

Anabolic Steroids Have Few Long-Term Side Effects In Bodybuilders

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Every bodybuilder, powerlifter, athlete and gym rat who has ever taken anabolic steroids (AAS) worries at one point or another about the risks involved. Even though there are not designated parking spots at gyms for ambulances to make it easier for EMTs to push oversized gurneys to the squat racks, every public statement made by politicians, health agencies and celebrity athletes emphasizes the potential damage to a person's health in addition to tagging AAS users as cheaters.

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Certainly, AAS use carries risks, as does the use of any drug. Unfortunately, the true scope and degree of that risk is unknown, as AAS research has been stunted due to biases in funding and ethical concerns from traditionally ultra-conservative Institutional Review Boards (IRBs). Clinical research involving humans and animals is approved by an IRB prior to recruiting volunteers to ensure that the subjects will not be exposed to significant or unnecessary risks. At this time, the risk profile for testosterone use appears to be dose-related, with doses that result in plasma (blood) concentrations well outside the normal range (both above and below), leading to side effects that range from temporary and trivial to serious and permanent…potentially fatal in rare cases. Not only do the risks depend upon the concentration achieved; age, gender (sex), AAS used and underlying health conditions (sometimes undiagnosed) in the user need to be considered as well. Extremely young (adolescents or children) and elderly people may not be able to tolerate the sudden or extreme swing in androgen concentrations; women are much more sensitive to changes in androgen levels and may develop features that would go unnoticed or be of little consequence in men; while testosterone is generally well-tolerated, other AAS may affect certain tissues or behaviors negatively; and lastly, the existence of psychiatric or health conditions that may be stimulated or accelerated by fluctuations in androgens are relevant concerns (certain cancers, mania, depression, etc).

Nonetheless, demand for AAS remains high, particularly among adults who wish to improve their appearance, quality of life or health. Why is there such a disparity? Why do adults who are seeking to be healthier and more vital choose to use hormones that are supposed to be so dangerous? Frankly, most users do not perceive AAS to be dangerous and readily accept the side effects they realize in exchange for the tangible benefits of increased muscle mass and strength, not to mention the positive response of peers.¹ However, is it perception or reality that is influencing AAS users? After all, the medical literature is replete with cases of liver damage, heart attacks, behavior problems and premature deaths.²⁻⁵ Conversely, other papers have noted that in consideration of the assumed prevalence of AAS in the United States, the number of cases of serious adverse events is relatively low, especially when one considers that the majority of users are self-educated or even untrained in AAS use, that the drugs are often of undocumented purity and potency and may be adulterated with other substances and are also commonly distributed through dubious channels.⁶

Clinical studies of adult men, both young and elderly, administering doses in the range commonly reported by AAS users (300mg-600mg/week testosterone enanthate) did not result in significant adverse effects during six months of AAS use.^{7,8} Yet, while the controlled conditions of those studies resemble AAS use "in the wild," they do not account for many issues related to AAS use that may affect health, such as the use of adjunct drugs to increase AAS potency or prevent/treat side effects. Though there have been reports detailing the experiences of AAS users, ranging from data collected during the long, state-sponsored doping program for athletes in the German Democratic Republic to the unreleased data collected by Victor Conte during the "BALCO" doping scandal, long-term studies of unsupervised, nonmedical AAS users are rarely published.⁹

The International Journal of Sports Medicine has released a paper ahead of print, written by clinical researchers from two universities in Italy that followed 20 bodybuilders for two years who had not used AAS prior to the study.¹⁰ During this time, the subjects administered drugs they obtained, in the manner they chose, without guidance from the researchers other than an introductory primer on the known or potential risks associated with AAS use. The subjects were examined quite thoroughly prior to the onset of the study, then every six months for two years. In addition to answering questions about AAS use, the subjects also provided their diet and supplement history, training routine and background, were physically measured (including testicular volume) and blood work was drawn to assess the effect on the liver, lipids/cholesterol and other factors involved in cardiovascular health, heart function by echocardiography, endocrine hormones, glucose and insulin sensitivity, immune function, as well as prostate exams and semen analyses. This study incorporated as complete a workup as one can get without being abducted and probed by space aliens.

Seven subjects withdrew from the study due to emotional challenges or sexual dysfunction, leaving 13 who completed the two-year term. As would be expected, the subjects gained lean mass and lost fat mass, along with suppression of the pituitary hormones LH and FSH, resulting in smaller testicles (2 percent to 40 percent smaller); two of the subjects experienced azoospermia (no sperm) while two others had very low sperm counts.^{7,8,11} Most other hormones were unaffected by AAS use (including testosterone and estradiol, surprisingly), the exception being thyroid hormone. Both free T3 (the active form of thyroid hormone) and TSH (the regulatory hormone that controls thyroid hormone production) were lower, though remained in the normal range...yet the subjects still experienced apparent fat loss. Gynecomastia (bitch tits) occurred in five of the subjects. While total cholesterol and LDL (bad) cholesterol were unchanged, HDL (good) cholesterol was reduced though the effect is known to be transient (returning to normal after AAS are discontinued) from earlier studies.^{12,13} Interestingly, triglycerides (fats in the blood), which were already low in these subjects, decreased even further. Some clinicians believe triglycerides are more important in regard to cardiovascular risk than cholesterol.¹⁴ Another factor associated with increased risk of cardiovascular disease (lipoprotein a) trended downward, though the change did not reach statistical significance.

Additional metabolic findings reported were reductions in blood glucose (sugar) and insulin. This is a very powerful finding, as high blood sugar and insulin resistance increase the risk of developing the Metabolic Syndrome and pre-diabetes, as well as chance of future heart attack or stroke.¹⁵ Improved insulin sensitivity may also explain some of the fat loss realized by the subjects. The authors noted that this effect may be directly related to the increase in muscle mass, allowing for more effective and healthier sugar control. While the on-cycle reduction in HDL does cause some concern, the other changes appear to balance out the metabolic effects to a neutral or even positive physical state. The liver enzyme studies did show elevations in two of the hormones measured, but these changes are known to occur with intense exercise; a third enzyme actually decreased, suggesting much of the change seen reflected muscle strain/damage as opposed to liver.^{10,16} Two of the subjects (both using oral AAS) did experience a doubling of AST and LDH, which would prompt further examination in a doctor's office. Ultrasound imaging showed no changes in liver structure, though several of the subjects entered the study with fatty liver, possibly due to the high protein content of the diet, according to the study authors.

Since AAS are known to increase the production of red blood cells, clinicians monitor the hematocrit to make sure the blood is not becoming "too thick." This effect has been seen in studies involving elderly men on testosterone replacement therapy, but none of the subjects in this series experienced a dangerous elevation in red blood cell mass.¹⁷ Also, immune function measures were not affected in a clinically significant fashion.

All told, the AAS users appeared to avoid any untoward effects of significance, with the exception of gynecomastia. The authors stated in the paper that there were no changes in the structure or function of either the heart or the liver outside of those expected in a group of power-trained athletes.¹⁰ In fact, the greatest concern raised by the authors was the possibility of a drug interaction due to the numerous drugs and supplements consumed. The final paragraph of the study is quite enlightening: "The picture emerging is one of a knowledgeable population of 'users' integrated into a subculture of clandestine use of drugs, able to manipulate substances in order to maximize the 'advantages' and minimize the disadvantages."¹⁰ One might walk away from this study with a warm, fuzzy feeling that AAS use is not so dangerous after all and that even first-time users can achieve gains in muscle mass and definition relatively safely. Really, despite the lack of any apparent adverse side effects, one need realize there are many limitations to this report. First off, the number of subjects is very small. Secondly, seven of the 20 dropped out, primarily due to emotional or sexual problems. Third, five experienced gynecomastia and four became infertile, at least temporarily. Fourth, the subjects were not examined uniformly on-cycle or off-cycle, so it is likely that each time point represents a random mix. I think this is one of the biggest flaws of the study, as each data point has no relation to standard conditions. Fifth, the drugs vary all across the scale of AAS, including prohormones. Doses, number of cycles, duration of cycle, pattern (such as pyramiding), use of adjunct drugs (GH, thyroid hormone, clenbuterol, hCG, Clomid, etc.) are all different. Sixth, the drugs were sourced through the black market and the contents were not analyzed to determine potency and purity.

Truly, the most amazing result of this study is that any significant findings were evident; those that were reported were generally of little clinical significance. Further, from this study, it appears that the negative effects were balanced by other metabolic adaptations such that one could argue that the AAS use promoted greater health. In the end, this study, despite its extensive examinations and long-term data collection, provides little real knowledge about the health risks/benefits of AAS use. Hopefully, the authors will repeat the study looking at changes relative to periods of use and non-use under more uniform conditions. As it stands, we have no idea what impact aromatase inhibitors, GH and insulin have on a person during and after prolonged periods of AAS use. To end on a more positive note, this study certainly did not reveal any significant negative effects among these AAS-using bodybuilders over a two-year period of use.

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