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## Effect of doping on sports performance

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### Abstract

Doping in sport is a widespread problem not just among elite athletes, but even more so in recreational sports. In scientific literature, major emphasis is placed on doping detection, whereas detrimental effects of doping agents on athlete's health are seldom discussed. Androgenic anabolic steroids are well known for their positive effects on muscle mass and strength. Human growth hormone also increases muscle mass, although majority of that is increase in extracellular fluid and not the functional muscle mass. In recreational athletes, growth hormone does not have major effect on muscle strength, power or aerobic capacity, but stimulates anaerobic exercise capacity.

Erythropoietin administration increases oxygen carrying capacity of blood improving endurance measures, whereas systematic administration of beta-adrenergic agonist may have positive effect on sprint capacity, and beta-adrenergic antagonists reduce muscle tremor. Thus, there are certain drugs that can improve selective aspects of physical performance. However, most of the doping agents exert serious side of effects, especially when used in combination, at high doses, and for long duration.

**Keywords:** Doping, athletes, sports performance etc.

### Introduction

In competitive sports, doping is the use of banned athletic performance-enhancing drugs by athletic competitors. The term doping is widely used by organizations that regulate sporting competitions. The use of drugs to enhance performance is considered unethical, and therefore prohibited, by most international sports organizations, including the International Olympic Committee. Furthermore, athletes (or athletic programs) taking explicit measures to evade detection exacerbates the ethical violation with overt deception and cheating. The use of drugs in sports goes back centuries, about all the way back to the very invention of the concept of sports. In ancient times, when the fittest of a nation were selected as athletes or combatants, they were fed diets and given treatments considered beneficial to help increase muscle. For instance, Scandinavian mythology says Berserkers could drink a mixture called "butotens", to greatly increase their physical power at the risk of insanity. One theory is that the mixture was prepared from the Amanita muscaria mushroom, though this has been disputed. Sport makes physical and mental demands on your body. Recreational drugs are also demanding on you – whether you want them to or not they affect your mind and body. When you are very active - during sport for example, your body adapts to provide you with the support you need, such as increasing the rate your heart pumps blood and supplies oxygen to your muscles. Your brain works to maintain body temperature, coordinate your movement, and make sure you are alert. Your body is designed to coordinate itself to allow you to perform at your best. Mixing drugs and sport can disrupt your game in many ways.

### Breathing

Depressant drugs such as cannabis, alcohol and opiates, slow down your breathing. Cannabis reduces your lung capacity, so it's harder to get the oxygen your muscles need during sport. Opiates, such as heroin and codeine, slow down your breathing and narrow your airways. This makes it harder to breathe and reduces your breathing at a time when your body needs extra oxygen.

### Heart rate

Stimulant drugs, such as cocaine, ecstasy and speed, increase your heart rate and put undue

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stress on your heart. Cocaine can cause heart attack and abnormal heart rhythm. When you use speed, the lack of blood to your heart can cause angina (severe chest pain). Depressants such as alcohol slow down your heart rate, meaning less oxygen-rich blood reaches your muscles.

### Muscles

The last thing you want during sport is to disrupt your co-ordination and relax your muscles. Depressants such as cannabis reduce your motor activity so it's hard to coordinate your movements during sport. Alcohol is high in calories so you may start piling on the weight. Stimulants increase your movements so you are more likely to injure yourself during sport. Cocaine at higher doses can act as an anesthetic so you can't feel pain and may play on after an injury, causing even more damage.

### Concentration

Depressants like alcohol and opiates affect your alertness and concentration, so you are slower to react. Stimulants, such as cocaine, speed and ecstasy can make you irritable and restless - making you less focused on the game.

### Brain and Behaviour

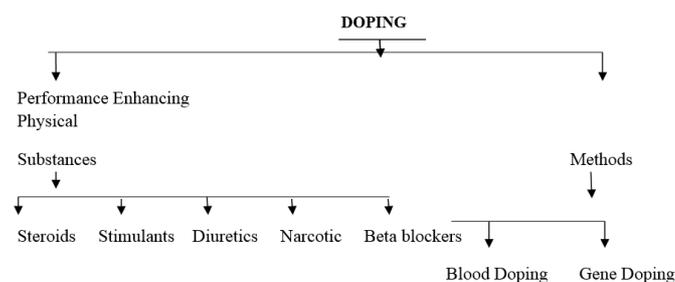
Stimulants, such as cocaine and speed, can keep you awake so you don't get the rest you need and this can affect your performance. They also decrease your appetite when you should be replacing calories after using so much energy. Side effects also include confusion, delirium and paranoia. At higher doses stimulants can cause you to become irritable and aggressive, they can also cause blood vessels in the brain to rupture leading to conclusions.

Doping controlling agencies such as: WADA & NADA etc.

**WADA** = World Anti Doping Agency

**NADA** = National Anti Doping Agency

### Classifications of doping



### Performance enhancing substances

#### Anabolic steroids (Androgenic agents)

The most commonly used substances are androgenic agents such as anabolic steroids. Anabolic steroids are usually taken either in tablet form or injected into muscles. Some are applied to the skin in creams or gels. These allow athletes to train harder, recover more quickly and build more muscle.

#### Stimulants

They make athletes more alert and can overcome the effects of fatigue by increasing heart rate and blood flow. The athlete uses cocaine, amphetamines, modafinil etc. as a tablet, injection or spray to improve.

#### Diuretics

They are used to remove fluid from the body, which can hide

other drug use or in sports such as boxing and horse riding, help competitors "make the weight."

### Narcotic analgesics and cannabinoids

They are used to mask the pain caused by injury or fatigue – but in practice can make the injuries worse. Narcotics are drugs like morphine, heroin. Which are used by athlete to reduce pain and anxiety to improve performance. But the opiate – derived painkiller codeine is allowed.

### Beta Blockers

Beta Blockers which may be prescribed for heart attack prevention and high blood pressure, are banned in sports such as archery and shooting because they keep the heart rate low and reduce trembling in the hands. For example:- Archery, Shooting, Golf etc.

### Physical Methods

#### Blood Doping

It is the process of increasing the red blood cells by blood transfusion. It is less common, where blood is removed from the body and injected back in later to boost oxygen levels. There are two types

- Autologous Doping: Help to increase oxygen in the blood.
- Homologous Doping: Increase strength in the muscles.

#### Gene Doping

Gene doping is the manipulation of cells or genes to enhance the body's sports performance. It can be used to improve the work function of normal healthy cells. Gene therapy plays an important role in growth and development of muscles and bones. It also speeds up the person to repair of the injured muscle tendon and ligament.

### Side effects of doping on sportsperson

#### Anabolic Steroids

Can cause blood pressure, sudden heart attack, mood swing, aggression, depression. It may also cause baldness and impotency in males. (low sperm count for men). It increased facial hair and deepened voices for women.

#### Stimulants

Causes insomnia, anxiety and aggression. It directly effects on the central nervous system and cardio vascular system. For Example – Poor judgment.

#### Diuretics

Cause dehydration, drowsiness and mineral imbalance, kidney damage.

#### Narcotics

Can cause of loss of balance and co-ordination, cause drowsiness, vomiting, constipation. It may cause fainting and coma.

#### Beta blockers

Reduces endurance, headache and weak digestion. Risk of heart attack due to slow heart rate.

### Conclusion

Doping in athletes is a significant problem that has potential underlying causes. The drive to be the best in sports dates to ancient times, as does the use of performance-enhancing substances. With the ever-mounting pressures faced by

athletes, it is not surprising that drug abuse by athletes exists across essentially all sports and age groups. Trainers, Coaches, Physical instructors and other health care providers should provide evidence-based safe alternatives to use optimal nutrition, best training strategies, and psychological approaches to improving performance, all of which may help with athletes' confidence in their natural abilities.

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