CHAPTER I: INTRODUCTION

The drugs are artificially derived from the main male hormone Testosterone. Testosterone is important for promoting and maintaining muscle growth and developing secondary male sex characteristics, such as a deepening voice and facial hair. Anabolic steroids, also called Anabolic-Androgenic Steroids (AASs), can build muscle and improve athletic performance, but they can also have significant adverse effects, especially when used incorrectly. Long-term, non-medical uses are linked to heart problems, unwanted physical changes, and aggression. There is growing concern worldwide about the non-medical use of steroids and its effects. Street names include Arnolds, gym candy, pumpers, roids, and stackers.

AASs are synthetic versions of the primary male hormone, testosterone. They affect many parts of the body, including the muscles, bones, hair follicles, liver, kidneys, blood, immune system, reproductive system and the central nervous system. During puberty, increases in testosterone levels enable the development of characteristics such as facial and body hair growth, increased height and muscle mass, a deepening voice, and the sex drive.

Testosterone can also contribute to competitiveness, self-esteem, and aggressiveness. Continuous use of AASs can lead to problems such as tolerance. They may even cause the body to stop producing its own testosterone. Some people use AASs continuously, but others try to minimize their possible adverse effects through different patterns of use.

Use of Steroids In Sports Such As:

1. Cycling: The person takes AASs in cycles of 6 to 12 weeks known as the "on" period, followed by 4 weeks to several months off.
2. Stacking: Users combine several different types of steroids or incorporate other supplements in an attempt to maximize the effectiveness of the steroids. This is called "Stacking."

3. Pyramiding: Some users gradually increase the dose to a peak, then reduce the amount. However, there is no evidence that these methods reduce the risks.

Facts on Anabolic Steroids:

- Steroids are sometimes used in medicine, but illegal use of AASs may involve doses 10 to 100 times higher than the normal prescription dose.
- In the United States, AASs need a prescription, but this is not the case in many countries. All synthetic steroids combine muscle-building effects with the development of secondary male sexual characteristics.
- AAS use has been linked to a higher risk of heart attack or stroke.

There are up to 32 types of Anabolic steroids listed on commercial websites. Some have only medicinal uses, such as Nebido. Anadrol is an example of a steroid with both medicinal and performance uses. Others, such as anadur, have no therapeutic use, but athletes use them.

People choose different types for different purposes:

- bulking steroids for building muscle
- performance steroids for strength and endurance
- cutting steroids for burning fat

Other reasons for use include healing and recovery and enhancement of metabolism.

For both medical and illegal purposes, AASs can be taken:

- by mouth
- as pellets implanted under the skin
- by injection
- through the skin as a cream or gel

Oral forms are taken by mouth. They include:

TYPES:

1. Fluoxymesterone (Halotestin), or "Halo"
2. Mesterolone (Proviron)
3. Methandienone (Dianabol), or "Dbol"
4. Methyltestosterone (Virilon)
5. Mibolerone (Cheque)
6. Oxandrolone (Anavar, Oxandrin), or "Var"
7. Oxymetholone (Anadrol), or "Drol"
8. Stanozolol (Winstrol), or "Winny"

Injectable forms include:

1. Boldenone undecylenate (Equipoise), or "EQ"
2. Methenolone enanthate (Primobolan), or "Primo"
3. Nandrolone decanoate (Deca Durabolin), or "Deca"
4. Nandrolone phenpropionate (Durabolin), or "NPP"
5. Testosterone cypionate (Depotest)
6. Testosterone enanthate (Andro-Estro)
7. Testosterone propionate (Testex)
8. Trenbolone acetate (Finajet), or "Tren"

AASs travel through the bloodstream to the muscle tissue, where they bind to an androgen receptor. The drug can subsequently interact with the cell's DNA and stimulate the protein synthesis process that promotes cell growth.

Medical uses:

Some types of steroid are commonly used for medical treatment. For example, corticosteroids can help people with asthma to breathe during an attack. Testosterone is also prescribed for a number of hormone-related conditions, such as hypogonadism. However, AASs are not commonly prescribed as a treatment. In the U.S., an AAS is a schedule III controlled substance available only by prescription. The use of these drugs is only legal when prescribed by a medical provider.

Medical conditions they are used to treat include:

- Delayed puberty
- Conditions that lead to Muscle loss, such as Cancer and Stage 3 HIV, or AIDS

Testosterone and several of its esters, as well as Methyltestosterone, Nandrolone decanoate, and Oxandrolone, are the main anabolic-androgenic steroids currently prescribed in the U.S.

Steroids in Sport: Non-medical use of steroids is not permitted in the U.S. Under the Controlled Substance Act, unlawful possession and distribution are subject to federal and state laws. As it is not legal for athletic purposes, there is no legal control over the quality or use of drugs sold for this purpose. Illegal steroids are obtained through the internet and through informal dealers, like other illegal drugs. However, they may also be available through unscrupulous pharmacists, doctors, and veterinarians.

"Designer" steroids are sometimes produced to enable athletes to pass doping tests. Their composition and use are entirely unregulated, adding to the hazards they pose. Athletes often consume steroids on a trial-and-error basis, using information gained from other athletes, coaches, websites or gym "gurus." As a result, they do not have access to medical information and support that can keep them safe while using these drugs. These extreme and unwanted effects can affect those who are already prone to these types of behaviors. Long-term, unregulated use of AASs can affect some of the same brain pathways and chemicals that are affected by other drugs, such as opiates. This can result in dependency and possibly addiction.

The American Psychological Association's (APA) *Diagnostic and Statistical Manual fifth edition (DSM-5)* considers abuse of and dependence on AASs a diagnosable condition.

Withdrawal:

Misuse of steroids can lead to withdrawal symptoms when the person stops taking them.

Withdrawal symptoms include:

1. Fatigue
2. Restlessness
3. Mood Swings
4. Depression
5. Insomnia
6. Reduced Sex Drive
7. Cravings

Anabolic steroids work differently from other drugs of abuse; they do not have the same short-term effects on the brain. The most important difference is that steroids do not directly activate the reward system to cause a "high"; they also do not trigger rapid increases in the brain chemical dopamine, which reinforces most other types of drug taking behavior.

Misuse of anabolic steroids might lead to negative mental effects, such as:

1. Paranoid (extreme, unreasonable) jealousy
2. Extreme irritability and aggression ("roid rage")
3. Delusions—false beliefs or ideas
4. Impaired judgment

1. Halotestin® (fluoxymesterone) :

DESCRIPTION:

Halotestin Tablets contain fluoxymesterone, an androgenic hormone. Fluoxymesterone is a white or nearly white, odorless, crystalline powder, melting at or about 240° C, with some decomposition. It is practically insoluble in water, sparingly soluble in alcohol, and slightly soluble in chloroform. The chemical name for fluoxymesterone is androst-4-en-3-one, 9-fluoro-11,17- dihydroxy-17-methyl-, (11β,17β)-. The molecular formula is $C_{20}H_{29}FO_3$ and the molecular weight 336.45

Each HALOTESTIN (fluoxymesterone) tablet, for oral administration, contains 2 mg, 5 mg or 10 mg fluoxymesterone. Inactive ingredients: calcium stearate, corn starch, FD&C Yellow No. 5, lactose, sorbic acid, sucrose, tragacanth. In addition, the 2 mg tablet contains FD&C Yellow No. 6 and the 5 mg and 10 mg contain FD&C Blue No. 2

DOSAGE AND ADMINISTRATION:

The dosage will vary depending upon the individual, the condition being treated, and its severity. The total daily oral dose may be administered singly or in divided (three or four) doses.

- Male hypogonadism: For complete replacement in the hypogonadal male, a daily dose of 5 to 20 mg will suffice in the majority of patients. It is usually preferable to begin treatment with full therapeutic doses which are later adjusted to individual requirements. Priapism is indicative of excessive dosage and is indication for temporary withdrawal of the drug.
- Delayed puberty: Dosage should be carefully titrated utilizing a low dose, appropriate skeletal monitoring, and by limiting the duration of therapy to four to six months.
- Inoperable carcinoma of the breast in the female: The recommended total daily dose for palliative therapy in advanced inoperable carcinoma of the breast is 10 to 40 mg. Because of its short action, fluoxymesterone should be administered to patients in divided, rather than single, daily doses to ensure more stable blood levels. In general, it appears necessary to continue therapy for at least one month for a satisfactory subjective response, and for two to three months for an objective response.

OVERDOSE:

There have been no reports of acute overdosage with the androgens.

CONTRAINDICATIONS:

1. Known hypersensitivity to the drug
2. Males with carcinoma of the breast
3. Males with known or suspected carcinoma of the prostate gland
4. Women known or suspected to be pregnant
5. Patients with serious cardiac, hepatic or renal disease.

1. Methandenone:

Descripition:

Dianabol is a mainly oral form steroid and is one of the rare steroids out there which was created purely to enhance athletic performance in humans, rather than originally developed for other purposes such as to treat medical conditions or for use in animals. Therefore Dianabol can be considered as a true performance enhancing androgen and anabolic steroid that has well known and studied benefits going back decades. Dianabol is considered to be much more powerful and effective than even the highly regarded steroid Anadrol.

The main benefits of this very powerful steroid relate to the core areas that influence muscle growth:

- Boosting Protein synthesis – this rapidly increases the protein building process in the cells; the building blocks of muscular growth.
- Increasing Nitrogen retention – keeping a positive nitrogen balance keeps the body in a prime anabolic state.
- Enhanced Glycogenolysis – the conversion of the carbohydrate glycogen from the liver and muscle cells breaks down into glucose to be used as energy.

These basic yet most critical of body processes are what contributes to the overall extremely powerful anabolic effects of Dianabol. Due to its ability to deliver enormous bulk and strength gains, Dianabol is mainly used for these purposes. It is rarely used for cutting besides by highly experienced or professional users who have a specific purpose, as there are better cutting steroids out there. Water retention is another reason that Dianabol is not a popular cutting steroid.

Dosage:

Being such a powerful steroid, Dianabol is very effective even at low doses. Excellent results can be achieved with only 15mg daily. A more common dosage for most people is to increase it after the first two to three weeks up to 20mg to 30mg per day. As expected, the higher the dosage the more pronounced you can expect side effects to be. The most advanced users who are confident in controlling the side effects are known to go to 50mg daily.

If you want a big rise in Dianabol levels quickly ready for an upcoming workout, taking then whole dosage in one go makes sense. But if you have an extremely long workout or other athletic activity being prolonged throughout the day, a more staggered dosing of Dianabol makes sense – because this steroid has such a short half life of several hours, levels can drop quickly. The trade off with multiple doses during the day is you will never reach the maximum blood level of Dianabol compared with a single full strength dosage. If you're using a higher dosage of Dianabol daily, precautions are greatly required when considering taking it all at once – only the most experienced users should consider a single dosage of 50mg of Dianabol.

Most Dianabol tablets come in strengths of 5mg, 10mg and 15mg, making it simple to design a dosage schedule even of the smallest amounts. While Dianabol is available as an injection, this is not common or as easy to come by as the pill form and the vast majority of users prefer the tablet for its very fast acting effect.

Dosage amount is not the only factor to consider with Dianabol: timing is also critical. As an oral steroid, Dianabol works fast but also leaves the body fast. It has a half-life of just three to five hours, so most people choose to break up a daily dosage into multiple smaller doses throughout the day (such as two or three) to ensure blood levels of the steroid don't drop. If you want to experience a peak in Dianabol levels however, taking the whole dose at once in timing with your training schedule, you can experience the maximum benefit right when you need it.

1. OXYMETHOLONE :

Description :

Oxymetholone, sold under the brand names Anadrol and Anapolon among others, is an androgen and anabolic steroid (AAS) medication which is used primarily in the treatment of anemia. It is also used to treat osteoporosis, HIV/AIDS wasting syndrome, and to promote weight gain and muscle growth in certain situations. It is taken

Side effects of oxymetholone include increased sexual desire as well as symptoms of masculinization like acne, increased hair growth, and voice changes. It can also cause liver damage. The drug is a synthetic androgen and anabolic steroid and hence is an agonist of the androgen receptor (AR), the biological target of androgen like testosterone and dihydrotestosterone (DHT). It has strong anabolic effects and weak androgenic effects.

Oxymetholone was first described in 1959 and was introduced for medical use by 1961. It is used mostly in the United States. In addition to its medical use, oxymetholone is used to improve physique and performance. The drug is a controlled substance in many countries and so non-medical use is generally illicit.

DOSAGE AND ADMINISTRATION:

The recommended daily dose in children and adults is 1-5 mg/kg body weight per day. The usual effective dose is 1-2 mg/kg/day but higher doses may be required, and the dose should be individualized. Response is not often immediate, and a minimum trial of three to six months should be given. Following remission, some patients may be maintained without the drug; others may be maintained on an established lower daily dosage. A continued maintenance dose is usually necessary in patients with congenital aplastic anemia.

Stanozolol: is a manmade steroid, similar to the a naturally occurring steroid testosterone. Stanazolol is used in the treatment of hereditary angioedema, which causes

episodes of swelling of the face, extremities, genitals, bowel wall and throat. Stanozolol may decrease the frequency and severity of these attacks.

Dosage:

Usual Adult Dose for Angioedema:

Prophylactic use to decrease freguency and severity of attacks of hereditary angioedema.
Initial dose: 2 mg orally 3 times a day.

Deca Durabolin:

Deca Durabolin, Nandrolone Decanoate.

Deca Durabolin was introduced by Organon in the early 1960s. It hit the market as an injectable steroid available in various strengths, most common being 50 mg/ml and 100 mg/ml. Deca Durabolin has over the years emerged as the most widespread and most commonly used injectable steroid. Although Nandrolone Decanoate is still contained in many generic compounds, almost every athlete connects this substance with Deca Durabolin. Deca's immense popularity can be attributed to wide range of applications and for its mostly positive results. Its driving feature is clearly defined in the package insert by Organon GmbH Company: 'The distinct anabolic effect of Nandrolone Decanoate is mirrored in the positive nitrogen balance.'

Nitrogen, in bonded form is part of protein. Deca Durabolin causes the muscle cell to store more nitrogen than it releases, so that a positive nitrogen balance is achieved. This positive balance is synonymous with muscle growth as the muscle cell, in this growth phase, absorbs a larger amount of protein than usual. It is however clearly pointed out on the package insert that a positive nitrogen balance and the inherent protein building effect occurs only with supply of enough calories and proteins. The

high anabolic effect of Deca Durabolin is linked to a moderately androgenic component, and this makes sure that a good gain in muscle mass and strength is obtained. Most athletes also notice to their dissatisfaction, considerable water retention at high doses that gives muscles a smooth and watery appearance. On the other hand, since Deca Durabolin also stores more water in the connective tissues, it can temporarily ease or even cure existing pain in joints and contribute to a heavier workout. Deca also blocks the cortisone receptors, allowing less cortisone to reach the muscle cells and the connective tissue cells. Athletes freely use Deca, for muscle buildup and in preparation for a competition.

Dosage:

Optimal dose is between 200 and 600 mg/week. Research has shown that best results can be obtained with the intake of 2 mg/pound body weight. The anabolic and consequent buildup effect of Deca Durabolin in the range of approximately 200 to 600 mg/week, increases almost proportionately to the dosage increase. If more than 600 mg/week is administered, one starts noticing the negative effects. Moreover, at a dosage level above 600 mg/week, the anabolic effect no longer increases proportionately to the dosage increase, so that even 1000 mg/week does not guarantee significantly better results than 600 mg/week!

Most male athletes experience good results by taking 400 mg/week. Steroid novices usually need only 200 mg/week.

CHAPTER 2: LITERATURE REVIEW

ANABOLIC STEROID USE: INDICATIONS OF HABITUATION AMONG ADOLESCENTS:

Sc.D, Andrea L. Streit, MHA, Judith R. Vicary, Ph.D 2015

The following article attempts to identify characteristics of the adolescent male AS user and suggests that AS use does have a dependence potential. The AS user population was found to be significantly different from nonusers in several areas such as self-perceptions of health and strength, interest in controlling AS use, and perceptions of peer AS use. The AS user group was also found to contain several subgroups (heavy users [≥ 5 cycles] versus other users, and those who initiated use prior to age sixteen who reported significantly different attitudes and/or behaviors. These differences suggest that prevention efforts will have to focus on different motivations for AS use.

ANABOLIC STEROID ABUSE AND CARDIAC DEATH

Michael C Kennedy MD(NSW), MB BS(Syd), FRACP

Christopher Lawrence MB BS(Syd), FRCPA 2001

To examine the relationship between anabolic steroid abuse and cardiac death. We report the first two cases in Australia. They are the only reported cases in which the anabolic steroid oxymesterone has been detected. This compound has never been approved for use in Australia. Two footballers, aged 18 and 24, sustained fatal cardiac arrests while at training sessions. Both were considered fit and healthy.

Autopsy revealed features of a hypertrophic cardiomyopathy in the 18-year-old; the 24-year-old had findings of a myocarditis. In both cases the coronary arteries were normal and there was no evidence of coronary thrombosis. Urine In both subjects contained the anabolic steroid oxymesterone.

There are limited clinical uses for anabolic steroids but they are widely abused by athletes in attempts to alter lean body mass and strength. Acute non-fatal myocardial infarction was first reported in 1988 and fatal myocardial infarction In 1990. While a causal relationship is hard to prove, It Is possible that the anabolic steroid contributed to the increase in cardiac size in the first subject and may have increased his responsiveness to catecholamines causing an arrhythmogenic event. In the second, the inflammatory changes could have provided the focus for an arrhythmia. It would appear that anabolic steroid abuse should be considered in any athlete presenting with an acute hypotrophy.

LESSON OF THE WEEK: ANABOLIC STEROID ABUSE BY BODY BUILDERS AND MALE SUBFERTILITY 2016

Steroid abuse by a minority of top class athletes is well recognised. Abuse by competitive body builders is thought to be common but has caused less public concern. Recreational body builders attending gymnasiums also abuse steroids1 but the frequency and patterns of use and the associated problems are less well known.

Among other side effects androgenic steroids induce hypogonadotrophic hypogonadism with subsequent azoospermia.2 Over the past year we have noted an increased number of men attending the infertility clinic who have been using anabolic steroids for body building. This has been associated with an apparent substantial increase in body building as a recreational pastime in the north east.

We are concerned about the lack of understanding of the consequences of steroid use by users and providers and the ease with which the diagnosis can be missed.

RESEARCH OF STIMULANTS AND ANABOLIC STEROIDS IN DIETARY SUPPLEMENTS

N. Baume N. Mahler M. Kamber P. Mangin M. Saugy 2005

The purpose of this study was to analyze the composition of 103 dietary supplements bought on the internet. The supplements were dispatched in four different categories

according to their announced contents [creatine, prohormones, “mental enhancers” and branched chain amino acids (BCAA)]. All the supplements were screened for the presence of stimulants and main anabolic steroids parent compounds. At the same time, the research was focused on the precursors and metabolites of testosterone and nandrolone.

The study pointed out three products containing an anabolic steroid, metandienone, in a very high amount. The ingestion of such products induced a high quantity of metandienone metabolites in urines that would be considered as a positive antidoping test. The results have also shown that one creatine product and three “mental enhancers” contained traces of hormones or prohormones not claimed on the labels and 14 prohormone products contained substances other than those indicated by the manufacturer. The oral intake of the creatine product revealed the presence of the two main nandrolone metabolites (19-norandrosterone and 19-noretiocholanolone) in urine.

CHAPTER 3: AIM AND OBJECTIVES

AIM:

To study the description of Androgenic Anabolic steroids, its types, medical uses, Side effects, and fatal dose .

OBJECTIVES:

1. To determine the Physiological and Psychological effects.
2. To determine the Common side effects due to Steroids.
3. To determine the Cause of death due to steroids usage.

CHAPTER 4: MATERIALS AND METHODLOGY

Materials Required:

1. Data collected from references on Steroid abuse and side effects
2. Data collected from the ancient texts and research articles such as some medicine books like Dark side of body building, Steriods and abuse and from some research papers in internet.
3. Data referred from research portals including NCBI other search engines like Google and available search publications from both `Medicinal journals and Steroid death journals literature.

Methodology:

All the references of Steroid death, Steroid abusing, Steroid side effects are considered and compared to evaluate and enlighten the concept of androgenic anabolic steroids (side effects and dosage).

All the medical practitioners and professional trainers are contributing that to be fit not to use any type of steroids which may cause side effects can lead to death sometimes. So many doctors and professional trainers proposed so many books and journals about steroids and their side effects.

CHAPTER 5: CASE STUDY

1. **Bodybuilder dies of Liver damage due to Excessive intake of Steroids, was preparing for competition in Thane.**

   Victim: Naved jamil khan

   Cause of death: Hepatitis B

   Due to over dosage of Steroid intake

   Lab reports: Increased levels of cortisol.

2. **Youth dies of Steroid overdose, Gym instructor was booked**

   (TNN mar 9, 2017)

   Victim: Kiran

   Culprit: Trainer

   Cause of death: Negligence of trainer, over dosage of supplements and steroids.

   Lab reports: Presence of steroid content in the blood and body.

3. **Fitness freak doctor, 33 found dead in flat.**

   (TNN apr2, 2019)

   Victim: Mayank kunar vashisth

   Cause of death: cardiac arrest

   Due to long term usage of Steroids intake

   Autopsy reports: Pre postmortem reveals the presence of steroids content in the body.

OBSERVATION AND RESULTS

Internal examination of autopsy:

Heart:

Myocardial Hypertrophy and Fibrosis, Vascular disease, Blood clotting, High blood pressure. Acute Myocardial Infraction (mi) with or without thrombotic occlusion of the cardiovascular lesions.

Liver:

Hepatoma, Peliosis Hepatis and Cholestatis.

Other observations:

Low density Lipo protein (LDL) Cholesterol, and depressed High-Density Lipoprotein(HDL) cholesterol.

Kidney:

Swollen kidney with renal damage

Stomach:

Hematoma in stomach walls, Swollen stomach walls.

Common side effects observed in Steroids taking individuals

The adverse effects of AAS use depend on the product, the age and sex of the user, how much they use, and for how long.

Legally prescribed Normal-dose Anabolic steroids may have the following side effects:

1. Acne
2. Fluid retention

3. Difficulty or pain when urinating
4. Enlarged male breasts, known as gynecomastia
5. Increased red cell count
6. Lower levels of "good" HDL cholesterol and higher levels of "bad" LDL cholesterol
7. Hair growth or loss
8. Low sperm count and infertility
9. Changes in libido

Incorrect use of steroids can lead to an increased risk of:

1. Cardiovascular problems
2. Sudden cardiac death and myocardial infarction
3. Liver problems, including tumors and other types of damage
4. Tendon rupture, due to the degeneration of collagen
5. Osteoporosis and bone loss, as steroid use affects the metabolism of calcium and vitamin D

In adolescents, it can result in:

- Permanently stunted growth

In men, there may be:

1. shrinking testicles
2. sterility
3. enlarged breasts

Women may experience:

1. Changes to the Menstrual Cycle
2. Deepening of The Voice
3. Lengthening of the Clitoris
4. Increased Facial And Body Hair
5. Shrinking Breasts
6. Increased Sex Drive

Some of these changes may be permanent, even after stopping use.

There is also a risk of:

1. Liver damage
2. Aggression and feelings of Hostility
3. Mood and Anxiety disorders
4. Reckless behavior
5. Psychological dependence and Addiction

People who suddenly discontinue AAS after using them for a long time may experience withdrawal symptoms, including severe depression.

Health risks:

Apart from these adverse effects, there are other health risks.

1. Sharing needles to inject steroids increases the chance of contracting or transmitting blood-borne infectious diseases, such as hepatitis or HIV.
2. The use of unlicensed products carries a risk of poisoning.

Psychiatric symptoms can develop in people who use steroids for a long time.

These include:

1. Severe mood swings
2. Paranoia and Delusions
3. Impaired judgment
4. Feelings of invincibility
5. Mania and anger — known as "roid rage" — that may lead to violence.

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