On the issue of doping in sport; how far are we willing to go?

Sobre la problemática del dopaje en el deporte, ¿hasta dónde se está dispuesto a llegar?

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Every week these days, we hear of cases of athletes and/or athlete support personnel who are sanctioned for breaching the regulations of the World Anti-Doping Agency (WADA). Recently, for example, the number 1 in world tennis was banned from the sport for 3 months for a doping violation. But what is doping? Doping is defined as the violation of one or more of the anti-doping rules set forth in the World Anti-Doping Code and the international standards approved by WADA; so doping is not limited to a positive result in a doping test (detection of a prohibited substance in the athlete's sample) but can involve breaching any of the 11 existing anti-doping rules and can affect both athletes and their support personnel. The first five are violations which only athletes can commit, but the next six can also be committed by his/her support personnel as well.

The eleven points are:

The presence of a prohibited substance in an athlete's sample.

- Use or attempted use of a prohibited substance or method.
- Refusing to submit to sample collection or evading it without a valid justification.
- Whereabouts failures by an athlete for out-of-competition sample collection.
- Tampering or attempted tampering with any part of doping control.
- Possession of a prohibited substance or a method without authorisation.
- Trafficking or attempted trafficking in any prohibited substance or method.
- Administration or attempted administration to an athlete of any prohibited substance or method.
- Complicity in any anti-doping rule violation.
- Prohibited association with any athlete support person sanctioned for doping.
- Acts of retaliation against whistleblowers who report doping violations.

So, what can lead an athlete to break the code? What factors may have an influence? Firstly, there are physiological factors which depend on the sports discipline. Because athletics and cycling are much more demanding in terms of the maximal oxygen consumption (VO2max) needed to perform than other sports, substances such as EPO, in microdoses, stimulants and bronchodilators are consumed to increase the ability to transport oxygen. In sports where a lot of strength is required, such as weightlifting, more anabolic steroids, growth hormone, insulin and SARMs are used.

Another factor which predisposes athletes to violate the rules lies in the need to achieve and to get results, to be popular and attract sponsors; athletes feel important and recognised, and do not wish to go into decline despite the passage of time.

A lack of training/information regarding doping, doubts as to whether they will be able to return to their previous level after suffering an injury and the athlete's environment when offered the chance to break the rules are other factors to take into account.

And what about involuntary doping? Is it sometimes possible to violate the rules without expressly wishing to do so? Inadvertent doping occurs when an athlete consumes a drug without being aware that it contains prohibited substances and has not applied for a therapeutic use exemption (TUE). Accidental doping can also occur when an athlete consumes "contaminated" food supplements.

A 2015 study funded by the World Anti-Doping Agency analysed 597 supplements bought online in 17 different countries. Prohibited

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substances were found in four of them: androsta-1,4-diene-3,17-dione, DHEA and androsta-1,4,6-triene-3,17-dione.

Another study conducted in 2015 by the Dutch Anti-Doping Agency found one or more prohibited substances in 38% of supplements.

In 2016, a study by the company LGC in Australia analysed 67 supplements purchased online and at physical stores. In 19% of the cases, one or more prohibited substances were found that would have resulted in a positive doping control result.

How could this be avoided? An expert doctor should be consulted before consuming supplements and/or medications. Online resources such as NOdopAPP and NOdopWeb also exist, as do seals issued by bodies certifying that a supplement is free of doping substances such as INFORMED-SPORT, NZVT and DRUGFREESPORT.

As a rule, we should be wary of products which use "secret formulas", contain terms such as "natural product" or offer "spectacular, quick results".

What is being used to enhance performance?

From Xenon gas, which WADA included in the 2014 List of prohibited substances and methods, alerted by the potential performance-enhancing effects in sports that the administration of this gas can produce given that inhaling it, mixed with oxygen, stimulates HIF-1-alpha (Hypoxia-inducible factor 1-alpha), a transcription factor which, among other effects, stimulates the production of endogenous erythropoietin or EPO, whose effects are: stimulation of red blood cell synthesis and better haematological parameters in general. All this ultimately leads to the improved transportation of oxygen to the tissues and, consequently, enhanced performance in sport.

Gene and cell doping, which consists of modifying genes or using cells to improve performance and is not only unfair to other competitors but also extremely dangerous.

In 2006, we were informed of a German coach who allegedly gave Repoxygen, a gene therapy developed by the British laboratories Oxford Biomedica in 2002 as a highly effective treatment for severe anaemia in neoplastic processes and kidney failure, to minors. Treatment with Repoxygen is based on the direct intramuscular administration of an inactivated virus carrying the erythropoietin gene. The drug worms a specialised gene into the DNA of its host; in this case, the gene responsible for EPO synthesis. In the right circumstances, the gene directs the cells to start making extra erythropoietin.

Through to SARMs (selective androgen receptor modulators). SARMs are chemicals with effects similar to those of testosterone and anabolic steroids. They consist of a very diverse set of substances whose specific names include enobosarm (ostarine), LGD-4033 (ligandrol), RAD140, S4 (andarine), YK-11 and S-23. SARMs are classified by the Spanish Medicines Agency as "experimental drugs", meaning that their distribution and sale is not authorised in Spain.

Similar in terms of effects to testosterone and anabolic steroids, SARMs are targeted at teens and young adults, sometimes through videos on social media platforms touting them as a quick or easy way to improve physical appearance, gain muscle mass and strength or enhance athletic performance.

And what about the health risks associated with the consumption of these substances?

These, unfortunately, seem to be of secondary importance. Taking EPO increases the risk of thrombosis, cardiovascular events, embolisms and hypertension.

Anabolic steroids cause: hair loss, acne on the back and face, increased risk of liver diseases, sudden mood swings, increased aggressiveness, testicular atrophy, breast growth (gynaecomastia), lower libido, impotence, lower sperm production, voice deepening, facial and body hair, altered menstrual cycle and clitoral growth.

The harmful health effects of SARMs include high blood pressure, skin rashes, risk of heart attack or stroke, headaches, psychosis, hallucinations, sleep disturbances, liver damage and acute liver failure, sight problems, infertility, miscarriage, decreased testicle size, sexual dysfunction and impotence.

Insulin administration can lead to dizziness and coma.

And the question is: how far are we willing to go?

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