Steroids

Psychology 470

Introduction to Chemical Additions

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Overview

- Developed in the late 1930's for hypogonadism
  - Is a lack of testosterone by the testes
  - Used to treat
    - Delayed Puberty
    - Impotence
    - Body wasting syndrome

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Side Effect

- Also found anabolic steroids increased the growth of skeletal muscle in animals.
- Result
  - Were used by bodybuilders and other athletes to increase muscle mass.
  - Has influenced sports outcomes.
  - Banned by many sports organizations

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Reasons for Use

- Improve sports performance
  - Used extensively in bodybuilding
- Increase muscle size
- Increase lean body mass
- Increase strength
- Reduce body fat
- Use for protection
  - Many abusers report past physical or sexual abuse.
  - Abusers believe the bigger and stronger you are, the lower incidence of future attacks.
- Overall
  - Use to make you look more attractive.
  - Use to improve athletic performance.

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Types of Anabolic Steroids

- Over 100 different types
  - Does not include dietary supplements
- Most are similar in structure
- Major differences in relation to metabolic degradation by the liver.
- Oral
- Injection

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Oral Steroids

- Anavar (Oxandrolone)
- Anadrol-50 (Oxymetholone)
- Oxandrin (Axandrolone)
- Dianobol (Methandrostenolone)
- Winstrol (Stanozolol) (Vet)
- Primobolan (Methenolone)
- Others

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Injectable Steroids

- Deca-Duraboli
  - (Nandrolone Decanoate)
- Durabolin
  - (Nandrolone Phenpropionate)
- Depo-Testosterone
  - (Testerone Cypionate)
- Equipoise (Vet Use)
  - (Boldenone Undecylenate)

Dietary Supplements

- Some people believe they have anabolic effects.
- Are designed to be converted into testosterone or similar compounds.
  - Are precursors
- Can be purchased without a prescription.
  - Dehydroeplan-Drosterone (DHEA)
  - Androstenedione (Andro) (Mark McGwire)

Three Effects from Steroids

- Anticatabolic Effects
- Anabolic Effects
- Motivational Effects

Anticatabolic Effects

- Blocks the action of natural cortisone
  - Cortisone functions to increase energy stores during stress and training
  - Breaks down proteins to their amino acids
  - To much cortisone, muscle wasting can occur.
  - To much of a workout is actually bad for you.

Result

- Steroids block the breakdown process of cortisone
- May be the reason for the development of body mass

Anabolic Effects

- Follows the synthesis of new protein in muscle cells
- Also causes steroid-induced release of endogenous growth hormone
- Problem
  - Doses used by athletes are 10-200 times the therapeutic dosage for normal testosterone deficiency

Result

- To get effects
  - You need to stack or pyramid several drugs.
  - Combine oral and injectable substances through cycles of weeks duration

Motivational Effects

- Effects are huge
- Develop aggressive personalities
  - Called Roid Rage
- Can be beneficial in sports involving strength and combativeness
  - Football

Females

- Steroids exert the same effects as in males
- Induce female masculinizing effects
  - Increased body hair
  - Enlarged clitoris
  - Coarser skin
  - Voice changes
  - Menstrual cycle cessation or irregularity
  - Others

Ceasing Use?

- Is variable
- Often there is an incomplete return of altered functions after stopping
- Many side effects continue

Pharmacokinetics

- Oral
  - Pill form
- Injection
  - Usually IM not IV
  - Give in the gluteus maximus (butt muscle)
  - Usually with clean needles
  - Needle sharing not as common as with other drugs

Oral Administration

- Is absorbed in from the intestine
- Goes to the liver
  - Is immediately metabolized to androstanolone
    - Is the most active anabolic substance
  - Result – Minimal amounts reach the systemic circulation to reach the brain.

Injection

- Gets around this process.
  - More gets into circulation before being metabolized by the liver.
  - Improves the effectiveness of administration routes.

When Testosterone Levels are Decreased

- Is sensed by receptors in the hyphothalamus
- Hypothalamus begins producing a releasing factor
  - Called Gonadotropin-Releasing Factor (GRF)
- GFR circulates in the blood and goes to the Pituitary Gland

Stimulates the Pituitary to Release

1. Follicle-Stimulating Hormone (FSH)
   - In Females
2. Luteinizing Hormone (LH)
   - In Males
   - Acts on the testes to
     1. Induce production of sperm
     2. Cause the synthesis and release of testosterone.

As Testosterone Levels Increase

- Hypothalmus decreases the production of gonadotrophin-releasing factor.
- Get reductions of FSH and LH
- Testes decrease production of testosterone
- Process repeats

Introduction of Steroids

- Overwhelms the system
- High levels decrease natural production of
  - GRF
  - FSH and LH
  - Testosterone
  - Decreases spermatogenesis

Result

- Decreases sizes of
  - Thymus
  - Adrenal glands
  - Spleen
  - Lymph glands
- All involved with immune system functioning

Ultimately

- Blocks the normal process that regulates testosterone
  - Male fertility
  - Sperm Production
- Exerts peripheral hormone actions to increase muscle mass and gives a more masculine appearance
- Increases aggression

Pharmacodynamics

- Compounds bind on specific receptor binding sites.
- Cause nerve cells to fire or structures to secrete hormones.

Downregulation

- Occurs when to much of a substance binds on the receptors.
- Over time have fewer receptors
- Takes more drug to get the same effect.
- Occurs in the testes
  - Need to increase the steroid level

Problem

- High levels shut down the hypothalamus
- Less production of hormonal release
- Less stimulation of testosterone by the testes
- Need more drug.
- Repeat

Side Effects

Brain

- Can occur even in adults
- Changes the size of soma's (cell body)
- Changes the volume of some brain structures – e.g., hypothalamic nuclei

Musculoskeletal structures

- Does increase muscle mass
- Get tendon degeneration
  - Increased risk of tendon tears
- Begin use to early, get premature closure of bony growth centers.
  - You may look good, but you are also shorter than you would be.

Liver Effects

- Increased liver enzymes
- Jaundice
- Liver tumors
  - Benign
  - Malignant (>24 months use)
    - Fatal 1-3% with 2-8 years of exposure
- Peliosis Hepatitis
  - Is rare
  - Are blood filled cysts that form in the liver.
  - Can rupture causing internal bleeding

Cardiovascular Effects

- All steroids
  - Decrease good cholesterol (HDL)
  - Increase bad cholesterol (LDL)
- Result
  - Hypertension
  - Increased plaques in arteries
  - Increased risk of strokes
  - Increased risk of heart attacks

Reproductive Effects

- Hypogonadal State
  - Decreased testosterone production
  - Abnormal spermatogenesis
  - Infertility
  - Testicular atrophy
- Decreased libido
- Impotence
- Painful urination
- Enlarged Prostate
- Often are reversible when use stops

Females

- As before
- Also get smaller breasts
- Offspring problems if pregnant and using and are irreversible

Gynecomastia

- Enlargement of the breasts in males
- Is a side effect of steroids being metabolized
  - Converted to Estradiol

Others

- Reduced immunity to diseases
- Decreased thyroid functioning
- Acne
- Acceleration of male pattern baldness

Psychological Problems

- Can get euphoria
  - Increases addiction potential
- Increased risks of habituation
- Severe mood swings
- Increased mania
- Increased aggression
- Psychotic episodes
- Depression/Suicide

Jekyll-Hyde Personality

- Is a common occurrence
- Slight provocation can cause
  - Exaggerated, violent, and **OFTEN UNCONTROLLED** responses
- Are reversible

Other Psychological Syndromes

- Paranoid Jealousy
- Extreme irritability
- Delusions
- Feelings of invincibility
- May also get
  - Euphoria
  - Sexual arousal
  - Forgetfulness/Confusion

Stopping Use

- Get withdrawal syndrome
- Often people become
  - Clinically depressed
  - Decreased sexual desire
  - Fatigue

Conclusions

- Is bad stuff.
  - Lots of side effects
- Can be very dangerous