Drug doping in senior Australian Rules football: a survey for frequency

Kenneth J Hardy, John J McNeil, Anthony G Capes

Abstract
Objectives—To determine by survey whether the frequency of use of performance-enhancing drugs (drug doping) is significant in elite players of Australian Rules football, and to compare this frequency with that in other competitions.

Methods—Randomised unannounced prospective urine testing during the period 1990–95 of players from the Australian Football League out of competition, in competition matches, and in finals matches; testing was performed according to Olympic International Committee protocols and standards. The players’ identities and clubs were unknown during testing.

Results—Of 900 random urine tests, no positive results were obtained for anabolic steroids, diuretics, caffeine, or peptide hormones. Five positive results (0.6%) were obtained—for pseudoephedrine in two instances, and for probenecid, methoxypenamine, and dextropropoxyphene in one instance each. Each were inadvertent medical doping and declared before testing.

Conclusions—Drug doping is not a problem in the Australian Football League. This is probably because no doping method is considered to be of value to Australian Rules football, because an educational programme is run by football authorities, and because random during season and out of season testing for drugs occurs.

(Keywords: drug doping; football; testing)

The first Australian Rules football match was played in 1858, close to the site of the present Melbourne Cricket Ground, with the goal posts half a mile apart, 40 players on each side, and took three days to complete.1 It was a peculiar mixture of what was later soccer, rugby, and basketball, and is akin to Gaelic football. Probably the fastest game played, there is a rugby-style ball with fields of 200 metres and the ball is moved by running, 70 metre kicks, or handball with no offside rule. High jumping to catch (“mark”) the ball and physical contact similar to American grid-iron football are special features of the game. There are now 21 players a side, and many run 20 kilometres in the 120 minutes of play. Pre-requisites are fitness, speed, stamina, courage, strength, agility, and judgment. The code has a very high media and press profile. Partly because of this, interest focused on the prevalence of drug doping, especially anabolic steroids, in this football code, even though it was not suspected to be a problem.

Through the medical commissioners (AGC and KJH) the football administration arranged a prospective random testing programme. This report documents those results. Drug doping in sport is essentially an underground activity, with little formal published research.2 As far as we know, this is the first prospective random drug doping study for a single sport involving out of season and throughout competition play.

Subjects and methods
Testing for drug doping was arranged out of competition, at competition matches, and at finals matches for the period 1990–95. Clubs and players were selected by random numbers, obtained from alphabetical club lists out of training and from the numbers worn on their backs for competition matches. The testing team attended matches or training sessions unannounced, tested up to six players from the teams selected, and involved all of the 16 clubs in the senior national competition. Testing by choosing random numbers meant that some players were tested on more than one occasion.

The classes of banned drugs adopted by the Australian Football League are based on the recommendations of the International Olympic Committee Medical Commission. Anabolic steroids are not sanctioned under any circumstance. Compounds used socially, such as caffeine in popular drinks, are permitted to a specific urine concentration, as defined by the International Olympic Committee.

The collection of samples and their testing was conducted by the Australian Sports Drug Testing Agency. This agency meets testing standards required by the International Olympic Committee. The protocol for escorting randomly selected players, and urine collection, was also according to the International Olympic Committee guidelines. Urine samples were numbered so that the testing agency was unaware of the origin of the specimens. Analysis was carried out at the Australian government analytical laboratory (Sydney, Australia).

Samples were tested by gas chromatography, and gas chromatography/mass spectrometry extraction with silyl derivatisation was used to detect the presence of stimulants, narcotics, and anabolic steroids. A urine ratio of testosterone to epitestosterone of greater than six was defined as a positive result for testosterone, and

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Drug doping in football

Table 1 Number of Australian Football League players having random urine drug tests during 1990-95

<table>
<thead>
<tr>
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<tr>
<td>Out of competition matches</td>
<td>12</td>
<td>71</td>
<td>73</td>
<td>66</td>
<td>90</td>
<td>70</td>
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<tr>
<td>Competition matches</td>
<td>72</td>
<td>79</td>
<td>75**</td>
<td>84*</td>
<td>72*</td>
<td>106*</td>
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<tr>
<td>Finals matches</td>
<td>10</td>
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<td>10</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>148</td>
<td>148</td>
<td>160</td>
<td>172</td>
<td>186</td>
</tr>
<tr>
<td>Positive</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

* Indicates a positive test.

A urine concentration of 12 μg/ml as positive for caffeine.

Results

Table 1 shows the results of random testing of Australian Football League athletes. A total of 382 players were tested out of season, 488 during competition, and 30 in final matches for the period 1990–95. All clubs were tested at least twice a year, and a number of players were tested on more than one occasion. The medical commissioner did not request any additional tests. There were five positive results—pseudoephedrine (two cases), and methoxyphenamine, dextropropoxyphene, and probenecid (one case each). Medications were declared by the player on the drug notification form in each instance. Investigation showed legitimate medical illness, these being flu-like illness with sinusitis (three cases), tonsillitis and migraine (one case each). Each event was judged inadvertent medical doping and no further action was taken.

Discussion

This study reports the results of random prospective drug testing in senior Australian Rules football. Athletes in many sports have been tempted to enhance their performance by using drugs that influence factors that limit physical performance. No instance of the use of anabolic steroids, diuretics, narcotics, β blockers, or peptide hormones was detected in this survey.

The positive results detected in this study were pseudoephedrine (two cases), methoxyphenamine for influenza-type illness (one), probenecid with penicillin for tonsillitis (one), and dextropropoxyphene for migraine (one). Each was classed as inadvertent medical doping and no action was taken against the player.

This unique Australian football requires speed, stamina, judgment, physical skills, and courage in about equal proportions for nearly all players. Drugs which enhance some of these characteristics decrease others.

Although there is limited information available about the physiological responses involved, the game principally requires periods of low level dynamic exercise punctuated by surges of considerable activity. This combination of aerobic and anaerobic activity can be limited by physical factors such as cardiac output and muscle bulk as well as higher mental functions.

Anabolic steroids increase muscle bulk but slow the player down so that gaining possession of the ball is difficult. Cruciate knee ligament injury with knee reconstruction is not uncommon, and player folklore has it that healing after this operation is retarded by steroids.

Although no instance of illegal drug use has been detected to date in the senior competition, there have been occasions of suspected misuse at a lower level. In particular, the urinary steroid, oxymesterone, was detected in the urine of two country league footballers who died suddenly while training. At necropsy hypertrophic cardiomypathy and myocarditis was found, both of which are recognised effects of oxymesterone.

Attempts have also been made to improve athletic performance using shorter acting drugs such as digoxin or sympathomimetic agents such as ephedrine, caffeine, and amphetamines. These produce mental stimulation, increased cardiac output, and a heightened state of alertness and reduced fatigue. Caffeine is proposed to increase catecholamines, enhancing fat oxidation, sparing muscle glyco- gen, giving a prolonged time to exhaustion. The effect of caffeine has been studied, but the results are controversial. However, trained athletes in cycling and long distance running showed a significant increase of endurance times to exhaustion when 9 mg/kg of caffeine was given one hour before exercise. Plasma adrenaline but not noradrenaline was raised twofold. Urinary caffeine mean concentrations were below the IOC limit (12 μg/ml), but not in all subjects. Similarly, trained middle distance runners who were given 3 g of caffeine completed a 1500 metre treadmill run with a one minute finishing burst in less time and with a faster finishing burst than controls.

Doping with caffeine in Australian football would need to take heed of the length of effect (total period of the match about 150 minutes—game and intervals) and any mental stimulation making the doped more susceptible to physical or verbal taunting. However, it is doubtful if caffeine would prove a useful adjunct to this game.

Accurate data for testing in sport have been hard to locate, with isolated incidents and questionnaires being the only reports (table 2). For example in unannounced doping tests 38–58% of competing bodybuilders in Flanders were positive for anabolic steroids, and 5.5% of 2066 urine tests across 17 sports in South Africa were identified as containing substances banned by the International Olympic Committee. These were principally anabolic steroids and fenecomfamin. Reports of drug doping do vary widely in frequency; of 1015 top grade Italian athletes, 10% admitted frequent use of anabolic steroids or amphetamines for first class competition, whereas there were 0.01% positive results from 17 083 athletes tested in the United Kingdom.

Randomised studies on footballers were not identified, but reports that 13 players were penalised by 30 days' suspension by the National Football League in America indicate that steroids are an issue in that code.  

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Of 4064 Australian athletes surveyed for the period 1979–1982, 5.4% had used steroids, diuretics or stimulants in the previous year, highest among weight lifters and swimmers. Among footballers of all codes, 9% had taken stimulants, 0.8% had taken diuretics and 0.3% had taken anabolic steroids. Among athletes of all codes, the use of anabolic steroids causes most concern. These agents share chemical similarities with testosterone, and their effects include an increase in muscle bulk and strength and a decrease in body fat. Over 1000 of these compounds have been synthesised. They may be taken in “cycles” of 6–12 weeks continuously, with peaks of use just before a competition, by “stacking” (using multiple types of steroids to stimulate all receptor sites), “staggering” (to avoid tolerance), “pyramiding” (incremental doses), or in an “array” (in combination with other drugs such as human chorionic gonadotrophin, human growth hormone, anti-oestrogens or anti-inflammatory agents).

Anabolic steroids have been used by footballers of different codes and other athletes requiring high endurance in the hope of improving high intensity/long duration performance. To date there is no reliable evidence that they provide a benefit and, possibly, any performance enhancing effect may simply reflect greater self-confidence or aggression. The adverse effects of anabolic steroids on the endocrine, hepatic and cardiovascular systems, and the skin are well recognised, and this led to a ban on their use by the International Olympic Committee in 1975. Unfortunately, athletes may consider it necessary to take performance enhancing drugs to match their peers. This attitude is even present among students. However, this has not been the practice of elite Australian Rules footballers.

All Australian Football League clubs were notified that random urine testing for drug doping would be performed unannounced on players out of competition, in competition, and in finals matches. An educational programme on drug doping was begun through club medical officers. It is concluded that currently drug doping is not a problem in senior Australian Rules football.

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Table 2  Positive drug doping reported in refereed journals

<table>
<thead>
<tr>
<th>Author</th>
<th>Study</th>
<th>Number</th>
<th>Positive result (%)</th>
<th>Reference</th>
</tr>
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<tbody>
<tr>
<td>Van der Merwe et al</td>
<td>Non-random</td>
<td>2066</td>
<td>5.5</td>
<td>11</td>
</tr>
<tr>
<td>Delbeke et al</td>
<td>Non-random</td>
<td>—</td>
<td>38-58</td>
<td>12</td>
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<tr>
<td>Haynes</td>
<td>Questionnaire</td>
<td>4064</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td>Schwellnus et al</td>
<td>Questionnaire</td>
<td>1361</td>
<td>0.6</td>
<td>20</td>
</tr>
</tbody>
</table>

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15 Cowart VS. Professional footballer suspensions re-emphasize problems of steroid abuse. AMA 1989;262: 1743.
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