

## Types of Doping and Its Side Effects on Athletes: An Overview

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### Abstract:

Doping is a serious problem in sport physiology nowadays on an international scale. The moral and ethical principles of mankind that affect the fair competition of sports are also taken into consideration. Worldwide sporting events are being directly impacted by this. Blood doping is the use of particular substances improperly to raise red blood cell mass, which enables the body to carry more oxygen to muscles and boosts performance and stamina of a player or individual. Blood doping has been linked to a long range of harmful harmful effects, including blood viscosity increases, myocardial infarctions, emboli, strokes, infections, allergic reactions, and an increased risk of blood-borne illnesses like HIV and hepatitis, among others. Local legislation may contradict with anti-doping policies implemented by various athletic governing bodies. These authority & government legislation don't correlate in this way. Nowadays, players use a variety of methods and medicines, making it difficult for professionals to identify them and win the battle against doping. However, it is our duty to combat them, using the most recent information and developments.

**Keywords:** Doping, Erythropoietin, Sport Physiology, Anti-doping policies

### Introduction:

Doping is currently a serious problem in sport physiology on a worldwide scale. In addition to physical issues, this also has moral and ethical implications for the integrity of teamwork in athletic competition. This has a direct impact on international sporting events. The term "doping" was formerly primarily used to refer to blood doping. But as doping becomes more prevalent nowadays, the present tests are rendered useless for detecting it. However, it is the responsibility of professionals to stay informed in this area in order to avoid doping. Any type of behaviour that encourages the use of particular medicines for the purpose of enhancing athletic performance or endurance is referred to as doping. According to the organisations concerned, this is unethical because it frequently happens at both the national and international levels. The International Olympic Committee deems this situation to be illegal and immoral. These committees frequently accuse such events of regular, significant offences. occasionally took place. This organisation makes constant, unrelenting efforts to promote doping-free sports. Sportspeople frequently utilise doping in an effort to enhance their performance without concern for or ignorance of its repercussions or negative effects. These actions not only degrade sportsmanship, but they may also be viewed as a component of sports corruption, which weakens the competitive spirit.

### Purpose of the article:

To make coaches, trainers, players and parent to aware of anti-doping and side effect of doping.

### Objectives:

1. To know about different types of doping
2. To create awareness amongst people about anti-doping.
3. Good health and success in sports and physical activities through nutrition and anti-doping.
4. To make athletes aware of the side effects of doping

### Research Methodology:

This research paper is based on secondary content. For data collection, the researcher has relied on various research materials, reference books, books, research papers, magazines, newspapers, YouTube, media, TV, Internet and through conference and seminars for promoting health and anti-doping to spread awareness.

### Definition of Doping:

The word doping is probably derived from the Dutch word dop, the name of an alcoholic beverage made of grape skins used by Zulu warriors in order to enhance their prowess in battle.

The use of a substance (such as an anabolic steroid or erythropoietin) or technique (such as blood doping) to illegally improve athletic performance.

### Reasons for Athletes Taking Drugs

1. There are a large number of reasons why an athlete may decide to take Drugs, the reasons are listed here:
2. Feeling under pressure to perform, whether it comes from their instructors or families; • Believing that their rivals are using drugs
3. Lack of access to, or funding for, training facilities and additional support (nutrition, psychological support), pressure from governments and national authorities (as was the case in the eastern bloc countries in the 1960s and 1970s);
4. Financial rewards for exceptional performance;

**Types of Doping:****(A) Performance enhancing substance:****1. Stimulants:**

Drugs that directly influence the central nervous system are known as stimulants. They function by accelerating certain bodily and mental processes, raising the user's heart rate, blood pressure, metabolism, and body temperature. They help athletes perform better by reducing weariness and drowsiness and boosting alertness, aggressiveness, and competitiveness. 'Performance-enhancing drugs' or 'performance and image-enhancing substances' are prohibited in sports because they could provide a competitor an unfair edge.

**2. Anabolic Steroids:**

By mimicking the effects of the body's natural male hormone, testosterone, anabolic steroids aid in the development of muscular tissue and increase in body mass. Steroids, however, cannot increase an athlete's agility or talent. Genetics, body size, age, sex, food, and how hard an athlete trains are just a few of the many variables that affect athletic performance.

**3. Peptide hormones:**

Peptide hormones are hormones whose molecules are peptide. Peptide hormones have shorter amino acid chain lengths than protein hormones. These hormones have an effect on the endocrine system of animals, including humans. Most hormones can be classified as either amino acid-based hormones (amine, peptide, or protein) or steroid hormones.

**4. Beta - 2 Agonist:**

These medications, also known as sympathomimetic amines, are made to replicate the body's normal response to the hormones adrenaline and norepinephrine, but with a focus on B2 receptors in an effort to minimise side effects. They are mostly employed to treat respiratory conditions like asthma and chronic obstructive pulmonary disease (COPD).

**5. Narcotics:**

Drugs of the narcotics class are used as doping in sports. They are injected into a person's muscles, bloodstream, or subcutaneously. Drugs can also be ingested. Unless prescribed by a licenced professional, unlawful.

**6. Diuretics:**

Diuretics are medications that alter the body's fluid and salt balance. They may result in water loss from the body, lowering an athlete's weight. Diuretics may also assist athletes in passing urine drug tests that look for indicators of drug use. They thin the urine and could mask drug residue.

**7. Cannabinoids:**

Tetrahydrocannabinol (THC) is the principal active ingredient. The soothing and slightly euphoric effects of cannabinoids are felt. Although marijuana is rarely used to improve performance, its usage outside of sports results in several positive doping samples. In all sports, marijuana use during competition is illegal.

**(B) Physical methods:** Blood doping and Gene doping these are two types of physical method.

**Blood doping:****Meaning of Blood Doping:**

Blood doping is also referred to as blood packing, blood boosting, or even artificial erythrocythemia. It is "the misuse of specific methods or/and substances to increase one's red blood cells, enabling the body to deliver more oxygen to muscles to enhance stamina and performance," according to WADA. High oxygen transport to the working skeletal muscles and its usage are the primary determinants of performance in aerobic sports disciplines including long-distance running, cycling, and cross-country skiing.

**Methods and Techniques of Blood Doping:**

There are two basic techniques of blood doping; heterologous and autologous blood doping:

**Heterologous Blood Doping:**

Heterologous blood doping involves transfusing a donor's blood into the body of an athlete. Even though this technique is frequently employed for therapeutic purposes, if the blood is contaminated, it may be harmful to the athlete's health.

**Autologous Blood Doping:**

Two units of the athlete's blood are taken, stored, and then reinfused around seven days before the sports competition. This is known as autologous blood doping. Venesection must be carried out at least three weeks before to reinfusion to give the subject time to return to normal haemoglobin levels. Doping with autologous blood is challenging to identify

**ii) Gene Doping:****Meaning of Gene Doping:**

The non-remedial use of genes and genetic materials that have the potential to improve athletic performance is referred to as gene doping. The fake gene is introduced by a virus, genetically modified cells, or by injecting DNA directly into the muscles. Some of the drugs utilised by athletes to improve their athletic performance include erythropoietin, insulin-like growth factor

(IGF), and vascular endothelial growth factor (VEGF). The World Anti-Doping Code's "The 2017 Prohibited List" lists gene doping as Prohibited Method M3, or gene doping.

**The following things are not allowed using this method:**

1. The exchange of nucleic acid or nucleic acid analogue polymers; 2. The application of unaltered or genetically modified cells. There is no solid proof that gene therapy has ever been used as a means of athletic enhancement, despite the fact that gene doping was first addressed in 2001 by the International Olympic Committee and later outlawed in 2003 by the World Anti-Doping Agency (WADA).

**Methods of Gene Doping:**

The most effective way to transfer genes is through a viral infection; but, to achieve the highest levels of safety, a significant financial investment is needed. Ex vivo introduction is a different technique that entails extracting a collection of disease-related cells from the patient. The separation and characterisation of the human DNA region that codes for endogenous EPO, as well as the production of a complementary mould copy of the same region (c-DNA), were the actions that made it possible and heralded a new era in the production of synthetic EPO. Because they derive from diverse sources of synthesis, every RhEPO manufactured by different manufacturers has a different analogy. The dangers of gene doping. Athletes wouldn't have to work hard or give up things to have good results if there were genetics in sports, which would kill the practise spirit and the attractiveness of the sport. The introduction of viral vectors into the host DNA raises the possibility of transhumanism or posthumanism due to insertional mutagenesis. In addition to harming the athlete's health, gene doping also affects others, i.e., future individuals. Gene therapy has the potential to cause leukaemia and flu-like symptoms.

**General Side Effects:**

Many athletes use excessive amounts of anabolic steroids. These dosages are significantly higher than those prescribed by medical professionals. Serious adverse effects can also be caused by anabolic steroids.

**Male specific effect:**

1. See their breasts expand.
2. Note any testicular atrophy.
3. Being unable to impregnate their partner.
4. Discover that their prostate gland has grown in size from a medical professional.

**women specific effect:**

1. Use a louder voice. Treatment might not be able to reverse the alteration.
2. Take note of the clitoris, a portion of their genitalia, which has become larger.
3. Increase body hair.
4. The head's hair will fall out. It's possible that treatment won't be able to regrow hair.
5. Stop having periods or have them considerably less frequently than before.

**General side Effect on Human bodies:**

1. Severe acne;
2. An increased risk of tendons—cords that connect muscle to bone—becoming enlarged or ruptured;
3. Liver tumours or other changes to the liver.
4. Higher concentrations of low-density lipoprotein (LDL), or "bad" cholesterol.
5. Lower levels of high-density lipoprotein (HDL) cholesterol, the "good" cholesterol. Blood pressure problems.
6. Heart and blood flow conditions.
7. Problems with aggression or violence.
8. Mental health issues including depression.
9. An uncontrollable urge for anabolic steroids.
10. Diseases, such as HIV or hepatitis, if injecting the narcotics with needles.

**Conclusion:**

Nowadays, players use a variety of methods and medicines, making it difficult for professionals to identify them and win the battle against doping. However, it is our duty to combat them, using the most recent information and developments. Doping medicines have awful negative consequences on the body. Steroids prevent your body's hormones from developing normally. Your body goes through alterations that can be reversed when this occurs. changes such sperm production, baldness, male breast development, female breast shrinkage, and a woman's voice becoming deeper. High blood pressure is more likely. Additionally, there is a greater risk of heart attacks. Blood doping, a doping substance, puts the heart under a lot of strain. This is because as your red blood cell count rises, your blood becomes thicker in your bloodstream. The heart of a human is not accustomed to pumping blood this thick. It causes many forms of cardiac disease. The risk of AIDS exists because this type of doping involves the use of needles, typically shared needles. Narcotic overdose can result in death. Limited vision, decreased sex drive, menstruation, persistent constipation, mood swings, and muscle twitching

are a few withdrawal symptoms. Cramping is one of creatine's known side effects. Dehydration, increased urination, and diarrhoea. The effects of consuming a lot of creatine are similar to those of drinking sea water.

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