
Performance Enhancing Drugs: Usage & Consequences

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INTRODUCTION

Athletes devote a great deal of time and effort to their sports. Being a top athlete requires hours of daily training and an intense focus and will. Athletes invest themselves in their sports and want to see their investments pay off. They want to win. Of course, training daily improves the chances of winning, but some athletes are willing to go further than that. In 1997, Sports Illustrated interviewed several top Olympic athletes and asked them the following question: "If you were given a performance enhancing substance and you would not be caught and win, would you take it?" (Baron). An unbelievable 98% said that they would (Baron). Even more shocking were the responses to the following question: "If you were given a performance enhancing substance and you would not be caught, win all competitions for 5 years, then die, would you take it?" (Baron). Astonishingly, more than 50% of the respondents said that they would (Baron). To some athletes, winning is apparently more valuable than life itself.

What Is a Performance Enhancing Drug and Why Are They Banned?

A performance enhancing drug (PED) makes feats of athleticism possible that otherwise might not have been. The World Anti-Doping Agency, the agency responsible for creating the list of banned substances for the Olympics, states that PEDs are substances that "have the ability or potential to drastically alter the human body and biological functions, including the ability to considerably improve athletic performance in certain instances" (USADA).

The United States Anti-Doping Agency claims that "The negative effects [PEDs] can have on one's body make USADA's mission paramount as to why no athlete should ever have to consider PED use to succeed in sport" (USADA). In addition to this, the real fact is that most PEDs are controlled substances in the first place. Steroids, EPO, and hGH are all controlled substances that are regulated by the federal government. According to the World Anti-Doping Agency, "a substance or method will be considered for the WADA Prohibited List if the

substance or method meets any two of the following three criteria: It has the potential to enhance or enhances sport performance, It represents an actual or potential health risk to the athlete, It violates the spirit of sport" (USADA).

A Brief History

Performance enhancing substances and methods have been used for a long time. Substances such as "Mushrooms, plants, and mixtures of wine and herbs were used by ancient Greek Olympic athletes and Roman gladiators competing in Circus Maximus dating back to 776 BC" (Baron). Additionally, "various plants were used for their stimulant effects in speed and endurance events as well as to mask pain, allowing injured athletes to continue competing" (Baron).

In the early 1900s, Olympic marathon runners began abusing drugs to enhance their performance through "mixtures of strychnine, heroin, cocaine, and caffeine" (Baron) These mixtures, developed by the coach or team, were widely used amongst athletes (Baron). In the 1950s, the Soviet Olympic team began using synthetic testosterone to enhance strength (Baron). This sparked the United States' interest, and the coach of the Olympic weight lifting team began working with a pharmaceutical company. Their efforts lead to the development of the steroid danazol (Baron). In Soviet controlled East Germany, the East German government administered steroids and other drugs to young athletes, yielding "a crop of gold medalists" (Baron). A list of banned substances in the Olympics was finally established in 1967, by the International Olympic Committee medical commission (Baron).

Today, PED use is widespread. According to one expert, there is "an over 100 million US dollar black market for steroids in the US alone, with more than 80% manufactured in Mexico" (Baron). Additionally, the projection of "these figures internationally suggests that the illegal steroid market alone approaches a billion US dollars annually, clearly making it a public health

concern, especially for at-risk groups” (Baron). These numbers do not even take into account drugs like hGH and EPO, which are the other top-two most frequently abused PEDs (Baron).

How Much Can Performance Be Enhanced?

The success of Arnold Schwarzenegger in bodybuilding was, although impressive, tainted by the fact that some of his success was attributed to anabolic steroid use. I wanted to know just how much of that success was due to drugs and how much was due to his training. There is a problem in figuring this out—due to the vast number of harmful side-effects of anabolic steroid use, it would be unethical to perform clinical evaluations. As a result, there is little to no data available that describes the strength or lean muscle gains associated with steroid use, and this is the case for most drugs.

There is, however, one athlete’s career on which we can speculate the effect of PEDs: Lance Armstrong. Armstrong, the seven-time winner of the Tour De France, admitted to using several different PEDs, including erythropoietin, or EPO (Wilson). EPO is a hormone that induces the production of red blood cells, and in doing so, increases the oxygen carrying capacity of the blood (Cleveland Clinic). So, did he really win those titles due to his blood doping?

In 1987, a study was performed that examined the effects of reinjection of autologous blood in cross-country skiers. Autologous blood reinjection involves the removal and later reinfusion of one’s own blood, producing the same results as administration of EPO (Leigh-Smith). This process can lead to an increase of red blood cell mass of up to 10%. This is an enormous increase, as an increase of 5% can take many months of intense training (Leigh-Smith). At the start of the study, the control group and the treatment group of skiers each had the same average completion time on a ski course. Only 3 hours after treatment with autologous reinjection of blood, the treated group was able to complete the ski course in 94.1% of the time that it took the control group to finish (Hemmingson). These results are fairly significant, and based on them I think it is fair to say that blood doping definitely gave Armstrong a big edge over his competition (assuming the other competitors were not doping).

Who Uses PEDs?

Studies have shown that PED use is not limited to professional athletes (Baron). Use has “spread to health clubs, high schools and other at-risk populations, creating an over \$1.4 billion US dollar industry that is growing daily as new compounds are synthesized and marketed” (Baron). The use of steroids has spread to adolescents in particular.

A study in the 1980s that examined a group of high school seniors indicated that “6.6% of respondents had used steroids and more than two-thirds of the group started using steroids when they were 16 years old or younger” (Baron). A similar study of college men found that 2% reported steroid use. Interestingly, 25% of the respondents that indicated steroid use were not athletes (Baron). Those respondents “abused steroids to improve personal appearance, a problem that continues today and is fueled by the media and the “anti-aging” marketing (Baron).

More recent data has shown more promising trends. A 2014 study performed by the National Institute of Health examined steroid use in a sample of over 40,000 students across more than 370 schools. The data from this study can be found in the table below (data is presented in

Drug	Time Period	8th Graders	10th Graders	12th Graders
Steroids	Lifetime	1.00	1.40	1.90
	Past Year	0.60	0.80	1.50
	Past Month	0.20	0.40	0.90

percentages):

Really? That’s a PED?

Not all performance enhancing drugs are as effective or easily identified as drugs like anabolic steroids or EPO. One look at a list of the substances banned by the PGA would probably prompt one to ask a few questions. The PGA banned substance list is one of the better lists to examine since along with listing

the banned substance it also explains why/how it could be used to enhance performance.

Although it is illegal anyway, the PGA does regard marijuana as a PED. It is a well-known fact that smoking marijuana produces a “high”, but the PGA claims that “some athletes have used cannabinoids to decrease anxiety before a competition” (PGA, 34). Whether or not the anxiety reducing effects outweigh its effects on focus and motor skills is up for debate.

Interestingly, it turns out that if you are a professional golfer, aside from avoiding marijuana use, you need to be careful of what kind of allergy medication you take since:

“Prohibited stimulants are sometimes present in over-the-counter substances such as cold medications, dietary supplements, diet aids and headache remedies. The U.S. Food and Drug Administration (FDA) has placed control on the sales of ephedrine. There are still substances that require caution, such as the presence of levmetamfetamine in Vicks Vapor Inhaler, ephedrine in Bronkaid and Primatene tablets, and epinephrine in Primatene Mist. Over-the-counter medications that contain prohibited substances continue to be available.”(PGA)

Supplements

It is valuable to mention dietary supplements when discussing PEDs. Supplements create an interesting dilemma for athletes. Dietary supplements are not regulated by the FDA and as such may contain ingredients that are inconsistent with the label (USADA). The US Anti-Doping Agency claims that such possibilities include:

1. “The label lists a stimulant or steroid, but when USADA tests the product, that ingredient is not actually in there.
2. The label lists ingredients that are fine (not prohibited), but testing shows the product contains a stimulant or steroid that is prohibited in sport.
3. Repeat testing of different batches of the same product do not match (provide consistent results).” (USADA).

As a result, athletes are “taking a risk by using the label to determine what is in the product” (USADA). Any supplement could contain a PED, and an athlete could unknowingly break a rule by using them.

A Gray Area

Consider the following scenario: A professional football player severely sprains his ankle and can no longer move freely without intense pain. When he visits the doctor, the doctor offers him a shot of cortisone to reduce pain and inflammation, as well as return him to playing sooner. The player gladly accepts and is able to return to playing significantly earlier than he otherwise would have.

In this instance, the athlete’s performance was clearly increased by the administration of this drug. Without administration of the drug during the same period of time, his performance would have been significantly lower. Additionally, it turns out that the injection of corticosteroids near tendons leads to an increased risk of tendon rupture (Soft tissue). It would appear as though the use of cortisone is a grey area, left to the discretion of the doctors who administer them and the acknowledgement of the risks by the players who receive them. This is a rare instance; most sports have banned every kind of imaginable substance and method that an athlete could use to gain an unfair edge.

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