Performance enhancement: not just for athletes anymore
by Michele LaBotz M.D., FAAP

Use of performance-enhancing substances (PESs) traditionally has been considered an issue in athletes, and prevention and screening efforts have primarily focused on that population. However, patterns of pediatric use of PESs have changed significantly over the past few years, with reports of increased rates of use by non-athletes, primarily for appearance-related concerns. This includes use of "diet pills" for weight loss, as well as protein, creatine and anabolic agents to enhance muscularity.


The greatest medical risk with attempts to enhance performance/appearance occurs with diversion of controlled substances, according to the report. Several classes of drugs frequently are diverted for these purposes. The following rates of non-medical use have been reported in recent national surveys of high school students: amphetamines, 12%, anabolic steroids, 7% and synthetic human growth hormone, 11%.

**Protein, creatine most common**

Although generally not considered as dangerous as drugs, the PESs most commonly used by adolescents typically are sold as dietary supplements. Protein and creatine are at the top of the list. Recent surveys of high school students report protein supplement use by 39% of boys and 18% of girls.

Pediatricians may find the following information helpful when counseling patients on protein supplementation:

- Protein supplements typically are in the form of powders, shakes or bars. They commonly contain 20-30 grams (g) of protein per serving, which is similar to the amount contained in a 3-4 ounce (oz) chicken breast.
- Young athletes may require up to 2 g protein/kilogram (kg) body weight/day (almost 70 g in a 150-pound athlete). This often is readily met with a typical American omnivorous diet.
- Vegetarians and others who are restricting their diet may benefit from nutritional consultation, but...
several easy changes can greatly increase dietary protein intake, as follows:

- Traditional yogurt has 7 g protein/6 oz serving, while Greek yogurt provides 17 g and cottage cheese has 21 g.
- Nonfat dry milk contains 12 g protein per half cup. This can be added to soups, sauces or beverages as a "hidden" source of added protein.
- Peanuts, almonds and cashews all contain over 20 g protein per 100 g serving.
- Creatine use has been reported by 18% of 12th-grade males and almost 2% of 12th-grade females.
- Creatine is stored in skeletal muscle and helps replenish adenosine triphosphate during maximal effort activities of short duration.
- The body requires about 1 g ingested creatine/day, which can be found in 2-3 servings of meat or fish.
- There is no added benefit to extra creatine.

**Contamination concerns**

Pediatricians should remind families that Food and Drug Administration regulation of supplements is much looser than for items sold as foods or drugs. However, it can be very difficult for consumers to distinguish these categories, as supplements often are intermingled on shelves with food and/or over-the-counter drugs at point of sale.

Analysis of supplements sold as PESs revealed that 25% were contaminated with anabolic steroids, 20% with heavy metals and 11% with stimulants.

Concerns regarding contamination and lack of FDA regulation of dietary supplements prompted attendees of the 2016 AAP Annual Leadership Forum to adopt a resolution calling for enhanced education and advocacy.

**Risk factors, different motivation**

Risk factors for PES use include: male, higher body mass index, body dissatisfaction, training in commercial gym and exposure to appearance-oriented fitness media. While use of PESs correlates with substance abuse and other high-risk behaviors, PES use typically is "goal oriented," whereas most other substance use in adolescents is recreational. This calls for a different approach when counseling on PES use.

Adolescents base their decisions regarding PES use largely on their hope for benefit, and this significantly outweighs any potential concern about adverse consequences. Therefore, prevention efforts are best focused on the lack of benefit of PES use, and pediatricians can provide information on alternative methods for achieving their goals.

Emphasize the following when counseling patients:

- The overwhelming majority of initial claims by supplement manufacturers regarding muscle-building, weight loss or performance enhancement are debunked after further investigation.
- Even the most favorable studies on the effects of PESs on athletic performance cannot rival the 30% strength gains that are reported in youth strength-training studies of several months’ duration.
- Adherence to fundamental principles of training, rest and nutrition remains the best way for patients to achieve healthy fitness and appearance-related goals.

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News Articles, Adolescent Health/Medicine, Pharmacology, Sports Medicine/Physical Fitness, AAP Technical Report

Fitness Executive Committee.

Resources

- U.S. Anti-Doping Agency
- AAP News Parent Plus article "Performance-enhancing products no substitute for exercise, healthy diet"