

Steroid abuse: a 'hidden' health hazard

Excessive anabolic steroid use has been a hard habit to break for Mr. A, despite resultant legal, physical, and mental problems. Keeping such patients in treatment poses a challenge to the clinician.

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INITIAL VISIT: ROAD RAGE OR 'ROID' RAGE?

Mr. A, 25, was arrested after police interrupted an altercation between him and a senior citizen at a stoplight. He had emerged from his car, walked over to the older driver in front of him, ripped open the car door, and pulled the man out of the car and onto the street. He was still yelling at the victim when a passing officer intervened.

Mr. A was charged with assault. After a plea bargain, he was sentenced to probation and fined. He had been seeing his probation officer every 2 weeks, but his parents were worried about his erratic and sometimes defiant behavior and insisted he see a psychiatrist. He reluctantly agreed to one consultation, largely because his parents threatened to withhold financial support if he failed to do so.

The first thing the psychiatrist noticed was Mr. A's striking muscular appearance. He was approximately 5 feet, 7 inches tall, weighed at least 200 pounds, and had a 30-inch waist and less than 10% body fat.

Dr. Carter's and Pope's observations

Mr. A's diagnosis should be suspected immediately upon his entering the office. Extensive anabolic steroid use produces body changes that can be diagnosed almost at a glance. It is virtually impossible to achieve a level of muscle mass comparable to what Mr. A exhibited without the use of anabolic steroids.¹

Remarkably, however, most people—including Mr. A's parents, law enforcement personnel, and even some members of the treatment team—failed to diagnose Mr. A's steroid use. He somehow convinced them that his extreme muscularity was the result of hard work, dedication, and scrupulous attention to diet. This suggests that steroid abuse cases involving serious violence—such as that of Mr. A—frequently go unreported and undiagnosed and are probably more common than we suspect.

Epidemiologic data suggest that clinicians should become familiar with the presentation of patients who are using anabolic steroids (*Box*).

EVALUATION: 'STACKING' UP

Mr. A at first vehemently denied that he had ever used anabolic steroids. After a more detailed conversation, during which the clinician demonstrated some knowledge of this area, Mr. A eventually conceded that he was taking a substantial weekly dose of the drugs at the time of the assault.

A subsequent clinical evaluation revealed that Mr. A had taken several ‘cycles’ (courses) of anabolic steroids over the last 2 to 3 years. Each cycle lasted 10 to 16 weeks and had been characterized by simultaneous use of two or more steroids, a practice known as ‘stacking.’

Mr. A started his first cycle with a modest ‘stack’ of drugs: testosterone cypionate, 200 mg twice a week, and stanozolol, 10 mg/d. Taken together, these dosages represented roughly 470 mg of testosterone equivalent per week—about 10 times the weekly secretion of testosterone in a normal male. He noticed no change in mood during this initial cycle.

With subsequent cycles, however, Mr. A became increasingly obsessed with his body image and used higher dosages. When the assault occurred, he was taking testosterone cypionate, 800 mg a week, nandrolone decanoate, 400 mg a week, and oxymetholone, 50 mg/d. With this regimen—the weekly equivalent of 1,550 mg of testosterone—Mr. A noticed prominent mood changes that met DSM-IV criteria for a manic episode. He experienced euphoria, dramatic irritability, limitless self-confidence, decreased need for sleep, distractibility, extreme recklessness (driving too fast, spending too freely), and some mildly paranoid ideation (without frank delusions). He admitted that he had twice assaulted his girlfriend and that he invariably became enraged at even the slightest annoyance when driving in traffic. He revealed that although the altercation with the older driver had led to his first arrest for ‘road rage,’ it was his third such incident.

The clinician warned Mr. A that continued steroid use could worsen his behavior—and lead to more serious trouble later on. Mr. A, however, said he was more afraid of losing muscle mass and becoming ‘small again.’ When the clinician mentioned that use of anabolic steroids without a prescription is illegal, Mr. A retorted that several of his friends had used the drugs without legal consequences.

Mr. A left the office showing no inclination to return for further treatment. The clinician could only offer to be available in the future.

ANABOLIC STEROID ABUSE: BEYOND THE GYM

The National Household Survey on Drug Abuse, which last assessed anabolic steroid use in 1994, estimated that about 1 million Americans had used anabolic steroids at some point, with 30% of those reporting use within the previous year. Among subjects who reported use within the last 3 years, the ratio of males to females was about 13 to 1.²

Clearly, anabolic steroid abuse is no longer exclusive to professional football players and other elite male athletes. In fact, more people appear to be using anabolic steroids to improve their physiques, rather than to enhance athletic performance.³ Evidence points to increasing use by adolescents, with one survey reporting current or past use by 6.6% of male high school seniors.⁴

What medical sequelae await Mr. A if he continues to abuse steroids? How would you convince him to stay in treatment?

Dr. Carter’s and Pope’s observations

Mr. A’s path to mania has been well demonstrated in the literature. Hypomania or even frank manic syndromes, sometimes associated with violent behavior, are rare at weekly doses of 300 mg of testosterone equivalent. At weekly doses of >1,000 mg, psychiatric syndromes such as hypomania or mania may occur in almost one-half of cases.⁵

If he continues to abuse anabolic steroids, however, Mr. A could experience adverse physical reactions ranging from embarrassing acne and male-pattern baldness (*Table 1*) to rare and life-threatening hepatic effects such as cholestatic jaundice and peliosis hepatitis (blood-filled cysts in the liver).

Table 1

ANABOLIC STEROID ABUSE: COMMON PHYSICAL FINDINGS

Hypertrophic muscularity, disproportionately in upper torso

- **Acne** on face, shoulders, and back
- Male-pattern **baldness**
- **Testicular atrophy** and gynecomastia in men

Clitoral enlargement, decreased breast size, hirsutism, and deepening of voice in women

Source: Adapted from Brower KJ. Anabolic steroid abuse and dependence. *Curr Psychiatry Rep* 2002;4:377-83.

The risk of atherosclerotic disease or prostate cancer later in life may also be greatly increased.

More common laboratory changes include:

- increased red blood cell count, hemoglobin and hematocrit
- elevated liver function readings (although these must not be confused with enzymes that originate from muscle tissue)
- and unfavorable changes in triglycerides, total cholesterol, and HDL:LDL cholesterol ratios ([Table 2](#)).

Other potential laboratory changes with steroid abuse include decreased luteinizing hormone and follicle-stimulating hormone due to feedback inhibition. Feedback inhibition will also reduce testosterone and estradiol levels with use of anabolic steroids other than testosterone esters. These levels, however, would both be elevated with use of testosterone esters alone.

In men, testicular atrophy and decreased sperm count are generally reversible manifestations of steroid abuse, whereas gynecomastia may be irreversible and require surgical intervention in advanced cases.^{3,6} Women who use anabolic steroids (such as for body-building) are vulnerable to disrupted menstrual cycles, decreased breast size, and masculinizing effects including enlarged clitoris, hirsutism, and deepening of the voice.⁶

In adolescents, anabolic steroid use may cause premature closure of the epiphyses, leading to shortened stature.³

Unfortunately, warnings about these many adverse effects rarely deter anabolic steroid users such as Mr. A or persuade them to continue in treatment of any type. Most young anabolic steroid abusers report that they have never felt significant adverse effects from steroid use and know of no one who has experienced such effects. The dramatic muscle gains they have witnessed in themselves and in other users decisively outweigh what they perceive to be remote threats of adverse consequences.

FOLLOW-UP: RETURN TO TREATMENT

We didn't hear from Mr. A until about 18 months later, when he unexpectedly requested a consultation.

Upon arrival, Mr. A exhibited major depression with prominent anhedonia, hypersomnia of 12 to 14 hours per night, loss of appetite, fatigue, prominent psychomotor retardation, feelings of guilt, difficulty concentrating, and suicidal thoughts (but without a frank plan). He also reported panic attacks that were randomly occurring each day, usually in public.

Mr. A conceded that he had experienced similar depressive episodes after stopping anabolic steroid use, but that they typically ran their course after 2 to 3 weeks. He said the present episode showed no sign of abating after nearly 2 months. He had attempted to 'treat' this episode by resuming anabolic steroid use, but he could not get an adequate supply from his dealer.

Mr. A's total testosterone level, measured in the morning when it should be near its diurnal peak, was 127 ng/dl (normal range is 270 to 1,070 ng/dl). Physical examination revealed that his testicles had shrunk to the size of marbles (each approximately 5 mm in diameter). He was referred to an endocrinologist for evaluation and was simultaneously started on fluoxetine, 20 mg/d.

• **Table 2**

LABORATORY ABNORMALITIES ASSOCIATED WITH ANABOLIC STEROID ABUSE

Elevated red blood cell count and hematocrit

- **Unfavorable** lipid profile changes
- **Changes** in LH, FSH, testosterone, and estradiol levels

Reduced sperm cell count

Source: Adapted from Brower KJ. Anabolic steroid abuse and dependence. *Curr Psychiatry Rep* 2002;4:377-83.

He returned 2 weeks later, exhibiting little improvement and wanting to resume steroids 'because it was the only thing that really helped.' Instead, he agreed to continue on fluoxetine and remain in follow-up. At 4 weeks, he noticed a decrease in panic attacks, return of normal mood, decreased anhedonia, and loss of suicidal ideation. He continued taking fluoxetine for another 3 months but then abruptly disappeared from treatment.

Mr. A resurfaced about 1 year later, revealing to the psychiatrist that he had taken yet another cycle of anabolic steroids, largely because he feared losing his muscle mass. His panic attacks had recurred almost immediately when he began tapering down from the peak of this cycle, and he agreed to resume taking fluoxetine.

A look at Mr. A's extended history may provide clues to his persistent anabolic steroid abuse problem. He had displayed prominent symptoms of conduct disorder as a child. He had been truant from school, had occasionally run away from home, and had been involved in several misdemeanors. While in high school, he typically drank 10 to 12 beers over a weekend and had experimented with hallucinogenic mushrooms and 3,4-methylenedioxymethamphetamine ('ecstasy').

He started weightlifting while in high school and by age 17 was visiting the gym every day. He began college on a football scholarship but dropped out after 1 year. Starting in his early 20s, he competed in several bodybuilding contests.

Despite his impressive muscularity, Mr. A was anxious about his body appearance. He often would not take off his shirt—even when at the beach or a swimming pool—for fear that he would appear too small. He sometimes wore heavy sweatpants in the sweltering heat to conceal his legs. He also admitted spending as much as 2 hours a day examining himself in the mirror. 'Sometimes when I get a bad (look at) myself, I will refuse to go out for the rest of the day,' he said.

Mr. A has had a succession of girlfriends, but his rigid commitment to diet and exercise invariably ended these relationships.

At this point, would you first address Mr. A's apparent substance use problem or the underlying body dysmorphic symptoms?

Dr. Carter's and Pope's observations

Two comorbidities noted here—substance abuse and body dysmorphic disorder—are common among anabolic steroid abusers. Addressing these problems, especially the body dysmorphic disorder, may sometimes help patients who are unwilling to address their steroid use directly. Body dysmorphic disorder may respond to selective serotonin reuptake inhibitors⁷ and cognitive-behavioral therapy.⁸

Anabolic steroids are not associated with immediate intoxicating effects, and ICD-10 categorizes them as substances not associated with dependence. After prolonged use at high doses, however, anabolic steroids are often associated with euphoria. Researchers also have found that some steroid abusers do meet DSM-IV criteria for substance dependence.⁶

Beyond the direct psychotropic effects of anabolic steroids, the depressive symptoms commonly seen during their withdrawal may perpetuate the dependence, as was the case with Mr. A. Most depressive symptoms that follow steroid cessation do not require drug therapy,³ but Mr. A developed severe and persistent depressive symptoms, complicated by panic disorder and body image concerns at a level diagnostic of body dysmorphic disorder. Such body image concerns often precipitate relapse into steroid use.

CONCLUSION: ANOTHER SETBACK

As of this writing, Mr. A is again lost to follow-up. After taking fluoxetine and keeping monthly appointments for about 6 months, he failed to arrive for a visit and did not set another appointment. The patient may have once again stopped medication and embarked on yet another cycle of anabolic steroid use. If this is so, we can only hope that he returns to treatment before it is too late.

Related resources

- National Institute on Drug Abuse (NIDA): SteroidAbuse.com. <http://www.steroidabuse.org/>
- NIDA Research Report: Anabolic Steroid Abuse. <http://www.nida.nih.gov/ResearchReports/Steroids/AnabolicSteroids.html>
- Lukas SE. *Steroids*. Hillside, NJ: Enslow Publishers, 1994.

Drug brand names

Fluoxetine • Prozac
Nandrolone decanoate • Deca-Durabolin
Oxymetholone • Anadrol
Stanozolol • Winstrol

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