



## FORENSIC SCIENCE AND SPORTS

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**Abstract:** Forensic science in sports plays a vital role in the detection and identification of illicit drugs (accelerants, stimulants, etc.) used for performance enhancement by athletes, to give themselves unfair advantage in the respective sport. In this paper, we review the attributes of forensic science applied in physiological and performance tests used in sports. We also understand the role of forensic science in identifying the practices relevant to coaches and athletes to ensure judicious use of drugs that are not harmful to the career and health of an athlete and ultimately aid in maintaining the very fabric and spirit of the sport.

### Introduction:

Forensic Science is the application of scientific methods and techniques to the matters under investigation to criminal and civil laws. It encompasses many different fields of science, including chemistry, medicine, pathology, toxicology, so on and so forth. The competitive nature of sports encourages some participants to attempt to enhance their performance through the use of medicines, or through other means such as increasing the volume of blood in their bodies through artificial means. Forensic Science, especially Forensic Toxicology plays a vital role in Sports through the detection and identification of such illicitly performance-enhancing drugs and hormones.

### Sports Testing and Forensic Science

In 1967, the International Olympic Committee (IOC) and the International Cycling Union became the first sporting organizations in the world to ban the use of performance-enhancing drugs or doping, in an effort to stop drug misuse during the 1968 Olympics. Stimulants, like amphetamines, could be detected through reliable tests in 1980s or somewhat prior to that, but detecting anabolic steroids was challenging which is now possible.

Gas Chromatography/Mass Spectrometry (GC/MS) systems, which can analyze most organic compounds of the type used in sports doping more accurately and

efficiently. Forensic toxicologists carry out sports testing for a range of drugs today, from steroids and beta-blockers, to growth hormones and diuretics. Sporting organizations extended testing into the training period, so an athlete could be tested, without warning.

The importance of the custody of a sample to secure it from being tampered and contaminated is also taken care by the forensic science department. Athletes competing at high levels are aware of the necessity of testing and some try to evade the testers by the use of new performance-enhancing substances, however forensic toxicologist have been trying to keep a step ahead by developing new, sensitive, and, above all, reliable methods for sports testing. The Forensic toxicology laboratories operate more professionally and with a higher degree of scientific accuracy and reliability.

### Commonly used Drugs

Androgenic agents such as anabolic steroids, allow athletes to train harder, recover more quickly and build more muscle, but they can lead to kidney damage and increased aggression.

Narcotic analgesics and cannabinoids are used to mask the pain caused by injury or fatigue - but in practice can make injuries worse and are even addictive.

Peptide hormones are substances such as EPO (erythropoietin) - which increases

bulk, strength and red blood cell count and gives athletes more energy - and HGH (human growth hormone), which builds muscle.

Glucocorticoids mask serious injury because they are anti-inflammatories and affect the metabolism of carbohydrates, fat and proteins, and regulate glycogen and blood pressure levels.

Beta blockers, meanwhile, 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.

Blood Doping is a process in which the athlete would transfuse himself with his own blood (drawn earlier and then stored for later use) or blood donated by another individual. This process increases the number of red blood cells, allowing the athlete's blood to carry more oxygen to the muscles and theoretically increasing performance levels on the day of the competition. This practice (particularly when the athlete's own blood is used) is difficult to detect in the laboratory.

#### **Challenges:**

Some debate exists over testing for the steroid Nandrolone, an anabolic steroid by the forensic toxicologists. Some athletes claimed false positive results with the new technology use by the forensic science. A review found no problem with the testing procedure, but also found a number of reasons why it is at least theoretically possible to test positive for nandrolone without actually taking the banned substance.

A challenge for forensic toxicology is the use of body fluids as a medium for accurate drug testing without being unnecessarily invasive. When it comes to sports testing, there may be even bigger questions to address in the future, like the presence of a new genetic material in the genome.

#### **Suspensions and Penalties:**

Adequately policing the issue, has been resulting in enhanced testing policies in many countries and sports organisations, along with increased suspensions and

penalties for players who test positive for performance-enhancing drugs.

The World Anti-Doping Agency makes a list of banned substances every year, and they test athletes to check they haven't used them. All sports recognised by the IOC or Sport Accord have been implementing testing programmes and making coaches and athletes aware of banned drugs.

In April 2005 professional cyclist and Olympic gold medal winner Tyler Hamilton was suspended from racing for two years after blood tests indicated the presence of blood doping via transfusion with donated blood. As of May 2005, Hamilton maintained his innocence and asserted his intent to appeal his suspension. In January 2013, the retired American cyclist Lance Armstrong admitted to doping and was stripped of his seven Tour de France wins and banned from sport for life. Ben Johnson was probably the world's highest-profile drugs cheat. The Canadian sprinter tested positive for anabolic steroids at the 1988 Olympic Games in Seoul.

Johnson had won the 100m in a world record of 9.79 seconds but was stripped of his gold medal after the positive test and sent home in disgrace.

#### **Conclusion:**

Sports are governed by a set of rules, which serve to ensure fair competition, and sportsmanship is an attitude that strives for fair play, courtesy toward teammates and opponents, ethical behaviour and integrity, and grace in victory or defeat.

Use of performance-enhancing drugs or hormones not only predetermines the result of the game but takes away the right to have the equal opportunity of winning the game from the participant who is ethically playing it.

Sportsmanship expresses an ethos that the activity will be enjoyed for its own sake, not to win or to lose, but to play the game in the right spirit.

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