

# Anabolic-Androgenic Steroid Use Among California Community College Student-Athletes

Robert D. Kersey, PhD, ATC, CSCS

**Objective:** To determine the incidence of anabolic-androgenic steroid use among a sample of community college student-athletes; also, to compare various aspects of users and nonusers, as well as to describe usage patterns.

**Design and Setting:** A survey following random stratified cluster sampling techniques was administered to 10 California community colleges.

**Subjects:** A group of 1,185 male and female student-athletes.

**Measurements:** An anonymous 27-item, valid, and reliable questionnaire was administered surveying anabolic-androgenic steroid use and usage patterns.

**Results:** Of all student-athletes sampled, 3.3% were anabolic-androgenic steroid users. Gender-specific incidence rates were 4.2% for males and 1.2% for females. Anabolic-androgenic steroid users tended to be older males, usually in

their second year of college. The users were more often minorities. Users believed that they were knowledgeable about anabolic-androgenic steroids, and that the rates of usage were higher than reported. Their sources of steroid information were often lifting partners and fellow athletes. Use of these drugs was most often in cycles (mean of 6.7 weeks) and was frequently done using multiple anabolic-androgenic steroids at a time. The average number of cycles completed was 2.9. A wide variety of steroids were used by the student-athletes, of which most were obtained from illegal sources.

**Conclusions:** Anabolic-androgenic steroid use among California community college student-athletes were similar to other previous research studies involving high school and university student-athletes.

**Key Words:** anabolic steroid(s), athlete, ergogenic aid(s)

Certified athletic trainers are often called upon to provide information about various aspects of athletic medicine. It is important that they know, understand, and disseminate to their athletes the most current and correct information available. With the increasing pressure on athletes to perform at higher levels, the use of ergogenic aids has become a health care issue of concern.

Anabolic-androgenic steroids are drugs that are believed by many to increase athletic performance.<sup>4,12-14,35</sup> Unless prescribed by a physician for a particular illness, these drugs are illegal to use, with or without a prescription.<sup>30</sup> The use of these types of ergogenic aids by athletes (and nonathletes) has been reported at many levels, including high school, university, elite, and health club athletes.<sup>1-3,5,7-12,15-28,31-33,36</sup>

An extensive literature review indicated no current or previous information concerning junior college, 2-year college, or community college student-athletes and their involvement with anabolic-androgenic steroids. This population is a unique group of considerable size. While elite high school athletes often receive athletic scholarship offers and marginal high school athletes choose not to continue in athletics, community college student-athletes may be unable to participate academically, financially, or physically at the university level. They often compete at a community college to improve to a level that allows them to move on to university athletics. No other group of student-athletes has these same characteristics. Due to their unique traits, the significance of the population size, and the lack of previous research, a study of community college

student-athletes and their relationship with anabolic-androgenic steroids was conducted.

The purpose of this study was to determine the frequency of anabolic-androgenic steroid use among student-athletes from a random, stratified, cluster sample of California community colleges. In addition, those who identified themselves as anabolic-androgenic steroid users were compared to those who identified themselves as anabolic-androgenic steroid nonusers. Patterns concerning the nature of abuse among users were also identified and described.

## METHODS

The California Community College Anabolic-Androgenic Steroid Survey was designed to obtain information regarding California community college student-athletes and their use of anabolic-androgenic steroids. Through a review by a panel of experts, the 27-item survey was deemed to have both face and content validity. Reliability of the instrument was determined to be .90 through a test-retest procedure.

## Population and Sample

The population pool for the present study included all student-athletes enrolled in the California community college system. This educational system included 71 districts with 106 community colleges, of which 99 had athletic teams. Total enrollment in the system was over 1.4 million students.<sup>6</sup> The number of student-athletes was approximately 23,000 (personal communication with Walt Rillet, California Commissioner of Athletics).

Robert D. Kersey is an associate professor in Human Performance at San Jose State University in San Jose, CA 95192-0054.

The sample for the current research was determined through a random, stratified, cluster sampling technique. The use of individual colleges (clusters) was used, as it was logistically impossible to produce a current and accurate list of all 23,000 student-athletes in the California community college system and then survey a random sample of this group. The stratification of the colleges within the state was used to get equal representation of the various types of institutions throughout California. The sample included 10 community colleges: two each from the North-Large and South-Small divisions and three each from the North-Small and South-Large divisions. These sampling methods allowed for the surveying of a representative sample of community colleges in both size and locale, while achieving a sufficient sample size.

### Data Collection

Data were gathered on all student-athletes at each selected college throughout the given academic year. A National Athletic Trainers' Association-Board of Certification (NATA-BOC) certified athletic trainer acted as the site administrator at each institution. They were selected to allow for maximal accuracy and rate of return of the survey questionnaires, while allowing for minimal disruption of the student-athletes. Each site administrator emphasized the need for truthful and honest answers and informed participants that the questionnaire was anonymous. A standardized instruction manual was provided to each site administrator. The instrument was administered without incident.

### Data Treatment and Statistical Analysis

All questionnaires were returned to the final collection site by the site administrator. Each individual instrument was coded and recorded. The resulting data file was printed and rechecked by hand against each survey questionnaire to insure accuracy.

## RESULTS

### California Community College Anabolic-Androgenic Steroid Survey Institutions

The institutional population of the 10 randomly selected community colleges ranged from 5,700 to 24,000, ( $\bar{x}$  = 11,960). The mean population for the institutions sampled in this study was similar to the median for all California community colleges with athletics, 12,000. The average number of sports offered at the various schools was 12, while the range was from 1 to 17. Both men's and women's sports were offered

at 8 of the 10 institutions. Sports offered at the selected schools included: men's and women's basketball, cross-country, soccer, swimming, tennis, track and field, and volleyball; men's baseball, football, golf, and wrestling; and women's softball.

Survey returns ( $n = 1,185$ ) varied among institutions. The range of returned surveys from each institution was 15 to 238 with a mean of 118.5 (83 male and 35 female).

### California Community College Anabolic-Androgenic Steroid Survey Sample

Student-athlete participants ranged in age from 17 to 39 years with a mean of  $19.6 \pm 2.2$  years. The sample included 833 males (70.3%) and 352 females (29.7%). Most of those sampled [640 (54%)] considered themselves to be academic freshmen (less than 30 semester units completed). Five hundred twenty-one of the sample (44%) were academic sophomores (30 to 60 semester units completed). Twenty-three subjects (2%) were neither freshmen nor sophomores. The majority [736 (62.1%)] considered their current athletic eligibility status as that of a first-year collegiate athlete (athletic freshmen). Second-year collegiate athletes (athletic sophomores) comprised 396 (33.4%) of the sample. Those who were neither athletic freshmen nor sophomores (redshirts) accounted for 55 (4.6%) of the subjects. The ethnic makeup of the sample is presented in Table 1. Multi-sport athletes comprised 190 (16.1%) of the respondents. There were 175 (14.8%) two-sport athletes; 17 (1.4%) of the sample participated in three sports.

### Incidence of Anabolic-Androgenic Steroid Use

Overall, 38 respondents used anabolic-androgenic steroids (3.3%). Thirty-four male subjects (4.2%) used, while only 4 females (1.2%) were users.

### User and Nonuser Comparisons

Respondents described their perceived knowledge about anabolic-androgenic steroids. While the most common response for users was "very knowledgeable" [18 (48.7%)], only 169 (15.2%) of the nonusers responded similarly. Of the nonusers, 315 (28.3%) felt they were "not very knowledgeable" compared to only 2 (5.4%) of users who responded in a similar manner.

While nonusers indicated their primary source of knowledge was coaches/instructors [312 (32.8%)], users indicated that lifting partners/fellow athletes were their main source [14 (42.4%)] of perceived steroid knowledge. A large percentage of both nonusers [235 (24.8%)] and users [6 (18.2%)] got their information from magazines/trade literature.

**Table 1. Ethnic Composition of Sample**

	African-American	Caucasian	Hispanic	Native American	Asian Pacific	Other
Anabolic-androgenic steroid user	11 (29%)	17 (44.7%)	6 (15.8%)	1 (2.6%)	1 (2.6%)	2 (5.3%)
Anabolic-androgenic steroid nonuser	217 (19.6%)	640 (57.8%)	145 (13.1%)	15 (1.4%)	53 (4.8%)	37 (3.3%)
Total sample	228 (20.1%)	657 (57.0%)	151 (13.2%)	16 (1.4%)	54 (4.8%)	39 (3.5%)

Users felt that use of these drugs among their peers was much more prevalent than did nonusers. Of the nonusers, 773 (70.4%) felt the use of these drugs was low (under 10%), while only 7 (18.4%) of the users responded in a similar fashion.

Nonusers' mean age was 19.6 years, with the median and mode both being 19 years. Alternatively, users' mean age was slightly older (19.8 years), with the median and mode both being 20 years. Of the users, 23 (62.2%) were no longer teenagers, compared to 398 (35.4%) of the nonusers.

Most of the respondents were male, 777 (69.8%) of nonusers and 34 (89.5%) of users. The sample included 337 (30.3%) nonuser females and 4 (10.5%) user females. Most respondents were Caucasian; only 21 (55.3%) of the users were ethnic minorities, compared to 467 (42.2%) of the nonusers (Table 1).

Most users were academic sophomores [25 (65.8%)] compared with only 13 (34.2%) freshmen. The majority of nonusers were academic freshmen [613 (54.7%)] and 484 (43.2%) were sophomores.

Respondents classified themselves as being either athletic freshmen, athletic sophomores, or redshirts. Nonusers were most often athletic freshmen [702 (62.5%)] as compared with 371 (33%) of athletic sophomores. Nineteen of the users (50%) considered themselves to be athletic sophomores, while 16 (42.1%) of the users were athletic freshmen. The percentage of redshirts was low for both groups, although higher for users [3 (7.9%)] than nonusers [51 (4.5%)].

### **Anabolic-Androgenic Steroid Abuse Patterns**

The average length of a cycle was 6.7 weeks in duration. The mean cycle length was 4.7 weeks for females and 7.2 weeks for males, with a range of 29 weeks (from 1 to 30 weeks). The average number of completed cycles was 2.9. Males averaged 2.7 cycles, while females averaged 3.3 cycles, with a range of 9.5 (from 0.5 through 10 cycles).

Of the users, 18 (47.4%) had used more than one anabolic-androgenic steroid at a time (stacking), while 20 (52.6%) said they had never stacked anabolic-androgenic steroids. No female respondents admitted to stacking anabolic-androgenic steroids.

Most steroids were obtained through illegal methods such as friends and coaches [20 (59%)]. Over one-fourth of the users [9 (26.5%)] obtained their drugs from physicians without a prescription, while 3 (8.8%) got their drugs through doctors with a prescription. Anabolic-androgenic steroids were obtained from pharmacists, veterinarians, athletic trainers, or other medical sources by 2 (5.9%) of the users.

Of the users, 19 (51.4%) reported using some form of testosterone, making it the most commonly abused anabolic-androgenic steroid. Other commonly used steroids are presented in Table 2. Percentages total to more than 100%, because most users used multiple drugs.

## **DISCUSSION**

### **Anabolic-Androgenic Steroid Incidence of Use**

California community college student-athletes sampled use anabolic-androgenic steroids at a rate of 3.3%. These results are

similar to findings reported by others who studied high school and collegiate student-athletes.<sup>1-3,5,8-10,15-16,19,23,25,27-28,31-33</sup>

An interesting trend may be emerging judging from the results of this study and previous studies. Patterns of anabolic-androgenic steroid use appear to have declined. A recent study<sup>23</sup> of high school student-athletes found one of the lowest incidences of use of all studies when looking at males (2.9%) and females (0.4%) independently. A series of studies among collegiate student-athletes<sup>1-3</sup> also indicated a similar decline.

The apparent drop in anabolic-androgenic steroid use may result from increased underreporting. The Anabolic Steroids Control Act,<sup>30</sup> which was passed in 1990, made the possession of anabolic-androgenic steroids a felony. (These drugs are now a Schedule III Controlled Substance.) The effects of this law on the reporting of anabolic-androgenic steroid use is unknown, but it may lead to underreporting. Others have indicated that the usage rates found by steroid surveys were probably valid and reliable, but were likely the lower end of a range.<sup>5,7,19,25,26,33,36</sup>

### **Anabolic-Androgenic Steroid User Profile**

The present study indicated that users tended to be chronologically older than nonusers and most often second-year students. One previous study on high school and college student-athletes indicated similar findings.<sup>16</sup> Past high school studies<sup>16,27</sup> seemed to yield no apparent trends or patterns regarding the relationship between educational level and steroid use. Previous collegiate studies did not consider this issue.<sup>1-3,10,25</sup>

As reported in previous research,<sup>1-3,8,15-18,20,23,27,29,33</sup> the present study determined that males used much more often than females. Talk of the use of anabolic-androgenic steroids is often guarded, and admitted use of these drugs may lead to negative feedback from others. Admitted use by females may be more covert than for males.

Although slightly more minorities than Caucasian were users, the present findings did not appear to reveal any definite trends or use patterns among the various ethnicities. Nor has any known previous study found any statistically significant differences with regard to ethnicity and use.

### **Anabolic-Androgenic Steroid Knowledge**

Anabolic-androgenic steroid users in the present study believed that they knew more about these drugs than others. Almost one-half of the users considered themselves to be "very knowledgeable" about anabolic-androgenic steroids, while only 15% of the nonusers answered similarly. The ability to differentiate between perceived and actual steroid knowledge was beyond the scope of the present research.

The primary sources of information concerning anabolic-androgenic steroids among all student-athletes in the current study were instructors/coaches. Those who considered themselves to be users obtained their steroid information most often from lifting partners/fellow athletes (42%). It is critical that educators (including athletic trainers) become more knowledgeable about anabolic-androgenic steroids.

**Table 2. Most Commonly Used Anabolic-Androgenic Steroids**

(Brand Name)	(Generic Name)	No. Used	(%*)
Testosterones	Varies	19	51.4
Dianabol	Methandrostenolone	11	29.7
Anadrol	Oxymetholone	8	21.6
Deca-Durabolin	Nandrolone decanoate	4	10.8
Winstrol	Stanozolol	4	10.8
Anavar	Oxandrolone	4	10.8
Equipose	Boldenone undecylenate	3	8.1
Durabolin	Nandrolone phenylpropionate	2	5.4

\* Percentage totals more than 100% due to use of multiple anabolic-androgenic steroids by student-athletes.

Current results found that anabolic-androgenic steroid non-users underestimated the rate of usage among their peers, while users overestimated the incidence of use among peers. With this in mind, it is interesting to note that one of the present reasons cited for the use of anabolic-androgenic steroids was to maintain competitive ability against others who were also taking anabolic-androgenic steroids. Results from this study indicate this reasoning is invalid for anabolic-androgenic steroid use.

### Patterns of Anabolic-Androgenic Steroid Usage

Anabolic-androgenic steroids are typically taken in time frames known as "cycles." The time period for completing a cycle varied among the specific users of these drugs and their goals or objectives. In reviewing earlier studies, it seemed that the most common length of a cycle was 6 to 12 weeks.<sup>5,20,36</sup> Data collected through this study paralleled these findings, as the average cycle length was 6.7 weeks.

The number of cycles completed by individual athletes varied. Most previous studies reported 70% to 80% of anabolic-androgenic steroid users had completed two or more cycles.<sup>5,20,36</sup> In my sample, fewer users (62%) had completed two or more cycles.

Previous research indicated that slightly less than one-half of high school and college anabolic-androgenic steroid users stacked these drugs.<sup>5</sup> Researchers who studied health club, gym, or elite athletes found a rate of anabolic-androgenic steroid stacking of at least 50%,<sup>17,20</sup> about the same as the 47% of my sample who stacked these drugs.

Almost 59% of the users in my study obtained their steroids through illegal sources, and 41% received theirs from medical suppliers, similar to past research.<sup>5,10,17,18,20,32,33,36</sup> As stated before, these drugs are illegal to use,<sup>30</sup> and, although many stated they got their steroids through medical suppliers, only a small percentage (9%) reported having a prescription from a physician.

The specific anabolic-androgenic steroids used by athletes and nonathletes for ergogenic purposes have been changing over the years. Many have been discontinued; some are being counterfeited; and new anabolic-androgenic steroids are always being developed. The present research paralleled previous findings.<sup>17,29,33,36</sup> The most commonly used anabolic-androgenic steroids as reported in this study are indicated in Table 2.

### Future Research

More research is needed concerning athletes and their relationship with anabolic-androgenic steroids. Trends and patterns of use will change over time; it is important to follow such variations. Additional information should be collected about the actual knowledge of users and nonusers. Further studies may be helpful in determining if the student-athletes' sources of steroid information are actually knowledgeable about steroids. The role of age, gender, and ethnicity, as they relate to the use of anabolic-androgenic steroids, should be studied in more detail.

Many athletes will face the dilemma of whether or not to use these ergogenic aids at some point in their athletic lifetime. Individuals need to be well-informed to make good choices. Information by itself is not necessarily good; information must be accurate and correct. Athletes often look to athletic trainers for advice and guidance. Athletic trainers should strive to be well-informed and then provide accurate and honest information so that good choices can be made by the athletes under their care.

### ACKNOWLEDGMENTS

I thank Drs. Leon Griffin, Gail Szenasi, Mary Jane Johnson, and Bill DeGroot for their help in completing this research. I would also like to extend my appreciation to all the California community college athletic trainers and student-athletes who helped make this study possible.

### REFERENCES

1. Anderson WA, Albrecht RR, McKeag DB. *Second Replication of a National Study of the Substance Use and Abuse Habits of College Student-Athletes (Report No 3)*. Mission, KS: NCAA; 1993.
2. Anderson WA, Albrecht RR, McKeag DB, Hough DO, McGrew CA. A national survey of alcohol and drug use by college athletes. *Physician Sportsmed*. Feb 1991;19:91-104.
3. Anderson WA, McKeag DB, Albrecht RR, deSpelder TG, Hough DO, McGrew CA. *Replication of the National Study of the Substance Use and Abuse Habits of College Student-Athletes (Report No 2)*. Mission, KS: NCAA; 1989.
4. Ariel G. Residual effect of an anabolic steroid upon isotonic muscular force. *J Sports Med Phys Fitness*. 1974;14:103-111.
5. Buckley WE, Yesalis CE, Friedl KE, Anderson WA, Streit AL, Wright JE. Estimated prevalence of anabolic steroid use among male high school seniors. *JAMA*. 1988;260:3441-3445.
6. Chancellor of California Community Colleges and Community College

- League of California. 1992 *Community College Directory*. Sacramento, CA: CCCC-CCLC; 1992.
7. Clement DB. Drug use survey: results and conclusions. *Physician Sportsmed*. Sep 1983;11:64–67.
  8. Collins MA. Prevalence of anabolic steroid use among Georgia high school students. Presented at the meeting of the National Strength and Conditioning Association; June 1993; Las Vegas, NV.
  9. Corder BW, Dezelsky TL, Toohey JV, Divito CL. Trends in drug use behavior at ten central Arizona high schools. *AZ J Health Phys Ed Recr Dance*. 1975;18:10–11.
  10. Dezelsky TL, Toohey JV, Shaw RS. Non-medical drug use behavior at five united states universities: a 15-year study. *Bull Narc*. 1985;37:49–53.
  11. Frankle MA, Cicero GJ, Payne J. Use of androgenic-anabolic steroids by athletes. *JAMA*. 1984;252:482–483.
  12. Freed DLJ, Banks AJ, Longson D, Burley DM. Anabolic steroids in athletics: crossover double-blind trial on weightlifters. *Br Med J*. 1975;2: 471–473.
  13. Hervey GR, Knibbs AV, Burkinshaw L, et al. Effects of methandienone on the performance and body composition of men undergoing athletic training. *Clin Sci*. 1981;60:457–461.
  14. Johnson LC, Fisher G, Silvester LJ, Hofheins CC. Anabolic steroid: effect on strength, body weight, oxygen uptake and spermatogenesis upon mature males. *Med Sci Sports*. 1972;4:43–45.
  15. Johnson MD, Jay MS, Shoup B, Rickert VI. Anabolic steroid use by male adolescents. *Pediatrics*. 1989;83:921–924.
  16. Johnston L, O'Malley P, Bachman J. *Smoking, Drinking, and Illicit Drug Use among American Secondary School Students, College Students, and Young Adults, 1975–1991*. Washington, DC: US Government Printing Office (DHHS Publication No. NIH 93-3480); 1992.
  17. Kersey RD. Anabolic-androgenic steroid use by private health club/gym athletes. *J Strength Cond Res*. 1993;7:118–126.
  18. Komoroski EM, Rickert VI. Adolescent body image and attitudes to anabolic steroid use. *Am J Dis Child*. 1992;147:823–828.
  19. Krowchuk DP, Anglin TM, Goodfellow DB, Stancin T, Williams P, Zimet GD. High school athletes and the use of ergogenic aids. *Am J Dis Child*. 1989;143:486–489.
  20. Lindstrom M, Nilsson AL, Katzman PL, Janzon L, Dymling JF. Use of anabolic-androgenic steroids among body builders—frequency and attitudes. *J Intern Med*. 1990;227:407–411.
  21. Ljungqvist A. The use of anabolic-androgenic steroids in top Swedish athletes. *Br J Sports Med*. 1975;9:82.
  22. McKillop G. Drug abuse in body builders in the west of Scotland. *Scott Med J*. 1987;32:39–41.
  23. Mikow VA. *North Carolina Student Athletes' and Non-Athletes' Use of and Beliefs About Alcohol and Other Drugs (Draft)*. Raleigh, NC: Department of Public Instruction, Alcohol and Drug Defense Section, Division of Student Services; 1993.
  24. Payne AH. Anabolic steroids in athletics. *Br J Sports Med*. 1975;9:83.
  25. Pope HG, Katz DL, Champoux R. Anabolic-androgenic steroid use among 1,010 college men. *Physician Sportsmed*. Jul 1988;16:75–84.
  26. Taylor WN, Black AB. Pervasive anabolic steroid use among health club athletes. *Ann Sports Med*. 1987;3:155–159.
  27. Terney R, McLain LG. The use of anabolic steroids in high school students. *Am J Dis Child*. 1990;144:99–103.
  28. Trevisan L, Bents R, Bosworth E, Elliot D, Goldberg L. A sequential study of anabolic steroid use and availability among high school football athletes. *Med Sci Sports Exerc*. 1989;21(suppl):S25.
  29. Tricker A, O'Neill MR, Cook D. The incidence of anabolic steroid use among competitive bodybuilders. *J Drug Educ*. 1989;19:313–325.
  30. Foods and Drugs. Annotated Title 21 USC §812.
  31. Welch MJ, Priest RF. Anabolic steroid use among high school athletes. *Med Sci Sports Exerc*. 1989;21(suppl):S25.
  32. Whitehead R, Chillag S, Elliott D. Anabolic steroid use among adolescents in a rural state. *J Fam Pract*. 1992;35:401–405.
  33. Windsor R, Dumitru D. Prevalence of anabolic steroid use by male and female adolescents. *Med Sci Sports Exerc*. 1989;21:494–496.
  34. Win-May M, Mya-Tu M. The effect of anabolic steroids on physical fitness. *J Sports Med Phys Fitness*. 1975;15:266–271.
  35. Yesalis CE. Incidence of anabolic steroid use: a discussion of methodological issues. In: Yesalis CE, ed. *Anabolic Steroids in Sport and Exercise*. Champaign, IL: Human Kinetics Publishers; 1993:49–70.
  36. Yesalis CE, Herrick RT, Buckley WE, Friedl KE, Brannon D, Wright JE. Self-reported use of anabolic-androgenic steroids by elite power lifters. *Physician Sportsmed*. Dec 1988;16:91–100.