

Psychophysiotherapy

Performance Enhancing Drug Abuse in Athletes and Role of Physiotherapy

Jaswinder Kaur,¹ Megha Masaun², M.S. Bhatia³

Department of Physiotherapy^{1,2}, Dr.R.M.L. PGIMER & Hospital, New Delhi and

Department of Psychiatry³, UCMS & GTB Hospital, Delhi

Contact: Jaswinder Kaur, E-mail: linktojk@yahoo.com

The integrity of sport is predicated on the assumption that all athletes compete on a level playing field. Unfortunately, the use and abuse of performance-enhancing drugs (PEDs) has become ubiquitous, creating complex challenges for the governing bodies of individual sports.¹

It is an unacceptable, illegal part of sports because of their adverse effects and performance enhancing actions; moreover, several prohibited drugs may have very high potential for addiction and abuse. These drugs help in increasing muscle mass, strength, and resistance to fatigue, but the utmost advantage of these drugs is their effect on the central nervous system, which makes athletes more aggressive in training and in competition.²

Several psychological and social support factors may contribute to the athletes' probability to engage in drug abuse. These factors include a desire to enhance performance, high perception of ego involving climate, criticism by coach, concern of athletes on their own mistakes, athletes' personal standard, lack of self confidence, low social support, as well as high task and ego orientations. Many athletes through self reported measures revealed that they can improve their performance by engaging in drug abuse in relatively short span of time instead of adapting to advanced techniques. General psychology of the athletes is that in their sports only performance matters, no matter how they achieve it.³

Performance-Enhancing Drugs

There are several types of performance-enhancing drugs: Anabolic steroids, Stimulants, Human growth hormone and Supplements.

- Anabolic steroids are synthetic substances that stimulate proteins that help build non-fat muscle mass, helping an athlete become stronger and able to train and play for longer periods of time.
- Tetrahydrogestrinone, also called "THG" or "The Clear," is the type of steroid purportedly used by many high-profile athletes.
- Stimulants help boost an athlete's energy level, helpful after strenuous training. Amphetamines are a type of stimulant.
- Human growth hormone (HGH), is available only by prescription and is administered by injection. Athletes take it for improved endurance and strength.
- Androstenedione, known as "andro," was formerly an over-the counter supplement but was banned by the National Football League (NFL), Olympics, National Collegiate Athletic Association (NCAA) and later the Major League Baseball (MLB). It helps the body process testosterone.

The World Anti-Doping Agency (WADA) strictly regulates the use of pharmaceutical products in competitive sport. WADA produced and regularly updates the World Anti-Doping Code that includes a prohibited drug list. A substance is added to the list if it meets two of the three criteria listed below.⁴

- 1) The potential for enhanced performance
 - 2) The potential for being detrimental to health
 - 3) Violation of spirit of sport
- Substances banned by WADA
- 1) Anabolic steroids including THG

- 2) Hormones including
 - a) Erythropoietin (EPO)
 - b) Human Growth Hormone (hGH)
 - c) Insulin-like Growth Factor (IGF-1)
 - d) Human Chorionic Gonadotrophin (HCG)
 - e) Adrenocorticotrophic Hormone (ACTH)
- 3) Beta-2-Agonists
- 4) Hormone Antagonists and Modulators
- 5) Diuretics

Reasons for taking PEDs by Athletes



Athletic life may lead to drug abuse for a number of reasons, including for performance enhancement, to self-treat otherwise untreated mental illness, and to deal with stressors, such as pressure to perform, injuries, physical pain.⁵

In a bid to improve performance and/or aid recovery, various pharmaceutical products have been used, both openly (legally) and in a clandestine manner against the rules of governing bodies, by a broad array of athletes.⁶

Additionally, athletes may be significantly less likely to receive treatment for underlying mental illnesses such as depression. Athletes receive comprehensive treatment and rehabilitation for physical injuries, but this may be less often the case for mental illness, because of their viewing that mental illness as a sign of weakness. Untreated mental illness is often associated with substance use, perhaps in an effort to self-treat.^{5,7}

Individual mindset of the athlete plays a important role here. It is hypothesized that athletes' motivation to engage in, or refrain from prohibited PED practices is assumed to be influenced by the magnitude and dynamics of positive and negative expectancies and their developmental pathways. Individual differences between athletes and

intrapersonal fluctuations across developmental stages are explained by the changes in the PE expectancy construct, which may serve as an effective starting point for anti-doping interventions.⁷

Some researchers⁸ have found cardiovascular complications with steroid use. Hartgens et al reported that steroid use was associated not only with decreased HDL but also with increased LDL cholesterol. Other possible cardiovascular complications include cardiomyopathies, atrial fibrillation, embolism development and acute heart failure. Steroid use also reduces natural production of testosterone, which can lead to the onset of testicular atrophy and decreased spermatogenesis.⁹

Some studies found increased systolic blood pressure, frontal alopecia, acne and psychological problems, including increased aggression and irritability—commonly called “road rage” associated with use of PEDs.^{9,10}

Treatment / Coping with PED abusing athletes



Prevention and Education

The first level of addressing the problem of drug abuse by athletes is prevention. WADA has channeled a understanding and knowledge into what is known as the Athlete Learning Program about Health & Anti-Doping (ALPHA) which adopts a fresh approach to anti-doping education by addressing how an athlete's attitudes shape his or her intentions, and ultimately determine doping or anti-doping behaviors.

ALPHA approaches doping issues from a positive mindset. Instead of telling athletes ‘Don’t do this or that,’ which can come across as negative and daunting, ALPHA provides athletes with ‘solutions’.⁴

Potential side effects associated with Performance Enhancing Drugs ⁸

Substance	Potential side effects
Androgens (eg, testosterone, danazol, nandrolone, stanozolol)	<ul style="list-style-type: none"> • Reproductive: diminished spermatogenesis and gynecomastia in men, decreased fertility, decreased testicular size, possible benign prostatic hypertrophy or prostate cancer • Cardiovascular: decreased high-density lipoprotein cholesterol, increased low-density lipoprotein cholesterol • Hepatic: hepatotoxicity • Neuropsychiatric: depression, mania, psychosis, aggression • Other: hastened epiphyseal closure in adolescents, acne, hirsutism, temporal hair recession, clitoromegaly, voice deepening, and oligomenorrhea/amenorrhea in women, infections (abscesses at injection sites, septic arthritis, and hepatitis/human immunodeficiency virus from sharing needles), tendon rupture
Growth hormone and growth factors (eg, insulin-like growth factor, insulin)	<ul style="list-style-type: none"> • Insulin resistance, hyperglycemia, diabetes mellitus, cardiomegaly, hastened epiphyseal closure in adolescents, myopathy, hypertension, edema, carpal tunnel syndrome
Stimulants (eg, amphetamine, D-methamphetamine, methylphenidate, ephedrine, pseudoephedrine, caffeine, cocaine)	<ul style="list-style-type: none"> • Hypertension, tachycardia, myocardial infarction, stroke, heat stroke, weight loss, rhabdomyolysis, headache, nausea, tremor, insomnia, anxiety/panic attacks, agitation, aggression, psychosis
Other recreational drugs	<ul style="list-style-type: none"> • Alcohol: sedation, decreased concentration and coordination • Cannabinoids: reduced alertness, impaired short-term memory, psychomotor retardation, dysphoria, anxiety, psychosis • Narcotics: physical dependence, nausea/vomiting, constipation, decreased concentration and coordination, fatigue • Nicotine: chronic use associated with cardiovascular disease, chronic obstructive lung disease, and many types of cancer
Beta agonists (eg, albuterol, formoterol, salmeterol)	<ul style="list-style-type: none"> • Tachycardia, arrhythmias, hypokalemia, hyperglycemia, tremor
Other prescription drugs	<ul style="list-style-type: none"> • Diuretics and other masking agents: dizziness, muscle cramps, rash, gout, renal insufficiency, electrolyte imbalances, gynecomastia (spironolactone)

Psychological Counseling

Psychological factors are very important in player's decision towards using banned substances, so proper counseling of athletes by sports psychologist is much required. During counseling, social support factors should also be considered. Motivational interviewing approaches have been suggested for athletes with drug abuse or doping problems, since athletes may often present in the pre contemplation stage of change.

Important elements of motivational interviewing include:

1. Clinician empathy
2. Developing discrepancies between where the athlete wants to go in life after sport and the impact that continued use of the substance might have on those goals. This

helps to clarify conflict among their values, motives, interest, and behaviors.

3. Rolling with resistance. When resistance inevitably occurs, providers should avoid arguing with athletes, as that can exacerbate resistance to change. The provider may "agree to disagree" on certain points with some athletes.
4. Encouragement of self-efficacy. Athletes may need to shift their viewpoint from one of being willing to do whatever it takes to win, to acknowledging that they would use PEDs only if ultimately incapable of succeeding without them (with the hope that athletes will never get to that point). Any underlying mental illness should be treated.⁵

Role of Physiotherapy

Physiotherapist has a role at two stages. First in prevention of PEDs abuse i.e. by improving athletic performance, so that the athletes do not indulge in practice of PEDs. And the second at the level when the athlete has started with PEDs.

Performance enhancement does not come with a short cut, but if athletes take this course of doping they may end up with jeopardizing their health. So, to save athletes from ruining their health and future of sports by using these substances they should be encouraged to learn new skills and techniques to enhance performance which can be achieved with the help of a Physiotherapist.

The Physiotherapist will:

- i. Be familiar with current anti-doping policies (including the current list of banned substances) and the rules of the WADC (World Anti-Doping Code).
 - ii. Not engage in any activity that encourages or enables the use or administration of any prohibited substance or doping method (as defined by the World Anti-Doping Code) unless an athlete has a current therapeutic Use Exemption (TUE).
 - iii. Cooperate fully with the athlete testing programme and not impede doping control officials, or encourage/assist athletes to impede or evade doping control procedures and processes. Discourage the potential use of banned performance enhancing substances and banned doping methods.^{11,12}
- According to Breaking the Cycles,³ a website dedicated to substance abuse and recovery education, physical therapy can help an individual with a full recovery and help prevent relapse. The benefits of physical therapy include:
 - Improved self-confidence. Using exercise as a means of therapy can help a person feel and grow stronger. Lack of confidence in oneself can be a contributing factor to relapse, so fostering positive self-image can help a person make better decisions in the future.
 - Improved physical appearance. A more healthy physical appearance correlates to higher levels of confidence. It also may help to mend some of the surface damage that

can happen to a body as a result of drug or alcohol use.

- Pain relief. The American Physical Therapy Association identifies the use of physical therapy to assist with chronic pains. Exercise can help decrease pain levels and increase one's mobility.
- Fills void left over from drugs. When a person is recovering from drugs or alcohol, there is often the feeling of a void or hole where that substance used to be. Physical therapy can help to refocus a person on committing to a healthy lifestyle through exercise.

Role of Exercise

1. Positive Stimulation: Exercise produces endorphins that stimulate the body in a positive way. It helps patients in dealing with depression, and it can also help recovering addicts for the same reason.
2. Muscle Strengthening – Exercise helps muscles to gain mass and become stronger. So, it helps to enhance performance of athlete thus helping them to avoid PEDs.
3. Disease Prevention – Drug addiction can lead to symptoms such as fibromyalgia and arthritis. Physical therapy can help strengthen a patient's body and reverse some of the debilitating effects.
4. Promoting a Healthy Lifestyle – Restorative physical therapy helps recovering addicts learn how to lead a healthy lifestyle that includes mindful habits and physical fitness. Moreover, the level of physical fitness is correlated negatively with depression, anxiety and self centeredness and correlated positively with self satisfaction and social adjustments.^{11,13}

Training principles to improve athlete performance

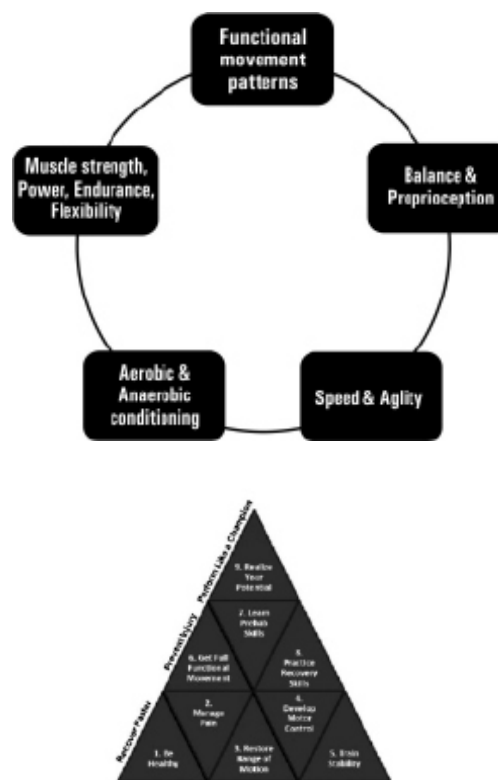
The following training principles should be kept in mind while helping an athlete improve his performance:

- 1) *Specificity Principle*: This asserts that the best way to develop physical fitness for your sport is to train the energy systems and muscles as closely as possible to the way

they are used in your sport.

- 2) **Overload Principle:** It states that to improve their fitness levels, athletes must do more than what their bodies are used to doing. When more is demanded, within reason, the body adapts to the increased demand.
- 3) **Progression Principle:** To steadily improve the fitness levels of athletes, physical demands to overload their systems must also be increased continuously.
- 4) **Diminishing Returns Principle:** When unfit athletes begin a training regime, their fitness levels improve rapidly, but as they become fitter, the diminishing returns principle becomes law. That is, as athletes become fitter, the amount of improvement is less as they approach their genetic limits.
- 5) **Variation Principle:** After athletes have been trained hard for several days, they should be trained lightly to give their bodies a chance to recover. This principle also means that exercises or activities should be changed regularly so that a part of the body is not overstressed.
- 6) **Reversibility Principle:** When athletes stop training, their hard-won fitness gains disappear, usually faster than they were gained. It is better to maintain a moderately high level of fitness year-round than detraining at the end of the season and then retraining at the beginning of the next.
- 7) **Individual Differences Principle:** Every athlete is different and responds differently to the same training activities. Factors that affect how athletes respond to training include their pre-training condition; genetic predisposition; gender and race; diet and sleep; environmental factors such as heat, cold, and humidity; and of course motivation.
- 8) **Moderation Principle:** All things in moderation. Make training fun. Design games and activities that challenge athletes to do the same work but without the drudgery of monotonous exercises. Be encouraging and promote a positive attitude about training.

Based on these above mentioned eight principles, the Physiotherapist can make an Exercise



Your Physical Process

Regime for the athlete based on his individual requirements.

The pyramid represents the physical process that the athlete must go through to enhance his performance and reach his/her full potential.

Conclusion

Drug abuse in athletes is a significant problem that has many potential underlying causes. Trainers, coaches, Psychiatrists, Psychologists and Physiotherapists should provide evidence-based, safe alternatives to PED use, including optimal nutrition, weight-training strategies, and psychological approaches to improve performance, all of which may help with athletes' confidence in their natural abilities.

Moreover, they should guide athletes towards a positive approach to encounter the pressure of any competition. Emphasis should be given on sports participation and coaches should praise athletes for their effort whether they win or lose, never criticize them for their mistake but try to motivate them to learn from their mistakes.

References

1. Lardon MT. Performance-Enhancing Drugs: Where Should the Line be Drawn and by Whom? *Psychiatry (Edmont)* Jul 2008; 5(7) : 58–61.
2. Calatayud V A, Alcaide G G, Zurian J C, Benavent R A. Consumption of anabolic steroids in sport, physical activity and as a drug of abuse: an analysis of the scientific literature and areas of research. *Br J Sports Med* 2007; 42 : 103–109.
3. <http://www.altamirarecovery.com/ptsd-and-addiction/physical-therapy/>
4. World Anti Doping Agency Official site <http://www.wada-anna.org>
5. Reardon CL, Creado S. Drug abuse in athletes. *Sust Abuse Rehab* 2014; 5 : 95–105.
6. Angell PJ, Chester N, Sculthorpe N, Whyte G, George K, Somauroo J. Performance enhancing drug abuse and cardiovascular risk in athletes: implications for the clinician. *Br J Sports Med* 2012; 46 : i78–i84.
7. Petróczi A, Aidman E. Psychological drivers in doping: The life-cycle model of performance enhancement. *Substance Abuse Treatment, Prevention, and Policy* 2008; 3 : 7 doi:10.1186/1747-597.
8. Baron DA, Reardon CL, Baron SH. Doping in sport. In: Baron DA, Reardon CL, Baron SH, editors. *Clinical Sports Psychiatry: An International Perspective*. Oxford, UK: Wiley; 2013.
9. Hartgens F, Kuipers H. Effects of androgenic-anabolic steroids in athletes. *Sports Med* 2004; 34(8) : 513–54.
10. Kuipers H, Wijnenja, Hartgens F, Willems SM. Influence of anabolic steroids on body composition, blood pressure, lipid profile, and liver functions in body builders. *Int J Sports Med* 1991; 12(4) : 413–8.
11. <http://www.breakingthecycles.com/blog/2012/01/15/how-physical-therapy-can-help-recovering-addicts/>
12. Hetteke Frima, Laetitia Dekker-Bakker. International federation of sports physiotherapy. Guidelines on doping, Nov 2004.
13. Chastain PB, Shapiro GE. Physical fitness program for patients with Psychiatric disorder: A clinical report. *Phy Ther* 1987; 67 : 545–8.