

Combating Anabolic Steroid Abuse

The **National Strength and Conditioning Association** has developed an action plan for coaches to identify and respond to the problem of anabolic steroid abuse among athletes.

This plan includes:

- Instituting a school policy
- Providing scientific information on anabolic steroids, as an educational tool
- Establishing intervention and consultation guidelines

The NSCA and its membership are in a unique position to deter steroid abuse. The strength and conditioning coach has a daily influence on the athlete's physical development. Therefore, the responsibility to counsel and educate against steroid abuse, and encourage hard, systematic training and sound nutrition in its place, is the primary goal of the NSCA.

The material that follows represents the basis of our action plan, and was developed by a select committee of noted sports scientists and practitioners.

Forward any comments or inquires to:

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Instituting A School Policy On Anabolic Steroid Abuse

Fact Finding

The first step in the procedure is determining whether the school currently has a policy concerning the use of anabolic drugs, or if the school's drug and alcohol policy includes anabolic-androgenic steroids (AS). If not, assemble a committee.

Committee Development

Your committee should consist of key representatives of diverse interest groups. These representatives should include:

- School administrators (athletic director, school or district athletic trainer, district activities supervisor, health curriculum consultant)
- Parents
- School nurse or district nursing consultant
- Coaches
- Athletes
- Students

This committee will formulate a preliminary district policy, share it with all students and parents and request a response.

Timetable

Once the committee has incorporated all input, the policy should be scheduled for presentation to the board of education and its attorney for review, modification and adaptation. Generally, an outline for implementation must be presented at this time, including necessary resources (personnel, time, money, etc.) and a time line.

Athletic Director Support

In most situations, the support of athletic directors is essential for such policy development. Especially in larger districts, policy can seldom be enacted in one school and not another, so consensus support of building athletic administrators must be obtained early in the policy-making process. County-wide acceptance and cooperation would be necessary in most school districts.

Rationale for Developing a Separate Policy

In those instances where some form of general drug information policy and/or school curriculum is in place, it may be necessary to provide additional rationale for the establishment of a distinct steroid education program. Such a rationale might include the following points:

- Anabolic drugs are not recreational drugs. They are used, rather, to enhance athletic performance or physical appearance.
- Persons who do not use recreational drugs may use anabolic drugs.
- The psychological impact of anabolic drugs differs from that of recreational drugs.

Review Process

Once a school or district policy has been proposed, a review and modification effort must follow. Initially, teaching and administrative personnel should be made aware of:

1. The content and intent of the policy.
2. The role of staff in policy implementation and enforcement.
3. The differences between anabolic drugs and recreational drugs.
4. The rationale behind the policy.

Their input should be encouraged, and constructive criticism of the proposed policy should be considered.

Parents also should be invited to review and comment upon the policy. Parents will have questions regarding the signs and effects of steroid use. Informational materials that answer parent questions should accompany the proposed policy. The role of the parent in detection and intervention should be discussed. This may be the most important faction to involve, for both prevention and enforcement.

Once a final draft of the policy has been completed, it should be submitted to the school district attorney for review. The approved policy should then be resubmitted to interested parties for evaluation and approval. Parents should be asked to sign a statement that indicates their understanding of and support for the policy as it applies to their children.

Policy Enactment and Enforcement

Application or enforcement of the policy begins following its approval by the appropriate administrative body. All parties affected by the policy (administrators, teachers, coaches, students, athletes and parents) should be given the opportunity for policy orientation regarding content, implementation and enforcement procedures. Sample orientations may be presented to male athletes, female athletes and non-athletes, depending upon the needs of your school. The orientation should also cover the documentation of intervention efforts, the distribution of athlete training pledges and an explanation of punitive actions.

The following is a list of possible punitive actions:

1. First offenders will complete a counseling program.
2. Second offenders will receive a limited suspension from extracurricular activities.
3. Third offenders will be permanently suspended from extracurricular activities.

Resources Materials to Gain Support for the Policy

Certain general materials that may be useful in establishing broad support for development and implementation of such a policy are provided in this packet. They include:

- The existing NSCA survey of high school coaches that addresses steroid use issues (Reference 1),
- The NSCA-developed position paper on anabolic drug abuse among athletes,
- The steroid fact sheet,
- Suggested letter soliciting the support of parents and parent groups (Reference 2),
- Suggested letter to school administration that outlines the need for a steroid abuse policy (Reference 3), and
- Athlete's Pledge. Each athlete will be required to sign off on understanding and agreeing to the anabolic-androgenic steroid policy of the school. (Reference 4)

If testing for anabolic-androgenic steroids is a part of your school's policy, see Reference 5 for suggested rationale and guidelines.

One-to-One Counseling

Step One: School Policy Review

Before dealing with the individual athlete in a conference, the coach should review the established school policy. Part of that policy will be:

1. Group Presentation.
 - a. Cover the school policy.
 - b. Go through the educational program.
2. Gather tangible information for the conference with the individual by:
 - a. Keeping records and reviewing progress in the athlete's size, weight and strength gains, using proper tests and measurements;
 - b. Documenting personal observations in size, strength and behavioral changes; and
 - c. Consulting other sources, conducting meetings with teachers and following up on rumors.

Step Two: Personal Intervention

Note: Document all steps of personal intervention and counseling

The following approach is suggested:

1. Express genuine personal concern for the athlete's well-being.
2. Cite and discuss information and observations as documented.
3. Try to get an indication of steroid use. Observe terminology, evasive comments, lack of eye contact and body language.
4. Ask questions:
 - a. Does the athlete understand the policy as explained in the group presentation?
 - b. Does the athlete understand your reasons for concern?
 - c. Does the athlete have a broad knowledge of the use of steroids?
5. Reiterate your reasons for concern.
6. Does the athlete use steroids? The coach must make an informed judgment call based on evidence gathered and the athlete's response.
7. If other problems are identified (family, girl/boyfriend), refer the athlete to counseling and other resources.
8. If the answer is no and no other problems are identified, be complimentary to his/her achievement.
9. If the answer is yes or maybe, then initiate counseling (see Step Three).

Step Three: Counseling

The coach must firmly reiterate the ground rules for all athletes, his/her stand and school policy.

1. College level - If yes, refer to policy.
 - a. Is the athlete under medical supervision?
 - b. Is the drug being taken to enhance performance?
 - c. Is the drug being taken for other reasons?
 - d. Turn athlete over to proper school authorities.
2. High School level - If yes, refer to policy.
 - a. If there is no medical supervision, recommend that the athlete see a physician.
 - b. Give a "buyer beware" warning of potential problems with black market drugs.
3. Effects - Refer to fact sheet, and ensure that the athlete has a copy. Reinforce sport and competition ideals and intrinsic motivation, and the personal satisfaction that comes from training and achievement.
4. Ethics - The use of anabolic steroids is unfair. There are no short cuts to excellence; perseverance is the key to success.
5. Preferred plan of action - Train clean. Give the athlete a detailed program to increase size and strength based on athlete's goals without the use of steroids, including proper nutrition and strength training guidelines. Provide ample opportunity and recognition for drug-free contests. This detailed program should be the result of a joint effort between the counselor (strength and conditioning coach) and the athlete.

Ending Anabolic Drug Use

Anabolic-androgenic steroids (AS) are not believed to be physically addictive, but a habituation of use is implied by the fact that once an athlete uses them, he/she tends to keep coming back to them after shorter intervals of non-steroid use. Anecdotal information suggests that individuals may experience psychological withdrawal after ending steroid use. The most common problems for the athlete are coming to grips with the loss of size and strength, and decreased performance. This causes an altered self-image and a lowering of self-esteem. It is important that the athlete continues to train during this period, but with a new workout and new goals. This is best accomplished in new surroundings and with new training partners who are also withdrawing from anabolic drugs, or who have never used them. It may be possible to form an anabolic support group that could include a variety of types of athletes, as well as a strength and conditioning coach to offer sound training advice. A sports nutritionist may be of great assistance in developing a dietary plan to help maintain lean body mass and performance through proper nutrition. These potential problems associated with quitting are more reasons a coach can give an athlete for not starting anabolic steroid use. Encourage your school district to include material on AS in health class units on substance abuse.

The promotion of "steroid replacers" and substitute "anabolic" food additives is inappropriate and may simply substitute a new set of poorly researched health risks to the athlete. While some of these may be safe and even effective nutritive supplements, others may contain substantial pharmacological potency, including highly purified amino acids. These have uncertain benefits and potential adverse effects for the athlete. "Steroid replacers" as a general class are probably without any effect whatsoever and represent money wasted for athletes who could have benefited from proper nutrition.

Suggestions for the Coach

Why is the use of anabolic agents so widespread among athletes? Part of the problem is an over emphasis on winning, often at any cost.

The most important thing that a strength and conditioning coach can do about the problem is to send a clear message to his/her athletes that it is unacceptable to use steroids or growth hormones. This drug problem is a threat to the strength and conditioning coach's very existence. Some athletes think that using anabolic steroids is a substitute for proper training and hard work, and is a shortcut to success. In this sense too, the anabolic steroid problem has produced a backlash of skepticism that an athlete can achieve maximal performance or be a winner without anabolic steroid use. This unfairly labels or penalizes athletes who are drug-free winners. The general public is beginning to assume that all highly successful athletes (especially strength athletes) have achieved success with the aid of anabolic substances. Solutions to the drug problem begin at the high school level or earlier, and coaches at this level are the first line of intervention. Here, the ethics of fair play and the reason for sports competition can have the most impact on young, impressionable athletes.

The coach faced with athletes contemplating using anabolic steroids or human growth hormones or athletes who are already using these substances, can start by finding out what it is about athletics that attracted the athletes in the first place; what do they enjoy most about the training? What lessons are they carrying from their participation in sports to the rest of their lives? How do anabolic drugs (chemically uncontrolled shortcuts) fit into a picture of self-discipline and good self-esteem? Is anabolic drug use different from the use of illicit recreational drugs? Why do they think anabolic steroid use is necessary? Will anabolic steroids really be the shortcut they are looking for? Is there some way that they can be helped with better nutrition and training instead of resorting to chemicals? The coach may at least be able to delay the use of anabolic steroids by young athletes, allowing them more time to mature and reconsider this course. Are the coach's goals for the athlete realistic, and are the athlete's goals realistic? Maybe the chosen sport isn't an appropriate sport for the athlete, and he or she needs to be redirected.

The next line of discussion is about the risks to the athlete and to his/her teammates. With increased emphasis on drug testing, what will happen to the athlete and the team if the athlete is caught using an illegal and banned substance? Are they willing to chance health risks, especially not knowing what drug they are getting or what the consequences of its use may be? If they start using anabolic steroids, when will they be willing to stop? There is no gray area where the coach can counsel the athlete to "at least use the steroid safely." The coach must do everything in his or her power to help the athlete quit, stay off or resist starting anabolic steroids. The coach can do this by recommending realistic individual goals attained through effective training methods.

Suggestions For Further Reading

General topic:

Wadler, G.I. and B. Hainline. 1989. Drugs and the Athlete. Philadelphia: F.A. Davis Company. 353 pp.

Wright J.E., Stone M.H./NATIONAL STRENGTH & CONDITIONING ASSOCIATION. Position statement: anabolic-androgenic steroid use by athletes. *National Strength & Conditioning Association Journal* 15(2): 9-28, 1993.

Yesalis, C.E. and Cowart, V.S. 1998. The Steroids Game. Champaign: Human Kinetics. 195 pp.

Physiology of androgenic steroids:

Kochakian, C.D., ed. 1976. Anabolic-androgenic steroids. New York: Springer-Verlag. 725 pp.

Sturmi, J.E. and Diorio, D.J. Anabolic agents. *Clinical Sports Medicine*. 17(2):261-282, 1998.

Wilson, J.D. 1988. Androgen abuse by athletes. *Endocrine Reviews*. 9:181-199.

Prevalence of use and types of steroid used:

Buckley, W.E., Yesalis, C., Friedl, K.E., Anderson, W., Streit, A., and J. Wright. 1988. Estimated incidence of anabolic androgenic steroid use among male high school seniors. *Journal of the American Medical Association* 260:3441-5.

Burkett, L.M. and M.T. Falduto. 1984. Steroid use by athletes in a metropolitan area. *The Physician and Sportsmedicine*. 12:69-74.

Street, C. and Antonio, J. 2000. Steroids from Mexico: educating the strength and conditioning community. *Journal of Strength and Conditioning Research*. 14(3):289-294.

Yesalis, C.E., Kennedy, N.J., Kopstein, A.N., and Bahrke, M.S. 1993. Anabolic-androgenic steroid use in the United States. *Journal of the American Medical Association*. 270(10): 1217-1221.

Drug testing and prevention:

Catlin, D.H., Kammerer, R.C., Hatton, C.K., Sekera, M.H. and J.L. Merdink. 1987. Analytical chemistry at the games of the XXIIIrd Olympiad in Los Angeles, 1984. *Clinical Chemistry*. 33:319-327.

Elliot, D., and Goldberg, L. 1996. Intervention and prevention of steroid use in adolescents. *American Journal of Sports Medicine* 24(6): S46-S47.

Goldberg, L., et al. 1996. Effects of a multidimensional anabolic steroid prevention intervention: The Adolescents Training and Learning to Avoid Steroids (ATLAS) Program. *Journal of the American Medical Association*. 276(19): 1555-1562.

Side effects:

Bahrke, M.S., Yesalis, C.E. and Wright, J.E. 1996. Psychological and behavioral effects of endogenous testosterone and anabolic-androgenic steroids: an update. *Sports Medicine*. 22(6): 367-390.

Parssinen, M., Kujala, U., Vartiainen, E., Sarna, S. and Seppala, T. 2000. Increased premature mortality of competitive powerlifters suspected to have used anabolic agents. *International Journal of Sports Medicine*. 21(3):225-227.

Strauss, R.H., Wright, J.E., Finerman, G.A.M., and D.H. Catlin. 1983. Side effects of anabolic steroids in weight-trained men. *The Physician and Sportsmedicine*. 11:87-96.

Street, C., Antonio, J., and Cudlipp, D. Androgen use by athletes: a reevaluation of the health risks. *Canadian Journal of Applied Physiology*. 21(6) 421-440, 1996.

Sturmi, J.E. and Diorio, D.J. Anabolic agents. *Clinical Sports Medicine*. 17(2):261-282, 1998.

Effects on athletic performance:

Wright, J.E. 1980. Anabolic steroids and athletics. *Exercise and Sport Sciences Reviews*. 8:149-202.

Risk factors:

Bahrke, M. S., Yesalis, C., Kopstein, A. N. and Stevens, J. A. 2000. Risk factors associated with anabolic-androgenic steroid use among adolescents. *Sports Medicine*. 29(6):397-405.

Web sites:

National Institute on Drug Abuse (NIDA) web site on Anabolic Steroid Abuse -
<http://www.steroidabuse.org/>

National Institute of Health (NIH) website about anabolic steroid abuse -
<http://www.nlm.nih.gov/medlineplus/anabolicsteroids.html>

Letter Soliciting Parent Support

Typed and printed on school letterhead--parents should be encouraged to sign and return the letter to the coach.

Dear Parent(s):

It is no secret that high school students use anabolic steroids. Some do so with the hope that their athletic ability will be enhanced. Others do so believing that steroids will give them a muscular body that draws attention and praise.

Whatever the reason, we want our students, your sons and daughters, to know that using anabolic steroids is a negative way to achieve goals that may, in and of themselves, be positive.

The long-term impact on the health of steroid users has not been fully researched and documented. While it would seem that the immediate, visible complications of unregulated, unsupervised use (severe acne with facial scarring, premature hair loss in males, unwanted growth of body and facial hair in females, reproductive dysfunction, increased risk of heart disease, fluid retention) would serve as sufficient deterrents, it is the long-range unknowns that may pose the greatest dangers.

Because most anabolic steroids are purchased on the black market, users have no way of knowing exactly what compounds they are introducing into their bodies. Dosages taken are usually far above those recommended by medical practitioners. Students serving as their own pharmacists and physicians are definitely operating outside their levels of knowledge and expertise.

As a coach, I want these young athletes, and all our students, to experience the fulfillment that comes from athletic success and personal physical development. My involvement with the National Strength and Conditioning Association, the professional organization dedicated to athletic development, speaks of this commitment. With the help of the NSCA, and with your support, our school is developing a policy intended to eliminate the use of anabolic steroids by our students.

Our efforts here are part of a nationwide campaign launched by the NSCA. It will eventually reach athletes at all levels of competition. But for us, the emphasis will be right here at home.

I have informational materials that explain the outcomes of anabolic steroid use. I want to share them with you, and have you share them with your sons and daughters on <date> at <location>. You'll be given the opportunity to review the policy on steroid use as it is developing. I hope you will see this opportunity as a responsibility, because the health of your children and the atmosphere of fair play in athletic competition are at stake.

Please contact me for additional information or for a confidential appointment should you feel anabolic steroids are part of your child's life. Please sign below, signifying your cooperation and support, and return this letter to me by <date>.

Sincerely,

Coach Smith

I (we) have read and understand the school's concern with anabolic substance abuse. I (we) will encourage my (our) children to train and compete drug free.

*Signature _____
Date _____*

*Signature _____
Date _____*

Rationale and Guidelines for Drug Testing

Research has indicated that the more education about steroids imparted to young athletes the more likely they are to abuse anabolic drugs ¹. Coupled with the high failure rate (80% to 90%) of counseling and drug rehabilitation programs, strong measure will have to be taken to deter use of an anabolic steroid when dealing with young athletes.

One option is a testing program to conclusively identify the user so that early measures can be taken on a one-to-one basis. Testing may also be viewed as part of the educational process to determine the effectiveness of the program. Educational programs, testing, rehabilitative options and progressively deterrent athletic sanctions may be a viable option for your program. The following is a list of guidelines for establishing and operating a drug testing program for anabolic drugs.

- A. Check to see if the local school board has any type of policy that would cover drug testing.
- B. Consult with the school board's legal council on implementation of a program or policy.
- C. Alert both students and parents to the program and its intent prior to implementation.
- D. The program/policy should be written with copies available to parents and students.
- E. Obtain the informed consent (waiver) of both parents and students prior to implementation.
- F. Maintain or use professional personnel for specimen collection.
- G. Contract/use an IOC approved lab for specimen analysis.
- H. Use reasonable suspicion rather than random testing for legal and financial expedience.
- I. Confront the athlete, then the parent with evidence prior to specimen collection.
- J. Have a policy that is primarily rehabilitative in nature rather than punitive.
- K. You must show that there is clear danger to the athlete and possibly others when participating under the influence of anabolic drugs.
- L. Document everything you do; i.e., reasonable suspicion signs scenario, dates, test results.
- M. Maintain strict confidentiality and keep all records locked. No one is to know test results outside of parents, athlete and essential personnel, e.g. coach, athletic director, physician. Personal information should not be given to the media.
- N. The cost of testing is high (\$100 to \$300 per test) and may have to be borne by the parents in whole or part. If the proper mechanism for testing, rehabilitation, and sanctions are in place, parents may be willing and able to cover costs for the benefit of their child once they are educated to the problem.

¹Bosworth, E. et al. 1988. Anabolic steroids and high school athletes. *Medicine Science and Sports Supplement*, 20(2):S3-17.

What the Coach, Athlete, and Parents Need to Know About Anabolic Drugs

A Fact Sheet

Introduction

A survey done by the National Strength and Conditioning Association member high school strength and conditioning coaches shows that many coaches are concerned about the use of anabolic drugs by their athletes. It also indicates that coaches do not have reliable information on these drugs and would like help in dealing with this problem. This fact sheet reviews and updates what the athlete, coaches, and parent need to know about anabolic drugs.

What is an Anabolic Drug?

Anabolic-androgenic steroids (AS) and human growth hormones (hGH) are anabolic, or protein-building, drugs that are used by athletes for effects that are believed to enhance performance. These are drugs that are legally prescribed only by physicians and veterinarians. Anabolic-androgenic steroids are just one type of a class of chemicals known as steroids. Not all steroids are AS. Other types of steroids include anti-inflammatory drugs such as cortisone and prednisone, which are used to treat severe inflammation and asthma. Estrogens and progestagens are naturally occurring female sex steroid hormones; which are also found in oral contraceptive pills.

Growth hormone is not a steroid; it is a large protein. Small differences in the protein structures make animal growth hormones ineffective in humans; only human growth hormone produces effects in humans. Now that this complex protein can be manufactured in the laboratory, hGH is becoming increasingly available, and its use by athletes may expand rapidly. In normal function, growth hormone is secreted from the pituitary gland. Secretion increases under a wide variety of conditions including exercise and deep sleep. Too much growth hormone secretion over several years results in a disfiguring disease known as acromegaly.

The testes naturally produce one of the most potent AS, testosterone. This steroid is secreted at a rate of about six milligrams per day in the normal adult male. By comparison, men who are deficient in testosterone production are treated with 200 to 250 mg of synthetic testosterone preparations once every one to two weeks to achieve approximately normal blood levels. Some testosterone is also produced by the ovaries in women, and by the adrenal glands in both men and women. The balance of properties of different AS may vary, but all AS have important effects on reproductive physiology and behavior. Anabolic-androgenic steroids also produce gender differences in muscle mass and strength, with large increases occurring in boys at puberty because of the increased secretion of testosterone.

Synthetic AS are related to testosterone in structure and function, but the chemical structures have been modified in ways that slightly alter their properties (slightly changing which tissues they are most likely to affect) and to increase the time that they remain effective in the circulation. With a few exceptions, AS can be generally divided into two categories on the basis of their properties, risk and method of administration; (1) AS that are taken orally and (2) AS that are given by injection, usually deep into the gluteal muscle. The chemical alteration that allows oral AS to be absorbed without being immediately disposed of by the liver appears to impose certain health risks not found with most of the AS which must be given by intramuscular injection. Steroid potency is generally reduced with the oral route of administration. The AS in these two categories that are most commonly used by athletes are listed in Table 1.

Other AS also exist (the International Olympic Committee currently tests for more than a dozen different AS that are suspected of being used by athletes) under a wide variety of names. Drugs that are commonly used in association with these drugs include a protein hormone called hCG (human chorionic gonadotropin, not to be confused with hGH) and non-steroidal chemicals known as testolactone and tamoxifen. Injectable stanozolol (Winstrol-V) is a veterinary product; the same steroid is available for human use (in oral form) but the standards for allowable impurities are different. Many of the steroids used by athletes come from black market sources. Since there is no regulation of these sources, counterfeit (not made by the

manufacturer listed on the label) and deliberately misidentified AS have become a widespread problem. Because of this, many athletes may not be using the drug they think they are using, and they may be faced with health risks other than those associated with anabolic drug use.

<u>Generic Name</u>	<u>Example Trade Names</u>
<u>Oral As</u>	
methandrostenolone	Dianabol
oxandrolone	Anavar
stanozolol	Winstrol
oxymetholone	Anadrol
<u>Injectable AS*</u>	
testosterone esters	Depo-testosterone
nandrolone esters	Deca-durabolin
methenolone esters	Primobolin Depot
stanazolol	Winstrol-V
<u>Other drugs with associated anabolic properties</u>	
human growth hormone (hGH)	
<u>Other drugs used with anabolic drugs</u>	
human chorionic gonadotropin (hCG)	
tamoxifen	Nolvadex
furosemide	Lasix
thyroxine	Synthroid

*Esters refers to a variety of chemical compounds including propionate, cypionate, enanthate and decanoate.

Table 1. Categories of AS Commonly Used by Athletes

Effects of Anabolic-Androgenic Steroids

Anabolic-androgenic steroids are prescribed by physicians primarily as a lifetime replacement therapy to maintain the masculine characteristics of men who are deficient in normal testicular function, and are also prescribed for the treatment of a few rare medical conditions that generally would preclude athletic participation. As evidence of how rare these legitimate conditions are, there has been no case in six years in the NCAA of an athlete requesting medical waiver for AS treatment of a medical condition. Anabolic-androgenic steroids are not generally considered useful in the treatment of ligamentous/soft tissue injuries, but some physicians prescribe them for this purpose.

Anabolic-androgenic steroids are used by athletes because they can increase weight and because there is evidence that they help to induce muscle hypertrophy. Research has not answered how much of the weight increase is represented by an actual increase in lean body mass and how much is related to water retention, but there is no question that one effect of AS is that they can add to body weight while the athlete is using them. Anabolic-androgenic steroids may enhance strength and endurance, improving recovery time so that an athlete can train harder, and may increase aggressiveness. Personal experience can be compelling, but fails to take into account other factors, including personal expectations (placebo effect), that may explain effects attributed to a drug.

Health Risks

The health risks of AS use are not well known. There is little medical information on the effects of AS at the doses used by athletes. Athletes experiencing health problems may not inform their physicians that they

are using AS. The information that is known from medical experience with AS indicates that as many as one to three percent of patients using oral AS for an average time of five years may develop liver tumors. These tumors can rupture and produce life-threatening internal bleeding. Oral AS will consistently decrease HDL-cholesterol while increasing LDL-cholesterol. This change in serum cholesterol fractions has been identified as a significant risk factor for heart disease; however, this is a temporary condition that returns to normal within several weeks after discontinuing AS use. An increase incidence of cardiovascular disease is suggested, but no study has followed a group of AS users long enough to demonstrate such effects.

Not all injectable AS produce liver tumors or reduce HDL-cholesterol, but these drugs may produce other risks at high doses. Three cases of stroke have been reported in young men dosing themselves with high levels of AS; this included at least one using high doses of only an injectable testosterone. Health risks associated with injections of unreliable supplies and administered by non-medically trained individuals include:

1. local abscess
2. illness from contaminants (infections and fever)
3. hepatitis
4. AIDS
5. nerve damage resulting from improper intramuscular injection

A wide variety of significant illnesses has been reported in steroid users, including cancer, heart disease, and uncontrolled behavioral outbursts. Case reports are difficult to evaluate, but these anecdotal reports suggest adverse effects that should be followed up with careful study and increased observation. Even though few serious health risks have been detected with clinical use of AS, health risks have been suggested with the high doses of AS used by some athletes, but these have not been conclusively demonstrated.

Other adverse effects are not life-threatening but are clearly caused by AS in some men. These include:

1. increased secretion of skin oils
2. increased problems with acne
3. gynecomastia (the development of breast tissue in males with painful or tender swelling)
4. altered patterns of hair growth with increased body hair but decreased scalp hair in men predisposed to balding
5. reduced fertility during use
6. a reduction in testicular size (a direct effect of the temporarily reduced sperm production)

These effects are temporary with AS use, but the altered patterns of hair growth and some severe cases of gynecomastia may not reverse with AS cessation.

For women, there is a general masculinization including:

1. the development of a male physique
2. increased body hair
3. failure to ovulate (menstrual irregularities)
4. deepening of the voice
5. clitoral enlargement

For adolescents, there is a risk of premature closure of the long bones resulting in a shorter-than-predicted adult height.

Medical monitoring to avoid potential adverse effects from AS is not likely to be effective. Physicians who perform biochemical tests and physical exams to detect changes in health status are likely to detect a fall in HDL-cholesterol with AS use. They may also detect an elevation of some of the enzymes that are released by damaged heart and liver tissue, but these also increase with intense exercise. These blood measurements may show abnormal values during steroid use, but return to normal when AS use has stopped. The types of tumors associated with oral AS are generally discovered only once an enlargement can be felt though the

abdominal wall by the physician or when abdominal pain leads to a liver scan. Cardiovascular damage is likely to be detected only once a heart attack or stroke occurs. Since the health risks associated with AS use are not yet well defined, safe use is not guaranteed just because a physician is monitoring use. Whatever health risks are associated with AS use are likely to increase along with the dose and duration of use.

Effectiveness of Drug Testing

Many athletes claim they must do so to counter the unfair advantage of their competitors who use AS. Drug testing can be an effective deterrent to AS use by athletes if it is properly conducted. An effective program includes all of the following elements:

1. year-round, randomized, unannounced testing,
2. chain-of-custody collection of urine (this involves the athlete coming into a lab, voiding and producing a new urine specimen under supervision),
3. testing of the sample by a properly certified laboratory, and
4. simultaneous measurement for masking drugs and diuretic agents that might be used to interfere with the test or conceal the use of AS.

If AS use is to be stopped, drug testing is one of the few ways currently available to do it.

Athletes have attempted to devise methods to beat drug tests but these methods generally don't work; drug tests at recent international events have been detecting drug use in athletes who thought they were below the limits of detection or had used drugs in an attempt to mask anabolic drug use. The current perception that some athletes are beating steroid drug tests may be accurate, since athletes train with the drugs and may quit taking them before competition, but this is unlikely to be a problem if testing is done on a year-round, randomized basis. If conducted properly, drug testing provides the only proof that AS are being used and gives coaches and athletes an indication of the prevalence of use in a given league or sport.

Growth Hormone

The perceived benefits of hGH are in achieving long-lasting gains. Like steroids, it is clear that hGH has many complex actions and far-reaching effects on metabolism and specific tissues. The effects of growth hormone use in mature males or females is poorly understood, since there is no known therapeutic use for growth hormone in normal adults. The only medically accepted use for growth hormone is to treat children who have inadequate secretion of their own growth hormone. The goal of this therapy is to achieve normal adult height. Most research in this area has dealt with the treatment of the chronic overproduction of growth hormone by adults known as acromegaly (overproduction in children results in gigantism). In this disease, adults increase muscle mass but complain of muscle weakness. No studies have assessed the quality of hGH-induced hypertrophy in trained athletes. The effects of growth hormone overproduction in adults (acromegaly) are well-established and occur in men and women alike. These include widening of the bones, especially with facial deformities, enlargement of the heart and liver, and disturbances in metabolism. Acromegalics tend to die young from heart disease, due in part to extraordinarily high cholesterol levels.

Athletes use growth hormone in the belief that there is a point between normal adult levels and the disease of chronic overproduction where some athletic benefits can be gained. This remains unproven, and athletes experimenting with growth hormone, like AS users, are playing the role of human guinea pigs. Growth hormone has some risks not associated with AS that are specific to its classifications as a protein hormone. One of these effects is the potential stimulation of antibodies against themselves, with uncertain medial consequences. The handling and dosing of growth hormone is more complicated than that of steroids. The hormone decomposes in solutions at room temperature, which results in the injection of inactive material. The actions of hGH occur primarily through the stimulation of a second group of hormones produced primarily in the liver called insulin-like growth factors (or somatomedins). Thus hGH stimulates several complex reactions of varying duration.

This material was developed by NSCA's Performance Enhancing Substance Abuse Committee.