

Research article

ADOLESCENT ATHLETES AND THE DEMAND AND SUPPLY OF DRUGS TO IMPROVE THEIR PERFORMANCE

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ABSTRACT

The aim of this study was to gather information into the principal methods and means employed to supply adolescents with doping agents and others substances used to improve their sporting performance. We conducted a nation wide study in France among adolescent athletes, using a self-completed questionnaire. Exploitable questionnaires ($n = 6402$) were returned, corresponding to 48.9% for the girls and 51.1% for the boys, both aged on average from 16.1 ± 2.2 years. These adolescents practise on average 10.0 ± 5.2 hours of sport per week. 21.9% participate on a national or international competition level. Of our respondents, 4.0% (95% confidence interval: 3.5% - 4.5%) say they have been enticed into using products which are prohibited for athletes. 10.3% of the adolescents say that they have received substances to improve their performance at least once from an average of two different people. It was mostly a friend, their parents and the family doctor. On average, in 33.2% of the cases, the adolescent received the product without asking for it, and in nearly half the cases (46.6%), the adolescent paid for the product. We feel that it is necessary to better understand the ways in which this black market functions: for example; the initial sources of the products sold, the number and the 'profiles' of the dealers, the general organisation of the market and the sums of money involved.

KEY WORDS: Doping in sport, adolescents, enticement, black market.

INTRODUCTION

In the World of Sports, the consumption of certain substances in order to improve performance, fight against pain or help recuperation, is judged as problematic as it can lead to two major areas of concern fraught with physical danger for the athletes, and ethical dilemmas for the Sporting Community. Firstly, there may be damage to the athlete's health linked to the nature of the substances taken, the doses, the methods of administration or even the combination of products, etc. And secondly, there may be inequality between athletes by giving an unfair advantage: the improvement in performance being gained through the use of products rather than by training alone.

It is mainly for these reasons that the sporting movement both prohibits the consumption of certain classes of substances (named on a list which is updated annually) and also ensures that this ban is respected by two series of measures. The first of these series works on people in a non-coercive manner: these are preventative measures. The second series is coercive, can be deemed as repressive, and works mainly through anti-doping tests and the fight against the trafficking of prohibited substances.

This last series, put into action in collaboration with the authorities, notably includes the fight against the fabrication, the importation, the exportation, the commercialisation and the illegal possession of these products, and even the financing of illegal supply networks. On a more basic level,

that of the athletes themselves, the fight against trafficking aims at the supply of these substances, whether they be paid for or not.

As for adolescent athletes, who seem to be from 3% to 5% to have admitted to using prohibited substances at least once in their lives (Laure, 2000), only a few rare studies provide us with indications on their means and methods of supply. According to these young consumers, it would seem that their suppliers are mostly their peer group and their kin. For example, work carried out in the United States among 135 users aged from 14 to 18 shows that their sources of anabolic steroids are mainly their friends (for 55% of the subjects), followed by their trainers (for 26%), doctors (for 12%), or their parents (for 7%) (Tanner et al., 1995). Besides their family and kin, the other source of products seems to be the black market as underlined by other work (Althaus et al., 2000; Lambert et al., 1998; Laure et al., 2004; Scott et al., 1996; Terney and McLain, 1990). Finally, the adolescents, even the non-consumers, freely express the ease of being able to get hold of the prohibited products (Kindlundh et al., 1998; Nilsson, 1995; Tanner et al., 1995; Terney and McLain, 1990).

This data suggests the existence of an easily accessed black market which seems to be directed at young athletes. However, this data gives us a very little helpful information: Did, for example, these adolescents ask for the substances themselves or were they 'enticed' into accepting them? Were the products paid for by the adolescents themselves? And was this enticement totally effective, that is to say, did the young athletes actually consume the products that they were given or bought?

The answers and the information gained from these questions could prove to be useful from a prevention point of view. As such, the aim of this work is to gather information into the principal methods and means employed to supply adolescents with substances used to improve their sporting performance.

METHODS

Subjects

The study was carried out on a national basis in France among all the adolescent members of the 'Union Nationale du Sport Scolaire' (UNSS) who compete on at least a regional level. The study took place in the school year 2001-2002.

A self-completed questionnaire, designed with an easy answer format, was distributed by the UNSS to the students in accordance with a schedule agreed upon with the school authorities. UNSS officials provided information to the subjects about the study (the background of the project and project

objectives, the possibility of refusing to answer specific questions, etc). They also assured confidentiality and anonymity for the respondents, and solicited honest answers. Participation in the study was voluntary, and the subjects were free to withdraw their consent without any prejudice for them. The participants were requested to seal the completed forms in an envelope before depositing them in a closed collection box at the school gymnasium. The questionnaires were given out in April and May 2002.

The questionnaire, of semi-structured type, was adapted from studies published elsewhere (Laure et al, 2000, Laure et al, 2004) and was tested beforehand on fifty subjects. It was composed of two parts and included mainly single choice questions. The two parts were:

Part 1. Drugs used to enhance physical performance during sport activities, such as cannabis, tranquillisers, vitamins, iron, proteins, creatine (in France, creatine is considered as an illicit compound) and doping agents. Doping substances are drugs registered on the Olympic Movement Anti-Doping Code (OMAC), the list which is used in sport drug-testing as a basic list for sports authorities. This list includes substances and 'recreational drugs', which are optionally covered by testing (i.e. the IAAF list does not include testing for cannabis). So, despite the fact that the OMAC list contains cannabis (Classes III.B), we decided to consider this substance separately from other doping agents in the questionnaire.

Part 2. Young people's sources and means of supply of substances, such as friends, parents, trainers, physicians, pharmacists, or sports teachers. The questionnaire also included items about the enticement to use the substances: for example, the arguments used by the enticers, as well as the 'effectiveness' of the enticement.

Statistical analyses

The data was managed and analysed using the Modalisa ® 4.1 (Kynos, Paris) survey processing software (data entry verified by two operators). Frequency and summary statistics were calculated on all variables. Comparisons were made using the chi-square test (sex, etc). The significant threshold employed was $p < 0.05$.

RESULTS

Description of the respondents

6,523 questionnaires of which 6,402 were exploitable were returned, corresponding to 48.9% for the girls and 51.1% for the boys, both aged on

average from 16.1 ± 2.2 years (mean \pm standard deviation). We had foreseen the diffusion of about 42,000 questionnaires: so the raw response rate is around 15%. But in practical, only the third of these questionnaires was really distributed to the athletes by the local UNSS officials (according to them due to lack of time or neglect). Thus, the real response rate is about 46 %.

These adolescents practise on average 10.0 ± 5.2 hours of sport per week. The majority of them (78.1%) participate in competitions on a regional basis and 21.9% participate on a national or international level.

On the whole (84.8%), they say that they are "satisfied" or "very satisfied" with their sporting achievements.

The subjects' opinions on doping

The majority of the adolescents confirmed that doping is "always dangerous" for the health (92.9%), and they also consider that "doping in sport is cheating" (95.8%). However, 31.6% think that doping can be "used without danger if taken following a doctor's advice", and 20.7% think that to "refuse doping means losing all chances of becoming a great champion".

The 'Enticement' To Use Doping

The adolescents 'enticed' into using doping

A small number of the adolescents, 4.0% (95% confidence interval: 3.5% - 4.5%) say they have been enticed into using products which are prohibited for athletes.

This is especially the case for the boys (5.6% vs. 2.6% of girls; $p < 0.001$). These boys practice more than ten hours of sport per week (5.8% vs. 2.9% of those who practice less; $p < 0.001$). They compete in national or international competitions (7.6% vs. 3.4%; $p < 0.001$.) and they also judge their sporting achievements as "not at all satisfactory" (8.3% vs. 3.8% of those who give a more positive reply; $p < 0.01$).

The arguments used by the enticers

According to the adolescents, two categories of arguments are used by the enticers.

The first category is centred upon performance improvement, for example; "With this you'll run faster", "Your level will be better", "This is to help you perform better", "This gives you strength", "This makes your muscles bigger", etc.

The second category seems to concern the combating of fatigue, anxiety or pain occurring during the sporting activity. For example, "This fights the pain", "You'll be better after this", "This is to help you keep going", "This is so you don't feel

the effort", "This fights the stress", "This is to stop your legs hurting", etc.

The 'effectiveness' of the enticement

The majority of the adolescents (69.7%) say that they trust the person who enticed them into taking doping products, and half of them (52.5%) did not talk to their parents about it.

More than half of the adolescents (56.6%) who accepted the product say that they consumed it. This group especially includes young athletes engaged in competitions on a national or international basis, and who think that doping is "not always dangerous for the health" and who also believe that "doping is *not* cheating".

The Black Market

In our study, 10.3% of the adolescents say that they have received substances to improve their performance at least once from an average of two different people: and this for all types of substances banned for athletes; iron, vitamins, non-steroid anti-inflammatories, etc

According to the adolescents, it is mostly a friend, their parents and the family doctor who provide the products. Others also mention a drug-dealer, a member of the family other than their parents, a pharmacist, the trainer or the manager of a sports club, a sports teacher and a physiotherapist.

On average, in 33.2% of the cases, the adolescent received the product without asking for it, and in nearly half the cases (46.6%), the adolescent paid for the product, especially when he had asked for it (Table 1). Here, there is no significance difference in the age or the sex of the young athlete.

DISCUSSION

This study does have its limits. Firstly, our sample group is not statistically representative of young French sports competitors. In any case, the aim of this study must *not* be seen to be quantitative, but simply to discover certain types of behaviour. As such, these inconveniences do not seem to pose any major problems for this present study. Also, our results come from a study conducted by questionnaire, the limits of which are well-known. However, recent work exploring the validity of answers to questions concerning the personal consumption of illicit substances concludes that the self-completed questionnaire *is* a reliable tool for gathering information (O'Farrel et al., 2003; Secades-Villa and Fernandez-Hermida, 2003).

Our results confirm the existence of a 'black market' for products to improve performance which

Table 1. Source of supply for products to improve physical performance.

Supplier of the product(s)	Percentage of adolescents supplied	Main product(s) supplied	Percentage of adolescents who received a product without asking for it	Percentage of adolescents who paid for the product
Friend	96.6%	Cannabis Ψ^* , analgesics, creatine#, extra-protein	23.5%	15.5%
Parents	96.3%	Vitamins, analgesics, magnesium, anti-inflammatory \dagger , stimulants* \dagger , corticosteroids* \dagger , EPO* \dagger	30.7%	36.5%
Family doctor	96.2%	Vitamins, analgesics, corticosteroids* \dagger , anti-asthmatics* \dagger , magnesium, iron, EPO* \dagger , creatine#	40.7%	81.2%
Dealer	93.1%	Cannabis Ψ^*	16.7%	72.2%
Relative	91.2%	Cannabis Ψ^* , analgesics, anti-asthmatics* \dagger	34.7%	22.6%
Pharmacist	90.7%	Vitamins, analgesics, anti-inflammatory \dagger	27.4%	82.0%
Club trainer	87.5%	Vitamins, extra-protein, androgenic anabolic steroids* \dagger , creatine#	48.7%	61.0%
Club manager	78.3%	Vitamins, extra-protein	41.1%	53.8%
Sports teacher	77.8%	Creatine#, anti-inflammatory \dagger	60.0%	25.0%
Physical therapist	76.7%	Vitamins, analgesics, anti-inflammatory \dagger	62.5%	0.0%

Ψ Narcotics, * Prohibited substance for athletes, # Non-authorized product in France, \dagger Medicine supplied only on medical prescription in France.

is directed at adolescent athletes engaged in high-level competitions.

This black market presents several characteristics:

Firstly, it is well and truly a 'market' insofar as it represents a place where the demand for and the supply of products meet. Thus, the majority of young athletes have asked for the substance that they consume. The market can be termed a 'black market' as it is both hidden and illicit: the large majority of 'suppliers' give or sell the products in conditions which are totally illegal; cannabis (an illegal drug), creatine (prohibited in France) or medicines, which are solely reserved for dispensing pharmacists in France. Finally, in nearly half the cases, the adolescents paid for the substances that they consume. In any case, for the two categories of 'suppliers' the most often 'paid', it is probable that a part of the 'transactions' take place legally. For example, when the adolescent buys vitamins in a pharmacy, or when he states that he 'paid' for a product at the doctor's, whereas in reality only the cost of the consultation is paid.

The second characteristic of this black market is the enticement to take products which are prohibited for athletes: a practice which is forbidden by law in France. This characteristic only concerns a small percentage of adolescents, but it is not certain that all those who have been targeted by this black market have realised that they were being enticed.

Thus, the phenomenon is perhaps more widespread than it seems at first sight. We feel however, that the people who entice others to consume products do not simply choose just any adolescent. In fact, they seem especially to target high-level athletes (those at least of a national level) who are not satisfied with their sporting results. What is more, the information on the products that the enticers give to the adolescents is incomplete. The information supplied only underlines the 'positive' aspects of the products, that is to say the improvement in performance, the effects against fatigue, etc. No enticer evokes the undesirable effects on the athletes' health, or the nature of these products which is sometimes illicit for the athletes. Moreover, the enticers' *spiel* seems to be convincing for the adolescents as they themselves say they are trusting, and especially since more than half of them end up consuming the products. This behaviour obviously does not allow the adolescent to make a free and well-informed decision, that is to say, with full knowledge of the facts. This type of behaviour can thus be seen to be *manipulation*. On a different scale, this is similar to what the tobacco industry seems to do to encourage young people to start smoking, or to smoke more (Sly et al., 2000). If these results are confirmed, anti-doping prevention measures may well be inspired by the techniques used these last few years to prevent young people from taking up smoking, as these

techniques seem to be effective (Backinger et al., 2003).

Finally, this 'market' of products is characterised by its ease of accessibility and also the diversity of its 'suppliers'. The two main sources of supply are friends and parents, a finding already brought to light elsewhere (Althaus et al., 2000; Lambert et al., 1998; Laure et al., 2004; Scott et al., 1996; Tanner et al., 1995; Terney and McLain, 1990). As for the third main source of supply, the family doctor, they are regularly solicited by athletes to prescribe prohibited products (Laure et al., 2004). The diversity of the sources of supply may be explained by the nature of the products that the adolescents want. Indeed, friends or parents, for example, can be seen to supply different substances. Some 'suppliers' also seem to be legitimate; parents for example, when they decide to give medicines to their children, or family doctors when they prescribe medicine in the case of a legitimate pathology. All the same, these sources do raise certain questions: Why, for example, do a third of the adolescents say that they paid their parents? And why do doctors prescribe products (corticosteroids, anti-asthmatics, epoietin, etc.) which are prohibited for athletes when there is no pathological condition. This last example is a practice which is prohibited by French law, even more so when the athlete is under the age of 18.

CONCLUSIONS

We feel that it is necessary to examine this black market in more depth for at least two major reasons. Firstly, it is illegal. In France, French law (Article L. 3631-3 of the Code de la Santé Publique) notably prohibits 'the giving, the offering, and the administering to, or the use of one or several substances or methods mentioned in the present article by, athletes participating in competitions, or to facilitate or incite their usage'.

Secondly, it is potentially dangerous for the health, as the risks that are run when using substances, including doping products bought on the black market, are well-known. These risks are notably due to the use of counterfeit products (Forgione et al, 2001; Ritsch et Musshoff, 2000).

Therefore, it is necessary to better understand the ways in which this black market functions: for example; the initial sources of the products sold, the number and the 'profiles' of the dealers, the general organisation of the market and the sums of money involved. Moreover, it would be useful to find any possible links and connections between the suppliers of doping products for high-level and/or professional athletes with both the suppliers of illegal drugs and the suppliers of counterfeit medicines to the black market.

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REFERENCES

- Althaus, M.A., Kubr, I. and Mahler, F. (2000) Prevalence of anabolic steroid consumption in male teenagers in the french part of Switzerland. *Medecine & Hygiene* **2309**, 1528-1532 (In French: English abstract).
- Backinger, C.L., Fagan, P., Matthews, E. and Grana, R. (2003) Adolescent and young adult tobacco prevention and cessation: current status and future directions. *Tobacco Control* **12** (4), 46-53.
- Forgione, D.A., Neuenschwander, P. and Vermeer, T.E. (2001) Diversion of prescription drugs to the black market: what the states are doing to curb the tide. *Journal of Health Care Finance* **4**, 65-78.
- Kindlundh, A.M., Isacson, D.G., Berglund, L. and Nyberg, F. (1998) Doping among high school students in Uppsala, Sweden: a presentation of the attitudes, distribution, side effects, and extent of use. *Scandinavian Journal of Society of Medicine* **26**, 71-74.
- Lambert, M.I., Titlestad, S.D. and Schwellnus, M.P. (1998) Prevalence of androgenic-anabolic steroid use in adolescents in two regions of South Africa. *South African Medical Journal* **88**, 876-880.
- Laure, P. (2000) Doping : epidemiological studies. *Presse Medicale*, **24**, 1365-1372 (In French: English abstract).
- Laure, P., Lecerf, T., Friser, A. and Binsinger C. (2004) Drugs, recreational drug use and attitudes towards doping of high school athletes. *International Journal of Sports Medicine* **2**, 133-138.
- Laure, P., Lecerf, T. and Le Scanff, C. (2001) Do motives of drug consumption depend on the number of substances used by adolescents? *Archives de Pediatrie* **8**, 16-24 (In French: English abstract).
- Nilsson, S. (1995) Androgenic anabolic steroid use among male adolescents in Falkenberg. *European Journal of Clinical Pharmacology* **1**, 9-11.
- O'Farrel, T., Fals-Stewart, W. and Murphy, M. (2003) Concurrent validity of a brief self-report drug use frequency measure. *Addictive Behaviors* **28**, 327-337.
- Ritsch, M. and Musshoff, F. (2000) Dangers and risks of black market anabolic steroid abuse in sports. Gas chromatography-mass spectrometry analyses. *Sportverletz Sportschaden* **1**, 1-11.
- Scott, D.M., Wagner, J.C. and Barlow, T.W. (1996) Anabolic steroid use among adolescents in Nebraska schools. *American Journal of Health System Pharmacy* **53**, 2068-2072.
- Secades-Villa, R. and Fernandez-Hermida, J. (2003) The validity of self-reports in a follow-up study with drug addicts. *Addictive Behaviors* **28**, 1175-1182.

- Sly, D.F., Heald, G., Hopkins, R.S., Moore, T.W., McCloskey, M. and Ray, S. (2000) The industry manipulation attitudes of smokers and nonsmokers. *Journal of Public Health Management and Practice* **3**, 49-56.
- Tanner, S.M., Miller, D.W. and Alongi C. (1995) Anabolic steroid use by adolescents: prevalence, motives, and knowledge of risks. *Clinical Journal of Sport Medicine* **2**, 108-115.
- Terney, R. and McLain, L.G. (1990) The use of anabolic steroids in high school students. *American Journal of Disease of Children* **144**, 99-103.

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KEY POINTS

- This study confirms the existence of a 'black market' for products to improve performance, which is directed at adolescent athletes engaged in high-level competitions.
- This market is characterized by its ease of accessibility and also the diversity of its 'suppliers', the two main sources being friends and parents.

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