

O 121. STEROIDS AND THEIR EFFECTS ON HUMAN HEALTH

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ABSTRACT: Steroids, which have important functions in the living body, are natural hormones that are naturally released into the blood from gonads and adrenal glands. However, these hormones can also be synthesized artificially. Synthetic steroids are chemical molecules that work just like natural hormones. Synthetic steroids are widely used in medicine for the treatment of various diseases. It is known that immunosuppressive steroids are used to suppress the immune system and anti-inflammatory steroids are used as anti-inflammatory agents. The main purpose of the initial synthesis studies of steroids was to be able to treat the hormonal disorders in the human body. Today, however, many people and especially athletes, are using steroids to accelerate fat burning in their bodies and increase muscle development and body resistance. Irresponsible use of steroids can lead to a deterioration of the natural hormone balance and several side effects in the human body. These side effects occur in overdose and long-term use, even if not in all people. Side effects associated with steroid use include acne, blurred vision, cataract, glaucoma, insomnia, high blood pressure, weight gain with appetite, hair growth, bad temper, restlessness, sudden mood swings, swollen face, edema, worsening diabetes and liver damage. The use of steroids should always be checked by experts to minimize the side effects on human health.

Keywords: Synthetic steroids, corticosteroids, anabolic steroids, natural hormones

1. STEROIDS AND THEIR TYPES

Steroids are divided into two main groups as natural and synthetic (Aufartová et al. 2011). Natural steroid hormones are natural hormones produced from cholesterol in gonads and adrenal glands and released into the blood (Rone et al. 2009; Soldin and Soldin, 2009). They are produced at the levels required by the body. Cholesterol, which takes part in natural synthesis, is the precursor of five major steroid hormones secreted in the body. These hormones are progesterone, cortisol, aldosterone, estrogen and testosterone. These 5 hormones are important hormones that assume various functions in our body. Synthetic steroid hormones, on the other hand, are natural steroids that can be synthesized under laboratory conditions. In other words, important steroids in our body are also produced by synthesis and used for various purposes. Artificial steroids are used both by patients in terms of medical requirements and by athletes to provide muscle and performance gains (Hoffman and Ratamess, 2006).

2. HISTORY OF STEROIDS

It is thought that the efforts to improve the performance of athletes with steroid use started in the 1940s. In fact, the basis of these studies dates back to the 1700s. Indeed, the preparation of athletes competing in the Greek Olympics by consuming sheep and bull testicles and the serious improvements in their performance due to this consumption was written in the historical records as also showing in figure 1 (Yesalis and Bahrke, 2002).

In fact, the presence of hormones in the testicles was first recognized by religious leaders and medical professionals of the late 15th century. Actually, the testicles of young men assigned to sing at the opera were removed to prevent puberty from changing their voices. Thus, these people were enabled to sing in soprano tones. These young children were boys of that time and called Castrati (Peschel and Peschel, 1987).



Figure 1. Historical records of sports in ancient time

Synthetic testosterone hormones were first used during World War II. During the war, these hormones were used to eliminate the malnutrition of the soldiers and to increase their body weight to make them stronger during the war (Yesalis and Bahrke, 2005).

In the same years, the use of anabolic steroids was very common in the Soviet Union. The success of the Soviet Union in international sporting events has been the biggest proof of this. In 1952, the wrestling team of the Soviet Union increased their performance with these compounds and attracted attention. In 1953, 19-nortestosterone (nandrolone) was the first synthesized anabolic steroid. This derivative performs 5 times better than testosterone in terms of muscle building. Dr. John Ziegler learned that a Soviet coach used steroids at the weight lifting championship in Vienna in 1954 and decided to work in this field and in 1958 he synthesized methandrostenolone (dianabol) (Todd, 1987).

During the 1988 Olympic Games in Seoul, Ben Johnson used Stanazolol, an anabolic steroid, and set a record by completing the 100-meter marathon in 9.79 seconds. However, these substances were detected in his urine samples and his gold medal was withdrawn (Yoshida et al., 1994). In 1998, at the Tour de France, Russell, coach of the Festina cycling team, admitted that his team was using steroids called erythropoietin (EPO) (Savulescu et al., 2004). There are many similar examples around the world. For this reason, it has been made compulsory to perform a doping test in all sports activities.

3. MEDICAL USE OF STEROIDS AND THEIR EFFECTS ON HUMAN HEALTH

Doctors often use steroids to treat muscle loss, anemia, developmental disability and delayed puberty in patients. Corticosteroids, which are similar to the hormones secreted by the adrenal glands and also happen to be their synthetic forms, are steroids commonly found in medicine. They are prescribed by doctors in almost every area from calcification to the treatment of respiratory diseases (Tabakoğlu, 2014; Akdoğan and Özen, 2006).

Androgenic steroids, the synthetic form of hormones secreted from gonads, play an active role in prostate, seminiferous vesicles, gland growth, increased body mass, skeletal development and closure of the pineal plaque (Carson and Manolagas, 2015). In addition, in the treatment of premenopausal breast cancer, trauma, surgical intervention, prolonged inactivity and after severe diseases, the use of androgens and anabolic steroids in combination with appropriate diet and exercise is useful.

Anabolic Androgenic Steroids (AAS) are synthetic derivatives of testosterone (Rogol and Yesalis, 1992). They are often used to promote the growth of muscles and bones due to their ability to increase cell growth and division. However, they can also increase the growth of other body tissues. There are many different types of anabolic steroids and each of them has different anabolic and androgenic properties. These are called AAS or Anabolic-Androgenic Steroids. Bone growth, appetite, puberty and muscle growth can be stimulated by using anabolic steroids. Anabolic steroids are being used by athletes because they increase protein synthesis, muscle mass and strength (McBride et al., 2016). Even when the great benefits of using anabolic steroids for medical purposes are controversial, their use by athletes for training purposes is a contradiction. Due to the potential health effects of anabolic steroids, the use of these substances is controlled in the United States and other countries.

3.1. Side effects of steroids

Not everyone who uses steroids may experience side effects and harm. There are those who have been using steroids for a long time but have not suffered any side effects or harm, there are, by contrast, those who have been exposed to permanent damage even after using them for a very short time. Everyone's

body structure, functioning and genetics are different. Therefore, irresponsible and excessive use of steroids can cause significant health problems (Bordin et al., 2017). Excessive doses of both oral and injectable steroids have serious side effects. Side effects of overdose may include acne, blurred vision, cataract, glaucoma, easy bruising of the skin, difficulty in sleeping, high blood pressure, increased appetite, weight gain, body hair growth, less resistance to infection, muscle weakness, bad temper, uneasiness, osteoporosis, sudden mood swings, swollen face, edema, worsening diabetes, high blood pressure, high total cholesterol, increased acne and pimple, hair loss and baldness, prostate cancer (Vardar et al., 2002; Talas and Pınarcı, 2010).

4. CONCLUSION

Natural and artificial steroids have important functions for human health. The body produces a certain number of steroid hormones in its own balance. However, in case of insufficient steroid production or medical necessity in the body, a specialist doctor can give artificial steroids to his patients for treatment. In addition, athletes can use synthetic steroids to improve their body and muscles and to increase their performance in competitions. Irresponsible use of these drugs can cause negative side effects in the human body. For this reason, in case of medical needs where steroid use is necessary, it should be done under doctor's supervision. Of course, the profit and loss relationship for the patient and/or athlete who will use steroids should be considered by experts.

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