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REVIEW

ANDROGENIC-ANABOLIC STEROIDS AND BODY DYSMORPHIA IN YOUNG MEN

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Abstract—There has recently been increasing attention focused on the use of androgenic-anabolic steroids (AAS). Some research has suggested that a disturbance in body image in males leads to AAS use. At present, the available literature is sparse and there is little/no discussion on the causal factors for their use. This review gives a historical account of the development and the changing patterns of AAS use. Both the physical and psychological side-effects are presented. The available evidence and theories for external/social and internal, psychological, and developmental influences are discussed in relation to AAS use. The current trends for the treatment of AAS abusers are also presented. Recommendations regarding further research are made in the conclusions. © 1997 Elsevier Science Inc.

Keywords: Androgenic-anabolic steroids; Body image; Gender development.

INTRODUCTION

Over recent years there has been increasing awareness and reporting of androgenic-anabolic steroids (AAS) use by sportsmen and women. It is generally accepted within the literature that the main users of AAS are body-builders, predominantly male, but also female. It is alleged that 75% of those attending body building competitions are taking AAS [1]. More recently, evidence of steroid use in the general, non-sports population has emerged. It has also been reported that, in the U.S., over half a million high school children are currently taking AAS for non-medical purposes [2].

There is much speculation as to the extent of AAS use in various populations. Those examined in the U.S. include: high school children, students, and college and professional athletes. The majority of the data and evidence presented in the past have been anecdotal, especially data from groups of sportsmen and women. It is difficult, therefore, to make an informed estimate of the level of use. However, it has been suggested that, in the U.S., 4–11% of males and 0.5–2.5% of females have tried AAS, and 75% of users began using in college [3]. A further estimate of the annual per capita spending of AAS users has been put at between approximately \$90 and \$6780. This puts the annual national spending on AAS at \$500 million in 1993 [4]. It is generally accepted that between 80% and 100% of national and international-

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level body-builders, weight-lifters, and field athletes use AAS [5]. This implies that many young people are taking unprescribed steroids and that these may be illicit and unsafe.

Why are apparently healthy young people taking steroids? A recent study by Pope et al. [6] suggests that one explanation could be a disorder that they refer to as “reverse anorexia”; this being the fear of having a small and weak physique even when large and muscular. They suggested that this disorder may be a disturbance of body image or even a body dysmorphic disorder. They cite causes such as cultural expectations, societal pressures, a gym subculture, media imagery, and Hollywood publicity. Most importantly they suggest that “reverse anorexia” leads to AAS use. However, no firm evidence has been presented to support this relationship.

The majority of the research into AAS use has been conducted in the U.S., so the extent of the problem elsewhere is largely unknown. As will emerge from this review, many studies have discussed the effects of AAS use and some have hinted at causal factors. None have discussed the possible external/social and internal/developmental influences which may prove fundamental in increasing our understanding of this population and phenomenon.

The aims of this study are to:

1. Give a historical account of the development of AAS use and observe how prevalence and patterns of use have changed.
2. Present together the physical and psychological side effects of AAS use.
3. Consider some of the external causes cited for an increase in AAS use and determine if they are as influential as suggested.
4. Present some of the psychological and developmental issues of body image and self-esteem that have not previously been considered in relation to AAS use.
5. Present the current trends for the treatment for AAS abusers.

THE HISTORY OF ANDROGENIC-ANABOLIC STEROID USE AND ABUSE

There are three general classes of AAS: oral androgenic steroids; structured agents, which include testosterone esters (injectable); and, finally, the 19 nortestosterone derivatives. All are available by prescription but are more commonly found on the black market [7]. AAS are derived from testosterone, first made synthetically in the 1930's. Legitimate medical uses include the treatment for breast cancer, aplastic anemia, edema, the promotion of growth in delayed puberty in males, and in treatment of Turner's syndrome in females [7, 8].

In the 1950s weight-lifters began to use synthetic testosterone as a way of gaining greater size and strength beyond that achievable by weight training alone. This usage spread to other “strength” sports such as American football and track and field events [9]. Bierly [10] reported that, in the 1956 Olympics, many of the “strength” athletes used oral AAS. It was only at the 1976 Summer Games that AAS were first included on the banned substances list by the International Olympic Committee. Detection methods were successfully introduced in 1983, and by 1987 the National Football League was also considering testing. Fuller [11] noted that AAS were being taken in non-physical strength sports such as badminton and volleyball. LaBree

[12] suggested further changes in the type of user from athletes and body builders, to high school athletes, and also a proportion of non-sports users who simply wanted to improve their appearance and self-worth. He has questioned the effectiveness with which policies against AAS use are being enforced. The significant financial enticement for athletic achievement may lead to ambivalence about drug use and stringency of testing. Perry and Hughes [13] reported on the increasing use of drugs wrongly believed to be AAS. This, they argued, may pose a greater danger than the effects of AAS. In 1990, the Steroid Trafficking Act became part of legislation in the U.S., and by 1993 steroids were classified as Schedule II controlled substances carrying a similar penalty for dealing as cocaine.

Nonprescribed AAS users structure their doses to maximize the anabolic effects (i.e., skeletal muscle building) but minimize the risk of detection. The two ways of doing this are referred to as "stacking" and "pyramiding." Stacking is more common, involving taking two or more different drugs, mixing injectable, oral, and illicit veterinary AAS [14]. Pyramiding involves beginning at a low dose and then slowly increasing the doses of the different drugs until competition day. Drugs are taken in "cycles." A cycle tends to be 4–12 weeks on, and 4–12 weeks off, and is scheduled with respect to competition dates. It would appear that athletes are becoming experts in balancing their AAS doses. Successful body-builders, through stacking and pyramiding, can take over 1000 times the clinically recommended dose of AAS [15].

The denial exhibited by the AAS user is typical of the drug abuser in general [8]. However, in the case of AAS there are the added arguments of a commitment to the sport and the fact that "everyone is doing it." Terney and McLain [16] argues that we have an "... as yet unappreciated drug problem amongst our adolescents." Evidence of needle sharing and a resulting AIDS case in the AAS population have also been reported [17, 18]. Other parallels with the traditional drug-abuse culture include dependence and withdrawal syndromes consistent with DSM-III-R criteria [3, 4, 19–22]. Symptoms noted on withdrawal from AAS include: tolerance, loss of control, depression, fatigue, restlessness, loss of appetite, insomnia, decreased libido, and headaches. Although it has been suggested that dependence syndrome develops in approximately 14–57% of cases [21] as yet very few data are available.

There is a great deal of pressure placed upon sports coaches to supply AAS so that team members are not using street drugs which risk being contaminated [12]. Athletes now appear to be taking drugs capable of masking the detection of AAS use and therefore rigorous testing is encouraging the use of potentially more toxic drugs [23].

WHAT ARE THE EFFECTS OF TAKING AAS?

Physical effects

The reported effects of AAS use, both positive and negative, are considered to be both variable and transient and dependent upon the type and dose of drug. The effects have also been noted to abate once use has been discontinued [24]. There is no study of the long-term effects of AAS abuse.

The desired physical effect of AAS is to increase the synthesis of protein in skeletal muscle, promote nitrogen retention, and increase lean body mass. This is especially true in experienced weight trainers when they are performing high-intensity

work combined with a high protein diet [10, 25, 26]. When used in the young to promote growth, AAS can also lead to premature closure of the growth plates and hence stunted growth [27, 28]. Although muscle mass may increase, bones and tendons are unaffected and as a result tendons can be torn and bones broken due to the sudden overload of the musculoskeletal system. Other physical effects include increased sex drive and appetite and a decrease in pain tolerance [15].

Psychological effects

Uzych [29] has reviewed the psychological effects on users and concludes that the data are often inconsistent and inconclusive. One clear and consistent finding, however, are the associations between AAS use and increased aggression, and a decrease in the tolerance of frustration or poor performance especially in situations which involve provocation [15, 27, 30]. The typical aggression produced by AAS has coined the term "roid rages" among users [11]. Other psychological side-effects noted include: acute psychotic symptoms, such as hallucinations and delusions [27, 31, 32]; mania and hypomania [29, 33]; increased confidence; surges in self-esteem; and elevation in mood and a sense of invulnerability [15,27]. Depressive symptoms have also been noted on withdrawal [13]. Some psychological effects could be construed as relating to athletic abilities; that is, a reduction in anxiety which may effect performance, enhanced attention, and concentration and the development of a more competitive attitude [34].

The majority of available research is based on therapeutic doses of AAS and as yet no research has looked at the effects on those who are stacking and/or pyramiding. A few AAS abusers have been seen by clinical psychologists and guidelines to their assessment and treatment are available. It has been recommended that there be increased vigilance to the possibilities of AAS use, especially when working with those for whom anger control is an issue [18].

Effects on mood and behavior

Changes in mood and behavior as a result of AAS use have also been noted. Looking at the acute effects, individuals show an increase in both positive and negative moods; that is, euphoria and irritability [35]. The incidence of violent crimes while individuals were using AAS has also been reported [31, 36], and physical abuse of, for example, wives, is not uncommon [27]. Choi et al. [30, 37] reported on cases of violent assault and one case of attempted murder, purported to have been related to AAS use. She argued that these behavioral effects subside on withdrawal of the drug. It is interesting to note that, after having publicized this type of AAS-related problem, the researchers reported being approached by lawyers who had cases currently or in the past in which they felt that AAS use was a contributory factor to a violent crime [36].

Adverse effects

Adverse effects from AAS use in therapeutic doses include: glucose intolerance; insulin resistance; an increased risk of cardiovascular disease; atrophy of the testicles; prostate cancer; and impairment of thyroid functioning [38-43]. There is no evidence, as yet, to suggest that athletes are any less susceptible than those on therapeutic doses and adverse effects first seen in the U.S. are beginning to be observed

in the U.K. [18]. Johnson [44] noted that the younger the AAS user is, the worse these adverse effects can be. Primate studies on the effects of AAS have found that the drug can disrupt the social milieu to the extent that dominant animals become more so by an increase in aggression [45, 46].

WHAT ARE THE EXTERNAL CAUSES WHICH MAY HAVE AN INFLUENCE ON AN INCREASE IN AAS USE?

Yesalis [47] argued that, it is our social fixation on winning and physical appearance which has led to a demand for AAS. Evidence of sportsmen and women being caught by drug tests is testimony to both to the extent and effectiveness of their use: The most memorable example probably being the Ben Johnson 1988 Olympic 100 meters victory and subsequent disqualification. AAS use as an occupational aid among personal trainers in the U.S. has also been observed [48]. They need to look good to secure and maintain clients. Their income is based upon how they look and how they are perceived as looking. Throughout the literature the assertion is made that more and more young people are using AAS simply to look good [1, 2, 7, 9, 12, 15, 16, 18, 27, 34, 47, 49–51].

There appear to be two worlds of use; those using the drug for athletic or appearance reasons and the legal and prescribed uses of the medical world [52]. “Guys want to look good at the beach. High school kids think steroids enhance their ability to get an athletic scholarship, play professional sports or win the girl of their heart” [53]. It is possible that the numbers of those who want to enhance their appearance has risen due to a perception of success attributable to an “attractive” body. It is also increasingly acceptable for women to have muscular bodies. The success of the “Gladiators” TV program and the preponderance of exercise videos highlight this.

Current trends in the U.S. may reinforce these ideals and preoccupation with shape and weight [9]. Gender differences reflect differing social expectations: for women it is beauty and thinness, and the increasing acceptability of a lean and muscular look. For men it is athletic prowess. If they want to achieve this then the obvious method is to increase muscular size and strength.

There have been major changes in media presentations of the male physique over the last 50 years [54]. The physical proportions of the muscular icons have changed from types such as Victor Mature and Charles Atlas (the physical specimens of their day), to Arnold Schwarzenegger and Sylvester Stallone today. This change in physicality surely cannot constitute pure evolutionary development. Goldstein [54] suggested that muscular strength and development is basic to the male mentality and sexual attractiveness.

WHAT ARE THE PSYCHOLOGICAL AND DEVELOPMENTAL CAUSES WHICH MAY HAVE AN INFLUENCE ON AN INCREASE IN AAS USE?

“The degree to which body satisfaction is a component of general self-esteem is doubtless related to the importance individuals place on physical appearance” [55]. Cultural attitudes towards both the male and female body have changed, as have fashions, over the years. In men “. . . the desire for a muscular, mesomorphic phy-

sique is at its strongest just now" [56]. The increasingly closer relationship between men, body strength, and AAS use has not, however, been clearly examined [9].

Erickson [57] argued that the development of the complex self-concept and body image are "inexorably related." The body is the source of identity and the adolescent forms a new identity through the positive acceptance of their mature body from past and present biological, psychological, and sociocultural experiences. "Females tend to view their bodies primarily as a means of attracting others whilst males tend to view their bodies primarily as a means of effectively operating on the external environment" [57]. As a result of this assertion concerning body functioning there are different consequences suggested for body image and self-concept in males and females [58].

Research into appearance anxiety is mainly focused on women [55]. The rise of the gym culture highlights an increased interest in the mesomorph. Could the rise of this new culture lead men to focus more upon the discrepancies between themselves and the ideal? It has been suggested that underweight males have a negative self-image and poor social adjustment. As a result they perceive themselves as less adequate in the social marketplace [59]. Research suggests that males who mature early are most satisfied with their height and weight [60]. A negative self-evaluation of personal attractiveness has been identified in those as young as 9–12 years [61]. Do young and adolescent men, therefore, yearn to achieve maturity at a young age so as to establish themselves in the "market place"? Anderson and DiDomenico [62] hypothesized that the "gender related reinforcement" of the media promotes the different ideals: thinness for women, and the mesomorph for men. Beyond this I would also suggest that the media and the general public reward these physical examples with sponsorship contracts, jobs, money, and success, so the incentive is twofold; to look good and be successful via your body.

It has been argued that self-esteem may be directly related to the perceived size, shape, and attractiveness of one's body [25]. Many men use AAS to overcome natural limitations or to speed up the process of "bulking up." Those not involved in sport, the "look gooders," do not have an event or athletic career as a goal. Rather, their aim is to overcome physical, psychological, emotional, and social limitations and especially low self-esteem.

Body image has long been a subject of research and most individuals are found to be unhappy in some way with their body. Generally women want to be 7 lb lighter, have smaller hips and waists, thinner arms and legs, and to have smaller noses. Men, however, want to be 3 lb heavier, taller, have wider shoulders, thicker arms and legs, to have larger chins, and smaller ears. Both want to have larger chests. On the whole it is concluded that men are dissatisfied with themselves from the waist up and apart from their chest women are dissatisfied with their bodies from the waist down [63]. These findings are consistent across the research [9, 64, 65], and they also correspond to the physical attributes we rate highly in the opposite sex [66]. The pressure to look "good" appears to be both internal and external. In women this pressure has been considered to contribute to the development of eating disorders [67]. In men, and a smaller proportion of women, it may be contributing to the use of AAS.

It has been asserted that men's worth is based upon career achievements rather than on physical attractiveness [68]. Also, women who are liberated from the tradi-

tional sex roles and expectations do not place such dependency upon body image for their feelings of worth and well being [69]. Although this would appear to make logical sense the research does not back this up, at least not for adolescents.

Adolescence is the age at which the development and maintenance of physical health care behaviors is the major task [70]. Combined with this is the development of self-esteem, self-identity, and psychological well being. All in all it is a time of great personal change, and factors which are around to effect the development of these attributes may be of great influence on the individual. The lure of "winning" and looking good are very powerful at any age and especially so in adolescence and to men. As noted earlier [47], the fixation that we have for winning is leading to the use of AAS. Personal and peer values and expectations need to be considered in the understanding of adolescent AAS use as these drugs have potential effects upon social status and peer perceptions.

ANDROGENIC-ANABOLIC STEROID ABUSE AND TREATMENT

Some take the stance that AAS have the same psychologically addictive status as other drugs and so treatment should be in accordance with the addictions model [3]. In looking at the natural history of abuse, Goldstein [54] suggested that there are three stages. First, *exploration*, during which the individual may be attending the gym to improve his physique either for sport or appearance reasons. It is here that he may be exposed to other users who not only exhibit the desirable effects of AAS, but also have the drugs available. Undoubtedly a tempting and persuasive option to one who is unhappy with their body. Second, *continuing*, in this phase habitual use develops through the addictive nature of the drug. The habitual nature of the workout boosts positive self-esteem, [71], accompanied by the evidence that the desired masculinity and strength is being achieved. The attention of the gym culture and women add to the feeling of well being. The psychological effects of euphoria and increased self-esteem help to maintain use and the negative effects of low mood on withdrawal delay cessation. The final stage, *cessation*, tends to occur without help. Either the person "matures out" and opts for the more traditional sources of self-esteem, such as career and marriage, or the development of more serious health problems leads to cessation.

As yet few AAS abusers have presented for psychological treatment. Diagnosis using DSM-III-R criteria and treatment of the patient accordingly has been suggested. However, "... psychological understanding of the client is critical, regardless of the diagnosis or treatment" [23]. This supports the idea that self-perception may be implicated in the use of the drug. As part of the counseling for withdrawal, attention must be given to the fact that many users have a great deal invested in body image and so the focus needs to be on accepting the alternatives. An important psychological issue in rehabilitation, therefore, is the identification of the physical attributes for self-esteem and the seeking of alternative sources of self-esteem. This type of approach has been implicated in the treatment of eating disorders in women [72]. Cognitive-behavioral treatment strategies and consideration of the possible presence of a narcissistic personality disorder have also been presented as important factors in the conceptualization and treatment of the AAS abuser [73, 74].

CONCLUSIONS

Although the data are somewhat sketchy and often anecdotal, from a historical perspective, AAS use and abuse is increasing in the male population from the time of adolescence and beyond. Its use has spread beyond that of body-builders to non-strength sports where competition and its rewards have increased. More recently those who are simply dissatisfied with their physique are reported to be using these drugs.

Although the effects of increased skeletal muscle and athletic performance are desirable, the accompanying physical, psychological, and behavioral side effects are often far more dramatic and potentially damaging. However, it could be asserted that some of these effects may be acceptable to those who desire an increase in confidence and self-esteem.

It is fair to say that there are considerable pressures put upon adolescent males, both of an internal and an external nature. Added to this there appears to be a good deal of evidence in the form of social, developmental, and peer pressure to support the view that anxiety concerning body image in males can and does exist. The media presentation of the desired physique for both men and women has changed over the last 50 years or so. It has been noted that these images may have some effect on the development of eating disorders in women. The literature concerning men, body image, and AAS use would seem to support the view of the genesis of a similar "reverse" problem in men where the response to anxiety concerning body image could be to take AAS. Again, it could be argued that the physical changes and the accompanying psychological effects of increased confidence, self-esteem, and elevation in mood may be the key factors in supporting and continuing AAS use in men with distorted body images. The clinical approach suggested so far also tends toward the view that body dysmorphia is an issue which requires consideration in the assessment and treatment of such patients.

At present there are some considerable gaps in the research, namely, there are no clear and accurate prevalence rates in athletic and nonathletic populations. No epidemiological data exist. The effects of social and psychological factors in AAS use in individuals have often been proposed but never clearly examined. In carrying out this review only one controlled study of AAS use could be identified [75]. A clearer medical understanding of the effects upon those taking massive and mixed doses of AAS is needed. Also, knowledge of the long term-effects is lacking at present. In short there is a population of drug users and as a result a potential clinical population which has not yet been adequately explored. We still have neither a theory for the onset of AAS abuse nor sufficient knowledge of the short- or long-term effects of their illicit use.

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