

Review Article:

Doping – hazards and anti-doping laws: Review

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Abstract:

Doping refers to the use of performance-enhancing drugs or other illicit substances by athletes to gain an unfair advantage in competitive sports. The use of doping has been a significant problem in the world of sports for many years, and it undermines the integrity of fair competition. Doping has a long and controversial history in sports. Overall, doping has been a persistent problem in sports for over a century, and the battle against it continues to this day. The history of doping shows how the use of performance-enhancing drugs has evolved over time, with new substances and techniques constantly being developed to gain an edge in competition. However, the consequences of doping on both the athletes and the integrity of sports have become increasingly severe, and the fight against doping remains a top priority for sports organizations worldwide. Overall, anti-doping laws are an essential part of maintaining fair and safe competition in sports. By preventing the use of performance-enhancing drugs, anti-doping laws protect the integrity of sports and ensure that athletes compete on a level playing field.

Keywords: Doping, physiology, anti –doping laws

Introduction:

Doping refers to the use of performance-enhancing drugs or other illicit substances by athletes to gain an unfair advantage in competitive sports. The use of doping has been a significant problem in the world of sports for many years, and it undermines the integrity of fair competition. Doping has a long and controversial history in sports. ¹ Overall, doping has been a persistent problem in sports for over a century, and the battle against it continues to this day. The history of doping shows how the use of performance-enhancing drugs has evolved over time, with new substances and techniques constantly being developed to gain an edge in competition. However, the consequences of doping on both the athletes and the integrity of sports have become increasingly severe, and the fight against doping remains a top priority for sports organizations worldwide.²

Historical landmarks:³

Here is a brief overview of key moments in doping history.

1. Early 1900s: Stimulants such as caffeine and strychnine were commonly used by athletes to enhance performance. Opium was also used to relieve pain.

2. 1928: At the Amsterdam Olympics, a British cyclist named Tommy Simpson died from a combination of heat exhaustion and amphetamines.
3. 1950s: Anabolic steroids were developed and used by Soviet athletes in the 1950s, and they quickly spread to other countries. Anabolic steroids mimic the effects of testosterone and can increase muscle mass and strength.
4. 1960s-70s: Amphetamines and other stimulants became widespread in sports, and their use was not yet banned.
5. 1967: The International Olympic Committee (IOC) banned the use of stimulants.
6. 1976: The IOC added anabolic steroids to the list of banned substances.
7. 1980s: Blood doping was developed, in which an athlete's own blood is extracted, stored, and then re-infused before a competition to increase the number of red blood cells and improve endurance.
8. 1990s: Erythropoietin (EPO), a hormone that stimulates the production of red blood cells, was developed and became widely used in endurance sports.
9. 1999: The Festina doping scandal occurred in the Tour de France, in which the entire Festina team was found to be using EPO.
10. 2000s: The use of performance-enhancing drugs continued to be a major problem in sports, with high-profile cases such as cyclist Lance Armstrong and baseball player Barry Bonds being caught and punished for doping.
11. 2010s: The World Anti-Doping Agency (WADA) continued to develop and refine anti-doping measures, including more advanced drug testing and harsher punishments for doping violations.

There are many different types of doping substances, including anabolic steroids, stimulants, hormones, and blood-doping agents. These substances can help athletes increase muscle mass, improve endurance, reduce recovery time, and enhance mental focus. However, they can also have severe health consequences and long-term side effects. The use of doping is strictly prohibited in most professional sports, and athletes who are caught using these substances can face serious consequences. These consequences can include suspension, fines, and even lifetime bans from competition. In some cases, doping can also result in criminal charges or lawsuits.³

Despite the risks and consequences, some athletes continue to use doping substances in an attempt to gain an advantage. This has led to a constant cat-and-mouse game between anti-doping agencies and athletes seeking to cheat. Anti-doping agencies use a variety of methods to test for doping substances, including blood and urine tests, as well as physical examinations and interviews.^{4,5,6}

In recent years, there has been an increasing emphasis on education and prevention as a way to combat doping. Athletes are taught about the dangers of doping and the importance of fair competition. Many sports organizations have also implemented stricter rules and harsher penalties for doping violations, as well as increased testing and monitoring. Overall, doping is a serious issue that undermines the integrity of sports and puts athletes' health at risk. It is important for athletes, coaches, and fans to take a stand against doping and promote fair play and healthy competition.⁶

Commonly used drugs and substances in doping:^{7,8,9}

There are several commonly used drugs and substances in doping, including:

1. **Anabolic steroids:** These are synthetic versions of the male sex hormone testosterone, and they are commonly used to increase muscle mass and strength.

2. **Human growth hormone (HGH):** HGH is a hormone that is naturally produced by the body, but synthetic versions can be used to increase muscle mass and strength, as well as to aid in recovery after exercise.
3. **Erythropoietin (EPO):** EPO is a hormone that stimulates the production of red blood cells, which can increase endurance and stamina.
4. **Stimulants:** These drugs, such as amphetamines and cocaine, can increase alertness, reduce fatigue, and improve reaction time.
5. **Beta-blockers:** These drugs can reduce anxiety and tremors, which can be helpful in sports such as archery and shooting.
6. **Diuretics:** These drugs can help athletes lose weight quickly and can also be used to mask the presence of other doping substances in the body.
7. **Blood doping agents:** These are substances or procedures that increase the amount of oxygen-carrying red blood cells in the body, which can increase endurance and performance.

Doping – hazards: ^{8,9}

It is important to note that the use of these substances is strictly prohibited in most professional sports, and athletes who are caught using them can face serious consequences. These consequences can include suspension, fines, and even lifetime bans from competition. Additionally, the use of these substances can have serious health consequences and long-term side effects, including liver and heart damage, cancer, and infertility.

Doping can have several hazards and risks to an athlete's health and well-being, including:

1. **Cardiovascular problems:** Doping can increase blood pressure and heart rate, which can lead to an increased risk of heart attack, stroke, and other cardiovascular problems.
2. **Liver and kidney damage:** Many doping substances can cause liver and kidney damage, which can be irreversible and life-threatening.
3. **Hormonal imbalances:** Doping substances can disrupt the natural balance of hormones in the body, which can lead to a range of health problems, including infertility, impotence, and breast development in men.
4. **Psychological effects:** Doping can also have psychological effects, including increased aggression, mood swings, and depression.
5. **Addiction:** Some doping substances, such as stimulants and anabolic steroids, can be addictive and can lead to substance abuse.
6. **Detection risks:** The use of some doping substances, such as blood doping agents, can also carry a risk of infection from contaminated blood or other medical equipment.
7. **Negative impact on sport integrity:** Doping undermines the integrity of fair competition and can create a sense of disillusionment among fans and spectators, which can ultimately hurt the sport's reputation.

Doping – Physiological effects: ¹⁰

Doping can have various physiological effects on the body, depending on the type and dosage of the substance used. Here are some examples of how doping can affect the body:

1. Anabolic steroids: These substances mimic the effects of the male hormone testosterone and can increase muscle mass, strength, and endurance. They can also increase the production of red blood cells, which can improve oxygen delivery to the muscles, and accelerate recovery after exercise.
2. Human growth hormone (HGH): HGH stimulates the growth of muscle and bone tissue and can also increase fat metabolism. It can increase muscle mass and strength, reduce recovery time, and enhance endurance.
3. Erythropoietin (EPO): EPO is a hormone that stimulates the production of red blood cells, which carry oxygen to the muscles. By increasing the number of red blood cells in the body, EPO can improve endurance and stamina.
4. Stimulants: Stimulants like caffeine, amphetamines, and cocaine can increase alertness, reduce fatigue, and improve reaction time. They can also increase heart rate and blood pressure, leading to an increased risk of cardiovascular problems.
5. Beta-blockers: Beta-blockers can reduce anxiety and tremors, which can be helpful in sports such as archery and shooting. They can also reduce heart rate and blood pressure, which can negatively impact endurance and performance in sports that require physical exertion.
6. Diuretics: Diuretics can help athletes lose weight quickly by increasing urine output, but they can also lead to dehydration and electrolyte imbalances, which can be dangerous.
7. Blood doping agents: Blood doping agents increase the number of red blood cells in the body, which can improve oxygen delivery to the muscles and increase endurance. However, they can also increase the risk of blood clots, stroke, and other cardiovascular problems.

Doping in India: ¹¹

Doping is a problem in India, and several Indian athletes have been caught using prohibited substances in recent years. The Indian government has established the National Anti-Doping Agency (NADA) to promote and coordinate the fight against doping in sports. NADA is responsible for conducting in-competition and out-of-competition testing of Indian athletes to detect the use of banned substances.

However, there have been several instances where Indian athletes have been caught using banned substances. In 2019, five Indian weightlifters were provisionally suspended after they tested positive for banned substances. In 2018, a Commonwealth Games gold medalist in the 400m was banned for four years after she tested positive for anabolic steroids. One reason for the prevalence of doping in India is the lack of awareness and education about the dangers of using prohibited substances. Many athletes may be unaware of the risks and consequences of using banned substances, or they may be under pressure to perform at a high level and feel that using these substances is necessary.

Another factor is the lack of resources for anti-doping efforts in India. NADA has limited resources and staffing, which can make it difficult to conduct thorough testing and monitoring of athletes. Additionally, some critics have raised concerns about the lack of independence of NADA from the government and sports organizations, which can compromise the agency's ability to effectively detect and punish doping violations.

Overall, doping is a serious issue in India, and there is a need for increased education and awareness about the risks and consequences of using prohibited substances. Additionally, there is a need for more resources and independent oversight to strengthen anti-doping efforts and ensure that athletes compete on a level playing field.

Anti-doping laws: ¹²

Anti-doping laws are rules and regulations established to prevent the use of performance-enhancing drugs (PEDs) in sports. The purpose of these laws is to ensure fair competition and protect the health and safety of athletes. The World Anti-Doping Agency (WADA) is the organization responsible for promoting and coordinating the fight against doping in sports. WADA develops and updates the World Anti-Doping Code, which is a set of anti-doping rules that govern all sports organizations and athletes who participate in international competitions.

The World Anti-Doping Code includes several key components. The first is a list of prohibited substances and methods that athletes are not allowed to use. These substances include anabolic steroids, human growth hormone, and blood doping agents, among others. The second component is a set of testing and monitoring procedures. Athletes may be subject to both in-competition and out-of-competition testing, which involves collecting blood and urine samples to test for prohibited substances. Athletes may also be required to provide whereabouts information so that they can be located for testing at any time. The third component of the World Anti-Doping Code is the consequences for violating anti-doping laws. Athletes who are found to have used prohibited substances or methods may face sanctions such as suspension, disqualification, and forfeiture of medals and prize money. The severity of the sanction depends on the type of violation, the athlete's history, and other factors.¹³

The World Anti-Doping Code also includes a provision for therapeutic use exemptions (TUEs). A TUE allows an athlete to use a prohibited substance or method for medical reasons, with the approval of a medical professional and anti-doping organization. In addition to the World Anti-Doping Code, individual countries and sports organizations may have their own anti-doping laws and regulations. These laws may provide additional testing and monitoring procedures or impose stricter penalties for doping violations.¹⁴

Conclusion:

Overall, anti-doping laws are an essential part of maintaining fair and safe competition in sports. By preventing the use of performance-enhancing drugs, anti-doping laws protect the integrity of sports and ensure that athletes compete on a level playing field.

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