

Ethical Considerations
Regarding Anabolic-Androgenic Steroid Use
Emphasis on the Exercise Professional

by

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Abstract The use of anabolic-androgenic steroids (AAS) as a means to improve athletic performance is not a novel idea in the realm of exercise physiology, strength and conditioning, or sports medicine. The article briefly overviews the mechanisms and reasons for the use of AAS in sport, but its main purpose is to explore the moral arguments for and against the use of such ergogenic aids. The role of the medical care provider is emphasized with respect to the athlete's decision whether or not to use AAS for sport performance enhancement.

Keywords: anabolic-androgenic steroids, ergogenic aids, ethics, morals

Background

Anabolic-androgenic steroids (AAS) are synthetic drugs that mimic the effects of the male hormone testosterone (1). Although there are legitimate medical applications for AAS, they are sometimes used by athletes as an ergogenic aid to improve performance and/or physique (1). They are nearly always used in conjunction with resistance training, and by athletes who are involved in sports that emphasize power production. Alarming, there have been increasing reports of AAS use by people who desire to use the drugs' muscle-building effects to enhance their physical appearance (1-3, 5). It appears that these drugs, whose use was limited to elite and professional athletes, are now making their way into the training regimes of high school and college students (1, 2, 4). Also, AAS use is no longer limited to a predominately male population, with females becoming increasingly more involved in using AAS (5).

The exact physiological mechanism of AAS is not well understood. It is thought that there are three physiologic pathways for AAS to act. First, these drugs cause increased protein synthesis in cells that are sensitive to AAS. Second, AAS provide an anti-catabolic effect by decreasing the effects of catabolic hormones released secondary to intense exercise. Finally, AAS are thought to help increase nitrogen retention, an indicator of protein synthesis, by shifting to a positive nitrogen balance, thus making better utilization of ingested protein in the cellular environment (1).

Recent evidence suggests that one myotrophic action of AAS *in vivo* is to increase the number of myonuclei, which occurs in skeletal muscle fibers through the enlistment of nearby satellite cells that are developmentally residual muscle precursors (6). Previous research has shown regulatory effects of anabolic steroids on satellite cells in *in vitro* (7). Greater satellite cell activity leads to greater fusion of nuclei with muscle cells, the end result of which being more nuclei to direct protein synthesis and to maintain a more favorable nucleus-to-volume ratio (6). Normally, muscle growth potential has a ceiling described as the nucleus-to-volume ratio (aka DNA unit or nuclear domain), which recognizes that a nucleus can reliably sustain a limited volume of cell (6). Because myonuclei persist until near the point of cell death (8), once incorporated, the additional nuclei may be a permanent cellular fixture in healthy myocytes.

AAS have been shown in some studies to have serious consequences associated with their use under certain circumstances. Traditionally, general side effects of AAS for sports enhancement have been thought to include:

- Physiological dependence
- Psychological changes
- Blood lipid profile changes
- Elevated blood pressure
- Cardiac myopathy
- Liver disease/cancer
- Increased body hair
- Increased libido
- Increased acne (2, 5, 9).

Gynomastinoma, testicular atrophy, and priapism may occur specifically in men (9). Women may experience masculinization and clitoral enlargement secondary to AAS use (2, 5). Pre-adolescents may experience early musculoskeletal maturity, including premature closure of the growth plates (2, 5, 10). Some AAS-induced side effects may not be reversible, and many, such as liver disease/cancer and cardiomyopathy, may develop later in life years after the AAS use has ceased (5, 10). Some of these effects are socially disabling while others are life threatening. In either event, the side effects can be a high price to pay for the benefits associated with AAS use. Although there is evidence to substantiate the occurrence of certain alleged AAS side effects, some authors claim that AAS side effects have traditionally been distorted and overstated (11, 12).

Perhaps surprisingly, the refereed literature is historically unclear whether AAS actually enhance athletic performance. Until recently, most impressions of improved performance and appearance of AAS users were based primarily on anecdotal evidence instead of controlled research (9). Authorities now recognize that many early clinical studies of AAS were methodologically flawed, and that subsequent well-controlled studies have demonstrated enhanced body composition following AAS administration (i.e., increased lean body mass and decreased fat mass) (12-14). Bhasin's landmark study in 1996 demonstrated increased lean body mass and strength in individuals involved in both training and non-training conditions who administered AAS (15). It is noteworthy that no side effects were reported as a result of the 10-week intervention. Until Bhasin's study, it was thought that there must be four concurrent conditions present for AAS to improve athletic performance (16):

- AAS must be administered to previously trained athletes during training (16).
- The AAS administration must be concurrent with a high protein/calorie diet (16).
- Sensitive techniques for measuring strength must be utilized (16).
- The AAS must be administered for prolonged periods of time (4.5 months) in order to measure significant training effects (9, 16).

Although it appears that the number of AAS users is decreasing according to some sources, it is important to realize that AAS are still being used (17). Secondary to the

persistent use of AAS, it is imperative that healthcare practitioners and exercise professionals be prepared to recognize and address treating a patient for a condition while he/she may be concurrently using AAS. This is especially true if the patient is involved in a sport where strength, power, and size are beneficial for performance, such as the field events in track and field or American football.

Ethical Management of the Athlete

One could take the stance that AAS use should be banned outside of treatment for medical conditions because of possible side effects associated with their use. However, this is a very parentalistic, or paternalistic, view, and it may not hold true for adults or professional athletes who view AAS and their consequences as a fair trade-off for success in sport (18). This perspective of a balanced exchange may be especially accurate for athletes who train for years to advance through the levels of elite sport only to find that many of their competitors are using AAS. These athletes are then forced to decide to use AAS, compete at a perceived disadvantage, or abandon competition in general (19).

In sport, participants usually attempt to gain an advantage over opponents and win the contest through that advantage. This may be done in the context of fair play, gamesmanship, professional foul, or doping with substances such as AAS (18). If all athletes competing within a given sport or contest decided to use AAS, does that produce an unfair competitive environment? The situation probably would remain unfair unless all athletes had access to the same types and quality of drugs (19). Some argue that sport is constituted as free interplay between the participants (19). If this is so, and the participants openly and freely choose whether or not to use AAS despite knowing the potential side effects, then this action is an expression of the athletes' autonomy (18-20).

An argument could be made against AAS use because they may give the athlete the chance to perform outside the natural limitation of man. However, this argument is inherently weak because one could say the use of coaches, vitamins, or weight training potentially allows one to perform at a level outside one's natural limitations, and these strategies are readily accepted practices in sport (18). It is the scientific application of training principles that allow an athlete to hone his or her skills in sport. One really needs to decide if sport is a test of character and excellence within the human condition. If this

is the case, then the use of AAS might be thought to limit the development of character, and it is inherent that drug use is wrong because it removes participants from the human condition and into a pharmacologically-induced state (18).

While the unfair competitive advantage of acute AAS use by athletes has been debated for decades, a more recent concern is the possibility that AAS may confer long-term benefits in athletes with a history of AAS intervention. Given that AAS increase myonuclear number (6, 7) and that myonuclei are resistant to degradation even in necrosing myocytes (8), we propose that an advantage may be conferred months or even years beyond cessation of exogenous AAS supplementation. As long as the additional myonuclei are present, an enhanced ability to synthesize muscle protein will likely remain. Some evidence supports this speculation, showing that although half of the AAS-induced increases in lean body mass and muscle mass are lost at approximately 2 months post-intervention in non-athletic males, lean body mass remained significantly elevated at 5-6 months post-intervention (21). Remarkably, these increases in lean body mass occurred *without* a resistance exercise intervention. Therefore, it is plausible that in athletes who regularly strength train, an enhanced ability to adapt to training stimuli remains for an extended, perhaps infinite, period beyond AAS use. If this is accurate, then this raises the additional ethical dilemma of whether or not if athletes who have *ever* used AAS should be allowed to compete with lifetime drug-free athletes.

The Role of the Health Professional

The topic of testosterone and its synthetic equivalents certainly remains a contemporary issue, having recently been featured as the cover story of *Time* magazine (22). Because the subject of anabolic steroids is high profile, healthcare professionals may, by default, be scrutinized for their opinions on the matter as well as any association with athletes who use AAS. Coincidentally, the very same month when the *Time* article appeared, a controversial opinion on the topic of AAS use by athletes was published in *ESPN Magazine* (23). This alternative perspective was provided by Jose Antonio, PhD, FACSM, CSCS.

In the *ESPN* article, Dr. Antonio, a member of the American Society of Exercise Physiologists (24), stated in essence that an athlete could safely use anabolic steroids,

gain significant amounts of muscle mass and strength, with little to no side effects, particularly when carried out under the supervision of a medical professional. In the same article, Gary Wadler, MD, responded, "Saying there's a safe way to use steroids is an absolutely irresponsible statement." Wadler continued, "And it's nothing new. Years and years ago there were people saying it, fringe people. But no member of the medical community with any knowledge or integrity would ever say something like that. First and foremost, it's a violation of federal law. Steroids can be used only for legitimate medical treatment within the context of a doctor/patient relationship" (23). In spite of Dr. Wadler's assertion, Dr. Antonio recently co-authored a review paper published in the *Canadian Journal of Applied Physiology* which states verbatim that "based on the available evidence, we would posit that the administration of moderate doses (200-300 mg/wk for 6-12 weeks once per year) of an injectable androgen, such as testosterone enanthate or nandrolone decanoate, in healthy adult males could induce positive changes in body composition and athletic performance with little or no side effects" (11).

The unethicity of AAS use by athletes is obvious because AAS may offer an unfair competitive advantage. What is less clear is the role of the professional in the counseling of athletes who use or desire to use AAS. Many persons undoubtedly agree that the role of the professional is to educate the athlete as to the unwanted side effects of AAS to dissuade their use. However, if an athlete is steadfast in his/her decision to utilize such drugs, should the role of the professional with a background in pharmacotherapeutics then become to offer guidance in the use of AAS to minimize the medical sequelae?

The above scenario in which the professional stands to protect and benefit the athlete through guidance in the administration of an illicit substance presents an ethical dilemma. We are certainly not the first authors to elaborate on this dilemma, because it has been addressed several times throughout the years, particularly in popular bodybuilding publications. Nonetheless, we are unaware of any authors who have published these thoughts in a peer-reviewed forum.

Although several self-trained gurus have stepped up to the challenge of providing information about AAS to athletes, this is markedly different from the role of the professional in such matters. While self-educated authors and trainers are bound by laws,

regarding practicing medicine without a license, they are not bound by a professional code of ethics. This is an essential distinction between professionals and nonprofessionals, because membership in a professional organization, such as the American Society of Exercise Physiologists, adds another tier of accountability.

The importance of an understanding of ethics by exercise professionals has been previously impressed and the fundamental terminology defined (26). Ethics provides a systematic examination of moral conflict. In the instance of a health-care professional (e.g., exercise physiologist) who is aware of an athlete's intentions to use anabolic steroids, there are several possible paths of action.

First, the professional may elect to take a hands-off approach while an athlete haphazardly self-administers anabolic agents. The justification could be the professional's adherence to his/her respective code of ethics, which may contain a stipulation regarding the improper administration of medications. A second discouraging influence may be federal law that restricts the use of AAS. Another possible reason for abstaining from assisting the athlete is that the professional may perceive any education regarding the drugs as a means of facilitating a potentially deleterious behavior. Thus, providing the knowledge to utilize potentially harmful substances may be considered an act of maleficence, which is the act of "doing harm" to a patient. This is a violation of the ethical principle of nonmaleficence, which is the cornerstone of virtually all codes of ethics for healthcare professionals.

A second, albeit controversial, avenue for the professional to follow is to assist the athlete in illegal pharmacological intervention. The rationale for choosing to help the athlete may be that the professional is demonstrating the ethical principle of beneficence (i.e., doing good) by providing skilled services to decrease the chances of sequelae. In other words, assistance from someone proficient in exercise endocrinology or pharmacology is beneficent because it is in the athlete's best interest to have a knowledgeable individual design such a program. This perspective is in agreement with the comments of Antonio (23).

Some may contend that Antonio's comments violate tenets 4 and 6 of the ASEP Code which state, respectively: "Exercise physiologists are expected to conduct health and fitness, preventive, rehabilitative, educational, research, and other scholarly activities

in accordance with recognized legal, scientific, ethical, and professional standards” and, “Exercise physiologists are expected to call attention to unprofessional health and fitness, preventive, rehabilitative, educational, and /or research services that result from incompetent, unethical, or illegal professional behavior” (25).

However, his comments may be construed as being supportive of tenets 9 and 10, which read, respectively: “Exercise physiologists should participate in and encourage critical discourse to reflect the collective knowledge and practice within the exercise physiology profession to protect the public from misinformation, incompetence, and unethical acts” and “Exercise physiologists should provide health and fitness, preventive, rehabilitative, and/or educational interventions grounded in a theoretical framework supported by research that enables a healthy lifestyle through choice.(25)” If, as Dr. Antonio suggests, a healthcare professional protected a person from his/her own incompetence by designing an evidence-based pharmacotherapeutic AAS regimen to minimize negative health consequences, then these tenets are upheld. Of course there is also some inherent violation of these tenets due to legal and other ethical issues embedded in the tenets.

Thus far, we have introduced one scenario with two avenues resulting in an ethical dilemma. A multitude of other scenarios exists. For example, what if a collegiate athlete using AAS asked a health professional to help the athlete circumvent a positive drug test by teaching the athlete strategies to beat the testing system in order to avoid losing an athletic scholarship? Or, what if an athlete wanted you to procure sterile, genuine AAS for their use as opposed to the dangerous, black-market variety the athlete may alternatively receive? Perhaps an athlete may ask you to use your expertise to give the athlete an injection because the athlete is fearful of piercing an artery or a nerve. Healthcare professionals who may be intimately involved with athletes are well served to mentally rehearse these and other scenarios in the event one should ever be faced with such challenging situations.

As healthcare and exercise experts, we are responsible to serve our patients’ best interests and cause no harm (20). We have moral obligations that center on trust, loyalty, and confidentiality. We believe that if a patient is autonomous then it is ultimately his/her decision whether or not he/she uses AAS, thus demonstrating the ethical principle

of autonomy. However, it is up to us to provide the best possible information to that patient so he or she may make a truly informed decision (4). There are many dubious sources of information regarding AAS for patients to consult; healthcare practitioners who work with potential AAS users need to be these sources of truth.

Likewise, we must be prepared to assist AAS users who may range a great deal in age (2, 27). For the adult population, educational interventions would best be conducted in a one-on-one situation. If minors are suspected of AAS use, education needs to be directed toward the patient and parents. However, patient education may be insufficient for the patient who uses AAS, because these drugs may be physically and psychologically addicting (20, 28, 29). AAS users who try to discontinue the drug use often go through withdrawal symptoms akin to those associated with alcohol, cocaine, or opiate withdrawal (30). The most prevalent symptoms of AAS withdrawal are depression, fatigue, decreased libido, insomnia, anorexia, dissatisfied body image, and increased desire to continue to take AAS (28). With these possible side effects in mind, it may be necessary to refer the patient to a counseling program that specializes in drug rehabilitation (29, 31-33). It would also be appropriate for a patient discontinuing AAS use to seek counseling for the depression (29, 30) and altered body image (16) that are often associated with AAS withdrawal.

In the United States, AAS are controlled substances and are illegal to possess without a prescription (29). Therefore, a patient using AAS for non-medical conditions is breaking the law and could be reported to the law enforcement authorities. However, the practitioner probably will not know the exact manner in which the patient has acquired these drugs. In any event, due to the psychological changes these drugs may induce, the healthcare professional has a moral and legal duty to report any patients if they become a danger to themselves or others. In this way, society can be protected and patients' best interests can be served (20).

Summary

Although AAS use is not common among all athletes, it does appear that AAS use may occur from high school age through adulthood (2, 4, 32). Therefore, healthcare practitioners must be able to educate athletes and their families, and refer them to the

proper healthcare professionals for the athlete's healthcare needs (20, 30, 31). The use of AAS can affect many spheres of a patient's life. It stands to reason that because of its multifactorial cause and broad implications, treatment for AAS use and addiction will require the expertise of many healthcare professionals. The eventual decision to use AAS, after weighing the risks versus the benefits, is ultimately up to the patient. As healthcare providers and consultants, it is up to us to provide an enlightened path for our patients and to assist our patients as it serves their best interests.

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