There is often more to anabolic steroid use than enhanced sport performance.

Anabolic Steroids

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Illicit use of anabolic steroids, a significant issue in the United States, is by no means restricted to elite athletes or adolescent sport participants. While steroids can stimulate and enhance muscle tissue development, long-term or excessive use can increase the risk of heart attack, cancer, and/or psychologic impairments. This review examines the prevalence of steroid use, associated benefits and risks, and the importance of accelerating effective education and prevention efforts.

CONTINUING EDUCATION INFORMATION

TARGET AUDIENCE: This activity has been designed to meet the educational needs of physicians, physician assistants, and nurse practitioners involved in the management of patients who may use or abuse anabolic-androgenic steroids.

- **Original Release Date:** November 2008
- **Expiration Date:** November 30, 2009
- **Estimated Time to Complete This Activity:** 1 hour
- **Medium:** Printed journal and online CME
- Sponsored by Postgraduate Institute for Medicine

PROGRAM OVERVIEW: The primary objective of this educational initiative is to provide clinicians in primary care with the most up-to-date information regarding detecting steroid use, educating patients who might be using steroids, and contributing to public efforts to raise awareness and reduce illegal steroid use.

EDUCATIONAL OBJECTIVES: After completing this activity, the participant should be better able to:

- Identify the "typical" user of anabolic-androgenic steroids, including the motivation behind use.
- Trace the progression from the original 1970 Controlled Substances Act to the 2004 Anabolic Steroid Control Act and the intended impact of the legislation.
- Describe the physiological mechanisms and effects of anabolic steroid use that may be perceived as beneficial.
- Explain the elevated risks associated with supraphysiologic doses of anabolic steroids.
- List the signs of anabolic steroid abuse in men and women.

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PHYSICIANS

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The American Academy of Physician Assistants accepts AMA category 1 credit for the PRA from organizations accredited by ACCME.

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Through time, pharmacotherapeutic developments have had a profound impact on health and quality of life. Unfortunately, the illicit and incorrect use of some substances can turn a positive influence into an inappropriate and even dangerous scenario.

The use of anabolic steroids, not for legitimate medical purposes but for their ergogenic effects—increased strength, power, speed, and endurance—and/or to alter body weight or composition,[1] is one such example. To the general public, steroids are most commonly used or abused for the enhancement of sport performance and among bodybuilders and participants in recreational exercise. In recent years, anabolic steroid use and abuse have received significant media attention, but as early as 1993, the National Strength and Conditioning Association[2] issued a position statement reviewing the risks and benefits of using anabolic substances.

Exercise physiologists have defined anabolic steroids as "prescription drugs with the anabolic (growth-stimulating) characteristics of testosterone, taken by some athletes to increase body size, muscle mass, and strength."[3] While this definition satisfies the physiologic foundation of these substances, restricting our attention to the use of anabolic steroids by athletes, as will be shown, may be too narrow a focus. The purpose of this article is to examine the existing evidence regarding the risks and benefits of steroid use, data indicating the prevalence of use, and efforts to reduce illicit steroid consumption.

TABLE 1

Common Anabolic Steroids

Generic name	Trade name	Stated indication/comments
Oxymetholone	Anadrol®	Treatment of anemias caused by deficient red cell production
Oxandrolone	Oxandrin®	Promotion of weight gain after weight loss following extensive surgery, chronic infection, or severe trauma
Methandrostenolone	Dianabol	N/A
Stanozolol	Winstrol®	Prevention of hereditary angioedema, treatment of nonregenerative anemias
Nandrolone decanoate	Deca-Durabolin®	Treatment of anemia associated with renal insufficiency
Nandrolone phenpropionate	Durabolin	Treatment of refractory deficient red cell production anemias, breast carcinoma, others
Testosterone cypionate	Depo®-Testosterone Cypionax	Testosterone replacement therapy; female sexual dysfunction
Boldenone undecylenate	Equipoise	Veterinary (equine) steroid
Tetrahydrogestrinone	THG	N/A (banned by the World Anti-Doping Agency)

Data extracted from: US Food and Drug Administration. MedWatch. www.fda.gov/medwatch; www.fda.gov/cder/drugSafety.htm; www.steroidology.com; www.steroid.com; www.flexyx.com.

WHO IS USING STEROIDS?

Over the past several decades, use of dietary supplements and experimentation with illegal drugs have become increasingly prevalent among certain segments of the US population. Of the nearly three million Americans reported to have experimented with anabolic steroids (see Table 1), professional athletes and youth have received the majority of attention.[1,4] A national fixation has developed on "cheating" in elite and professional sports, justifying a public health concern for the well-being of preadolescent and teenage potential drug users, both male and female. Children and adolescents often model their behavior after that of professional athletes, and rising numbers of youths consider it acceptable for their sport heroes to "get an edge on the competition" by using steroids or other banned substances.[1,4]

The use of illegal performance-enhancing substances among minors has been followed through the NIH's ongoing "Monitoring the Future" study,[5,6] which provides insight into the problem behaviors of illicit drug, alcohol, and tobacco use among eighth, 10th, and 12th graders, college students, and young adults (ages 19 through 24). Though nearly nonexistent before the 1990s, steroid abuse in youth populations soon began to increase steadily, reaching a peak between 2000 and 2003.[5] In 2003, according to Grunbaum et al,[7] 6.1% of US ninth to 12th graders (6.8% of boys, 5.3% of girls) had used nonprescribed steroid shots or pills at least once.

As tracked in a number of large epidemiologic surveys, the incidence of overall illegal drug use among youth populations has followed similar trends.[7] It is generally agreed that the increase of steroid use among high school students from the 1990s to the early 2000s can be explained in part by an accompanying decline in the perception of drug use as dangerous.[6] Nonathletes and female high school students as well as young male sport participants account for increased experimentation.[8,9]

Since the reported peak of steroid abuse in the early 2000s, a gradual decline has been observed, with 2006 seeing the lowest reported prevalence since the early 1990s.[6] Nevertheless, among current US high school students, it is reported that more than one million have tried illegal performance-enhancing drugs at least once. However, little research has been conducted to investigate these substances' ergogenic benefits or health risks in this patient population.[1,8] Education and prevention efforts to ensure the continued decline in steroid use are essential, although a policy statement from the American Academy of Pediatrics[1] cautions against using "scare tactics" or minimizing these substances' potential ergogenic effects.

Negative media attention to the nonmedical use of anabolic steroids among professional and elite ath-

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letes is likely to blame for younger athletes' receiving "the wrong message" that winning is the only important goal in sport participation.[1,10] By most accounts, reports of steroid use by professional players are exaggerated; these athletes may actually represent a mere fraction of the population that uses illegal performance-enhancing substances.[11]

Who Is the Typical User?

According to current epidemiologic data, a large constituency of nonmedical anabolic-androgenic steroid users or abusers do not fit either patient category previously mentioned. In fact, recent evidence suggests that the typical anabolic steroid user is a well-educated, gainfully employed professional earning an above-average income, who is about 30 years old and not active in organized sports or athletic competition (although most are committed to a regular workout regimen and strict diet).[10] Steroid use is initiated, on average, during the mid-20s. Cycling (alternating periods of use and endocrine recovery through abstinence) is a common practice.

These steroid users, speculate Cohen et al,[10] may see themselves as using directed drug technology responsibly, "as one part of a strategy for physical self-improvement." Their use of steroids is not motivated by a desire to enhance athletic performance, but in the pursuit of increased skeletal muscle mass, strength, and physical attractiveness.

This trend may be explained by an escalating dissatisfaction with body weight and musculature, even body dysmorphia, among males of all ages—perhaps paralleling the common concern with overweight in adolescent girls.[12,13] A large proportion of adolescents who use performance-enhancing substances do not compete in sports and may share the "typical" user's motivation.[1,14] Understanding the reasons for steroid use is an important component in prevention.[1]

LEGISLATIVE RESPONSE

Historic concerns about the growing illicit market, potential abuse within youth populations, and the escalating reports of use among professional athletes led Congress to include anabolic steroids as a Schedule III controlled substance under the Controlled Substances Act.[15] The act was originally created in 1970, with five schedules based on potential for abuse, accepted medical utility, and safety of use under medical supervision (including the potential for dependence as a consideration).

In 1990, the act was amended to impose more stringent controls with more severe criminal penalties on those who commit offenses involving the illegal distribution of anabolic steroids.[16] It was in this amendment that anabolic steroids were first classified as Schedule III controlled substances, with penalties comparable to those associated with narcotics distribution.

Next, Congress passed the Anabolic Steroid Control Act of 2004, which further amended the definition of *anabolic steroid* under the Controlled Substances Act to include a number of supplements that are considered steroid hormone precursors (eg, androstenedione, tetrahydrogestrinone [THG]). It also granted authority to the Drug Enforcement Administration to add other steroid precursors to the definition in the future (eg, dehydroepiandrosterone [DHEA][17]; in March 2007, a bill was introduced in the US Senate to so reclassify DHEA, and referred to the Senate Judiciary Committee[18]). The Anabolic Steroid Control Act, which took effect on January 20, 2005, also provided $15 million for educational programs for children about the dangers of anabolic steroids.[17]

PHYSIOLOGIC MECHANISMS AND EFFECTS OF ANABOLIC DRUGS

Anabolic steroids function in a manner similar to testosterone, the principal male reproductive hormone. Testosterone binds with special receptor sites on muscle and other tissues that contribute to male secondary sex characteristics. Levels of endogenous anabolic hormones, such as testosterone and growth hormone (GH), have been shown to rise during the 15 to 30 minutes following resistance exercise that provides sufficient stimulus to the body.[19] These levels decline when exogenous steroids are taken and remain lowered even after exogenously administered steroids are no longer detectable in the urine.[20]

Steroids and other anabolic hormones, such as insulin and insulin-like growth factor 1 (IGF-1), are critical to the growth of skeletal muscle. The combination of steroids and strategic hypertrophic exercises tends to produce the greatest acute hormonal elevations (eg, testosterone, GH, and the catabolic hormone cortisol)[19]; presuming adequate protein intake, steroids combined with exercise stimulate protein synthesis and increase muscle protein content (myosin, myofibril, and sarcoplasmic factor),[21] muscle RNA, body mass, fat-free mass, and muscle size.[3,22] Steroids also increase water retention, which leads to increased interstitial and extracellular volume.[22] Steroid use has no apparent positive effects on aerobic endurance performance.[3]

The physiologic benefits of exogenous anabolic steroid use remain somewhat unclear, although steroids' impact on both animals and humans has been studied extensively. In the late 1970s, Rogozkin[23] demonstrated that when rats consumed adequate protein and performed exercise, they experienced an increase in skeletal muscle protein—accompanied by increased relative enzyme activity when anabolic steroids were injected. In a study of hamsters some 20 years later, Melloni et al[24] found no change in body weight between anabolic steroid users and nonusers, suggesting no change in skeletal muscle protein; the investigators did observe increased aggression in animals undergoing steroid administration.

In human research, conflicting results have been reported, even in well-controlled double-blind studies.[25] However, recent trials in which supraphysiologic doses of anabolic steroids were administered to normal and eugonadal men have consistently demonstrated increases in fat-free mass and muscular strength, with accompanying reductions in adipose tissue.[26-30] Nevertheless, with these supraphysiologic doses comes an increased likelihood that the user will experience the potential adverse effects of anabolic steroid use.

Potential Risks

In contrast to the conflicting reports regarding the physiologic benefits of anabolic steroid use, there appears to be no question as to the adverse effects associated with their use. These range from unpleasant changes in appearance

TABLE 2

Risks Associated With Supraphysiologic Steroid Use[26,30,31,33]

Increased risk of heart attack
High blood pressure
Liver cancer
Tumors
Infertility
Shrinking of the testicles
Male-pattern baldness (both men and women)
Breast development (men)
Shrinking of the breasts and enlargement of clitoris (women)
Deepening of the voice and increased facial hair (women)
Premature growth halting (adolescents)
Severe acne and cysts
Rage/aggression
Mania
Delusions

Data extracted from: Woodhouse et al. *J Clin Endocrinol Metab.* 2004[26]; Bhasin et al. *N Engl J Med.* 1996[30]; Kam and Yarrow. *Anaesthesia.* 2005[31]; Pope et al. *Arch Gen Psychiatry.* 2000.[33]

(eg, acne, unwanted hair growth, masculinization in women) to long-term, potentially life-threatening alterations in physiology and overall health, including cardiomyopathy, dyslipidemia, atherosclerosis, hypercoagulopathy, and hepatic disease or dysfunction[1,31,32] (see Table 2,[26,30,31,33] page 28). Cancers in various organs, including the kidneys and the liver, have been reported.[34] Additional long- or short-term effects of anabolic steroid abuse may include reduced fertility, tendon damage, and fluid retention.[12,35]

A comprehensive 2002 research review by Pärssinen and Seppälä[36] examined steroids' adverse impact on former athletes and reported an elevated risk of premature mortality in powerlifters who had used steroids. In research examining the mental/psychosocial health of anabolic steroid users, patients have reported increased aggression, hostility, insomnia, mood swings, impaired judgment, and feelings of invincibility.[33,36-39] Competitive bodybuilders have reported that steroids elicit an antidepressant feeling.[38] Use of steroids at supraphysiologic levels has been associated with manic episodes involving violent behavior ("roid rage"), hypomania, hallucinations, or delusions.[33,38,39] Drug withdrawal (sometimes associated with suicidality) and dependence are not uncommon.[33,39]

In studies of mood and aggression among men who self-administer steroids, symptoms were uncommon among those who took the equivalent of no more than 300 mg per week of testosterone, but weekly regimens of 1,000 mg or more yielded frequent symptoms, particularly in users who engaged in simultaneous "stacking" of oral and injectable steroids.[33,40]

In men, the outward signs of performance-enhancing drug use may include testicular atrophy, breast enlargement, severe acne, baldness, painful erections, and loss of testicular function.[32] Women may experience virilization: growth of facial and body hair, deepened voice, breast reduction, enlarged clitorises, and menstrual irregularities.[1,41]

Growth Hormone

The reported beneficial effects of GH have led to its expanded therapeutic use in both children and adults. But over the past decade, improper or excessive use of GH has become one of the most common drug abuses in sporting competition—particularly among elite athletes—in part, perhaps, because its use cannot easily be detected.[42,43]

The effectiveness and long-term health effects of GH use among adolescents are unclear.[12] In adults, its use has been associated with colon, breast, and prostate cancers—although GH is often used with other licit or illicit substances that may account in part for these developments.[34]

EDUCATION, INTERVENTION

The first challenge in implementing intervention efforts is to identify the warning signs of steroid abuse. Among adolescents in particular, it may not be easy to detect use of performance-enhancing drugs through outward signs.[1] In adults, however, some noticeable signs (see Table 3[1,41]) may include rapid muscle growth, growth of facial and body hair, deepened voice, breast reduction (in females), dermatologic oily hair, oily skin, alopecia, and sebaceous cysts.[1,41] Worsening acne is common. Other signs are depression, nervousness, extreme irritability, delusions, hostility, and aggression.[33,38,39]

Although identifying persons who may be abusing steroids can make intervention possible, preventing uninitiated teens and preteens from beginning to use them is a more urgent priority. This requires accelerated education and prevention efforts, with steroids included among the illicit drugs addressed and an emphasis on the long-term risks of steroid abuse. Drug bans and drug testing (see below) are the most commonly used strategies to deter youth from abusing, but they fail to address the conflict between "doing the right thing" and winning at any cost.[1] Few interventions have been appropriately tested, although one reportedly effective program offered adolescent athletes drug education combined with drug refusal skills training.[1,44]

Limiting use by reducing access to anabolic steroids is an added challenge, considering their wide accessibility through the Internet[12] and the availability of substances (some of questionable origin) on the black market. These sources hinder tracking and prevention. Perhaps the most effective contribution clinicians can make is to resist requests to prescribe steroids for athletes, bodybuilders, or other patients without a genuine medical need. Programs, education, controls, and checks should be implemented by the medical community to uphold a legal and ethical approach to anabolic steroids and help prevent inappropriate disbursement through registered clinicians.

A considerable challenge that cannot be overlooked is the need to reach the large hidden segment of the steroid-abusing population. Users who self-administer these substances justify their practices based on anecdotal data and their own experiences as self-appointed study subjects. Without the personal intervention of a respected clinician, they are likely to dismiss common warnings that steroids are ineffective and/or dangerous.[40]

Drug Testing Among Athletes

Although a considerable majority of anabolic steroid users are likely to remain untouched by strategies to reduce these substances' nonmedical use, drug testing is an important component of addressing the problem in youth and elite athletes. Olympic athletes have been required to undergo testing since the 1968 games, and recommendations from the International Olympic Committee have led to a system of accreditation for laboratories to perform national and international sport drug testing.[45]

Despite mounting social pressures to detect and punish for use of illicit or performance-enhancing substances, testing among professional athletes has been less well coordinated. While most major professional sports organizations now have drug-testing programs, these vary in degree of quality, coordination, thoroughness, and effectiveness.

One challenge is the availability of tests to identify certain substances. New techniques have

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TABLE 3

Potential Warning Signs of Steroid Use[1,41]

Rapid muscle growth and development
Aggressive behavior
Extreme mood swings
Delusions
Jaundice
Severe acne

Data extracted from: Gomez. *Pediatrics.* 2005[1]; Strauss et al. *JAMA.* 1985.[41]

TABLE 4

Anabolic Agents Banned by the NCAA[46]

Androstenediol	Methyltestosterone
Androstenedione	Nandrolone
Boldenone	Norandrostenediol
Clostebol	Norandrostenedione
Dehydrochlormethyltestosterone	Norethandrolone
Dehydroepiandrosterone (DHEA)	Oxandrolone
Dihydrotestosterone (DHT)	Oxymesterone
Dromostanolone	Oxymetholone
Epitrenbolone	Stanozolol
Fluoxymesterone	Testosterone
Gestrinone	Tetrahydrogestrinone (THG)
Mesterolone	Trenbolone
Methandienone	

Abbreviation: NCAA, National Collegiate Athletic Association.
Data extracted from: NCAA Banned-Drug Classes, 2007-08.[46]

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become available in which carbon-13 levels of urinary steroids are analyzed to detect both exogenous steroids and urine-manipulating agents.[27] Testing for the "designer steroid" THG has also been developed. However, a quality test for human growth hormone has yet to be developed and validated.

On the college level, the National Collegiate Athletic Association (NCAA; www.ncaa.org) implemented a drug-testing program for Divisions 1, 2, and 3 in 1990. The program involves random urine collection for laboratory analysis for substances on a list of banned drugs—principally, stimulants and anabolic steroids[46] (see Table 4,[46] page 29). Failing a drug test results in loss of eligibility to participate in NCAA athletics, generally for one year. This program offers a solid standard for drug testing, education, and prevention among student athletes—including resources for both athletes and coaches to improve awareness and prevention.

Secondary schools have been much less organized in their efforts to test for and prevent drug use among their athletes and/or participants in extracurricular activities—in part because available resources and financial support for testing programs are lacking. Currently, the National Federation of State High School Associations provides materials for its member state organizations and their associated schools[47] regarding drug testing (www.nfhs.org), but it neither mandates nor regulates it. Legal issues have been raised in opposition to such testing[48]; however, a 1995 Supreme Court ruling declared random student athlete drug tests constitutional.[49]

While immunoassay is used to perform initial screening for amphetamines, marijuana, cocaine, opiates, phencyclidine, and other substances, the more costly gas chromatography–mass spectrometry is considered the standard testing procedure to detect steroids

Posttest Questions

1. **According to results of large epidemiologic studies, illicit use of anabolic steroids among high school students:**
   a. Was unheard of before 1990
   b. Has increased steadily since the late 1960s
   c. Peaked between 2000 and 2003 and has declined since
   d. Declined in the late 1990s and has increased sharply since

2. **Which of the following best describes the "typical" steroid user?**
   a. A professional football or baseball player
   b. A recreational weightlifter or bodybuilder
   c. An underweight adolescent boy with low self-esteem
   d. A gainfully employed professional in his 30s

3. **Of the following, which best explains the motivation for nonmedical use of steroids?**
   a. Greater speed in sports that involve running
   b. Dissatisfaction with body weight and musculature
   c. Increased endurance for powerlifting
   d. Faster recovery after an exercise workout

4. **Which of the following substances has been proposed for addition to the list of defined anabolic steroids under the Controlled Substances Act?**
   a. Androstenedione
   b. Dehydroepiandrosterone (DHEA)
   c. Dihydrotestosterone (DHT)
   d. Tetrahydrogestrinone (THG)

5. **Anabolic steroid use has no apparent beneficial impact on:**
   a. Muscle protein content
   b. Endurance in resistance training
   c. Cortisol levels
   d. Endurance in aerobic exercise

6. **Which of the following substances cannot yet be detected through a reliable, validated test?**
   a. DHEA c. Testosterone cypionate
   b. Growth hormone d. THG

7. **Illicit use of growth hormone has been associated with:**
   a. Colon, breast, and prostate cancers
   b. Cancers of the kidneys and the liver
   c. Hypercoagulopathy
   d. Premature mortality

8. **Steroid withdrawal is sometimes associated with:**
   a. Suicidality c. Hypomania
   b. Insomnia d. Testicular dysfunction

9. **Men are more likely to experience symptoms of aggression and hostility when they:**
   a. Periodically abstain from use ("cycling")
   b. Take oral and injectable steroids together ("stacking")
   c. Follow weekly regimens of 200- to 300-mg equivalent of testosterone
   d. Are prevented from exercising

10. **Women who take performance-enhancing drugs may experience any of the following *except:***
    a. Menstrual irregularities
    b. Growth of facial hair
    c. Breast enlargement
    d. Enlargement of the clitoris

Examination Answer Sheet

Issue Date: **November 2008** Expiration Date: **November 30, 2009**

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Anabolic Steroids

Directions: Select one answer for each question in the exam and evaluation by completely darkening the appropriate circle. An identifier is required to process your exam.

The primary objective of this educational initiative is to provide clinicians in primary care with the most up-to-date information regarding detecting steroid use, educating patients who might be using steroids, and contributing to public efforts to raise awareness and reduce illegal steroid use.

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Examination

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ

1 = Very well 2 = Well 3 = Fairly 4 = Poorly 5 = Very poorly

How well was each course objective met?

11. Identify the "typical" user of anabolic-androgenic steroids, including the motivation behind use.	①	②	③	④	⑤
12. Trace the progression from the original 1970 Controlled Substances Act to the 2004 Anabolic Steroid Control Act and the intended impact of the legislation.	①	②	③	④	⑤
13. Describe the physiological mechanisms and effects of anabolic steroid use that may be perceived as beneficial.	①	②	③	④	⑤
14. Explain the elevated risks associated with supraphysiologic doses of anabolic steroids.	①	②	③	④	⑤
15. List the signs of anabolic steroid abuse in men and women.	①	②	③	④	⑤

1 = Very well 2 = Well 3 = Fairly 4 = Poorly 5 = Very poorly

Rate the effectiveness of how well the activity:

16. Related to your practice needs.	①	②	③	④	⑤
17. Will help you improve patient care.	①	②	③	④	⑤
18. Avoided commercial bias/influence.	①	②	③	④	⑤
19. How would you rate the overall quality of the material presented?	①	②	③	④	⑤

20. Your knowledge of the subject was increased: ◯ Greatly ◯ Somewhat ◯ Hardly

21. The difficulty of the course was: ◯ Complex ◯ Appropriate ◯ Basic

How long did it take to complete this course? _____ Suggested topics for future CE articles: _____

Comments on this course: _____

Please retain a copy for your records. Please print clearly.

You must choose and complete one of the following three identifier types:

① SS # ___ - __ - ____

② Last 4 digits of your SS # and date of birth ____ _____

③ State Code and License #: (Example: NY12345678) _____

First Name _____

Last Name _____

E-Mail _____

The following is your: ☐ Home Address ☐ Business Address

Business Name _____

Address _____

City _____ State ___ ZIP _____

Telephone # ___ - ___ - ____ Fax # ___ - ___ - ____

Profession: ☐ MD ☐ PA ☐ NP ☐ Other

Credit Requested (check one): ☐ .75 Hour Category 1 AMA PRA ☐ 1.0 Contact Hour by The NPA

Attestation: I attest to completing this CME activity. _____ Signature _____ Date

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TABLE 5

Internet Resources for Steroid Abuse Information

National Institute on Drug Abuse (NIDA)
www.drugabuse.gov

Anabolic Steroid Abuse, NIDA
www.steroidabuse.gov

ClubDrugs.gov, NIDA
www.clubdrugs.gov

US Drug Enforcement Agency
www.justthinktwice.com

Alcohol and Drug Information, US Department of Health and Human Services
www.health.org

(and to confirm other positive test results).[47] Collecting samples for testing on short notice appears to be the most effective way to discourage young athletes from using anabolic steroids.[45]

CONCLUSION

Steroid abuse education and prevention efforts, including drug testing among athletes at several levels, are vital. Although some progress has been made in reducing the reported prevalence of such illicit drug use, we must further this trend through more focused prevention efforts. Clinicians can play a vital role by sharing up-to-date information with patients and parents regarding the risks of steroid use. See Table 5 for sources of information on drug abuse prevention that can benefit health care providers, patients, parents, and teachers alike. **CR**

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