Pharmacological agents in sports: Safe or deadly

Navjot Kaur

Abstract
Many forces are at work to promote supplement use and abuse. Most nutritional ergogenic aids are unjustifiable. Only positive choices are fluid, CHO and HMB. Is steroid, or any ergogenic, abuse a symptom of a larger problem (e.g: win at all costs)? At last we realize that all the pharmacological agents have worst side effects on the systems of athletes.

Keywords: Pharmacological agents, sports, supplement etc.

Introduction
Ergogenic is defined as, “tending to increase work” An ergogenic aid is defined as “A physical, mechanical, nutritional, psychological, or pharmacological substance or treatment that either directly improves physiological variables associated with exercise performance (Robert A. Robergs, Ph.D., FASEP, EPC Professor of Human Movement and Health). Mostly players use performance enhancers to improve their performance during high-intensity physical exercise. A performance enhancer, or ergogenic aid, is anything that gives you a mental or physical edge while exercising or competing. There are a variety of both safe and harmful ergogenic aids (Medically Reviewed by Michael Charles, MD on August 9, 2016 - Written by Brian Krans and Rachel Nall). Ergogenic aids are any external influences that enhance athletic performance or facilitate physical exercise. Nutritional ergogenic aids are dietary supplements that supposedly enhance performance above levels anticipated under normal conditions. The term ergogenic means “work producing.” Athletes hope that ergogenic aids will give them a competitive edge and they fear losing. Since sporting competitions are sometimes won by a difference of 1/100th of a second, it is not surprising that athletes want to try the newest ergogenic aid. By definition, a supplement is something added to the diet to make up for a nutritional deficiency. Athletes, however, consume dietary supplements to improve athletic performance and health. The quest for performance-enhancing supplements is not new. Athletes of ancient days would eat the heart or liver of an animal, such as a lion or deer, to increase their swiftness, courage or strength. While it is no surprise that competitive athletes use supplements, supplement use is not limited to the elite level. A recent survey by the National Strength and Conditioning Association (NSCA) at their annual convention reported that 71% of the coaches encouraged supplement use among their athletes. When asked which athletes were helped by supplementation, 92% of coaches believed that the performance of professional athletes was increased, 91% believed that the performance of collegiate athletes was increased and 65% believed that the performance of high school athletes was increased.

Dietary supplements are a multi-billion dollar industry that targets a wide range of populations, including athletes. Between the years of 1990 and 1996 supplement sales almost doubled from $3.3 billion to $6.5 billion. The Dietary Supplement and Health Education Act of 1994 (DSHEA) bolstered sales by classifying “dietary supplements” in their own category and not as “food additives” or “drugs.” Under the DSHEA, “dietary supplements” are defined as vitamins, minerals, amino acids, herbs and other botanicals.

Examples of ergogenic AIDS
• Swim suits
• Equipment
- Steroids
- EPO
- Diuretics
- Blood doping
- Caffeine etc. (Robert A. Robergs, Ph.D., FASEP, EPC Professor of Human Movement and Health)

Types of ergogenic AIDS
- Pharmacological Agent
- Mechanical Agent
- Psychological Agent
- Physiological Agent
- Nutritional Agent

Why athletes and exercisers take drugs?

物理原因包括
- 增强性能
- 治疗伤痛
- 看起来更好
- 控制食欲并减肥

心理原因包括
- 逃避不愉快的情绪或压力
- 建立自信或增强自我价值
- 获胜
- 增加动机

社会原因包括
- 他们准备赢下所有成本
- 压力来自于教练和同伴
- 不赢的恐惧
- 通过获胜他们可以赚大钱

Pharmacological agents
- Amphetamine
- Anabolic steroids
- Alcohol
- Beta blockers
- Caffeine
- Cocaine
- Diuretics

Amphetamine
这是一种药理学剂。它刺激中枢神经系统延迟疲劳点在持续锻炼期间。它被用于精神疾病的人。摔跤手、拳击手使用这种药物。医生在短期基础上对儿童的肥胖和注意力缺陷障碍进行描述。

Used by - Wrestlers, Boxers, Sprinter, Jumper, Swimmer.

Sports benefits
- 增加工作能力
- 自信
- 增加注意力
- 减轻精神疲劳
- 帮助运动员跑得更快，跳得更高，掷得更远。

Harmful effect
- 增加血压
- 它导致问题，如易怒、便秘和营养问题。
- 它导致头晕和抑郁的感觉。
- 它增加精神混乱。

Anabolic steroids
Anabolic steroids are also known as anabolic androgenic steroids (AAS’s), these are derivatives of the hormone testosterone. These help athletes to build muscle and to recover faster from training. It promotes the secondary male characteristics.

Used by - Body Builder, Baseball, Football, Basketball, Wrestling and football.

Sports benefits - Steroids are most commonly used by athletes involved in power sports, for example weight lifting, throwing and sprinting events. Field sports such as American Football and Rugby also demonstrate a high incidence of use, as does body building. The perceived benefits of AAS use include:
- 增加肌肉块
- 增加肌肉力量
- 快速肌肉恢复
- 增加肌肉大小
- 增加肌肉（肌肉超常）
- 减少肌肉分解（运动后肌肉恢复和发展的肌肉分解）（未得到证实）

Harmful effect
Side-effects from the use of steroids are extremely common and can be quite significant. Most side-effects are reversible once the athlete stops usage although serious long-term side-effects and even death have occurred as a direct result of steroid use.
- 减少精子生产并降低性欲
- 增加攻击性，易怒和情绪波动
- 肝脏疾病
- 青春痘
- 影响生长
- 雌性表现男性特征
- 肾、心、肝功能下降
- 男性嗓音
- 高血压
- 高胆固醇
- 乳房发育（男性乳房发育）
- 女性月经不调
- 多余的头发
- 深化声音
- 减少免疫力

Beta-blockers
Beta-blockers also known as beta adrenergic blocking agents. Beta blockers are dilators which cause dilation (widening) of vessels by relaxing the smooth muscles surrounding them.

Used By - Archer, Shooter, Chess.
Sports Benefits - Inhaled forms used for the treatment of Asthma and EIB has no performance-enhancing effect and so are permitted for use by WADA (world anti-doping agency). When administered by injection or tablet form they are thought to have anabolic effects (increased muscle mass, reduced body fat percentage and faster recovery rates) and so their use is prohibited.

- Alertness
- Increase concentration
- Reduce high blood pressure.

Harmful Effect

- Tachycardia (rapid beating of the heart)
- Palpitations (abnormal/irregular beating of the heart)
- Headaches
- Nervousness
- Sweating
- Nausea
- Vomiting
- Depression
- Hypertension
- Dizziness
- Upset stomach

Caffeine

Caffeine is a central nervous system stimulant. It is well known as one of the ad and active drug in coffee and tea. Large doses can make the individual over –excited and restless. The heart becomes more irritable, and may show extra beats. Caffeine is a naturally occurring substance, found in over 60 different plants. It is the most commonly used drug in the world as it is found in coffee, tea, chocolate and many carbonated and energy drinks. Caffeine promotes fatty acids release, fat burning does not appear to increase during exercise and carbohydrate stores are not protected. Caffeine is considered a banned substance by the National Collegiate Athletic Association if too high an amount is found in urine. It also helps with mental sharpness and decreases perceived exertion. (Supplements and Ergogenic Aids for Athletes Reviewed by Sharon Denny, MS, RDN Published December 03, 2014).

Used by - Cycling, Marathon runner.

Sports benefits

During periods of 30-120 minutes caffeine has been shown to produce the following benefits:

- Improved muscle contractibility
- Increased time to exhaustion
- Improved concentration
- Enhanced alertness
- Reduced fatigue

Harmful effect

- Abdominal pain
- Diarrhea
- Dehydration
- Restlessness, anxiety & irritability
- Headaches
- High blood pressure
- Interference with recovery and sleep patterns
- Palpitations
- Increased muscle tension

- Caffeine affects the blood vessels and the heart.
- It increases the contractile strength of the heart muscle.
- It may cause coronary heart disease.
- Long term coffee drinkers have intra-vascular blood clotting and ulcers.

Diuretics

Diuretics are the drugs used by the athletes for losing their body weight. If anything they have a detrimental effect on performance as they cause dehydration. Diuretics are used for two reasons. Firstly to lose weight rapidly in sports which require the athlete to be within a set weight limit and Secondly, to dilute the presence of illegal substances and aid their excretion.

Used by - Athletes in weight category sports like that judo, boxing, wrestling etc.

Sports benefits

It is generally use as ergogenic aid for weight control. They are also used to flush other drugs out of peoples systems.

Harmful effect

- Dehydration
- Hypotension (low blood pressure)
- Muscle Cramps
- Electrolyte disturbances (alterations in the levels of electrolytes such as sodium, potassium and chloride)
- Muscle weakness
- Fatigue
- Body loses vital salts
- Loose motion
- Restlessness
- Dizziness

Conclusions

Many forces are at work to promote supplement use and abuse. Most nutritional ergogenic aids are unjustifiable. Only positive choices are fluid, CHO and HMB. Is steroid, or any ergogenic, abuse a symptom of a larger problem (e.g: win at all costs)? At last we realize that all the pharmacological agents have worst side effects on the systems of athletes. That’s why (Robert A. Robergs, Ph.D., FASEP, EPC).

References

2. Jump up ^ Berardi John, Brooks Justin. BCAA and Athletic Performance. Retrieved January 2016. In this article, we’ll discuss the effectiveness of one of these supposed ergogenic aids – branched chain amino acids (BCAA), 2006.