

Consequences of Doping

In many cases, the substances and methods used for doping have not been tested or proved in humans

The substances or methods used by doping athletes are usually developed for patients with well-defined medical conditions and are not intended for use by healthy people

Volunteers in a therapeutic study are unlikely to be put through the same conditions of administration and dosage of a substance and/or a method as those used by doping athletes.

Most athletes who use the prohibited substances and/or methods, do so over and above the recommended dosage for therapeutic purposes and additionally use them in combination with other substances.

Risk of contamination to the substances is high since most of them that are sold to athletes are manufactured illegally.

Non-sterile injection techniques, including sharing possibly contaminated needles can increase the risk of transmission of infectious diseases such as Hepatitis and HIV/AIDS.

The use of any substance may lead to addiction, whether physiological or psychological.

S1. Anabolic Androgenic Steroids (AAS) AAS

Natural or artificial versions of the hormone testosterone which is responsible for stimulating the development of the male reproductive characteristics.

Use of AAS can lead to adverse effects on health such as:

- Increased risk of liver diseases such as cyst formation and liver tumours
- Increased risk of cardiovascular diseases such as myocardial infarctions (heart attack) and hypertension
- Increased risk of contracting infectious diseases such as hepatitis and HIV/AIDS.
- Psychological and physiological dependence.
- Increased heart rate and irregular rhythm of the heartbeat
- Sudden death from cardiac arrest
- Muscle tremor and cramps
- Headaches
- Nervousness
- Insomnia

In Males: Acne, Shrinking of testicles, Impaired sperm production, Infertility, Impotence, Enlargement of prostate gland, Breast enlargement, Premature baldness, Libido disorders

In Females: Acne, Decreased breast size, Inhibition of ovulation, Infertility, Shrinking of the uterus, Menstrual irregularities, Deepening of the voice, Baldness, Growth of facial and chest hairs, Libido disorders, Increased aggression and mood swings

In adolescents: Severe acne, Premature puberty, Stunted growth

S2: Peptide Hormones, growth factors, related substances and mimetics

- Erythropoietin;
- human growth hormone (hGH);
- the gonadotropins;
- corticotrophins and their releasing factors



Erythropoietin: Thickening of blood, Cerebral Embolism leading to a stroke, Pulmonary Embolism leading to a heart attack

Human growth hormone: Risk of diabetes in those already at risk; worsening of cardiovascular diseases, muscle, joint and bone pain, abnormal growth of organs, accelerated osteoarthritis

Corticotrophins: Stomach irritation, Irritability, Ulcers, Infections, Softening of the connective tissue, Osteoporosis, High blood sugar Cataracts, Reduced resistance to infections, Water retention, Weakening of an injured area in muscles, bones, tendons or ligaments



Chorionic gonadotrophins: Loss of appetite, Allergic reaction and rashes, Depression, Nausea and dizziness, Tiredness, Headaches, Irritability, Bone and joint pain, Gastrointestinal problems, Hot flushes, Irregular heart beats, Decrease in libido, Shortness of breath, Hypertension, Fluid retention, Diabetes in individuals who may already be prone to the disease, Gigantism in young people (excessive skeletal growth)

S3. Beta- 2 Agonists

Beta-2 agonists is necessary for asthmatics but should not be used by non-asthmatic athletes due to their possible systemic side effects.

- a. Fine tremor of the hands
- b. Restlessness
- c. Palpitations
- d. Nervousness
- e. Headache
- f. Abnormal heart rhythms
- g. Sleep and behaviour disturbance
- h. Muscle cramps
- i. Allergic reactions

S4. Hormone and Metabolic Modulators

Use of compounds with anti-estrogenic activity may lead to the following side effects

- a. Hot flushes
- b. Weight gain
- c. Fluid retention
- d. Excess fat in the blood
- e. Osteoporosis
- f. Cardiovascular disorders
- g. Eye disorders
- h. Liver toxicity

S5. Diuretics and Masking Agents

Diuretics are agents that help to eliminate fluid and minerals from the body by , increasing the production or affecting the composition of urine.

- a. Dizziness
- b. Dehydration
- c. Muscle cramps
- d. Drop in blood pressure
- e. Loss of co-ordination and balance
- f. Confusion
- g. Mental changes or moodiness
- h. Cardiac disorders

Masking agents

- a. Headache
- b. Nausea
- c. Dizziness
- d. Hot flushes (Fever or chills) e. Kidney stones
- f. Allergic reactions e.g. skin rashes
- g. Acute gout
- i. Hair loss

M1. Manipulation of Blood and Blood Components



Blood doping is the administration of blood or blood related products to increase the number of red blood cells in the body, thereby increasing the delivery of oxygen to the muscles. Artificial oxygen carriers are chemicals used to increase the ability of blood to carry extra oxygen.



Side effects of blood doping:
Jaundice, circulatory overload, allergic reactions, blood poisoning, blood clots, stroke or heart failure, metabolic shock, increased risk of contracting infectious diseases such as hepatitis and HIV/AIDS.



Side effects of artificial oxygen carriers A transient fever, reduction in platelet count, blood infection, pulmonary embolism, irritability, diarrhoea, potential white blood cells overload.

S6. Stimulants

The use of certain stimulants can cause serious cardiovascular and psychological

problems, as well as other side effects such as.

- Overheating of the body
- Dry mouth
- Increased and irregular heart rate
- Hypertension
- Increased risk of stroke, cardiac arrhythmia and heart attack
- Insomnia
- Anxiety and aggression
- Weight loss
- Problems with co-ordination and balance
- Tremors
- Possible dependence
- Addiction

S7. Narcotics

Narcotics act on the central nervous system to suppress feelings of pain. The use of narcotics to reduce or eliminate pain can be dangerous as the substance is merely hiding the pain. With the false sense of security caused by narcotics, the user may ignore a potentially serious injury and continue with activity, risking further damage or causing permanent damage. Apart from the risk of further or permanent damage, narcotics can have others dangerous side effects such as:

- Slowed breathing rate
- Decreased heart rate
- Sleepiness
- Loss of balance, co-ordination and concentration
- Suppression of the respiratory system and death
- Intense happiness
- Nausea and vomiting
- Constipation
- Physical and psychological dependence

S8.

Cannabinoids

Cannabinoids can be found in the form of different preparations from different parts of the cannabis plant, and bear different names such as marijuana, pot, hashish, etc.

Short term effects

- Loss of perception of time and space
- Drowsiness and hallucinations
- Reduced vigilance, balance and co-ordination
- Loss of concentration
- Reduced ability to perform complex tasks
- Increased heart rate
- Increased appetite
- Mood instability - rapid changes from intense happiness to depression

Long term effects

- Loss of attention and motivation
- Impaired memory and learning abilities
- Weakening of the immune system
- Respiratory diseases such as lung and throat cancer and chronic bronchitis
- Psychological dependence and • Increased risk of stroke, cardiac arrhythmia and heart attack
- Insomnia
- Anxiety and aggression

S9 Glucocorticoids

Glucocorticosteroids are the most powerful anti-inflammatory agents available in medicine. When administered into the bloodstream, they have numerous side effects involving different body systems. Possible side effects of large doses of glucocorticoids include:

- Fluid retention
- Increased susceptibility to infections
- Osteoporosis
- Weakening of injured areas in muscle, bone, tendon or ligament
- Disorders of the nervous system such as convulsions
- Muscular atrophy
- Heartburn, regurgitation and gastric ulcers
- Softening of connective tissues i.e. tendons and ligaments
- Cessation or decrease in growth in young people
- Blood clots
- Psychiatric disorders such as changes in mood and insomnia

P1. Beta blockers

Beta blockers are substances that decrease the output of blood from the heart.

Side effects of using beta blockers include:

- Lowered blood pressure and slow heart rate
- Narrowing of blood vessels in the arms and legs
- Sexual dysfunction
- Feeling of tiredness and decreased performance capacity in endurance activities
- Spasm of the airways
- Heart failure
- Sleep disorders

Social and Economic Consequences of Doping

Social

- Damaged relationships with friends and family;
- Isolation from peers and sport;
- Effects on emotional and psychological well-being.

Economic

- Loss of sponsorship deals;
- Loss of income;
- Damage to future career prospects and;
- Wiping out of previous achievements;