



IJCRR

Vol 05 issue 07

Section: Healthcare

Category: Review

Received on: 03/02/13

Revised on: 24/02/13

Accepted on: 15/03/13

DOPING IN SPORTS: CURRENT REVIEW

Motilal C. Tayade¹, Sunil M. Bhamare², Prathamesh Kamble², Kirankumar Jadhav²

¹Department of Physiology, PIMS, Loni, Maharashtra, India

²B.J.Medical College, Pune, MH, India

E-mail of Corresponding Author: drmcstayade@gmail.com

ABSTRACT

Nowadays doping is critical issue at International level in sport Physiology. This is not only concerned with health matter but also with the moral as well as ethical values of humanity affecting honest team spirit of sports competition. This is directly affecting sports, competitions around the world. Blood doping is the misuse of specific substances to increase one's red blood cell mass, which allows the body to transport more oxygen to muscles and therefore increase performance & stamina of player or person. There are seen a list numbers of life threatening side effects occurred as a result of blood doping like increases in blood viscosity, myocardial infarction, embolism, stroke, infections, allergic reactions & certain risk of blood born disease like HIV, Hepatitis etc. Anti-doping policies instituted by individual sporting governing bodies may conflict with local laws. There is no such correlation between these authorities & government laws. Nowadays there are a numbers of techniques as well as drugs are using by players, which is really a challenge to detect them by experts & fight the war against doping. However it is our responsibility to fight against them, with update of knowledge & events.

Keywords: Doping, Erythropoietin, Sport Physiology, Antidoping policies

INTRODUCTION

Nowadays doping is critical issue at International level in sport Physiology. This is not only concerned with health matter but also with the moral as well as ethical values of humanity affecting honest team spirit of sports competition. This is directly affecting sports, competitions around the world. Initially term 'doping' was restricted only with blood doping. But today the area of doping increases in such a way that the available tests become helpless for doping detection. However avoidance of doping is necessity & duty of experts by updating their knowledge in this field.

Any form of practices leading to use of specific drugs with an objective to improve performance or stamina in sport can be referred as Doping. This is considering as unethical by respective organizations where such incidences are

repetitively occurring either at National as well as International level. International Olympic committee declares this issue as unlawful & unethical. These committees often charges regular serious actions against such events occurred by time to time. This organization always tries extreme efforts for Doping free sports. ¹ Doping is widely used by sportspersons in an attempt to improve their performance without any fear or unawareness related to their consequences or side effects. These practices not only hampers the quality of sports but it may be consider as one part as corruption in sports, thus affecting sport spirit. ²

Blood doping is the misuse of specific substances to increase one's red blood cell mass, which allows the body to transport more oxygen to muscles and therefore increase performance & stamina of player or person. This can be

achieving either by direct use of either erythropoietin (EPO), synthetic oxygen carriers or direct blood transfusions. The first documented organized doping controls were carried out in the 1970s. In 1993, the Czech Antidoping Charter was signed and the Antidoping Committee was established. The medical commission of International Olympic Committee decides & declares regularly, which substances and methods are should be prohibited.³

DOPING FORMS

1. **Hormone abuse in sports :** steroidal and peptide hormones and their modulators, stimulants, glucocorticosteroids, beta2-agonists, diuretics and masking agents, narcotics, and cannabinoids all these, hormones constitute by far the highest number of adverse analytical findings reported by antidoping laboratories.³
2. **Blood doping:** Blood doping is systemically defined by WADA (World Anti-Doping Agency) as the misuse of techniques and/or substances to increases ones red blood cell count. ⁴ It is used by either autologous ways or Homologous ways. Most commonly this involves the removal of two units of the athletes blood several weeks prior to competition. The blood is then frozen until 1-2 days before the competition, when it is thawed and injected back into the athlete. This is known as autologous blood doping. Homologous doping is the injection of fresh blood, removed from a second person, straight into the athlete. ¹
3. **Use of Artificial Oxygen Carriers:** A second method of blood doping involves the use of artificial oxygen carriers. Hemoglobin oxygen carriers (HBOC's) and Perfluorocarbons (PFC's) are chemicals or purified proteins which have the ability to carry oxygen. They have been developed for therapeutic use, however are now being misused as performance enhancer's.

Medical Uses of Blood Doping: Artificial Oxygen carriers are the only form of blood doping have important medical use. They were developed for use in emergencies when there is no time for determining and cross-matching a patients blood-type for transfusion, when there is a high risk of infection, or simply when no blood is available.

DISCUSSION

Blood doping is most commonly used by endurance athletes, such as distance runners, skiers and cyclists. By increasing the number of red blood cells within the blood , higher volumes of the protein haemoglobin are present. Haemoglobin binds to and carries Oxygen from the lungs, to the muscles where it can be used for aerobic respiration. Blood doping therefore allows extra Oxygen to be transported to the working muscles, resulting in a higher level of performance, without the use of the anaerobic energy systems. Several Studies have shown that blood doping can improve the performance of endurance athletes.⁵

Side Effects of Blood Doping : There are seen a list numbers of life threatening side effects occurred as a result of blood doping like increases in blood viscosity, myocardial infarction, embolism, stroke, infections, allergic reactions & certain risk of blood born disease like HIV, Hepatitis etc.

Erythropoietin & Blood doping: Erythropoietin (EPO) is a naturally occurring hormone, secreted mainly by the kidneys, which plays an important role in the regulation of production of red blood cells. The use of EPO started in the 1980's as a quicker, cleaner alternative to blood doping. Testing for EPO only became possible after 2000. Testing may be done by using both blood and urine sample. Erythropoietin is mainly use by endurance athletes such as long distance runners & cyclists.³

Physiology of Erythropoietin: EPO stimulates bone marrow to produce more red blood cells and

therefore haemoglobin. For this reason EPO is most commonly used amongst endurance athletes as a higher RBC count means better oxygen transportation and so a higher rate of aerobic respiration. The faster the rate of aerobic respiration, the higher the level at which the athlete can work without utilising the anaerobic systems which produce lactic acid and cause fatigue.

Side effects of Erythropoietin: There is found major side-effects of using erythropoietin which have proven to be fatal. These are dangerous due to increases in viscosity of blood leads to fever, seizures, nausea, anxiety, lethargy etc.

Doping & Law:

1. There are certain laws concerned with punishment in an event occur by sport person. However due to worldwide lack of any uniform policies, doping was leading as Local issue. This is a major drawback in putting applications of strict antidoping laws.
2. Anti-doping policies instituted by individual sporting governing bodies may conflict with local laws. There is no such correlation between these authorities & government laws.
3. Athletes caught in doping may be subject only to penalties from their locality as well from the individual sporting governing body. The body has a only right to bar the player from their association. However these players may continue their carrier through other routes due to lack of uniformity.
4. The legal status of anabolic steroids varies from country to country.
5. These limitations hamper the strictness concern with such serious issue.

Doping and India

A *Zee Research Group* analysis released in October 2012 states the fact, doping associated with performance enhancing drugs badly affecting moral, ethical foundations and spirit of competitiveness in modern sports. Sports across

the world including India at some or the other point have suffered from doping matter.⁶ Bangalore based National Anti-Doping Agency (NADA) has introduced blood sampling and testing in India, with the kabaddi World Cup, in 2010.⁷ In India, the awareness concerned with doping increasing at International as well as National level sports. This is a promising facts noted in Indian doctors, players as well as in officers.

Doping – New challenges:

Recently German doping specialist Mario Thevis explained more than 100 certain undetectable performance enhancing drugs. According to him these are very difficult to detect due to their structural characteristics.⁸ It is very difficult to develop tests against these drugs.

CONCLUSION

Nowadays there are a numbers of techniques as well as drugs are using by players, which is really a challenge to detect them by experts & fight the war against doping. However it is our responsibility to fight against them, with update of knowledge & events.

ACKNOWLEDGEMENT

Authors acknowledge the great help received from the scholars whose articles cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed. Authors are grateful to IJCRR editorial board members and IJCRR team of reviewers who have helped to bring quality to this manuscript.

REFERENCES

1. Teach PE:
<http://www.teachpe.com/drugs/epo.php> ;
Downloaded on 14/12/2012
2. Belson, Ken , N.F.L. Seeks Congressional Help on Drug Policy, The New York

- Times,(2009-11-04).
http://www.nytimes.com/2009/11/04/sports/football/04starcaps.html?_r=1&hpw.
Retrieved 2010-05-27.
3. Jeschke J, Nekola J, Chlumský J. Doping in sports. *Cas Lek Cesk.* 1999 May 10;138(10):291-7.
 4. Hartgens F. Medication, athletes and doping regulations. *Ned Tijdschr Geneesk.* 2008 Aug 16;152(33):1844-8.
 5. Lippi G, Guidi G. Doping and sports. *Minerva Med.* 1999 Sep;90(9):345-57.
 6. Zee Research Group report. The curse of doping in sports. Tuesday, Oct 16, 2012, 21:41 IST Place: New Delhi | Agency: Zee Research Group.
http://www.dnaindia.com/india/report_the-curse-of-doping-in-sports_1753162
 7. TNN, NADA to crack down on blood doping. *Times of India*; 17 April 2010. http://articles.timesofindia.indiatimes.com/2010-04-07/others/28117471_1_blood-doping-nada-samples;downloaded on 03/01/2013.
 8. John Mehaffey. Doping-Undetectable new blood boosters available says expert. *Olympics 2012, Reuters Edition US*; http://www.reuters.com/article/2012/03/15/doping-epo_idUSL4E8EF70520120315;Downloaded on 03/01/2013.