

STEROID ABUSE in Today's Society

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A Guide for Understanding Steroids and Related Substances

STEROID ABUSE IN TODAY'S SOCIETY

Once viewed as a problem strictly associated with body builders, fitness "buffs," and professional athletes, the abuse of steroids is prevalent in today's society. This is an alarming problem because of increased abuse over the years, and the ready availability of steroids and steroid related products. The problem is widespread throughout society including school-age children, athletes, fitness "buffs," business professionals, etc. The National Institute on Drug Abuse (NIDA) estimates that more than a half million 8th and 10th grade students are now using these dangerous drugs, and increasing numbers of high school seniors don't believe steroids are risky. Another study indicated that 1,084,000 Americans, or 0.5 percent of the adult population, said that they had used anabolic steroids. These are just a couple of examples of how widespread the problem has become.

Some people are taking dietary supplements that act as steroid precursors without any knowledge of the dangers associated with their abuse. Dietary supplements are sold in health food stores, over the Internet, and through mail order. People may believe that these supplements will produce the same desired effects as steroids, but at the same time avoid the medical consequences associated with using steroids. This belief is dangerous. Supplements may also have the same medical consequences as steroids.

This guide will help you understand why steroids are being abused, and how you can educate athletes and others about the dangers of these drugs. This guide will also discuss the dangerous medical effects of illegal use of steroids on health. The short-term adverse physical effects of anabolic steroid abuse are fairly well known. However, the long-term adverse physical effects of anabolic steroid abuse have not been studied, and as such, are not known. In addition, abuse of anabolic steroids may result in harmful side-effects as well as serious injury and death. The abuser in most cases is unaware of these hidden dangers. By working together we can greatly reduce the abuse

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of anabolic steroids and steroid related products. It is important to recognize this problem and take preventive measures to protect athletes and other users.

WHAT ARE ANABOLIC STEROIDS?

Anabolic steroids are synthetically produced variants of the naturally occurring male hormone testosterone. Both males and females have testosterone produced in their bodies: males in the testes, and females in the ovaries and other tissues. The full name for this class of drugs is **androgenic** (promoting masculine characteristics) **anabolic** (tissue building) **steroids** (the class of drugs). Some of the most abused steroids include Deca-Durabolin®, Durabolin®, Equipoise®, and Winstrol®. The common street (slang) names for anabolic steroids include arnolds, gym candy, pumpers, roids, stackers, weight trainers, and juice.

The two major effects of testosterone are an androgenic effect and an anabolic effect. The term androgenic refers to the physical changes experienced by a male during puberty, in the course of development to manhood. Androgenic effects would be similarly experienced in a female. This property is responsible for the majority of the side effects of steroid use. The term anabolic refers to promoting of anabolism, the actual building of tissues, mainly muscle, accomplished by the promotion of protein synthesis.

WHY ARE STEROIDS ABUSED?

Anabolic steroids are primarily used by bodybuilders, athletes, and fitness "buffs" who claim steroids give them a competitive advantage and/or improve their physical performance. Also, individuals in occupations requiring enhanced physical strength (body guards, construction workers, and law enforcement officers) are known to take these drugs. Steroids are purported to increase lean body mass, strength and aggressiveness. Steroids are also believed to reduce recovery time between workouts, which makes it possible to train harder and thereby further improve strength and endurance. Some people who are not athletes also take steroids to increase their

endurance, muscle size and strength, and reduce body fat which they believe improves personal appearance.

WHERE DO YOU GET STEROIDS?

Doctors may prescribe steroids to patients for legitimate medical purposes such as loss of function of testicles, breast cancer, low red blood cell count, delayed puberty and debilitated states resulting from surgery or sickness. Veterinarians administer steroids to animals (e.g. cats, cattle, dogs, and horses) for legitimate purposes such as to promote feed efficiency, and to improve weight gain, vigor, and hair coat. They are also used in veterinary practice to treat anemia and counteract tissue breakdown during illness and trauma. For purposes of illegal use there are several sources; the most common illegal source is from smuggling steroids into the United States from other countries such as Mexico and European countries. Smuggling from these areas is easier because a prescription is not required for the purchase of steroids. Less often steroids found in the illicit market are diverted from legitimate sources (e.g. thefts or inappropriate prescribing) or produced in clandestine laboratories.

HOW ARE STEROIDS TAKEN?

Anabolic steroids dispensed for legitimate medical purposes are administered several ways including intramuscular or subcutaneous injection, by mouth, pellet implantation under the skin and by application to the skin (e.g. gels or patches). These same routes are used for purposes of abusing steroids, with injection and oral administration being the most common. People abusing steroids may take anywhere from 1 to upwards of a 100 times normal therapeutic doses of anabolic steroids. This often includes taking two or more steroids concurrently, a practice called "stacking." Abusers will often alternate periods (6 to 16 weeks in length) of high dose use of steroids with periods of low dose use or no drug at all. This practice is called "cycling." Another mode of steroid use is called "pyramiding." With this method users slowly escalate steroid use (increasing the number of drugs used at one time and/or the dose and frequency of one or more steroids), reach a peak amount at mid-cycle and gradually taper the dose

toward the end of the cycle. Please see "Appendix A" for additional information on patterns of anabolic steroid abuse.

Doses of anabolic steroids used will depend on the particular objectives of the steroid user. Athletes (middle or high school, college, professional, and Olympic) may take steroids for a limited period of time to achieve a particular goal. Others such as bodybuilders, law enforcement officers, fitness buffs, and body guards may take steroids for extended periods of time. The length of time that steroids stay in the body varies from a couple of days to more than 12 months.

Examples of oral and injectable steroids are as follows:

Oral Steroids

- Anadrol® (oxymetholone)
- Oxandrin® (oxandrolone)
- Dianabol® (methandrostenolone)
- Winstrol® (stanozolol)

Injectable Steroids

- Deca-Durabolin® (nandrolone decanoate)
- Durabolin® (nandrolone phenpropionate)
- Depo-Testosterone® (testosterone cypionate)
- Equipoise® (boldenone undecylenate) (veterinary product)

PHYSICAL & PSYCHOLOGICAL DANGERS

There is increasing concern regarding possible serious health problems that are associated with the abuse of steroids, including both short-term and long-term side effects (see Appendix B). The short-term adverse physical effects of anabolic steroid abuse are fairly well known. Short-term side effects may include sexual and reproductive disorders, fluid retention, and severe acne. The short-term side effects in men are reversible with discontinuation of steroid use. Masculinizing effects seen in women, such as deepening of the voice, body and facial hair growth, enlarged clitoris, and baldness are not reversible. The long-term adverse physical effects of anabolic steroid abuse in men and in women, other than masculinizing effects, have not been studied, and as such, are not known. However, it is speculated that possible long-term effects may include adverse cardiovascular effects such as heart damage and stroke.

POSSIBLE PHYSICAL SIDE EFFECTS INCLUDE THE FOLLOWING:

- High blood cholesterol levels – high blood cholesterol levels may lead to cardiovascular problems
- Severe acne
- Thinning of hair and baldness
- Fluid retention
- High blood pressure
- Liver disorders (liver damage and jaundice)
- Steroids can affect fetal development during pregnancy
- Risk of contracting HIV and other blood-borne diseases from sharing infected needles
- Sexual & reproductive disorders:

Males

- Atrophy (wasting away of tissues or organs) of the testicles
- Loss of sexual drive
- Diminished or decreased sperm production
- Breast and prostate enlargement
- Decreased hormone levels
- Sterility

Females

- Menstrual irregularities
- Infertility
- Masculinizing effects such as facial hair, diminished breast size, permanently deepened voice, and enlargement of the clitoris.

POSSIBLE PSYCHOLOGICAL DISTURBANCES INCLUDE THE FOLLOWING:

- Mood swings (including manic-like symptoms leading to violence)
- Impaired judgment (stemming from feelings of invincibility)
- Depression
- Nervousness
- Extreme irritability
- Delusions
- Hostility and aggression

LAWS AND PENALTIES FOR ANABOLIC STEROID ABUSE

The Anabolic Steroids Control Act of 1990 placed anabolic steroids into Schedule III of the Controlled Substances Act (CSA) as of February 27, 1991. Under this legislation, anabolic steroids are defined as any drug or hormonal substance chemically and pharmacologically related to testosterone (other than estrogens, progestins, and corticosteroids) that promotes muscle growth.

The possession or sale of anabolic steroids without a valid prescription is illegal. Simple possession of illicitly obtained anabolic steroids carries a maximum penalty of one year in prison and a minimum \$1,000 fine if this is an individual's first drug offense. The maximum penalty for trafficking is five years in prison and a fine of \$250,000 if this is the individual's first felony drug offense. If this is the second felony drug offense, the maximum period of imprisonment and the maximum fine both double. While the above listed penalties are for federal offenses, individual states have also implemented fines and penalties for illegal use of anabolic steroids. State executive offices have also recognized the seriousness of steroid abuse and other drugs of abuse in schools. For example, The State of Virginia enacted a new law that will allow student drug testing as a legitimate school drug prevention program. Some other states and individual school districts are considering implementing similar measures.

The International Olympic Committee (IOC), National Collegiate Athletic Association (NCAA), and many professional sports leagues (e.g. Major League Baseball, National Basketball Association, National Football League (NFL), and National Hockey League) have banned the use of steroids by athletes, both because of their potential dangerous side effects and because they give the user an unfair advantage. The IOC, NCAA, and NFL have also banned the use of steroid precursors (e.g. androstenedione) by athletes for the same reason steroids were banned. The IOC and professional sports leagues use urine testing to detect steroid use both in and out of competition.

COMMON TYPES OF STEROIDS ABUSED

The illicit anabolic steroid market includes steroids that are not commercially available in the U.S. as well as those which are available. Steroids that are commercially available in the U.S. include fluxoxymesterone (Halotestin®), methyltestosterone, nandrolone (Deca-Durabolin®, Durabolin®), oxandrolone (Oxandrin®), oxymetholone (Anadrol®), testosterone, and stanozolol (Winstrol®). Veterinary steroids that are commercially available in the U.S. include boldenone (Equipoise®), mibolerone, and trenbolone (Revalor®). Other steroids found on the illicit market that are not approved for use in the U.S. include ethylestrenol, methandriol, methenolone, and methandrostenolone.

STEROID ALTERNATIVES

A variety of non-steroid drugs are commonly found within the illicit anabolic steroid market. These substances are primarily used for one or more of the following reasons: 1) to serve as an alternative to anabolic steroids; 2) to alleviate short-term adverse effects associated with anabolic steroid use; or 3) to mask anabolic steroid use. Examples of drugs serving as alternatives to anabolic steroids include clenbuterol, human growth hormone, insulin, insulin-like growth factor, and gamma-hydroxybutyrate (GHB). Examples of drugs used to treat the short-term adverse effects of anabolic steroid abuse are erythropoietin, human chorionic gonadotropin (HCG), and tamoxifen. Also, diuretics and uricosuric agents may be used to mask steroid use. The following chart illustrates how masking is accomplished:

Drug Group	Drug or Effect	How Drug Masks Steroid Use
Uricosuric Agents	Probenecid	Decreases entry of steroids into the urine
Diuretics	Spironolactone, Furosemide	Dilutes steroid concentration in the urine
Epitestosterone	Decreases Testosterone to Epitestosterone ratio	Reduces detection of testosterone usage

Over the last few years, a number of metabolic precursors to either testosterone or nandrolone have been marketed as dietary supplements in the U.S. These dietary supplements can be purchased in health food stores without a prescription. Some of these substances include androstenedione, androstenediol, norandrostenedione, norandrostenediol, and dehydroepiandrosterone (DHEA), which can be converted into testosterone or a similar compound in the body. Whether they promote muscle growth is not known.

ARE ANABOLIC STEROIDS ADDICTIVE?

An undetermined percentage of steroid abusers may become addicted to the drug, as evidenced by their continuing to take steroids in spite of physical problems, negative effects on social relations, or nervousness and irritability. Steroid users can experience withdrawal symptoms such as mood swings, fatigue, restlessness, and depression. Untreated, some depressive symptoms associated with anabolic steroid withdrawal have been known to persist for a year or more after the abuser stops taking the drugs.

HOW WIDESPREAD IS THE PROBLEM?

In today's society people are willing to take great risk to excel in sports and perform their jobs better. Also, we live in a society where image is paramount to some people. Therefore, the popularity of performance enhancing drugs such as anabolic steroids and anabolic steroid substitute products are the choice of some people to achieve these goals. Steroid abuse is still a problem despite the illegality of the drug and the banning of steroids by various sports authorities and sports governing bodies. The following examples indicate how diverse this problem is and how widespread it is across all age groups.

General Public

The Substance Abuse and Mental Health Services Administration's National Household Survey on Drug Abuse determined 1,084,000 Americans, or 0.5 percent of the adult population, said that they had used anabolic steroids. In the 18 to 34 age group, about 1 percent had ever used steroids.

School-Age Children

The "Monitoring the Future" study conducted in 2002 determined that since 1991 there has been a significant increase of steroid use by school age children. This annual study, supported by the NIDA and conducted by the Institute for Social Research at the University of Michigan, surveys drug use among eighth, tenth, and twelfth graders in the United States. The first year data was collected on younger students was in 1991. Since 1991 there has been a significant increase in reported steroid use by teenagers. For all three grades, the 2002 levels represent a significant increase from 1991. The following chart illustrates the increase of steroid abuse among teenagers who reported using steroids at least once in their lifetime:

Percent of Students Reporting Steroid Use 1991 - 2002

Year	Eighth Grade	Tenth Grade	Twelfth Grade
1991	1.9%	1.8%	2.1%
1999	2.7%	2.7%	2.9%
2002	2.5%	3.5%	4.0%

The 2002 survey also indicated additional data related to steroid abuse by school age children:

Percent of Students Reporting Steroid Use in 2002

Student Steroid Use	Eighth Grade	Tenth Grade	Twelfth Grade
Past Month Use	0.8%	1.0%	1.4%
Past Year Use	1.5%	2.2%	2.5%
Lifetime Use	2.5%	3.5%	4.0%

In addition, the 2002 survey also determined how easy it was for school aged children to obtain steroids. The survey indicated 22% of eighth graders, 33.2% of tenth graders, and 46.1% of twelfth graders surveyed in 2002 reported that steroids were "fairly easy" or "very easy" to obtain. More than 57% of twelfth graders surveyed in 2002 reported that using steroids was a "great risk." Also, another study indicated that steroids are used predominately by males. The survey determined the annual prevalence rates were two to four times as high among males as among females.

The "Monitoring the Future" study also determined that misuse and abuse of steroids is a major concern among school aged children. Some of their findings are alarming and indicate a need for concern:

- A survey in 1999 determined that 479,000 students nationwide, or 2.9 percent, had used steroids by their senior year of high school.
- A survey in 2001 determined the percentage of 12th graders who believed that taking these drugs causes "great risk" to health declined from 68 percent to 62 percent.

The Center for Disease Control and Prevention (CDC) conducts the Youth Risk Behavior Surveillance Study, a survey of high school students across the United States. A survey conducted in 2001 indicated that 5% of all high school students reported lifetime use of steroid tablets/injections without a doctor's prescription. The survey also indicated that 5.8% of ninth graders, 4.9% of tenth graders, 4.3% of eleventh graders, and 4.3% of twelfth graders reported lifetime illegal use of steroids.

A majority of the studies performed on steroid abuse indicate males are twice as likely to abuse steroids as females.

Professional & College Sports

The NFL suspended running back Mike Cloud of the New England Patriots, defensive back Lee Flowers of the Denver Broncos, and linebacker Keith Newman of the Atlanta Falcons for violating the league's steroid policy. All three players tested positive for steroids and received a four game suspension without pay during the regular season. Three members of the Norwick University (located in

Northfield, Vermont) football team were arrested for possession of 1,000 anabolic steroid tablets. During interviews with the three football players they advised authorities that several other students and football players were using steroids. In professional baseball it is widely believed that steroid abuse is rampant. The news media has reported countless instances where players were taking steroids or other performance enhancing drugs. There is also continuous debate about steroid testing and other drug testing in professional baseball.

Law Enforcement

Despite the illegality of steroids without a prescription and the known dangers of steroid abuse the problem continues to grow in the law enforcement community. In Minneapolis, a police sergeant was charged for possession of steroids. He admitted to being a user of steroids. In Miami, a police officer was arrested for purchasing human growth hormone kits (HGH) from a dealer. The dealer had also informed Federal officials that the police officer had purchased anabolic steroids from him on four other occasions. In Tampa, a police officer was sentenced to 70 months in jail for exchanging 1,000 ecstasy tablets from police custody for steroids.

HOW CAN WE CURTAIL THEIR ABUSE?

The most important aspect to curtailing abuse is education concerning dangerous and harmful side effects, and symptoms of abuse. Athletes and others must understand that they can excel in sports and have a great body without steroids. They should focus on getting proper diet, rest, and good overall mental and physical health. These things are all factors in how the body is shaped and conditioned. Millions of people have excelled in sports and look great without steroids. For additional information on steroids please see our website at www.DEAdiversion.usdoj.gov

APPENDIX A: FACTS ABOUT STEROIDS AND ATHLETIC PERFORMANCE ENHANCEMENT¹

Patterns of Anabolic Steroid Abuse

Cycling

- Alternating periods of anabolic steroid use (on cycle) with periods of either no use or the use of low doses of anabolic steroids (off cycle)
- Cycling periods usually last from 6 to 16 weeks
- Anecdotal reasons for cycling
 - Reduction of tolerance development
 - Reduction of adverse effects
 - Prevent detection of steroid use
 - Insure peak performance during competition

Stacking

- Never done in medical practice
- Concurrent use of two or more steroids together
- Injectables may be stacked with oral preparations
- Short acting steroids may be stacked with longer acting steroids

Stacking the Pyramid

- A stacking regimen wherein there is a progressive increase in the doses and types of steroids used in the initial part of the cycle and a gradual reduction in the doses and types of steroids used in the latter half of the cycle
- This regimen is believed to give the optimal, desired steroid effects while decreasing the likelihood of detection of anabolic steroid use

Alternatives to Anabolic Steroids

- Human chorionic gonadotropin
- Human growth hormone
- Insulin-like growth factor
- Insulin
- Clenbuterol
- Erythropoietin (EPO)
- Gamma-hydroxybutyrate (GHB)
- Vitamins and amino acids

¹ Dr. James Tolliver (Pharmacologist), DEA, Drug and Chemical Evaluation Section (ODE)

APPENDIX A: FACTS ABOUT STEROIDS AND ATHLETIC PERFORMANCE ENHANCEMENT¹ (CONT'D)

Doses of Anabolic Steroids Abused

Steroid abusers select doses depending upon their particular objectives. For athletes, the doses selected are to some extent determined by the sporting event.

- **Endurance athletes:** At or slightly below replacement levels of 5 to 10 mg/day
- **Sprinters:** 1.5 to 2 times replacement levels
- **Weightlifters & body builders:** 10 to 100 times normal doses
- **Women:** Regardless of sport tend to use lower doses than men

APPENDIX B: PHYSICAL & MENTAL EFFECTS OF STEROID ABUSE ON MALES AND FEMALES¹

Short-Term Adverse Physical Effects of Anabolic Steroids in Men

- Acne
- Skin tissue damage at the site of injection
- Shrinkage of the testicles
- Decreased sperm production and motility
- Decreased semen volume
- Frequent or continuing erections
- Enlargement of the breast (gynecomastia)
- Elevated blood pressure
- Increased LDL cholesterol levels
- Decreased HDL cholesterol levels
- Fluid retention leading to swelling
- Abnormal liver function
- Prostate enlargement
- Bleeding (usually nose)

Short-Term Adverse Physical Effects of Anabolic Steroids in Prepubertal Boys

- Precocious sexual development
- Penis enlargement
- Painful, prolonged penile erections
- Increased frequency of penile erections
- Premature closure of the growth plates in long bones resulting in a decrease in the total height achieved
- Fluid retention leading to swelling

APPENDIX B: PHYSICAL & MENTAL EFFECTS OF STEROID ABUSE ON MALES AND FEMALES¹ (CONT'D)

Short-Term Adverse Physical Effects of Anabolic Steroids in Women

- Acne
- Oily skin
- Tissue damage at injection site
- Deepening of the voice
- Increased body and facial hair growth
- Enlargement of the clitoris
- Male pattern baldness
- Decreased breast size
- Menstrual irregularities (missed periods or no periods)
- Fluid retention leading to swelling

Adverse Cardiovascular Effects of Anabolic Steroids in Men and Women

- Increased blood pressure —> potential coronary artery disorder
- Increased LDL cholesterol —> potential coronary artery disorder
- Enlargement of the heart
- Actual death of heart cells
- Heart attacks (cardiac infraction)
 - Spasms of the coronary arteries
 - Increased blood clotting
- Stroke

Possible Long-Term Consequences of Anabolic Steroid Abuse in Men and Women

- Adverse cardiovascular effects
- Liver dysfunction
- Liver tumors
- Liver cancer
- Cancer of the prostate (men only)

¹ Dr. James Tolliver (Pharmacologist), DEA, Drug and Chemical Evaluation Section (ODE)

APPENDIX B: PHYSICAL & MENTAL EFFECTS OF STEROID ABUSE ON MALES AND FEMALES¹ (CONT'D)

Other Potential Risks Faced by Anabolic Steroid Abusers in Men and Women

- Skin infections
- HIV infection (needle sharing)——> AIDS
- Hepatitis infections
- Violent trauma

Psychological Effects of Anabolic Steroid Abuse in Men and Women

Psychotic and Manic Reactions (rare occurrence)

- Most likely seen in people with prior mental illness

Anger, Hostility, Aggression and/or Violent Behavior

- Occurs in some but not all anabolic steroid users
- Unpredictable who will respond
- Increased likelihood with higher doses
- Minor provocations evoke exaggerated responses
- Presents danger to spouse, family, and friends
- Presents danger to law enforcement