# POSITION STATEMENT ON APPEARANCE AND PERFORMANCE ENHANCING DRUGS AND SUBSTANCES

**National Federation of State High School Associations (NFHS)**
**Sports Medicine Advisory Committee (SMAC)**

**BACKGROUND**

Appearance and performance enhancing drugs and substances, or APEDS, refer to products that can be either naturally or synthetically produced and used with the intention of enhancing appearance or improving athletic performance. This use of APEDS is often referred to as "doping," and has unfortunately been a part of competitive sport since ancient Roman times. In 1999, the World Anti-Doping Agency (WADA) was formed, with the mission of creating a doping-free sporting environment. In the United States, the U.S. Anti-Doping Agency (USADA) is the national organization. WADA publishes the World Anti-Doping Code, which is followed by most sporting organizations, including the International Olympic Committee.

**WHAT ARE APEDS?**

The spectrum of APEDS is very broad, encompassing many different substances and methods of improving physical performance. There are multiple substances and drugs that fall under the heading of APEDS, from caffeine, found in numerous beverages, to illegal and dangerous anabolic steroids. All APEDS have the potential for dangerous complications and side effects, if used improperly. APEDS can be divided into two broad categories:

**1. Legal, not banned for competition, and may have some positive effects upon athletic performance:**

a. Caffeine (upper limit set by NCAA; WADA currently monitors caffeine levels, but no ban for use)
b. Creatine
c. Protein powders and amino acids

An interesting distinction is except for prescription medications, none of the other unregulated products are routinely tested by the U.S. Food and Drug Administration (FDA). A consequence of this lack of regulation is the potential for the presence of contaminants in dietary supplements. Some studies have shown that 8-20% of tested protein supplements are contaminated with significant amounts of heavy metals, such as lead and mercury. In addition, 25% were found to be contaminated with anabolic androgenic steroids, and 11% were found to be contaminated with stimulants. Such "contamination" may be no accident as the manufacturer obviously benefits from a product that is effective, despite significant safety concerns for the consumer.

Caffeine has been shown to improve performance in endurance events. Its use is restricted, but not banned, by the NCAA. Caffeine can also have multiple side effects, some potentially dangerous, including headaches, increased blood pressure and increased heart rate. In 2011, almost 1,500 12- to 17-year-old children went to the emergency department due to caffeine toxicity. Caffeine is treated differently than other supplements by

the FDA. While the FDA regulates the amount of caffeine allowed in foods and soft drinks, it does not regulate the amount allowed in energy drinks and supplements. This explains why the ingestion of multiple energy drinks can lead to dangerous levels of caffeine.

Creatine is a naturally occurring substance predominately stored in muscle fibers. It serves as an energy source for muscle contraction. It works to increase strength, peak force and peak power when performing multiple sets of maximal-effort muscle contractions. Therefore, it is likely more effective for off-season weight training than for any specific sport or event. Creatine use is relatively safe, but there are risks of dehydration, muscle cramps and blood clots associated with its use.

Amino acids and protein powders are very popular and marketed as "muscle building" products. While there may be some benefits to the use of these products, amino acids and proteins are present in a variety of meats and other foods for much less cost.

**2. Legal only when prescribed by a physician, illegal to possess without prescription, can have a positive effect upon athletic performance, banned for competition by NCAA, USADA and WADA.**

a. Anabolic Androgenic Steroids (AAS)
b. AAS prohormones
c. Non-Steroid Anabolics (Human Growth Hormone (hGH), IGH and Insulin)
d. Stimulants (examples: Methylpenidate and Amphetamines)

The most well-known category of APEDS is anabolic-androgenic steroids (AAS). The anabolic effect causes an increase in muscle mass, whereas the androgenic effect leads to masculinization (acne, voice change, facial hair and increased sex drive). These steroids are very different from corticosteroids, which are used to treat inflammation. A prohormone is a precursor to the active hormone that becomes converted to its active form once taken into the body. Prohormones are also included in the anabolic-androgenic category. AAS and AAS prohormones work by enhancing protein synthesis and decreasing the breakdown of muscle. The net result is an increase in muscle size, muscle strength and lean muscle mass.

AAS do work, but at a high cost. First, it is illegal to possess and use these drugs without a prescription. From a side effect standpoint, AAS use during adolescence can cause premature closure of the bones' growth plates, leading to decreased final adult height. Acne, male pattern baldness, permanent voice changes, hypogonadism (shrinking of the testicles), gynecomastia (male breast overdevelopment) and violent behavior changes are all common side effects. There are also life-threatening side effects including cardiovascular disease, arrhythmias, blood clots, stroke, cancer and increased risk of suicide.

For more than a decade, the use of human growth hormone (hGH) by professional athletes has been in the spotlight. hGH promotes growth throughout childhood and adolescence, and is also involved in the regulation of multiple other hormones, such as insulin. Studies have shown that the use of hGH can decrease fat mass and increase lean body mass. However, there is limited evidence that its use improves athletic performance. Because it is normally a very important hormone in the regulation of other hormones and multiple body processes, the use of hGH can lead to long term health consequences, including altered fluid balance in the body, cardiovascular disease, diabetes and cancer.

Stimulants are a category of APEDS that have been used for centuries as a performance enhancer. We have already discussed caffeine, the most used stimulant. Stimulants may enhance performance by improving

reaction time, increasing alertness, decreasing fatigue, and improving concentration and memory. Side effects from the use of stimulants range from relatively mild effects to serious, including inability to sleep, anxiety, tremors, panic attacks, tachycardia (a rapid heart rate > 100), hypertension, psychosis, heart attack and stroke. Some stimulants can also predispose an athlete to heat illness. Ephedrine was banned by the FDA in 2004 for use as a diet aid because of the increased risk of stroke and heart attack.

**WHO IS USING APEDS?**

The use of APEDS in high school students ranges from 3% admitting the use of AAS, to almost 40% reporting a history of protein supplement use. Eighteen percent of APEDS users in high school do not participate in sports, so it is considered that this group uses APEDS for appearance enhancement (weight loss or gain, body building). Girls report a higher use of nonprescription diet pills (considered stimulants) than boys, and a lower use of substances associated with gains in muscle mass and strength, such as AAS, prohormones, and creatine.

**WHY IS THE USE OF APEDS AN ISSUE?**

The use of illegal or banned APEDS by high school students is unfair, unethical and is considered a form of cheating. In addition, many of the products used as APEDS are not tested or regulated and have been found to contain significant contamination with heavy metals, AAS and/or stimulants. Their use undermines the values of fair play and can be a threat to the overall health and well-being of high school students.

The use of caffeine, creatine and amino acids/protein powders should not be taken lightly, but these substances are not dangerous in an otherwise healthy athlete. Athletes should discuss their proper use with a knowledgeable health-care provider and use as directed. As discussed earlier, the true purity of the product and potential for contamination must also be considered when deciding to use this category of APEDS.

**PREVENTING STUDENTS FROM USING ILLEGAL OR BANNED APEDS**

Education about APEDS and their use is the hallmark to any prevention program. Despite advances in APEDS detection, random testing does not appear to be an effective deterrent to the use of APEDS. The following are key educational points to prevent the use of APEDS:

- School personnel, coaches, parents and other family members can reduce APEDS abuse by educating students and speaking out against such use.
- Talk with your students about their concerns and frustrations related to how they look or how they are performing in their sport. Help them establish and reinforce healthy and realistic expectations of their bodies and athletic performance.
- Have your athletes focus on proper nutrition and hydration. If possible, have your athletes work with a registered dietician to develop a plan for appropriate weight gain and/or weight loss.
- Help your athletes understand that using illegal and banned APEDS is unfair, unethical and likely dangerous.
- Emphasize to your students that they should not trust internet marketing messages about quick fixes and enticing gains in athletic appearance or performance. Explain that the photos in these sites and in muscle magazines depict unrealistic pictures of male and female bodies.
- Discourage your athletes' access to environments where APEDS use might occur and to people who are involved with APEDS.
- Consider initiating a formal APEDS education program to educate your students and athletes and to deter APEDS use, such as the ATLAS and ATHENA programs.

**References/Resources:**

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**October 2024**
**May 2020**
**April 2017**

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