substance cannot compensate for inadequate training or a lack of talent.

## What About Creatine?

Creatine is something our bodies already make. It is present in skeletal muscle, heart, brain, testes, and retina. In skeletal muscle, it helps generate ATP for muscle contraction lasting less than 30 seconds. Supplemental creatine is claimed to stimulate increased muscle protein synthesis, but there is no evidence to support this.

Supplemental creatine may enhance production of ATP, allowing faster recovery after short bouts of maximal exercise, meaning that the athlete can work harder, longer. Exercise and carbohydrate ingestion appear to enhance uptake of creatine, and caffeine (which many teens consume much) decreases creatine uptake.

There is much evidence to support that creatine does have a positive effect on athletic performance, but ONLY in repetitive efforts such as short running or cycling sprints, short swims, and in weight training. Creatine does NOT benefit in endurance sports, or even in improving one-time, all-out performance.

Creatine has MANY potential side effects, which are dose-related (in other words, the more that is taken, the higher the risk of side effects): weight gain, headache, abdominal pain, and diarrhea. Users of creatine appear to suffer more muscle strains than other athletes. They are at increased risk of dehydration or heat illness due to the

fluid shifts caused by the substance. And the substance has been shown to cause kidney injury and even acute kidney failure in some users. Long-term effects of creatine supplementation are simply unknown.

If you or your teen is set on using creatine in hopes of enhancing athletic performance, do NOT give a "loading dose", as is often recommended. Instead, do not exceed a daily dosage of 3 grams, and take the supplement only during the athletic season.

#### What About DHEA and "Andro"?

DHEA (dehydroepiandrosterone) and androstenedione are hormones that seem to be increasing in popularity. According to some workers in nutritional supplement chain stores, they are the supplements most requested by young people. Both are precursors to testosterone, and NEITHER has been studied in young athletes.

Being hormones, while they could lead to increased muscle mass, they could also lead to hirsutism (excess body hair) and genital enlargement in females, breast development in males, early development of puberty in both males and females, and premature closure of the growth plates of long bones resulting in premature cessation of linear (height) growth.

Being hormones, they will also likely cause an athlete undergoing drug testing to test positive. For all these reasons, athletes of ALL ages should avoid using DHEA and Andro.

#### What About Amino Acids?

Protein and amino acid supplements are very popular, especially with athletes involved in strength training. The popular thinking is that supplements increase muscle mass because amino acids are building blocks of muscle.

While athletic training increases the daily requirement for protein, there is NO evidence that taking amino acid supplements is any more helpful in increasing lean muscle mass than increasing caloric intake during strength training. While no adverse effects are known to taking amino acid supplements in the short-term, there is yet no knowledge of potential long-term side effects, and therefore such supplements are discouraged.

#### What About Minerals?

Mineral supplements most commonly taken by athletes include chromium, iron, and calcium.

Chromium helps to regulate carbohydrate, lipid, and protein metabolism by enhancing the action of insulin. It is found naturally in brewer's yeast, nuts, asparagus prunes, mushrooms, wine and beer. Deficiency states are rare, and studies of chromium supplementation have consistently failed to demonstrate any benefit to the athlete.

Iron is well-known as crucial for the production of hemoglobin, the oxygen-carrying molecule in red blood cells. Some teens, especially menstruating females, are iron deficient, and increasing iron intake may be beneficial to athletic performance. However, it is usually best to increase dietary sources of iron to remedy a deficiency, rather than take a supplement, most of which won't be absorbed. Good dietary sources of iron include: liver, beef, turkey, pork, shrimp, chicken, fish/tuna, eggs, prune juice, apricots, dates and raisins, refried beans, spinach, broccoli, enriched breads and pastas, homemade bread with brewer's yeast, wheat germ, and fortified cereals.

Calcium supplementation can be useful for girls who participate in endurance (running, swimming, cycling) sports and 'appearance' sports \*gymnastics, figure skating, and equestrian). As with iron, it is better for the teen athlete to increase calcium intake through the diet, rather than to take a supplement. Check out the article on our website about Calcium, or call our office to request a handout detailing the best sources of dietary calcium.