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Performance-Enhancing Drugs on the Web: A Growing Public-Health Issue

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Abstract

Background and Objectives—Today’s Internet provides extensive “underground” guidelines for obtaining and using illicit substances, including especially anabolic-androgenic steroids (AAS) and other appearance- and performance-enhancing drugs (APEDs). We attempted to qualitatively characterize APED-related Internet sites.

Methods—We used relevant Internet search terms (e.g., “steroids bodybuilding” and “buy steroids online”), to assess 1) the numbers of site visitors; 2) offers of drugs for sale; and 3) the quality of online medical information. We also chose the examples of 4) “site-enhancing oils” and 5) “cattle implants” to illustrate the volume of available Internet information as compared with that in the medical literature.

Results—We found thousands of sites involving AAS and other APEDs. Most sites presented an unabashedly pro-drug position, often openly questioning the qualifications and motivations of mainstream medical practitioners. Offers of AAS and other APEDs for sale, together with medical advice of varying legitimacy, was widespread across sites. Importantly, many sites provided detailed guidelines for exotic forms of APED use, some likely associated with serious health risks, which are probably unknown to most practicing clinicians.

Conclusions and Scientific Significance—It seems important for practitioners to be aware of the extent of this “underground literature,” which may strongly influence their patients’ decisions about use and abuse of APEDs.

Introduction

The rise of the Internet has provided vast amounts of information, easily accessible to any computer user, about illicit drugs. Some of this material comes from government agencies, scientific publications, or other regulatory and educational sources. But a much larger amount appears on a myriad of privately created websites, online discussion groups, and forums. Many of the latter are openly sympathetic to illicit drugs, and provide thousands of pages of advice, unscreened for accuracy, on how to obtain and use these substances. We previously examined this issue for the case of hallucinogens,¹ and found that the Internet provided a huge reservoir of information on how to purchase, synthesize, extract, identify, and ingest hallucinogens. Importantly, much of this information extended well beyond that covered in medical articles or textbooks. Over the last decade, various studies have explored material involving other drugs on the Internet, including psychedelic drugs,² ecstasy

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Conflicts of Interest

Dr. Pope has provided expert testimony in legal cases involving anabolic-androgenic steroids on five occasions in the last three years. Dr. Pope declares no other conflicts of interest. The other authors declare that they have no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

(MDMA),³ cannabis,⁴ and new designer drugs.^{5,6} Collectively, these investigations have demonstrated that the Internet provides ordinary people with entire new realms of drug information, of widely varying accuracy, and has redefined the relationships among those who warn of the hazards of drugs, those who advocate or sell drugs, and those who take them.⁷

For the present article we surveyed Internet coverage of another group of substances: anabolic-androgenic steroids (AAS) and other appearance- and performance-enhancing drugs (APEDs) – substances used to improve body appearance or athletic performance.⁸⁻¹⁰ Although several recent investigators have utilized the Internet to perform online surveys of APED users,^{9,11-14} these studies have typically not described the actual Internet sites used to recruit survey participants. Therefore, for this paper, we sought to provide a brief picture of the Internet sites associated with APED use.

Methods

Using the Google search engine, we searched for APED-related sites and tracked the approximate numbers of sites identified by selected search terms (see Table 1). We then navigated within major sites (those appearing within the top 20 links generated by our search queries) and used links provided by those sites to obtain details about 1) the numbers of site visitors; 2) offers of AAS and other APEDs for sale; and 3) the quality of online medical information and advice regarding APED's. We then selected two of the more exotic examples of APED use, namely 4) *site enhancing oils* and 5) *cattle implants*, to illustrate the extensive “underground” Internet coverage of topics barely recognized in the published medical literature.

This study involved no human subjects and was based entirely on material posted on Internet sites in the public domain. Thus human studies committee approval was not required for the project. We would note in passing, however, that one reviewer of this manuscript reported acquiring a computer virus upon opening an AAS-related site. Thus readers should be cautioned that despite the absence of human risk, our methods may involve risk to computers.

Results

The magnitude of Internet coverage

We found many thousands of webpages involving AAS and other APED's (Table 1). A few websites, mostly from official sources such as the United States National Institute on Drug Abuse, focused on side effects and dangers of illicit AAS use (e.g., www.drugabuse.gov/infacts/steroids.html, www.medicinenet.com/anabolic_steroid_abuse/article.htm, www.deadiversion.usdoj.gov/drugs_concern/anabolic.pdf). Some additional sites provided essentially neutral comments (e.g. news stories about athletes using steroids). However, a large majority of the sites provided information that appeared openly sympathetic to use of AAS and other APEDs. The biggest sites typically included thousands of individual pages, and showed evidence of very heavy access. For example, www.steroid.com typically showed more than 14,000 individuals currently online at any given time, and listed more than 176,000 total members in its “steroids.com forums.” The site isteroids.com recently listed 697,571 posts and 133,653 members on its discussion forum, with more than 3500 individuals online at a given time. Although we could not verify these specific membership numbers, the size and sophistication of these and other sites clearly suggested large operations.

Drugs for sale

We found thousands of Internet sites offering AAS and other drugs for sale without a prescription. Many sites offered disclaimers indicating that they were not endorsing the sale of AAS to individuals in countries where they were illegal, or even stating explicitly that it was illegal for private individuals to import AAS into countries such as the United States and many countries in Western Europe. Despite these caveats, many sites provided multiple options for purchasing AAS by mail from overseas. Of course potential purchasers might question whether these sites would actually ship genuine AAS in return for their money. But in response to this issue, we easily found discussion forums that allowed users to exchange information about which sites were reliable and which were not, together with information about how to identify potentially counterfeit AAS (e.g. www.bodybuildingdungeon.com/forums/fake-steroids).

The Internet marketplace for AAS was recently tested by the United States Government Accountability Office, where federal investigators placed 22 orders for AAS on various websites using a credit card, and received genuine AAS in the mail in response to 10 of these orders.¹⁵ Another recent example of Internet AAS purchases appears in the 1500-page manifesto of the Norwegian terrorist Anders Breivik, charged with killing 77 civilians in Oslo and Utøya, Norway, on July 22, 2011.¹⁶ Breivik explains how he used an Internet vendor to obtain the AAS Winstrol (stanozolol) and DBOL (presumably methandrostenolone) in preparation for his attacks, and even details the methods used by the vendor to disguise the drugs to avoid detection when the package passed through customs.

Online “medical” information

Numerous sites offered medical information, of widely varying quality, about the effects and side effects of AAS and other APEDs. Some sites provided balanced presentations, complete with citations to peer-reviewed articles in the literature. Many other sites, however, implied that AAS were safe, and that the dangers of these drugs were grossly exaggerated by incompetent physicians, biased scientists, and government bureaucrats. Despite this pro-drug bias, the sites often provided detailed and relatively accurate medical information regarding side effects of AAS, such as gynecomastia (e.g., www.steroid.com/Gynecomastia.php), hypogonadism caused by AAS suppression of the hypothalamic-pituitary-testicular axis (e.g., www.uk-muscle.co.uk/steroid-testosterone-information/102444-famous-power-pct-program-dr-michael-scally.html), or abscesses developing from nonsterile AAS injections (e.g., www.mesomorphosis.com/articles/haycock/anabolic-steroid-injections-and-abscesses.htm). This information rarely seemed intended to deter individuals from using AAS, but instead to help users to minimize or treat potential side effects. Indeed, AAS users frequently used discussion forums to ask about medical issues, and often received abundant detailed responses from other forum members – effectively allowing novice AAS users to take the drugs under quasi-medical “supervision.”

The Internet vs. the medical literature: Site-enhancing oils

Underground Internet coverage of APED’s often extended far beyond information available in the medical literature, with detailed coverage of topics probably unknown to most practicing clinicians. One example among many is the topic of “site-enhancing oils,” generally referred to as “synthol.” These oils have no performance-enhancing effects, but are simply injected into selected muscles causing their size to appear inflated. Using the simple search term “synthol,” we found thousands of webpages offering detailed instructions on to how to inject the oils into selected muscles (e.g., www.professionalmuscle.com/forums/articles-forum/205-site-enhancing-oils-synthol-how-guide.html; www.howtodoinjections.com/IM/bis.html). This process may require a massive number of injections. For even a single muscle, some sites recommended separate injections

of the oil into each head of the muscle, every day for 30 consecutive days, to achieve the desired effect. This practice can inflate muscles far beyond their natural size, allowing some men to become so-called “synthol freaks” with absurdly inflated muscles – as abundantly illustrated on various Internet sites picturing purported synthol users (e.g., <http://acidcow.com/pics/5770-victims-of-synthol-53-pics.html>).

This widespread practice of performing hundreds of oil injections into various muscles has clear dangers, including abscess formation or nerve damage from improper injecting techniques and risk of embolism from inadvertent intravascular administration of the oil.¹⁷ Remarkably, however, we could find only a single published scientific article on synthol abuse, and this paper is in Polish.¹⁷

The Internet vs. the medical literature: Cattle implants

Another form of APED use, abundantly documented on the Internet but barely mentioned in the medical literature, is the use of cattle implants – devices containing anabolic drugs, such as the AAS trenbolone, that are implanted into a cow’s ear to stimulate muscle growth and meat production.¹⁸ Cattle implants typically include estrogens in conjunction with AAS, making them unsuitable for human bodybuilding as originally supplied. However, we found thousands of webpages offering detailed recipes for removing the estrogenic compounds from cattle implants to make them suitable for human AAS users (e.g., http://www.anabolicextreme.com/archives/anex_archives_issue3_catimplant1.htm, <http://healthknowledge.org/fitness-bodybuilding/87258>). Although cattle implants are designed purely for veterinary use, they likely represent a significant source of AAS that can be obtained with low risk of apprehension. In all of the scientific literature, we are aware of only a single poster presentation¹⁹ that has described this underground practice.

Discussion

We surveyed Internet sites involving anabolic-androgenic steroids (AAS) and other appearance- and performance-enhancing drugs (APEDs). Our findings were largely qualitative, since much of this material does not easily admit to quantitative analyses- and this must be acknowledged as a limitation of our study. Nevertheless, we found that AAS command a huge Internet presence, probably even more extensive than that found in our earlier investigation of hallucinogens on the Internet.¹ Indeed, our observations suggest that among the various classes of illicit drugs, AAS may be particularly adapted to the Internet. One reason for this, as noted above, is that many individuals want guidance for using AAS. By contrast, few individuals seek Internet guidance for using hedonic drugs such as alcohol or cocaine. But if one’s intentions go beyond the hedonic – i.e., to obtain religious insight with hallucinogens or to optimize muscle gains with AAS – one may be more likely to seek advice, and to share that information with others. A second reason for the AAS Internet presence is financial: not only did many websites contain advertisements offering to sell AAS and other potentially illegal substances, but most websites also carried extensive advertising for various legal bodybuilding or weight loss supplements as well. Importantly, even though AAS are illegal without a prescription in the United States and much of Western Europe, these drugs are available over-the-counter in some other countries. Now, if a drug is almost universally illegal (e.g., heroin), then users and sellers of the drug will likely keep a low profile. But in the case of AAS, sellers may be located in a country where AAS are legal, and hence can disclose themselves more readily – though their web presence penetrates other countries where non-prescription AAS use is illegal.

We are aware of one other recent study that has examined AAS-related websites.²⁰ These authors analyzed 30 major websites selected specifically because they offered AAS for sale, and noted that most offered other licit and illicit APEDs for sale as well, sometimes

including preparations that were almost certainly fraudulent (e.g. purported AAS preparations that likely contained no genuine AAS at all). Notably, the sites typically described few adverse AAS effects, seldom reported toxicity, and recommended doses markedly higher than current medical recommendations. The authors cautioned about the potential public health consequences of this often-misleading information.

Our present survey used broader criteria than the above study, and thus yielded a broader spectrum of websites, including even some that provided balanced, scientifically documented, cautionary presentations. But in congruence with the findings of the above investigators, we found that many sites provided strident pro-drug messages, often accusing the medical and regulatory establishments of biased and conspiratorial motives. In addition, we also found that Internet information often extended well beyond that available in the published scientific literature, sometimes describing hazardous techniques of illicit drug use that are likely unknown to most practicing clinicians. Thus, addiction treatment professionals, and indeed health providers in general, should at least be aware of the extent of this online “underground” information, since it may strongly influence their patients’ decisions about use and abuse of APEDs.

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Table 1

Number of results generated by representative search terms, using the Google search engine, as of December 22, 2011

Search term	Number of sites
“Steroids for sale”	328,000
“Buy steroids online”	266,000
“Steroids online”	104,000
Steroids bodybuilding	603,000
“Steroids forum”	193,000
“Growth hormone bodybuilding”	277,000
“Buy growth hormone online”	184,000
“Cattle implants” bodybuilding	4,680
“Synthol”	310,000