

# Anabolic steroids: types, applications and implications



**ASSIGN  
BUSTER**

## THE SCOPE AND HEALTH IMPLICATIONS OF DOPING IN SPORTS: ANABOLIC STEROID USE IN WEIGHTLIFTERS AND TEENS AND THEIR EFFECTS.

KOJO O. KUNTU-BLANKSON

### INTRODUCTION

There have been many definitions for doping. The current official definition of doping is given based on the World Anti-Doping Code as follows: “ Doping is defined as the occurrence of one or more of the anti-doping rule violations set forth in Article 2. 1 through article 2. 8 of the World Anti-Doping Code.”

Doping can also be defined as the deliberate or inadvertent use by an athlete of a substance or method banned by the International Olympic Committee (IOC) and other related organisations, to gain unfair advantage or to enhance performance. Performance-enhancing substances have been used for thousands of years in traditional medicine by societies around the world, with the aim of promoting vitality and strength.[1]. The use of gonadal hormones pre-dates their identification and isolation.

Medical use of testicle extract began in the late 19th century, while its effects on strength were still being studied.[2] Testosterone, the most active anabolic-androgenic steroid produced by Leydig cells in the testes, was first isolated in 1935 and chemically synthesized later in the same year. Synthetic derivatives of testosterone quickly followed. By the end of the following decade, both testosterone and its derivatives were applied with varying degrees of success for a number of medical conditions. It was not until the 1950s, however, that athletes began to discover that anabolic steroids could increase their muscle mass. According to sports physician John Ziegler, the <https://assignbuster.com/anabolic-steroids-types-applications-and-implications/>

first confirmed use of an anabolic steroid in an international athletic competition was at the weightlifting championships in Vienna in 1954, when the Russians weightlifters used testosterone.[5] Sport goes beyond a measure of athletic excellence and the winning of trophies and medals. Sport is an integral thread in the fabric of society and enriches our daily lives. Most of us have a favourite sport we play or follow with a passion be it soccer, rugby, swimming, cycling, athletics, winter sports or our national games of hurling, football and handball. The most honourable among us are perhaps those who have competed in sport and hold true its finest principles. True winners are those who achieve their goals through talent, skill, training, motivation and rising to all the challenges their sports present. Increasingly, however, a “win at all costs” ethos that undermines the very integrity of sport has entered the arena and a new game is at stake, the dangerous and sometimes deadly game of doping. Some ergogenic drugs used by athletes are categorized into blood boosters, diuretics, lean mass building, masking drugs, painkillers, sedatives and stimulants.

Blood boosters e. g. erythropoietin, increase the athlete’s blood oxygen-carrying capacity, above its natural capacity, giving the athlete unfair advantage over his/her non-doping colleague in endurance games like marathons, swimming, cycling etc. Diuretics help eliminate fluid from the body. Athletes who need to maintain a certain weight level for competition could use these to decrease their weight. They can also be used as masking agents because they dilute urine and decrease the likelihood of detecting the presence of other drugs. Lean mass builders increase the growth of the body’s muscle. This category includes several different classes of drugs,

<https://assignbuster.com/anabolic-steroids-types-applications-and-implications/>

particularly, the more popularly known anabolic steroids which's the focus of this review and human growth hormone. These are used in strength games like weightlifting, shot put, discus throwing etc. Methods of doping include blood doping and gene doping. Blood doping can be either autologous or homologous transfusions, to help to improve their blood-oxygen carrying capacity. Advancements in gene therapy for medical reasons mean potential cheats might seek to undergo procedures to modify their genes to enhance their physical capabilities. Doping in sports is a huge societal problem. No longer limited to elite athletes, it is increasingly found in amateur and school sports that teens or adolescents in their early or mid-puberty are engaged in. The use of anabolic-androgenic steroids (AS) is perceived by the media, by segments of the sports medicine and athletic communities, and by the public to have grown to epidemic proportions. Unfortunately, the incidence and prevalence of AS use among elite, amateur, and recreational athletes is poorly documented.

## BODY

### STEROIDS

Steroids are any of numerous naturally occurring or synthetic fat-soluble organic compounds having as a basis seventeen carbon atoms arranged in four rings. Steroids are important in body chemistry and include steroid hormones such as the gonadal or sex steroids (which include androgens e. g., estrogens and progesterone), corticosteroids (glucocorticoids, and mineralocorticoids); vitamins of the D group; and the sterols, including cholesterol, the main building block of the steroid hormones in the body.

<https://assignbuster.com/anabolic-steroids-types-applications-and-implications/>

## ANABOLIC STEROIDS

Anabolic androgenic steroids commonly called “roids,” juice, hype or pump, are synthetic derivatives of testosterone, which is the primary male sex hormone, but is also present in the female. They are a class of drugs that are legally available only by prescription and are prescribed to treat a variety of conditions that cause a loss of lean muscle mass. They produce anabolic activity by increasing protein synthesis, epiphyses closure of long bones during puberty, enlargement of larynx and vocal cords, improvement of red cells number, reduce body fat and androgenic activity (enhanced secondary sexual characteristics). These compounds can produce a significant increase in muscular size and physical strength in both males and females and therefore used in sports and bodybuilding (weightlifting) to enhance strength or physique. They can be either oral or injectable. The oral ones include: Anadrol (oxymetholone), Oxandrin (oxandrolone), Dianabol (methandrostenolone) and Winstrol (stanozolol). The injectable ones include: Deca-Durabolin (nandrolone decanoate), Durabolin (nandrolone phenpropionate), Depo-Testosterone (testosterone cypionate) and Equipoise (boldenone undecylenate).

## HOW ANABOLIC STEROIDS ARE TAKEN

Anabolic steroids are either taken by mouth or injected into a muscle. The “orals,” as they are called, are ingested tablets or capsules. These forms are reportedly more toxic to the liver. Often the orals are taken in conjunction with injectable forms. The injectable forms are known as “oils” or “waters”. The oils refer to the long-acting types. They are injected into a muscle,

<https://assignbuster.com/anabolic-steroids-types-applications-and-implications/>

usually the buttocks, and the steroid is released slowly over time. Typically, these drugs are injected only a couple of times a week. The “waters” are short-acting forms. Again, these are injected, usually in the buttocks, but they work much faster and are eliminated much more quickly. There are two ways for anabolic steroids administration. Oral steroids are highly potent and are excreted fairly rapidly from the body due to short metabolic half-lives, (usually within weeks). So, oral steroids are the first choice for athletes who want to rapidly improve their performance and try to escape showing positive results on drug tests. These drugs, however, are the most toxic and have more side effects. Injectable steroids are less potent and generally exhibit delayed uptake into the body, especially if they are oil-based diluents. They have less liver toxicity than oral steroids, but they are being less used by athletes because of having detectability in drug tests for long periods.

It should be noted that doses used by athletes often greatly exceed doses recommended for legitimate medical reasons, causing the potential for even greater negative consequences. Moreover, many athletes will use more than one anabolic steroid simultaneously. There are three common regimens practiced by anabolic steroid abusers: cycling, stacking and pyramiding.

In cycling, the athletes take the steroid for six to twelve weeks and then stops for ten to twelve weeks. The steroid can be oral or injectable and doses are often ten to hundred times higher than standard therapeutic dose.

Stacking is the use of more than one anabolic steroid at a time to break through response plateaus that often occurs. About forty percent of steroid abusers use this kind of regimen, presenting a high risk for central nervous  
<https://assignbuster.com/anabolic-steroids-types-applications-and-implications/>

system. Athletes can sometimes start with low dose of anabolic steroids, increasing the dose over a period of weeks, and then gradually tapering off before ending the regimen. This is known as pyramiding.

## MECHANISM OF ACTION OF ANABOLIC STEROIDS

The ergogenic effects of anabolic steroids use are valued for three main mechanisms of action:

They shift the nitrogen equilibrium to the positive side for better utilization of ingested protein and the increased retention of nitrogen. Although temporary and needing a high-protein complementary diet, this effect helps the body to “build” muscles. The formation of a steroid-receptor complex in skeletal muscle stimulates the RNA-polymerase system which, in turn, increases protein synthesis in the cell. Anabolic steroids compete for glucocorticoid receptors, resulting in an anti-catabolic effect by blocking the protein synthesis inhibition which physiologically occurs after exercises due to glucocorticoid liberation. Frequently, an euphoric and more aggressive behavior are experienced by anabolic steroids users, stimulating them to practice more and without fatigue for longer periods.

## ANABOLIC STEROID AND SPORTS: WINNING AT ANY COST.

To excel in athletic competition is admirable. Most high school, college, amateur and professional athletes participate in sports for the opportunity to pit their abilities against those of their peers, and to experience the satisfaction that comes from playing to their potential. Others do so to satisfy a desire for recognition and fame. Unfortunately, that creates some

athletes who are determined to win at any cost. And, they may use that determination to justify the use of anabolic steroids, despite evidence that these drugs can inflict irreversible physical harm and have significant side effects. Dietary supplements and ergogenic agents, including anabolic steroids, are common components of present-day bodybuilder and weightlifter training regimens. Prior reports of anabolic steroid use suggest polypharmacy and high doses of injectable agents. Anabolic steroid use among weightlifters and bodybuilders continues till date. For almost three decades, athletes have been supplementing their strength program with anabolic steroids to enhance their performance. To be sure, anabolic steroids are effective supplements to strength training programs, but there is no doubt that the consequences can be deleterious. The number of athletes who abuse anabolic steroids is unknown. Many athletic associations ban their use, including the National Football League (NFL), Major League Baseball (MLB), National Collegiate Athletic Association (NCAA) and the Olympics, so few athletes are willing to admit that they use these drugs. The NFL tests its athletes for illicit use. Players who test positive face suspension and, upon testing positive a second time, are expelled from the League. MLB players are tested once a year, and if they test positive they can be suspended for up to ten days. If a player tests positive after the first test, they can be suspended without pay for up to one year. The American Academy of Pediatrics and the American College of Sports Medicine condemn the use of anabolic steroids for enhancement of sports performance or body building.

#### WHY SOME ATHLETES ABUSE ANABOLIC STEROIDS



Believing that anabolic steroids can improve competitiveness and performance, uninformed or misguided athletes, sometimes encouraged by coaches or parents, abuse these drugs to build lean muscle mass, promote aggressiveness, increase body weight, to improve one's physical appearance and as self-medication to recover from injury.

#### HOW ATHLETES OBTAIN ANABOLIC STEROIDS

Athletes may obtain banned medicines from physicians, pharmacists, retail outlets, health and lifestyle magazines, gymnasiums, coaches, family members, fellow athletes, the internet and the black market. Many doctors may prescribe unwittingly for what they trust is a genuine complaint, 10, 14 & 16 and there are no controls on mail order and internet sales.

#### TESTING PROCEDURES

The advent of gas chromatography and mass spectrometry in the early 1980s transformed the success of drug testing. Moreover the new age of gene transfer technology (GTT) will gradually render dope testing control systems obsolete; GTT will increase muscle growth by as much as 28%. 4 Doping is a major ethical, educational, financial, health and management problem and governments have a poor track record in controlling its spread.

25

#### TEEN/ADOLESCENT USE OF ANABOLIC STEROIDS

Increasing numbers of adolescents are turning to steroids for cosmetic reasons. The common link among them is the desire to look, perform and feel better at almost any cost. Users-and especially the young-are apt to <https://assignbuster.com/anabolic-steroids-types-applications-and-implications/>

ignore or deny warnings about health risks. If they see friends growing taller and stronger on steroids, they want the same benefits. They want to believe in the power of the drug.

## EFFECTS OF ANABOLIC STEROID USE IN WEIGHTLIFTERS AND TEENS

Although anabolic steroids can boost physical performance, promote aggressiveness on the field, increase body weight, improve one's physical appearance and as self-medication to recover from injury, they have side effects that can impair athletic performance and also affect the quality of life abusers. Many athletes take anabolic steroids at doses that are much higher than those prescribed for medical reasons, and most of what is known about the drugs' effects on athletes comes from observing users. While the total impact of anabolic steroid abuse is not known, health care providers have observed the following problems in the blood, liver, heart, skeleton, skin and immune systems of users especially weightlifters. Cholesterol patterns associated with coronary heart disease, obstructed blood vessels, or stroke are some of the problems associated with the blood. In the heart, increased cholesterol eventually leads to high blood pressure. Impaired liver function, Peliosis hepatitis (blood-filled cysts that can rupture and cause liver failure) and tumours are observed in livers of weightlifters (both men and women) who abuse anabolic steroids. Bone growth is among the body processes that can shut down with steroid use. Adolescents/teens on anabolic steroids may find their muscles bulking up, but bone growth stops with premature fusion of the epiphysis (growth centre) of long bones. The result is permanently stunted growth. There is risk until bones stop growing. Appearance of, or increasing acne and other skin rashes or ailments, male pattern baldness, <https://assignbuster.com/anabolic-steroids-types-applications-and-implications/>

edema (water retention/swelling), striae (stretch marks) are also observed on the skin. The immune system is also compromised when abusers share hypodermic needles infected with HIV (Human Immunodeficiency Virus) and hepatitis B virus to administer these steroids. By sharing needles, syringes or other equipment, a person becomes a high risk for HIV transmission. HIV is the virus that causes AIDS (Acquired Immunodeficiency Syndrome). Abusers also experience psychological problems like Mood swings, aggressive (even violent behaviour), depression, psychotic episodes, mania and addiction. Since anabolic steroids are derived from testosterone, they can have profound effects on the hormone levels of both male and female abusers. In men, these problems can cause any of the following problems: Temporary infertility or sterility (reversible), altered sex drive, prostate enlargement, and increased prostate cancer risk, gynecomastia, priapism, shrinkage of the testicles, reduced levels of testosterone, abnormal sperm production.

Health care providers have reported the following problems in women: Increased risk of cervical and endometrial cancer, increased risk of osteoporosis, temporary infertility or sterility (reversible), altered sex drive, birth defects in future children, changes in fat distribution, growth of facial and body hair, deepening of the voice, shrinkage of the breasts and uterus, clitoral enlargement, menstrual irregularity. Changes in the male reproductive system are often reversible, if anabolic steroids have not been abused for a long period of time. Unfortunately, some of the changes in women are not reversible. Prolonged abuse of anabolic steroids very often results in physical addiction. Abusers must undergo a strict, medically-supervised withdrawal program. There are social consequences of

committing anti-doping rule violations (ADRV). Sanction may include: loss of sponsorship deals, loss of income, wiping out of previous achievements, damaged relationships with friends and family, isolation from peers and sports and damage to future career prospects.

## ENDING THE ABUSE OF ANABOLIC STEROIDS

Athletes who are really serious about their health and sports and aim to improve their physical strength, performance and appearance can keep the following tips in mind: Train safely, without using drugs, eat a healthy diet, get plenty of rest, set realistic goals and be proud of themselves when they reach them, seek out training supervision, coaching and advice from a reliable professional, avoid injuries by playing safely and using protective gear.