

RECREATIONAL AND PERFORMANCE ENHANCING DRUGS IN SPORT

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ABSTRACT

Athletes may use steroids to boost the body's protein production, enhancing muscle mass and strength. They may also use steroids to enhance aggression and be more competitive on the field or in the ring. Similar to any medication, using steroids carries numerous health and career risks. Not every substance that boosts performance is illegal or detrimental to health. For instance, a player may consume a cup of coffee to enhance energy prior to a match or training session. Yet, numerous sports enthusiasts and athletes recognize the misuse of steroids in athletics. Similarly, certain athletes utilize banned stimulants to enhance their performance in a competition to achieve victory.

Key words: Anabolic steroids, Erythropoietin, World Anti-Doping Agency, Athlete Biological Passport, CNS stimulant.

INTRODUCTION

For thousands of years, athletes have utilized performance-enhancing substances in hopes of boosting strength, speed, and stamina. Ancient Greeks tested various herbs, wine mixtures, and mind-altering substances. They consumed animal hearts or testicles in search of the most potent performance booster to get ready for the Olympic Games.

Regardless of health dangers and drug regulations, athletes persist in using performance-enhancing substances such as steroids and stimulants. For instance, from 2005 to 2015, 47 MLB players received suspensions for utilizing prohibited substances. In the NFL, the number of suspensions rose from 21 in 2011 to 82 in 2012. Steroid abuse impacts more than just baseball and football, making it challenging to determine which sport experiences the highest drug use. Doping influences every sport, and any competitor might resort to substances to boost performance and manage the stress of winning.

Nonetheless, it has been noted that cycling recorded the highest number of positive doping test results in the Olympics, followed by weightlifting, boxing, triathlon, and baseball. The precise count of athletes engaging in doping remains unclear since numerous athletes are reluctant to confess their use of performance-enhancing substances.

History

Although the use of PEDs has grown in recent years, the tradition of using substances to enhance performance dates back to the Ancient Olympic Games. During the Olympic Games in 668 BC, Charmis's diet of dried figs played a crucial role in his victory in the 200-yard stade race. Athletes in ancient Greece also included stimulants like wine and brandy in their training practices. Plant-based stimulants (e.g., Cola Nitida, Bufotein, etc.) were utilized by Roman Gladiators to combat injuries and exhaustion.

- ❖ In the late 19th century as modern medicine and pharmacology were developing, PEDs saw an increase in use. Supplements were now exclusively being used to enhance muscular work capacity. The main stimulants being used included alcoholic

drinks, caffeine, and mixtures created by the athletic trainers (e.g., strychnine tablets made

- ❖ of cocaine and brandy). Testosterone was also a commonly taken stimulant, however, it was more difficult to obtain.
- ❖ In 1889, a three-week program began where an athlete injected themselves with blood from the testicular veins, semen, and fluids from the testicles of a dog or guinea pig.
- ❖ By 1895, it had been assessed that testicular extracts did in fact improve athletic performance by increasing muscular strength.
- ❖ In the 20th century, testosterone was isolated and characterized by scientists. In 1941, the first record of synthesized testosterone use occurred when a horse was given testosterone which successfully improved its race performance. Sports trainers soon after began advocating for testosterone use. Images of bodybuilders with massive muscles began circulating which further perpetuated a desire among athletes to use testosterone.
- ❖ In the 1980s, the main PEDs were cortisone and anabolic steroids. In 1988, the United States Congress establishes the Anti-Drug Abuse Act to criminalize the distribution and possession of non-medical anabolic steroids.
- ❖ In 1999, WADA was formed to address the escalating use of substances in sports, particularly after the 1998 doping scandal in cycling.

ARE PERFORMANCE-ENHANCING DRUGS ILLEGAL?

Whether or not a performance-enhancing drug is legal or illegal depends on the substance. The World Anti-Doping Agency (WADA) provides a list of drugs that it prohibits. Most drugs, like anabolic steroids, are illegal without a valid prescription. Since 1991, anabolic steroids have been a Schedule III drug on the federal list of controlled substances. The possession or sale of anabolic steroids without a prescription can lead to jail time and thousands of dollars in fines.

Other performance-enhancing substances like energy drinks or dietary supplements such as creatine are not illegal. However, any substance may be banned in high doses depending on the sport. Athletes who wish to use a dietary supplement or caffeine should first check the WADA list of banned drugs. Remember, there are always healthy and legal ways to enhance performance without the need for substance abuse.

ARE PERFORMANCE-ENHANCING DRUGS ADDICTIVE?

Users might continue to take anabolic steroids despite the harmful effects to avoid withdrawal symptoms and to cope with body image issues. Athletes who use anabolic steroids may experience depression, restlessness and mood swings when they stop using steroids. Stimulants also produce many unpleasant withdrawal symptoms which keep users from stopping.

Steroids are often used alongside other drugs such as opioids or alcohol, adding to the complexity of the addiction. About 32 percent of individuals who misuse anabolic steroids become dependent.

(a). Anabolic steroids

Anabolic steroids can be taken through a transdermal method, orally, or through injection. Injectable forms of the steroid are the most potent and long-lasting. Urine samples are tested

to determine the ratio of testosterone glucuronide to epitestosterone glucuronide, which should be 3:1. Any ratio of 4:1 or greater is considered a positive test.

Examples of anabolic steroids include: oxandrolone, stanozolol and nandrolone.

- In general, potential side effects include: muscle hypertrophy, acne, increased blood pressure, elevated cholesterol, thrombosis, decreased high-density lipoproteins, altered libido, hepatic carcinoma, cholestasis, peliosis hepatitis, septic arthritis, Wilm's tumor, psychosis, aggression, addiction, and depression.
- Potential side effects specifically in males include: male pattern baldness, oligospermia, prostate hypertrophy, testicular atrophy, and prostate cancer.
- Potential side effects specifically in females include: hirsutism, uterine atrophy, amenorrhea, breast atrophy and thickening of vocal cords (voice deepening).

(b). Stimulants

Stimulants are commonly used in lengthy exercises that require short bursts (e.g., tennis, team sports, etc.). Stimulants work by increasing catecholamine levels and agonistic activity at the adrenergic receptors.

Examples of stimulants include: caffeine, ephedrine, methylphenidate and amphetamine.

- Potential side effects include: hypertension, insomnia, headaches, weight loss, arrhythmia, tremors, anxiety, addiction and strokes. Some stimulants are allowed in competitive sports and are widely accessible (e.g., caffeine).
- Others are banned as per the World Anti-Doping Agency (WADA) (e.g., cocaine, amphetamines, ephedrine, etc.).

(c). Ergogenic aids

Ergogenic aids, or athletic performance-enhancing substances, include a number of drugs with various effects on physical performance. Drugs such as amphetamine and methylphenidate increase power output at constant levels of perceived exertion and delay the onset of fatigue, among other athletic-performance-enhancing effects; bupropion also increases power output at constant levels of perceived exertion, but only during short term use.

(d). Human Growth Hormone (hGH):

HGH is one of the most commonly used substances among professional athletes because it has a small window for detection. It works by promoting the release of IGF-1, insulin-like growth factor, the release of which has anabolic effects on the body.

Potential side effects include: cardiomyopathy, diabetes, renal failure, and hepatitis. If not prescribed by a professional, it is a banned substance in competition per WADA. Despite its small window for detection, two primary methods of testing have been developed for hGH,

- **Isoform test:** which detects changes in growth hormone structure in the blood, and
- **The markers test:** which detects changes in serum protein ratios.

(e). Adaptogens

Adaptogens are plants that support health through nonspecific effects, neutralize various environmental and physical stressors while being relatively safe and free of side effects.

(d). Nootropic

It benefit overall cognition by improving memory (e.g., increasing working memory capacity or updating) or other aspects of cognitive control (e.g., inhibitory control, attentional control, attention span, etc.).

CNSagents

(e). Painkillers

Allows performance beyond the usual pain threshold. Some painkillers raise blood pressure, increasing oxygen supply to muscle cells. Painkillers used by athletes range from common over-the-counter medicines such as NSAIDs (such as ibuprofen) to powerful prescription narcotics.

(f). Sedatives and anxiolytics

Used in sports like archery which require steady hands and accurate aim, and also to overcome excessive nervousness or discomfort. Diazepam and propranolol are common examples; ethanol and cannabis are also used occasionally.

(g). Blood boosters

Blood doping agents increase the oxygen-carrying capacity of blood beyond the individual's natural capacity. They are used in endurance sports like long-distance running, cycling, and Nordic skiing. Recombinant human erythropoietin (rhEPO) is one of the most widely known drugs in this class.

(h). Erythropoietin

Erythropoietin is a hormone that helps increase the production of red blood cells which increases the delivery of oxygen to muscles.[36] It is commonly used among endurance athletes such as cyclists. It functions by protecting red blood cells against destruction whilst simultaneously stimulating bone marrow cells to produce more red blood cells.

Potential side effects include: dehydration and an increase in blood viscosity which could result in a pulmonary embolism or stroke. Per the World Anti-Doping Agency, it is a banned substance. Urine samples can be tested via electrophoresis, and blood samples via indirect markers.

(i). Gene doping

Gene doping agents are a relatively recently described class of athletic performance-enhancing substances. These drug therapies, which involve viral vector-mediated gene transfer, are not known to currently be in use as of April 2015.

(j). Prohormones

These steroids have little desired effect compared to anabolic steroids, but have the same side effects. Androstenedione in 2005 became classified as a controlled substance by WADA, however DHEA can still be obtained legally as an over-the-counter nutritional supplement.

Risk Factors

Adolescents are the most vulnerable group when it comes to taking performance-enhancing substances. This is in part due to the significance placed on physical appearance by this age group as well as feelings of invincibility combined with a lack of knowledge surrounding long-term consequences. Having a negative body image or a history of depression can also be a significant risk factor. These are further exacerbated by parental pressures

surrounding appearance, media influence, and peer pressure. Adolescents who partake in competitive sports are at a particularly high risk, with those involved in football, basketball, wrestling, baseball, and gymnastics at the top.

Usage in sports

In sports, the phrase performance-enhancing drugs is popularly used in reference to anabolic steroids or their precursors (hence the colloquial term "steroids"); anti-doping organizations apply the term broadly. There are agencies such as WADA and USADA that try to prevent athletes from using these drugs by performing drug tests.

Role of WADA and USADA in Performing drugs in sports

(i). WADA

WADA was founded on 10 November 1999, by Dick Pound. WADA focuses on establishing and enforcing rules and codes for all sports around the world. Their goal is to make all sports played fairly between all athletes in a doping free organization with the power to prevent athletes from using any form of performance-enhancing drugs. When medical exemptions are granted they are called therapeutic use exemptions.

(ii). USADA

USADA started 1 October 2000, as non-profit to combat doping in the United States and was composed of nine members. Five of which were former Olympic athletes with the other four elected from independent companies. This is the United States Anti-doping Agency and have the ability to test athletes across the nation.

Abuse of substances or methods to enhance the performance (PEDs)

It's is becoming very common in the sports, which often destroys the spirit of competition. The regulatory bodies for sports have reported rates ranging from 5% to 31% for the use of performance-enhancing substances among athletes. Athletes can have serious injuries and morbidities, leading to poor health with the use of such substances. Commonly abused agents in sports include anabolic-androgenic steroids and its analogs, blood, erythropoietin, growth hormone and its derivatives, nutritional supplements, creatine, amphetamines, beta-hydroxy-beta-methylbutyrate (HMB), stimulants, and analgesics.

- Health-care professionals need to be careful while prescribing medicines to sportspersons. Knowledge of exercise physiology, pharmacology of the commonly used agents for sports-related injuries, and agents used for doping could help the sportspersons and health-care professionals to avoid the embarrassment arising because of misuse of these agents.
- PEDs and dietary supplements are not regulated or tested by the U.S. Food and Drug Administration (USFDA) and so little regulation can be achieved in regard to product composition, safety, and efficacy which furthers the challenge of monitoring adverse effects.
- Manufacturers may spike their supplements with actual steroids or other alternatives in an effort to enhance the effects of their products. These same manufacturers may also market products that contain no active ingredients.
- Such dietary substances are available for purchase over the counter and online by persons of any age without prescription.

CONCLUSION

The usage of PEDs such as anabolic steroids, CNS stimulants, and various other substances among athletes has significantly surged and is anticipated to grow further in the upcoming years because of scientific and technological advancements. This has turned into a significant challenge for anti-doping organizations to stop the abuse of specific substances that could result in an unfair edge for athletes.

WADA was created to address these challenges and has developed a set of universally recognized, clear, and transparent guidelines, updating them regularly. However, the later introduction of designer drugs has posed another challenge to address. Going forward, ABP was put into action to address these problems and to safeguard the athletes from the unexpected negative consequences of these substances. Although various steps are continuously implemented to monitor it, emerging advancements could lead to the creation of new substances that might be abused. Thus, it is the duty of both the athletes and the doctors to act ethically; and laws must be enacted rigorously to prevent such actions from occurring in the future.

REFERENCES

- 1 Savulescu J, Creaney L, Vondy A. Should athletes be allowed to use performance enhancing drugs? *BMJ*. 2013;347:f6150.
- 2 By Mayo clinic staff: Performance-enhancing drugs: Know the risks.
- 3 Karri Sowjanya, Chandrashekar Girish*(2019): An Overview of Performance Enhancing Drugs (PED's) in Sports and WADA
- 4 Ryan A. Fairness and philosophy. *Social Research*. 2006;73:597–606.