

2006 IAAF WORLD ANTI-DOPING SYMPOSIUM

Theme of the Symposium:

Effectiveness of the Anti-Doping Fight

Session 1: Current Anti-Doping Realities

Positions and Opinions

Difficulties in the day-to day Implementation of the Code

A CHAMPION'S OPINION

Sergey Bubka
IAAF Council Member, Chairman of IOC Athletes Commission

Dear Ladies and Gentlemen,

As a former international athlete who is now the Chairman of the IOC Athletes Commission, a member of the IAAF Athletes Commission and who also represents the interests of athletes as a member of the IAAF Council and IOC Executive Committee, I can confidently say that athletes, in principle, do support the IAAF's anti-doping efforts.

All of us who are actively involved in sport must support the IAAF and our partners like the IOC and WADA – by making sure that we have a level playing field for all – since this principle is the foundation stone of competitive sport. It is important for athletes to know that there is equality of treatment under the rules of sport – both on the track and in the anti-doping domain as well.

As competitors we all need to know that we have the same chance of success and that any sanctions are also equal for everyone. Doping endangers sport on many levels – and we should all fight to preserve the health of athletes but also to ensure that there are ethics in sport, and that we fight to keep sport attractive to Sponsors, to the Media and to the General Public.

Another important issue is the question of sanctions. Here, it is important that we try to find greater harmony. At the moment, there are great differences between the sanctions imposed by different sports for exactly the same offence. This is something that needs to be addressed, since it is unfair that athletes receive different sanctions. At the last Congress in Helsinki, we agreed to do everything possible to increase the sanction for a serious doping offence from 2 years to 4 years. But athletics does not have a lot of support from other sports in this goal so we must continue to lobby WADA to reach collective agreements about sanctions for the different sports federations. Again, why should an athlete in one sport be able to reduce his or her sanction by more than an athlete in a different sport who has committed the same doping offence? At the moment, in some sports, it is almost automatic for athletes to reduce their sanctions on immediate appeal, while in other sports the process is much harder and takes much longer as well.

We should look for a policy that can be acceptable for all the different sports.

Returning specifically to what the IAAF is doing, at the end of 2004, during an IAAF Council meeting in Helsinki, we agreed that the IAAF Anti-doping strategies and structure were radically overhauled. That was a good thing, because it meant that the IAAF could concentrate on increasing the accountability and transparency of the IAAF anti-doping programme, developing its education and communication activities with key stakeholders, developing new and existing relationships with international anti-doping partners and increasing monitoring and cooperation with national anti-doping programmes. This Seminar is a concrete example of these new efforts.

This World Anti-Doping Symposium brings together interested members of the athletics, anti-doping and scientific communities to discuss various aspects of the modern anti-doping fight, and how they can be used most effectively in our sport. It is very important that all parties involved in the anti-doping fight come together on a regular basis to discuss the evolving anti-doping issues, share their experiences and solve the difficulties. It is only through this international cooperation that we will be able to regain the advantage over those people who chose doping rather than fair play and hard work.

From the point of view of the athletes, it is important that the vast majority of those who are clean and abide by our rule, get the support of the IAAF and IAAF Member Federations. We must ensure that the whereabouts system and the testing programme respects them as human being, but is also efficient enough to catch the real cheats. Effective anti-doping initiatives are the result of good collaboration between all parties – and the point of view of the athletes themselves should never be overlooked. Anti-doping should never become an issue of “them and us” with athletes on the one side, and the authorities on the other.

Above all, we must support the large majority of our athletes who chose to compete clean and fair. They are the true champions of athletics and we must do all we can to support them in this choice. For their part, our athletes must ensure they fully adhere to the anti-doping regulations and be willing and able to promote and advocate a doping free environment within our sport.

I also hope that this Seminar helps to raise awareness about an issue which is potentially very serious, and that is the role of Governments in the anti-doping war, and particularly in the work of WADA. As sportsmen and women, it is important to have the full support of the political authorities when it comes to a war that is not just about sport. Doping is also an issue of public health and of education and law, so I believe that the time is right to pressurise those governments who have not yet committed themselves to the struggle, despite promising to do so over recent years.

I strongly believe that athletes should accept and support the Court of Arbitration for Sport, based in Lausanne, when they are in dispute with sporting authorities. CAS is an independent body that considers the interests of all parties fairly, and with great competence.

WADA PERSPECTIVE ON CURRENT ANTI-DOPING REALITIES

David Howman
WADA Director General

As we approach the close of the seventh year of WADA's existence and the third year since the Code came into force, we remark on the significant progress to date in the global fight against doping in sport. Government and Sport have joined forces under WADA's umbrella and have made huge strides in the harmonization of anti-doping activities around the globe so that athletes benefit from the same anti-doping protocols and protections, no matter the sport, the nationality, or the country where tested.

At the same time, WADA takes stock of the current and emerging challenges facing the anti-doping community so that the next era brings even greater success in the battle for sport that is safe and fair. WADA Director General David Howman highlights some of the hot issues—including leaks, attacks on tests and laboratory analysis, and trafficking—and provides the framework for a solution-focused discussion among symposium attendees.

STRENGTHENING THE RESOLVE OF GOVERNMENTS IN THE FIGHT AGAINST DOPING IN SPORT

Marriott-Lloyd, P.
UNESCO, Paris, France

This presentation will discuss the International Convention against Doping in Sport and the role of Governments in the fight against doping in sport.

Considerable progress has been made in the fight against doping in sport with the establishment of the World Anti-Doping Agency in 1999 by Governments and the sporting community and the development of a unified World Anti-Doping Code in 2003. Increasingly effective testing procedures and the suspension of high profile athletes serve as further evidence of progress. However, these developments need to be matched by a compelling response from Governments. This is important because there are specific areas where only Governments possess the means to take the fight against doping forward.

The International Convention against Doping in Sport marks a new phase in anti-doping, one which all Governments around the world work within their considerable spheres of influence to remove doping from sport. The Convention provides the framework for this to take place, however, it requires forceful application by all of the Governments of the world.

MISE EN APPLICATION DU CODE MONDIAL ANTIDOPAGE : REALITES ET DIFFICULTES

Gabriel Dollé

Directeur du Département Médical & Antidopage de l'IAAF

Le Code Mondial Antidopage (Code) a été accepté par le Congrès de l'IAAF en 2003. Il s'en est suivi une modification en conséquence et une mise en application adaptée de la réglementation antidopage de l'IAAF en 2004. La même année, le Conseil de l'IAAF a demandé de faire un bilan de la situation pour évaluer l'activité antidopage menée et ses perspectives d'avenir. Cet état des lieux a été mené de pair avec la mise en conformité réglementaire avec le Code et les Standards Internationaux. Il a fait apparaître un besoin de réformes concrétisées entre temps essentiellement par :

- une restructuration du Département Médical et Antidopage de l'IAAF ;
- une augmentation des ressources humaines à disposition (le staff passe de 7 à 11 personnes) ;
- un accroissement du budget antidopage qui passe de 1.540.000 US\$ en 2003 à 2.600.000 US\$ en 2006 ;
- un renforcement des initiatives en matière de prévention du dopage ;
- une réadaptation du programme des contrôles antidopage.

C'est dans ce contexte qu'il est utile d'examiner, dans le cadre de ce Symposium, la mise en œuvre administrative actuelle de l'antidopage de l'IAAF avec ses difficultés au quotidien.

Les nouvelles procédures liées au Code concernent principalement :

- les **demandes abrégées d'Autorisation d'Usage à des fins Thérapeutiques (AUT)** ;
- le recueil des **informations sur la localisation des athlètes** faisant partie du **groupe-cible des athlètes**, soumis aux contrôles inopinés hors compétition ;
- les **tests manqués**.

La gestion de ces trois domaines particuliers a entraîné une charge de travail supplémentaire par ailleurs encore accrue du fait de l'augmentation importante du nombre d'analyses rapportées avec des résultats anormaux. Ceci est à mettre en relation directe avec :

- les modifications introduites à la **liste de l'AMA des substances et méthodes interdites**, soumise à révision annuelle ;
- les servitudes administratives nouvelles liées à la **procédure révisée de gestion des résultats** ;
- les difficultés relationnelles avec les **laboratoires accrédités** au regard des transmissions des résultats et des documents analytiques (délai trop longs, carence d'harmonisation des rapports et d'application des Standards Internationaux).

L'examen, au cours de cette présentation, des points évoqués ci-dessus, se veut de donner un aperçu réaliste de la lourde tâche administrative et des difficultés actuellement liées à la gestion quotidienne de l'antidopage à l'IAAF et de dégager des propositions contribuant à son amélioration.

Translation

Implementing the World Anti-Doping Code : realities and difficulties

Gabriel Dollé

Director of the IAAF Medical and Anti-Doping Department

The World Anti-Doping Code ("the Code") was accepted by the IAAF Congress in 2003. The IAAF anti-doping rules were changed to comply with the Code's requirements and applied accordingly in 2004. The same year, under President Lamine Diack's impetus, the IAAF Council requested the creation of a task force to evaluate the existing anti-doping activities in view of the future. This breakdown took place at the same time as the IAAF's regulations were being brought up to date with the Code and the International Standards. It concluded the need for a number of reforms. Since then the major concrete changes carried out have been the following:

- the restructuring of the IAAF Medical and Anti-Doping Department ;
- an increase of the human resources available, passing from 7 to a staff of 11 ;
- an increase of the anti-doping budget, from 1,540,000 US\$ in 2003 to 2,600,000 US\$ in 2006 ;
- new initiatives in doping prevention;
- a readjustment of doping control programme.

It is in the context of the anti-doping regulations' world harmonization that we should examine, over the course of this Symposium, the current daily administrative implementation of the IAAF's anti-doping activities and the difficulties encountered.

The new procedures linked to the Code mainly concern:

- the applications for abbreviated **Therapeutic Use Exemptions (TUE)** ;
- the gathering of **information on the whereabouts of athletes** who are in the **Registered Testing Pool**, for unannounced out-of-competition testing ;
- **Missed Tests** procedure.

The management of these three particular areas has increased the workload, already burdened by a substantial increase of the number of adverse analytical findings - a direct consequence of:

- modifications to the **WADA List of Prohibited Substances and Methods**, which is reviewed on an annual basis ;
- the new administrative requirements of the **revised procedure for the results management**;
- the difficulties with the **accredited laboratories cooperation** relating to the transmission of results and analytical findings (long delays, too much diversity in the reports and the International Standards compliance).

The examination, in this presentation, of the above points, seeks to provide a realistic overview of the heavy administrative burden and the difficulties faced by the day-to-day management of the IAAF anti-doping activities. It also aims to bring out proposals on how the current situation may be improved.

SPECIFIC SCIENTIFIC ISSUES: ANABOLIC ANDROGENIC STEROIDS

Christiane Ayotte, Ph.D.

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Twenty years ago, when we started implementing routine testing of anabolic androgenic steroids utilising GC/MS, our efforts were placed at identifying and characterising the metabolites of a relatively limited number of pharmaceutical preparations including a few from the veterinary pharmacopoeia. The long-lasting metabolites of nandrolone metabolites were (and still are) most frequently detected. Stanozolol (Winstrol), believed to be *invisible*, represented a major technical challenge; by the end of the 80s, the world learned it was no longer the case. Adverse findings grew from 19 in 1986 to 89 two years later; more than 200 findings were reported in recent years, confirming its relative prevalence. Simultaneously, by adopting the T/E value greater than 6 as the marker of the administration of testosterone, the laboratories flagged a couple of hundred cases per year to the testing authorities. Follow up testing to determine whether the athlete was naturally excreting slightly elevated T/E values became the common, albeit cumbersome practice.

In the following decade, with synthetic agents being fully detectable, and doping control programs being implemented, we realised that athletes who doped were adjusting to the new reality. We had to work at enhancing the sensitivity of our methods (GC/HRMS in Atlanta), looking for persistent/ long-lasting metabolites. We had to define the parameters of the steroid profiles and establish reference ranges in the athletic populations. Individual steroid profiles, *longitudinal studies*, were introduced. At the end of the 90s, different groups proposed the use of GC/C/IRMS to determine the origin, endogenous or exogenous, of the urinary metabolites of *natural* steroids such as testosterone. Once mastered, the technique was proven to be greatly useful in combination with the GC/MS analysis of the steroid profile, providing an alternative to the follow up testing. The technique however has been implemented with relatively limited success in accredited laboratories, requiring not only a major investment but also the dexterity of highly skilled and dedicated individuals.

On a few occasions, new, “undetectable” substances were detected in athlete’s samples. *Bromantan* and *carphedon*, both products of the Russian Institute of Pharmacology, were finally identified as a result of the concerted action of laboratories and the IAAF. The inclusion of the former to the list of prohibited substances had to be done formally, showing the limits of the “*and related substances*” appendix.

The adoption by the American Congress of the Dietary Supplement Health and Education Act has drastically modified our work. New substances are constantly introduced, some producing only subtle alterations of the steroid profile. Firstly, androstenedione and DHEA, both potential precursors “*pro-hormones*” of testosterone became available commercially for oral self-administration, followed two years later by norsteroids, precursors of nandrolone, then boldenone precursors. Within 5 years, 17-alkylated steroids started to be offered; while many products are advertised on the Internet, a few steroids are available to a restricted number of athletes, in total secrecy (norbolethone, DMT, THG). A cat and mouse game is being played with the regulatory agencies as well, requiring the characterisation of the hormonal properties before withdrawing the products which incidentally, are far from being pure. The list of prohibited androgenic anabolic steroids has more than doubled in recent years, which now has serious impacts on our capabilities to test efficiently.

The problems? Unknown compounds, oral forms of synthetic steroids detectable for few days, T/E values altered for only 12 hours by oral testosterone, marginally with gels and patches, not at all in some populations, not systematically by the precursors, urinary matrix being transformed from supplements use creating media suitable for new “activity”, excessive dilution of specimens, masking with interfering substances, “designer” testosterone or precursors of normal isotopic content, etc.

Administratively, while much needed guidance for reporting findings is given by WADA, it remains that time and energy are wasted in full confirmation of salbutamol, terbutaline, corticosteroids findings when TUEs were granted, and in full confirmation of T/E values greater than 4 in spite of an otherwise normal steroid profile and conclusively “negative” IRMS – the only way to force some testing authorities to follow up. New methods requiring careful interpretation and complementary expertise in molecular biology and protein analysis have been introduced for blood doping, and for GH.

The costs are increasing, more tests are being done and we still read that athletes can dope apparently without much stress. Close cooperation between laboratories and testing authorities must begin. Laboratories are often absent from international forums, are not formally recognised at WADA and do not have a voice besides the representation given at the laboratory committee. Better strategies for sample collection must be discussed, and close monitoring of individual athlete's profiles is urgently needed; abnormalities should be flagged and followed up. Finally, resources should be allocated to investigations when doping practises are suspected.

ERYTHROPOIETIN AND BLOOD DOPING

Martial Saugy

Swiss Laboratory for Doping Analyses, Lausanne, Switzerland

Blood doping in sports has been banned officially in 1984, because it increases artificially the number of red blood cells and potentially improves the performance in endurance sports. The availability of recombinant human erythropoietin (rHu-EPO) at the end of the eighties made it clear that this ergogenic hormone would be used illicitly in that kind of disciplines. The medical commission of the International Olympic Committee banned its use in 1990.

One must admit that despite this interdiction, the nineties were certainly the years of EPO abuse in sports.

It became then obvious that blood tests would help sports authorities to prevent such an abuse. But blood parameters were not able to give sufficient legal certainty to declare any formal doping offense. It is why that most of the blood tests during the last decade have been used to prevent huge EPO abuse or blood manipulation and to target suspicious individuals more than to sanction an athlete.

The introduction of the urinary test to detect recombinant EPO in 2000 linked to a screening blood test and in 2001, as a validated method, permitted to decrease drastically the overuse of that substance. Nevertheless, since that time, EPO doping still exists, but the habits of the cheaters changed and were rapidly adapted to the new detection technique employed by the laboratories. Lower dosage, other routes of application or hyper-dilution of the urine collected for the doping control are certainly some of techniques used today to fool the system of controls.

Moreover, the introduction of the urinary EPO test pushed also the athletes to return to old techniques such as blood transfusions. The hematological follow up of the athletes, particularly some blood parameters such as hemoglobin, hematocrit and reticulocytes indicated abnormal blood profiles for many endurance sportspeople who did transfuse blood. If homologous, but not autologous, the transfusion could be detected by examining the different populations of red blood cells present in the blood sample. This is achieved by specifically labeling some of the membrane proteins, defining notably the blood groups and subgroups, in combination with the use of flow cytometry measurements.

The time window for the detection of homologous blood transfusion being relatively large, the autologous transfusion is generally the most common blood manipulation abused today. The only indirect mode of detection, which can be applied currently by the anti-doping authorities, is still to use the classical blood parameters and to perform a follow up of the suspicious individuals. This needs to obtain reliable values on correctly collected samples. The pre-analytical work and a good coordination between the laboratories and the medical commission in charge of the hematological program are necessary in order to rely the adequate longitudinal view of the biological parameters. Already in place in some federations, applying the «no start» philosophy for the «outliers» during the competitions now completes this approach. Because of the serious impact on the career of the athletes and on its important deterrent effect on doping abusers, this policy still needs to be strongly structured on the legal side.

It is then clear that the future of the anti-doping fight will be based on both direct and indirect approaches for proving artificial manipulations of the sport performance. This will be very efficient if the biological, medical and disciplinary aspects of this procedure can be put together for the respect of ethic in athletics.

CURRENT ANTI-DOPING REALITIES – FIFA RESULTS MANAGEMENT

Prof. Dr. Toni Graf-Baumann
Chairman FIFA Doping Control Sub-Committee

Part 1 deals with the case management from the medical point of view, which means the investigation of all medical circumstances and the correctness of the sampling, transportation of the samples, laboratory procedure, information of positive analytical results to the federation involved.

Part 2 reports about the investigation of the individual circumstances of the athlete and his staff, his personal, social, medical and other special circumstances.

Part 3 describes the result of the investigations and the reporting system to the disciplinary bodies responsible.

Part 4 shows a conclusion of the positive cases and their individual circumstances in relation to the individual sanctions.

Part 5 presents an overview about the consequences of all those aspects for the prevention of doping and a consequent fight against doping in football.



Session 2: Current Strategies for the Detection and Prosecution of Doping

Session 2(a): Blood Issues

Session 2(b): Anabolic Issues

**Session 2(c): Current Issues in Prosecuting Doping Violations
under the Code**

Session 2(a)

HOW TO OVERCOME MULTIPLE NEGATIVE EPO TESTS AND INDIRECT EVIDENCE OF BLOOD MANIPULATION IN MULTIETHNIC SPORTS

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IAAF Medical & Antidoping Commission

The strategy of blood tests is currently applied by some IFs, both to detect health risk situations, and/or to apply “blood competition rules”.

The threshold values of some parameters (Hb, Ht, reticulocytes, OFF-hr score), permit in some sports, withdrawal from competitions and for some days or weeks afterward, athletes with abnormal haematological parameters; but, while this is a good “health” method, it is not able to “legally” prove blood manipulation; further, while adopting more certain and large threshold values, it has higher specificity, but lower sensitivity.

The contemporary negative EPO urine tests, in spite of very high and suspicious blood parameters, clearly prove the necessity to improve the laboratory research methods mainly on “diluted” or “effort” urine.

The conduction of EPO urine tests too close to competition, the change of strategies by cheating athletes (low EPO doses), or the use of different methods (i.e. autologous blood transfusions), are further causes of negative urine tests.

Moreover, the adoption of absolute threshold blood values is not easily adaptable to a real multiethnic population of athletes, due to many extreme physiological differences; athletes born and living at altitude might often be borderline or over Hb or Ht threshold values; and similarly sometimes athletes training at altitude. On the other hand, high thresholds will undervalue athletes, usually with normal-low basic values, but, for this reason, will permit possible cheating.

Start/competition rules are good deterrent methods to “lower”, but also to “level” the Hb mean values of athletes cheating with blood manipulation.

For this reason, a “no start rule”, should take into account both:

- the “*ethical problem*” of absolute very high values (independently normal or artificial), that are medically dangerous for the health of the athlete, due to the physiologic haemoconcentration during training or competition, mainly in difficult environmental conditions;
- the “*individual within-subject variability*”, that might be helpful not only for urine target tests but also for immediate suspension, when an established and agreed threshold of change is surpassed (third generation approach ?).

A wide database of blood screening tests will produce “longitudinal haematological profiles”, able to follow and “target” suspicious athletes with “intelligent, planned and timed” urine tests.

The increased number of blood values is able to increase the knowledge about ethnically different groups of athletes, and also on changes due to different conditions (high or low level living or training, pre/post training or competition, natural or artificial altitude training).

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HEMOGLOBIN CONCENTRATION AND RELATED VARIABLES IN ELITE ENDURANCE ATHLETES: INFLUENCE OF POSITION, STATE OF HYDRATION, EXERCISE, AND ALTITUDE

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Joachim Mester)

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Background

In an aftermath to the Turin Olympic Games where the use of blood testing came to trial, WADA together with the International Ski Federation has initiated a study on the magnitude of variations in Hb. The focus is not on variation between individuals, but at the individual level during a day, and day-to-day variations.

Design

Endurance athletes were studied following a fixed protocol as follows:

1. Early morning, before breakfast
2. After breakfast (1 hr)
3. After sitting for 20 more minutes or lying for 30 minutes, drinking 0.5 l of water
4. After training for 1.5 to 2 hrs at an intensity of ~40bpm below maximal heart rate, either drinking 1 l of water or with no water intake
5. After 1 hr of recovery with no water intake or drinking 2 l of water

All blood samples (arm vein) are taken after sitting 10 min except for the blood sampling after intervention 3.

This protocol was performed at two different days at close to sea level and at a separate occasion at medium altitude.

Methods

To determine haemoglobin and related variables the SYSMEX or the ABBOTT equipment was used.

Subjects

In total close to 40 world leading female and male cross country skiers have been studied. The athletes are from the national teams of France, Germany, and Sweden.

Results

The study started in June 2006 and is still ongoing. The investigations at altitude will be finished by the end of September whereafter only some sea level control measurements are to be performed. A comprehensive report of the results will be given at the conference, although all aspects of the study will not be ready for presentation.

The overall impression is that at the individual level, the Hb concentration is a very well regulated variable with only minor variation observed, in spite of quite marked changes in water turnover.

USEFULNESS AND LIMITATIONS OF BLOOD PARAMETERS IN THE FIGHT AGAINST DOPING

Mario Zorzoli, MD
UCI, Health Manager

Maximal oxygen uptake (VO_2 max) is the major limiting factor in endurance sports. Blood doping improves performance by increasing the blood capacity to transport and deliver O_2 to muscles and tissues. This can be done in different ways, which will lead to an increase of circulating red blood cells and haemoglobin concentration.

Following the administration of blood doping, different haematological parameters (i.e. haemoglobin, reticulocytes or free plasma haemoglobin) are modified in a characteristic way, although not specific. Anti-doping organisations can therefore use these parameters as screening tools for more targeted anti-doping tests.

Due to the fact that some of these modifications persist longer than the detection window of some forbidden substance, some International Federations have decided that when blood values lie beyond the established limits, the athlete would be temporarily prevented from competing. This measure, which is not to be confused with a doping sanction, has an important deterrent effect on the athletes, and is the only concrete action that can be undertaken in order to dissuade the use of non-detectable substances or methods (autologous blood transfusion, gene doping).

On the other hand, these elements have already been brought to court in order to support the evidence of doping against an athlete whose anti-doping test had revealed the presence of a forbidden substance or method (homologous blood transfusion, EPO or NESP).

Some people involved in the fight against doping have recently offered the opinion that fluctuations in these parameters would be sufficient proof of doping in order to convict athletes.

Before such a consensus can be reached, some important legal and scientific obstacles have to be overcome. In fact, answers to several possible pitfalls (pre-analytical variations; analytical variations; individual variations; natural or medical conditions) will have to be provided, in order to clearly establish that the abnormal blood result can only be the consequence of blood doping. Failing to do so will probably lead to the acquittal of the athlete before the court.

Conclusions

If measurement of blood parameters plays an important role in the fight against doping, improving the effectiveness of anti-doping testing and discouraging the use of non-detectable substances, precautions must be taken before simply considering abnormal results as doping infraction.

HOW TO ENSURE RELIABLE AND REPRODUCIBLE RESULTS IN BLOOD TESTING ON THE FIELD

Neil Robinson

Swiss Laboratory for Doping Analyses, Lausanne

Since 1996, the Swiss Laboratory for Doping Analyses (LAD) has been performing blood testing for different federations to deter and limit blood doping, rHuEPO (recombinant erythropoietin) abuse in particular. At the time, haematocrit levels and/or haemoglobin concentrations were measured mainly to prevent potential health risks due to an overconsumption of rHuEPO (blood hyperviscosity). These tests were valuable to identify those athletes taking erythropoiesis stimulating substances. In that way, it was possible to exclude from any competition (no start rule), all athletes with haematological parameters above certain cut off limits.

In 2000, two different tests were simultaneously launched to fight rHuEPO abuse. The direct detection test of rHuEPO in urine and the indirect measurement of blood markers of altered erythropoiesis. This latter approach was never used alone, because it was not sufficiently reliable, robust and also, because the urine test was more specific and enabled to identify the drug itself. Nevertheless, blood parameters were used for targeting purposes, especially to limit the amount of expensive urine tests.

With the introduction of rHuEPO urine tests, some athletes continued to demonstrate abnormal blood profiles while no rHuEPO could be detected in their urine. Thus, it was decided to introduce more blood parameters in order to fight blood transfusion (homologous and autologous) doping as well as micro rHuEPO injections. The most efficient parameters selected to identify and exclude athletes (No Start) possibly cheating with blood doping are the OFF-score and the percentage reticulocyte count.

In order to return reliable and reproducible results many precautions have to be undertaken. The period of blood collection, the material used for the venipuncture, the position of the athlete, the influence of the tourniquet time, transport conditions (time delay, temperature) all play a key role in the return of the results. Analytical conditions must be standardized as much as possible. The period of blood homogenization, the type and brand of instrument used, the calibration and the settings of the instrument, the number of analyses performed (which are the relevant data?) all influence the quality of results. Usually these latter are under the responsibility of the laboratory (ISO accredited laboratory), whereas pre-analytical conditions are in most cases, under the responsibility of the federation. With experience, we realize that pre-analytical conditions are more subject to discussion than analytical conditions, because they have more influence on the results and also because, they are not always well documented and accredited by external experts.

DIVERSIFICATION DES TRAITEMENTS PAR L'ÉRYTHROPOÏÉTINE ET CONTROLE ANTI-DOPAGE

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Le contrôle anti-dopage actuel de l'érythropoïétine (EPO) utilise une méthode dont la mise au point s'est achevée en 1999 et qui a été utilisée pour la première fois aux Jeux Olympiques de Sydney en 2000.

La méthode repose sur la mise en évidence de différences de charge électrique entre EPO naturelle et EPO recombinantes à partir d'un échantillon d'urine.

A cette époque, en effet, les seules EPO auxquelles pouvaient avoir recours les sportifs dopés étaient les Epoétines α et β , toutes deux formes recombinantes issues de la biotechnologie.

Cependant, les brevets arrivant à leur terme, le marché pharmaceutique s'ouvre aux génériques. De plus, de nouvelles formes recombinantes plus ou moins proches des Epoétines α et β (Darbépoétine α , Epoétines ω , δ) ont vu le jour.

Par ailleurs, une approche de production non plus biologique mais chimique (CERA) s'est mise en place.

Enfin, des méthodes utilisant les propres cellules du sujet traité sont actuellement en voie de développement.

Cette dernière approche conduit à évoquer la « thérapie génique » et sa déviance vers le « dopage génétique ».

Cette diversification des traitements par l'EPO pose la question du devenir du contrôle anti-dopage relatif à cette hormone.

A partir d'exemples issus de ces différentes formes médicamenteuses et de résultats expérimentaux concernant la thérapie génique, nous verrons que le test urinaire actuel répond à la plupart des préoccupations de détection mais nécessitera peut-être des ajustements concernant, entre autres, les critères de positivité.

Translation

DIVERSIFICATION OF TREATMENTS BY ERYTHROPOIETIN AND ANTI-DOPING TESTS

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The current anti-doping testing procedure for erythropoietin (EPO) relies on a method which was perfected in 1999 and used for the first time at the Sydney Olympic Games in 2000.

It is based on demonstrating, in a urine sample, the electrical charge differences between natural EPO and recombinant EPO.

Originally the only forms of EPO doped athletes could use were epoetins α and β , both of them biotechnology-derived recombinant forms.

However with the expiry of the patents, generic products appeared on the pharmaceutical market, whilst new recombinant forms, more or less similar to the epoetins α and β (darbepoetin α , epoetins ω , δ), also began to be produced.

At the same time production methods which were no longer biological but chemical (CERA) were emerging.

Finally, methods using the treated subject's own cells are currently being developed.

It is this approach which has led to talk of "gene therapy" and how it is tending towards "gene doping".

This existing variety of all the different EPO treatments means we must examine the future of the anti-doping tests on this hormone.

Using examples taken from various forms of medication, as well as experimental tests carried out in the field of gene therapy, we will show that the current urine test fulfils most of the detection issues, although it may require some adjustments of, among other things, the criteria defining when a test is positive.

Session 2(b)

NANDROLONE - DIFFERENT ASPECTS OF THE DETECTION OF ANABOLIC-ANDROGENIC STEROID MISUSE

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Nandrolone, a synthetic anabolic androgenic steroid, has been a subject for doping control analysis since testing for steroids started more than 30 years ago.

However, the main focus and emphasis for its detection and for the interpretation of analytical findings has changed during the years, because different kinds of application, the appearance of contaminated nutritional supplements, and the detection of natural production and stability questions of stored urine samples have influenced the discussions and judgments.

The misuse of nandrolone and nandrolone related steroids is disclosed by urine analysis of its main metabolites norandrosterone and noretiocholanolone. The detection of these metabolites in urine is done by state-of-the-art technology with the help of chromatographic separation and mass spectrometric detection, including techniques which may differentiate between metabolites naturally produced in the body and those having exogenous sources. Stringent criteria have to be met, before an adverse analytical finding is reported.

In order to interpret these results correctly different aspects have to be taken into consideration and will be discussed in this lecture:

- the influence of injectable versus oral administration of nandrolone preparations,
- the possibility of steroid contaminations in nutritional supplements with and without labeling as well as in food,
- the occurrence of nandrolone metabolites after administration of not prohibited medications,
- the evaluation of a natural production of these metabolites in females and males,
- the possibility of changes in stored urine samples.

Nandrolone is an excellent example of a doping agent, where doping practices and problems have changed over the years and where doping research has contributed to maintain the principles of legal certainty for the athletes.

CONSIDERING ETHNICAL DIFFERENCE OF STEROID PROFILES AND CARBON ISOTOPE RATIO OF URINARY MARKER STEROIDS

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It is well known that urinary testosterone to epitestosterone ratio (T/E) of healthy Mongoloid Asian is relatively lower than that of Caucasians because of low average levels of testosterone concentration. Response of system to testosterone application in a certain part of Asians is also relatively poor, and sometimes, the urinary T/E of Asians does not reach the ratio of 6 even after testosterone administration. Such situation triggered lowering the initial threshold of T/E from 6 to 4 for the further evaluation of the adverse analytical findings (AAF) by further testing e.g. by longitudinal studies or by carbon isotope ratio (CIR) mass spectrometer (MS).

Results of our oral testosterone application study suggests that the Asian subjects consist at least of two groups i.e. poor responders (majority) and quick responders (minority), probably depending on the different phenotype of 17-Hydroxysteroid dehydrogenases (17-HSD). As usually observed in the typical Caucasians, T/E ratio of the quick responders reached threshold few hours after the testosterone administration with the increase of urinary testosterone levels, but T/E of poor responders remained essentially unchanged.

These results were consistent with the results from 4-Androstenedione application studies on Mongoloid Asians. In these studies, slight increase of testosterone was observed in a quick responder only, and the levels remained unchanged in the other 4 volunteers. On the other hand, Androstenedione induced excretion of Epitestosterone was observed in all 5 Asians, and the extent of the increases was particularly remarkable in quick responders. The maximum concentration of ET exceeded the reporting threshold of 200 ng/ml.

Regardless of differences in the response or the phenotype of 17-HSD, carbon isotope methodology was found to be applicable equally on all cases to follow the AAFs suspected for testosterone cascade abuse.

Since changing of T/E threshold, all cases with $T/E > 4$ have been followed by CIRMS and some of the cases were also further followed by longitudinal studies conducted by the responsible testing authorities.

Outcome of further evaluation of AAF and results from follow up studies are discussed in this session.

NUTRITIONAL SUPPLEMENTS CROSS-CONTAMINATED AND FAKED WITH PROHORMONES, “CLASSIC” ANABOLIC STEROIDS AND “DESIGNER STEROIDS”

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In 1999, in connection with follow up studies of positive doping cases with norandrosterone, we detected the first cases of nutritional supplements cross-contaminated with anabolic-androgenic-steroids (prohormones). Our international study performed in 2001 and 2002 on 624 nutritional supplements purchased in 13 different countries showed that about 15 percent of non-hormonal nutritional supplements contained anabolic-androgenic steroids (mainly prohormones) not declared on the label. Since 2003 we have detected also products intentionally faked with high amounts of “classic” anabolic steroids as metandienone, stanozolol, boldenone, dehydrochloromethyltestosterone, oxandrolone etc. on the nutritional supplement market. These anabolic steroids were not declared on the labels too. The sources of these anabolic steroids are probably Chinese pharmaceutical companies which sell bulk material of anabolic steroids. At the end of 2005, German food control services confiscated nutritional supplements faked with high amounts of metandienone and stanozolol from a German manufacturer. The analyses of vitamine C -, multivitamine - and magnesium – tablets, which were produced from the same manufacturer on the same production line within the same time interval showed cross-contaminations of these products with metandienone and stanozolol. These vitamine C -, multivitamine - and magnesium-tablets were sold in ordinary German and Spanish groceries and drug stores. Since 2005 new “designer” steroids such as prostanazol, 6-bromo-androstenedione, 17-methyl-drostanolone etc. are offered on the nutritional supplement market. In the near future we expect also cross-contaminations with these steroids. Based on these results we can conclude that the situation on the nutritional supplement market has become worse and the risk of inadvertent doping cases has increased.

IDENTIFICATION OF DESIGNER STEROIDS, STERIODS PROFILING AND IRMS

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Several “pro-hormones” and eventually potent androgenic steroids became available since the end of the 1990s, modifying drastically our approach to testing anabolic androgenic steroids, making it extremely complex. The prohibited list of substances went from a few lines to several pages. The Internet and the magazines advertised regularly new “designer” supplements until their legal distribution was finally stopped in 2005. Other steroids are distributed secretly in restricted circles. The first example was given in USA when a female cyclist was banned for the use of norbolethone, a steroid which has been studied by the pharmaceutical industry in the 1960s but never commercialised. Later in 2004, following the characterisation of THG from an oily residue given to the American testing authorities, and in collaboration with the international athletic federation, several elite athletes’ samples were tested and found to contain that “designer” steroid. The properties of tetrahydrogestrinone were subsequently studied; it appears that THG is a potent androgen and progestin. Then, a former athlete was caught at the Canadian border in possession of growth hormone, THG and another steroid-product identified as DMT (17 α -methyl-5 α -androst-2-en-17 β -ol). When new steroids are detected, whether as a consequence of a seizure or from the detection of unknown metabolites in the urines of athletes, a comprehensive approach must permit its rapid identification, the characterisation of its metabolites and of its hormonal properties. We will review, using examples, typical research work aimed at identifying, characterising the substance and its metabolites as well as its hormonal properties, when a steroid is found.

The detection of the utilisation of “natural” steroids such as testosterone, its active metabolite DHT and precursors/prohormones DHEA and androstendione is based upon the modifications of selected parameters of the urinary steroid profile measured by GC/MS combined to the GC/C/IRMS analysis. Reference ranges determined in male and female athletes’ populations over the years and the stability of the individual parameters, such as the T/E value, will be presented and discussed. The IRMS analysis is based upon the comparison of delta ($\delta^{13}\text{C}_{\text{VPDB}}^{\text{‰}}$) values of the androgen metabolite(s) to the urinary reference steroids, reflecting a common or different origin; examples will be shown. Relation will be made to WADA’s Technical Documents. In the recent years, new forms of testosterone were studied and reported to cause subtle modifications of the steroid profile, and borderline differences in GC/C/IRMS analysis. It is also possible for certain athletes to get “designer” testosterone or prohormones of “natural” isotopic signature. Individual data bases and careful investigations are recommended.

Session 3: Specific Issues arising from daily Implementation of the Code

Parallel Sessions

- Session A Therapeutic Use Exemptions Management
- Session B Out-of-Competition Testing Efficiencies
- Session C Borderline Issues

Session A

LES AUTORISATIONS THERAPEUTIQUES

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Le principe de délivrance d'autorisations thérapeutiques (AUT) existe depuis fort longtemps, la Commission Médicale du CIO ayant délivré de telles autorisations lors des JO de SEOUL et CALGARY en 1988. En 1991, la Commission Médicale du CIO approuvera la création d'un Comité Consultatif (MAC) pour délivrer ces autorisations et en fixera les premières règles

Toutefois, ces possibilités d'autorisations étaient bien souvent méconnues. Seuls quelques médecins d'équipe en connaissaient la possibilité et ces autorisations ne concernaient la plupart du temps que les athlètes participant aux J.O.... et par extension aux Championnats du Monde. Le CIO fournira un modèle de formulaire d'AUT à utiliser par tous les athlètes souhaitant obtenir une telle autorisation pour les JO de Sydney en 2000, rendant ainsi la procédure transparente.

L'Agence Mondiale Antidopage, en inscrivant cette possibilité dans le Code Mondial, étendra la procédure des AUT à l'ensemble des athlètes.

Les fédérations internationales, qui mettront en application ce processus dès l'entrée en vigueur du Code en 2004, vont rapidement se trouver confrontées à un grand nombre de problèmes :

- Formation d'un Comité d'Autorisation Thérapeutique
- Volume de travail
 - o Nombre de dossiers à traiter
 - o Répartition annuelle des demandes
 - o Coût financier et humain de cette gestion
- Absence de critères médicaux pour délivrer ces AUT
- Absence de limites juridiques du Code qui ont pour conséquence une application de la procédure d'AUT à tous les athlètes, des plus jeunes aux plus âgés..., obligeant les FI à fixer leurs propres limites.
- Reconnaissance des AUT par les ONAD
- Absence de circulation de l'information dans un grand nombre de pays, si bien que :
 - o Trop de médecins ignorent les procédures (dossiers inutiles, incomplets, non argumentés sur le plan médical... quand une demande est effectuée...)
 - o Trop d'athlètes ne peuvent bénéficier de ces possibilités ; le Code avait pourtant pour but de traiter tous les athlètes du Monde de manière identique.
- Apparition de demandes pour de nouvelles pathologies ignorées auparavant dans le monde sportif

La FISA est amenée à traiter environ 350 dossiers par an et nous avons eu à faire face, comme bon nombre de nos confrères, à tous ces problèmes.

Les exemples que nous vous présenterons vous permettront de prendre conscience des problèmes rencontrés au quotidien dans la gestion de ces demandes.

Translation

THERAPEUTIC USE EXEMPTION PROCESS

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FISA Medical Commission

The principle of delivering therapeutic use exemptions (TUE) has been established for a long time, the IOC's Medical Commission having already delivered such authorisations during the Olympic Games of SEOUL and CALGARY back in 1988. In 1991 the IOC Medical Commission approved the creation of a Consulting Committee responsible for delivering authorisations and establishing its first rules.

However these exemption processes were not widely known. Only a few team doctors were aware of them and exemptions were generally only ever granted to athletes participating in the Olympic Games and, by extension, in the World Championships. For the Sydney Olympics, in 2000, the IOC supplied a model of a TUE request form to be filled in by every athlete wishing to apply for an exemption, thereby making the procedure totally transparent.

The World Anti-Doping Association, by including this possibility in its World Code, proceeded to extend the TUE process to every sportsperson.

The international federations who ratified the process immediately upon the Code being implemented, in 2004, quickly found themselves faced with a great many issues:

- Having to set up a Therapeutic Use Exemption Committee
- A heavier workload
 - o Numerous applications to process
 - o Applications received throughout the calendar year
 - o A heavy human and financial cost incurred
- No medical criteria set out for granting TUE
- No legal limits set out in the Code, meaning that the TUE process applies to every athlete, from the youngest to the oldest... forcing the IFs to establish their own limits
- Recognition of TUEs by ADOs
- Lack of information in many countries, meaning that:
 - o Many doctors ignore correct procedures (submitting either applications forms which are unnecessary, incomplete or with insufficient medical reasons supplied... or simply no application is made)
 - o Too many athletes do not benefit from these possibilities, although the Code's aim was that every single athlete worldwide be treated in an identical manner.
- The appearance of applications for new pathologies which had never before featured in the world of sport

FISA now processes an extra 350 applications per year, and we have faced, like many of our fellow federations, all of the above problems.

The examples we plan to present should make you fully aware of the issues we face in the day-to-day administration of TUE applications.

SHORTCOMINGS IN THE THERAPEUTIC USE EXEMPTIONS PROCESS

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Introduction When we are discussing possibilities how to improve the effectiveness and the quality of the TUE process, it is important to draw up an inventory of shortcomings and errors being made frequently, and to think about ways to avoid them.

Methods Based on the IAAF experience of nearly 3 years, an inventory was made of most frequently made errors, not only from the athletes' part, but also in the IAAF processing of applications.

Results As far as TUE applications are concerned, a distinction can be made between "formal" errors (wrong forms used, non-international level athlete, missing information, application not signed, etc), errors regarding medical documentation (no documents included with standard application, test not accepted in IAAF Beta₂-agonists protocol, etc) or applications which are not needed (e.g. out-of-competition use of local glucocorticosteroids).

Because of the huge administrative burden, even a big IF like IAAF doesn't succeed in notifying athletes immediately upon receipt of a complete request. The WADA International Standard for TUEs and the IAAF Procedural Guidelines for Doping Control impose this immediate notification. Communication about which athletes are considered 'international level' is troublesome. Making athletes and member federations understand what the difference is between international competitions in general and IAAF International Competitions as far as doping control (and the need for applying for a TUE at IAAF) is concerned, is difficult.

Finally, from an administrative point of view, due to a lack of efficiency in the processing of TUE applications, athletes don't always get their certificate of approval sent on time.

Discussion Almost 3 years after the introduction of the TUE process, still much is to be done to make the process more efficient and better applied by athletes, federations and physicians. As far as WADA and IFs are concerned, efforts should be made as to communication about TUE applications. Besides this, IFs and other ADOs might be hesitating as to steps to be taken to get their processing more efficient: should they further develop their own systems, or would ADAMS be the tool they've been hoping and waiting for?

In order to alleviate the administrative burden of the TUE process, as an example we are convinced that notification of the local use of glucocorticosteroids should be remained, but that the ADO shouldn't send any acknowledgement of receipt or TUE anymore. Besides this, distinction should be made regarding requirements for different levels and ages of athletes.

Conclusions The processing of TUE applications requires a lot of human and financial resources. In order not to weigh too much on the outcome (and global costs) of an efficient anti-doping fight, the cost:benefit ratio of the system should be considered. Better communication, education and efficient processing tools are urgently needed.

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IAAF List of International Competitions. www.iaaf.org > Anti-Doping > Testing > Guidelines

IAAF Registered Testing Pool. www.iaaf.org > Anti-Doping > Testing > Guidelines

WADA International Standards for Therapeutic Use Exemptions

THE SWEDISH EXPERIENCES WITH TUE

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of the Medical Committee of LEN

Sweden has had rules for granting TUE since 1988. However, these rules were only valid nationally. With the implementation of the World Anti-Doping Code (WADC), which was done from the 1st of July 2004, the Swedish Sports Confederation as being a NADO, created two TUECs, each led by a MD from the Anti-Doping Commission. These two TUECs had attached well experienced, highly academic qualified MDs, most of them with sport interest and with a broad medical experience.

During the first two years; from the 1st of July 2004 to June 30th 2006, a high number of TUEs has been granted, only for high level athletes. Those athletes that perform sport at a lower level - mostly joggers, there is a General TUE given to each sport federation.

The Swedish Sports Confederation has 68 different sport federations attached and handles all TUEs for these sport federations with the exception of applications sent to the different International Sport Federations (ISF).

These are the number of TUEs granted.

Abbreviated TUE	2178
Standard TUE	445

In my presentation I will present the number of TUEs for each Sport Discipline, the diagnosis that was presented and its distribution to the different sport disciplines and comment about that.

If the TUECs are uncertain how to judge an application they can ask the special Medical Advisory Board of the Anti-Doping Commission.

There have been problems associated with the application for TUE for Testosterone. The indications for Testosterone supplement were quite clear, but there was an uncertainty on how to check that the athlete did not take "too much".

Another problem has been all applications for hGH-supplementation. The indication for hGH medication was very clear, but there was an uncertainty on how to know that the athlete only did take the correct dosage.

Finally the TUEC has had problems with the applications for Finasteride as a treatment for Alopecia. Is the treatment medically important and does a rejection of the application cause severe psychological problems to the athletes?

The advisory board was of this opinion. However, when consulting WADA we got the answer that a TUE can not be given for "a cosmetic treatment".

Session B

IAAF OUT-OF-COMPETITION EFFICIENCY ISSUES

James Sclater

IAAF Overall Testing Manager

In 1928, the IAAF became the first-ever International Sport Federation to ban the use of doping products, declaring that any person using or assisting someone to use such products be suspended. Since then, the IAAF has continued in the struggle against doping in sport. For over 15 years, the IAAF has been conducting out-of-competition testing. In recent years, the IAAF has made attempts to maximise the efficiency of its Anti-Doping programme.

The IAAF Out-of-Competition Testing Programme tests thousands of athletes throughout the world every year. Recently, efforts have been made to increase the performance of the programme with respect to detection. Blood samples are collected as often as possible, the values of the blood parameters are entered into a database and athletes' blood profiles are tracked. Plans are in place to begin a steroid profile database as well. Using the scientific data, an emphasis is placed on testing suspect athletes at the right time.

Two main areas of the IAAF Out-of-Competition Testing Programme represent roadblocks to maximise the efficiency of the programme: the IAAF Registered Testing Pool and the Athletes Whereabouts Programme.

Issues regarding the IAAF RTP:

- Criteria for inclusion
- Deterrence vs Detection Testing
- Co-operation with NADOs

Issues regarding the Athletes Whereabouts Programme:

- Quality of Athletes Whereabouts
- Missed Test administration
- Co-operation with NADOs

To ensure that the resources allocated to promoting doping-free sport are utilised most efficiently these issues must be discussed and resolved.

OUT-OF-COMPETITION TESTING EFFICIENCIES: WADA'S VISION

Rune Andersen

Director, World Anti-Doping Agency

With the World Anti-Doping Code in full operation for over 2 years, stakeholders have been working through its intricacies to ensure effective anti-doping programs and, at the same time, trying to balance the much needed resources to carry out effective out-of-competition testing because, as we all know, the single biggest threat to the health and well being of sport is doping.

While the focus of this discussion is on the importance of out-of-competition testing and the need to ensure its effectiveness, it does not intend to undermine the importance of conducting in-competition testing as the more unpredictable anti-doping organization can be in their approach the more effective we will be.

When we reflect on the progression of the anti-doping movement over the past twenty years we can consistently come back to one thing, of course not excluding research, being the provision of Athlete whereabouts information. For years OOCT testing was occurring when athletes wanted it to occur. They would make themselves available and would welcome testing anytime; but for those who were cheating, they were never easy to find.

To be effective all anti-doping organizations need to have well-managed whereabouts programs; programs that demand that those athletes who are included in the RTP are providing the information as requested. Furthermore, it is just as important for athletes who are not providing the information to be dealt with in an appropriate manner.

With the provision of whereabouts information now mandatory for anti-doping organizations, more time needs to be spent on developing test distribution plans that incorporate a series of factors; factors such as training times, increase and decrease in performance, sudden withdrawal from events, etc. We often look at TDP on a yearly basis, but to be effective shouldn't this be spread over a few years?

To ensure effective detection and deterrence, anti-doping organizations need to work closer together, to build trust and to work towards one common goal of doping-free sport. The Code has provided us a mechanism to fulfil such an approach and we are now at a point in time where limited resources need to go further and the only way to achieve this is through coordination. Coordination that ensures those athletes outside an International registered testing pool are being tested; coordination that trusts that those athlete are being testing for the good of the anti-doping movement. The presentations and debates in this session of the symposium will explore some of the questions raised and solutions we can bring today and further develop in the future to do our part in promoting doping-free sport and effective out-of-competition testing.

OUT-OF-COMPETITION TESTING EFFICIENCIES: A NADO'S PERSPECTIVE

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The FIFA-WC 2006 in Germany has proven to be one of the best sport events ever in history, but besides this, doping has made the headline in sports at least throughout the summer. Cycling and athletics appeared to be infected to a great extent. And overall the topic of doping has become a top priority issue of politics and media in Germany. This has also turned the public focus towards the work of our agency.

The OOC-testing programme in Germany started in 1989, after the Seoul Olympics and the Ben Johnson case. This programme was developed by the Anti-Doping Commission (ADK) of the Deutsche Sportbund and the NOC of Germany. The testing program started with some national Olympic federations based on a deterrent detection programme. Over the years also Non-Olympic national federations and regional sport organisations were included. At the start of our organisation in the year 2003 about 4000 OOC-Controls per year were performed.

In the beginning of NADA's work the basis of the control-system stayed very much the same, but after the implementation of the WADA-Code, fundamental changes of our control system are taking place. To fulfil the requirements of the WADA-Code, the deterrent function of the controls is more and more changing towards a programme of detection.

For this reason, the number of athletes included in the testing system has to be changed by implementation of registered testing pools. The appearance of EPO and transfusion techniques in endurance sport reveals the need for new testing strategies. A more scientific approach towards training periods and the use of certain forbidden substances is needed. And in the future this will lead to a more individual profiling of athletes (steroid profile, haematological profile) and the use of adequate statistics for detecting pattern of abuse.

But there are questions remaining and some problems are unsolved: What is going to happen with athletes that are not members of a registered testing pool? Can we use education of athletes and support personal as a tool to support the controls? Will the change in testing strategy have any consequences on those that want to cheat?

But beside this, some topics still have to be discussed and must be improved. One of the topics is the lack of co-ordination of testing programmes between IF's and NADO's. Another important issue is the difference in testing in different nations. And in the end, reliable testing methods for all substances and methods on the Prohibited List are needed.

To achieve the goal of doping free sport more resources, intelligent strategies and closer co-operation between the stakeholders of the WADA-Code are essential.

Session C

HYPOXIC DEVICES IN SPORTS

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In 2006, the World Anti-Doping Agency (WADA) Executive Committee, after consultation of its Scientific Committees and Ethical Issues Review Panel, opened an international debate concerning the use of hypoxic devices in sports.

As usual before a possible introduction of a new substance or method in the WADA list, three questions have to be addressed:

- Do hypoxic devices have the potential to enhance sports performance?
- Do hypoxic devices represent an actual or potential health risk to the athlete?
- Do hypoxic devices violate the “spirit of sports”?

The answer to the first question is complex because hypoxic devices can be used under different conditions leading to different physiological adaptations: a) live high - train high (1800 – 3000 m above the sea level), b) live high – train low, c) live low – train high, and d) intermittent hypoxic exposure (> 4000 m). Nevertheless, there is now a compelling evidence that the responses to artificial hypoxia:

- show large inter-individual variations probably depending on the genotype and the training level of the subjects,
- may be associated, for some subjects, with a mild performance improvement which remains lower than the one observed after EPO abuse,
- are multi-faceted at the molecular level and not only relying on a red cell mass increase via and EPO stimulation.

The safety issue of hypoxic devices has been poorly studied, but one may argue casuistically that millions of people throughout the world live above 3000 m without altitude-related health defects, and that no severe accidents have been reported by regular hypoxic device users.

Addressing the issue of a violation of the “spirit of sports” by hypoxic devices would deserve a complete symposium, and this presentation aims to briefly review the main arguments exposed by the pro and con.

INTRAVENOUS VERSUS ORAL REHYDRATION

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The practice of using intravenous (IV) fluids to rehydrate athletes appears to be fairly common, whether in American football, halftime in sports such as soccer, between events in track and field, or after a marathon or triathlon. There are unquestioned medical benefits for providing an IV to a dehydrated athlete who is semi- or unconscious or who can not tolerate oral fluids. Concerning ergogenic issues the prevailing notions among many sports health professionals are that an IV:

- Is more effective than oral rehydration in rehydrating a dehydrated athlete.
- Will provide a greater performance edge (over rehydrating orally) for an athlete between two bouts of exercise, such as the first and second halves of an athletic contest or in between multiple daily maximal exercise bouts (i.e. decathlete, tennis player).

Surprisingly, however, the fact is that fluid taken orally (when in the same volume) has comparable physiological benefits compared to fluid given via IV. Of particular interest are studies that show oral rehydration may lead to lower body temperature, lower RPE, and improved athletic performance. When you consider these advantages against the disadvantages associated with using an IV (i.e., treatment is invasive, requires trained medical staff, must be given off the field, increases risk of infection and bruising) an oral rehydration protocol is usually a more efficacious hydration approach. Nevertheless, the fact remains that greater volumes can be tolerated when the fluid is administered intravenously. Additionally, the ethical considerations of this form of rehydration are important considerations. An athlete who uses IV simply to enhance performance and not for a noted medical condition may be crossing the line of ethical practices.

Perhaps the greatest advantage of an effective oral rehydration protocol is that it encourages athletes to take an active role in rehydrating themselves, thus avoiding psychological dependence on intravenous fluids. Keeping the athlete responsible for his or her fluid replacement needs is the best approach to reduce the risks associated with dehydration.

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MEDICAL USE OF AUTOLOGOUS BLOOD PRODUCTS IN TRACK AND FIELD

Dr Bruce Hamilton, MBCHB, BPHED, FACSP, DTM&H, FFSEM
UK Athletics

Increasingly medical science poses challenges to our practice, as new technology enables new treatment options. The use of growth factors is one such area which has the potential to provide treatment options where previously there was little available. The use of autologous blood and “blood spinning” is believed to be one way of utilising the bodies own growth factors to enhance healing.

Despite limited scientific evidence, both untreated autologous blood and “blood spinning” are allegedly being utilised by sports physicians around the world. This is despite the use of growth factors being explicitly prohibited in the WADA Code. The IAAF recently required the submission of a TUE, in order to permit its use in a case of recalcitrant patellar tendinopathy. Depending on ones view, the practitioners involved in this practice may be considered “ground breaking” or “archaic”.

This presentation aims to briefly review the current literature surrounding the use of autologous blood products in medicine and its possible use in sports medicine. It will address the challenges that the use of blood products and local Growth Factors may pose to the current version of the WADA code and recommend a way forward.

EXPLORING THE FRONTIERS OF ANTI-DOPING SCIENCE

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Over the course of time, and more acutely during recent decades, the traditional borders separating several scientific fields have become less defined, resulting in multidisciplinary scientific activities that generate innovative concepts and explorative research avenues.

In this global scientific context, anti-doping science is relatively new and is essentially based upon well defined categories of substances and methods to facilitate the educational and legal dimensions of the application of science in the fight against doping in sport. However, as a result of multidisciplinary approaches, innovative substances, methods or concepts occasionally challenge the established categories to determine their prohibited status or not.

Based on the issues recently raised by such innovations as blood spinning (recovery method), drosperinone (hybrid substance), hormonal homology with new preventive therapeutical approach (concept), and biotechnology applications, we can already perceive and anticipate some of the challenges the anti-doping scientific community will have to address. The presentations and debates in this session of the symposium will explore some of the questions raised and solutions we can bring today and further develop in the future.

As anti-doping science progresses, judgment on the prohibited status of substances and methods will inevitably evolve. Flexibility in scientific criteria will need to be maintained in order to support a coherent judgement on borderline substances and methods that modern creative science will deliver to the therapeutic fields and indirectly to anti-doping scientific scrutiny.



Session 4: Modern Methods for Prevention and Deterrence of Doping

Nutrition

Prevention by Information / Education

Intelligent Testing programmes

A MODEL FOR MANAGING SUPPLEMENTS FOR ATHLETES: THE AUSTRALIAN INSTITUTE OF SPORT SUPPLEMENT PROGRAM

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The sports world is filled with products that claim to prolong endurance, enhance recovery, reduce body fat, increase muscle mass, minimise the risk of illness, or achieve other goals that enhance sports performance. According to surveys, athletes are major consumers of supplements and an important target group for the multi-billion dollar supplement industry. Unfortunately, the many challenges to undertaking sports science research mean that it is impossible to keep pace with the number of new products that appear on the sports market. While some sports foods and supplements can provide true value in the nutrition program of the athlete, the majority of supplements and sports foods are either untested or have failed to live up to expectations in the preliminary studies that have been conducted. Scientists believe that well-controlled research should underpin the promotion of any sports nutrition practice and are understandably frustrated that producers of supplements often make impressive claims about their products without adequate or, in some cases, any proof. However, in most countries, legislation regarding supplements or sports foods is either minimal or unenforced, allowing unsupported claims to flourish and products to be manufactured with poor compliance to labelling and composition standards. Athletes are usually unaware of these lapses. This session provides an overview of an approach used by the Australian Institute of Sport Sports Supplement Program to educate athletes and coaches about supplements and to manage the provision of supplements to athletes and teams. Information and resources relating to this Program can be found at www.ais.org.au/nutrition.

PREVENTION OF DOPING IN YOUNG ATHLETES: DOES IT WORK OR NOT, AND WHY?

Patrick Laure

Public Health Physician, France

Prevention of doping in young athletes is an old subject, which has largely been debated since the fifties and of which the effectiveness, in the opinions of many people, is doubtful.

Prevention is anticipation of a type of behaviour, which is judged as problematic by a social group in relation to its fundamental values. The objective is to stop the occurrence of the behaviour, or at least to limit its negative effects.

Prevention of doping raises several questions, such as: What are the real objectives of doping prevention programmes? What method should be used to achieve these aims, in particular when dealing with adolescents? How can we be sure that the objectives have been reached, and if not, why not?

The aim of this intervention is to revisit this theme with the tools used in the field of public health to determine when a health problem must be considered as a public health priority: importance of the problem (frequency, damage), social perception, economic consequences, feasibility.

DETECTING DOPING THROUGH EFFECTIVE TESTING

Joseph de Pencier

Director, Canadian Centre for Ethics in Sport

Anti-doping programs usually have at least two main goals: to **deter** doping and to **detect** doping. While **detection** is the act of actually and specifically identifying doping (and permitting appropriate consequences to be imposed), **deterrence** may be defined as an act or acts intended to discourage or prevent doping. Since not every athlete can be – or should be – tested at all competitions, or at all times when training out-of-competition, **detection** can never promise to discover every single case of doping. Therefore, doping-free sport must involve measures to prevent or **deter** doping from happening in the first place.

While doping control (collecting and analysing athlete samples and acting on the analytical results) serves to detect doping, an effective and transparent program of doping control also deters doping. If athletes believe detection is effective, they will be deterred from doping and they will be more eager to support anti-doping programs. Doping control that meets the requirements of the World Anti-Doping Code (Code) and the International Standard for Testing (IST) is an effective means of deterring because, for example, it includes a mix of in- and out-of-competition testing (Code Article 5.1.1), involves intelligent test distribution planning that evaluates potential risk and pattern of doping (based on demands of sport, available doping statistics, research on doping trends, timing of training and competitive periods) (IST Article 4.5), makes no advance notice testing the priority (Code Article 5.1.2), involves target testing (Code Article 5.1.3), involves coordination with other doping control programs (Code Articles 14.2, Art. 15.1, 15.2, 15.3) and is based on accurate whereabouts information (IST Article 4.4).

But doping control can also deter doping when detection is not the immediate objective. According to Article 18.1 of the Code, the primary aim of anti-doping education is to “dissuade” athletes from doping. A comprehensive anti-doping education program for developmental athletes – who may only be subject to minimal doping control -- can be an effective deterrent to doping. Anti-doping education that includes a modest amount of doping control adds a practical element to that education. It reinforces for athletes that their right to doping-free sport carries with it their responsibilities to take the utmost caution in avoiding doping and to cooperate fully in doping control. It also increases their confidence in the anti-doping program. Domestic Canadian anti-doping education programs that integrate testing will be discussed as examples of enhancing deterrence of doping.

EDUCATION, A KEY ELEMENT FOR DRUG FREE SPORT

Jim Ferstle

Education is vital to the anti-doping effort. While the majority of attention and money is currently devoted to testing, much more needs to be done in education. For most, education is limited to providing athletes, coaches, and others in the athletics community with information about the banned list, dope test protocols, and how the testing process works. Some efforts have been made to highlight the negative health impact of drug abuse by athletes and other issues determined to be important to the anti-doping "message." Overall, however, the attempt to educate the athletics community about the anti-doping movement has been limited, uncoordinated, and lacking in focus. How can we change this? What role do the various "players" (WADA, NADOs, IFs and member federations) have in education? What impact does media coverage have on this issue? What information is important to convey to the Athletics community? How can you do this simply, efficiently, and within budget?

What is the best way to respond to the all too frequent "doping scandals" or crises that often dominate coverage of the sport? What message is currently being conveyed by the information disseminated by the various organizations, the media, the athletes? How do you deal with inaccurate information that often appears about this issue? As you can tell from these questions, education infiltrates every aspect of the anti-doping spectrum. What is said. What is done. What message is being conveyed. All the pieces of the anti-doping movement have an educational component. The key to success in your education program is developing a clear, simple, easily understood plan that can be implemented by all elements of the organization. Easier said than done, but hopefully you will come away from this presentation with some ideas on how to accomplish that goal within your organization.

The image features a solid blue background with several light blue, curved, overlapping lines that create a sense of motion and depth. A thin black rectangular box is centered horizontally, containing the word "Posters" in a simple, black, sans-serif font.

Posters

HAEMOGLOBIN MASS MEASUREMENTS DURING PROFESSIONAL ROAD CYCLING COMPETITION

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Introduction: Blood Doping with Transfusions or EPO abuse is difficult if not impossible to detect by conventional anti-doping urine tests. For this reason, many sporting federations have introduced blood tests for the indirect detection of blood manipulations. Cut off values for Haemoglobin concentration (Hb) and Haematocrit (Hct) are currently in use. However, these parameters have been criticised, as they are highly variable and are significantly influenced by body position, exercise or hydration status. The main reason for this variability is the fact that Hb and Hct are concentration measures and reflect every change that occurs in the vascular fluid compartment. Therefore, Hb and Hct are of limited use in the screening for blood manipulations. In contrast, a direct measurement of total haemoglobin mass would provide the most accurate tool in this context. The recently optimised CO rebreathing method for the measurement of total haemoglobin mass (1) might present a practicable method to be used for this purpose with sufficient accuracy. The aim of this study was to investigate the stability of total haemoglobin mass in highly trained athletes measured by these means over a period of heavy exercise. At the same time, this new variable was to be compared to Hb and Hct, two variables currently used in several sporting federations as screening values in blood tests.

Materials and Methods: Total Haemoglobin mass of 8 elite cyclists and 3 inactive controls was investigated using the CO rebreathing method at baseline and after each stage of a four day professional cycling stage race. At the same time, Hb and Hct were measured.

Results: Total Haemoglobin mass did not show any significant changes in athletes or controls over the study period (athletes mean 949 ± 29 g, controls mean 890 ± 21 g). The standard error of measurement during the study period was 1,40% (athletes; corresponding to 13,3g of Haemoglobin) and 1,13% (controls; corresponding to 10,1g of Haemoglobin), coefficient of variation (CV) 3,0% (athletes) and 2,3% (controls). Hb and Hct decreased significantly ($p < 0,01$) in athletes after the second day of racing with Hb 6,3% and Hct 7,2% lower at the end of the race compared to the beginning (Day 1 vs. Day 5: Hb $15,7 \pm 0,89$ g/dl vs. $14,7 \pm 0,66$ g/dl and Hct $44,1 \pm 2,32\%$ vs. $40,9 \pm 1,59\%$) (CV: 4,0% for Hb and 4,6% for Hct). Both variables remained statistically unchanged in controls.

Discussion: Total haemoglobin mass is not significantly influenced by acute heavy exercise. Hb and Hct show significant variations under the same conditions, most likely due to shifts in plasma volume. These variations are in line with previously reported data (2) and have to be considered when using blood tests based on these parameters in the field. In contrast, our data shows that total haemoglobin mass, which represents the main target for all blood manipulations, is stable even under conditions of prolonged heavy exercise and could therefore provide a valuable screening tool for blood manipulations.

Conclusions: Total haemoglobin mass is not influenced by heavy exercise. Measurements of total haemoglobin mass using the optimised CO rebreathing method in an Anti-Doping setting could improve the fight against Blood Doping.

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DEVELOPMENT OF A PROTOTYPE BLOOD-BASED TEST FOR EXOGENOUS ERYTHROPOIETIN ACTIVITY BASED ON TRANSCRIPTIONAL PROFILING

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Erythropoietin (Epo) is a naturally occurring hormone that stimulates red blood cell development. Synthetic Epo (such as recombinant human Epo, rhEpo), which is frequently used to treat anaemia, is one of the most commonly prescribed drugs in the world. Unfortunately, rhEpo is also one of the most common doping agents used by endurance athletes to boost their aerobic capacity. Treating anaemia with rhEpo injections is costly and gene therapy, in which the gene encoding Epo is inserted into the individual and stimulated to produce the hormone, is a promising alternative. Unfortunately, while gene therapy has the potential to revolutionize medicine, many experts believe that illicit application of this technology will be the next major challenge to anti-doping authorities.

Epo produced within the athlete by an exogenous gene would likely be identical to the natural hormone and undetectable by current tests; however, the biological pathway of which Epo is part (the response to hypoxia) is complex and involves the coordinate regulation of genes in a variety of distinct, but related pathways. Selectively stimulating only the Epo pathway would not have the same system-wide effects as the natural stimulation of the entire hypoxia pathway and we predict that distinguishing between the augmented and the natural Epo responses would be possible by comparing patterns of gene expression (the "transcriptional profile").

In stage one of this project, we are using Serial Analysis of Gene Expression (SAGE) to generate high-resolution transcriptional profiles of blood cells taken from mice exposed to either normobaric hypoxia (~14% O₂) or rhEpo injection. We hypothesize that comparing these profiles will identify patterns of gene expression that are characteristic of Epo functioning independently of the normal hypoxia response. Once candidate genes have been identified in the mouse model, we will locate and characterize their human homologues, and incorporate the latter into a blood-based test for diagnostic patterns of gene expression characteristic of exogenous Epo use. This test should work for any artificial induction or erythropoiesis, including Epo gene therapy.

SIGNIFICANCE OF CORTISOL/CORTISONE RATIO IN DOPING CONTROL

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Introduction: Cortisol (F) and cortisone (E) are steroid hormones synthesized and liberated in the suprarenal cortex. Since athletes might use glucocorticosteroids to improve their performance, these substances are included in the WADA Prohibited List. Natural cortisol levels rise and fall during the day. Highest level occurs at about 6 to 8 AM, and lowest level is at about midnight. Also well known that F and E are released in humans for the adaptation to stress, and the concentrations of F and E change during emotional events like games or competitions. For this reason, it looks interesting to assess the F/E ratio in the doping test to evaluate their possible abuse.

Material and Methods: In this work, an optimized method for the simultaneous determination of synthetic corticosteroids, F and E by HPLC-MS Ion Trap with fluoxymesterone internal standard was used. The variations and changes of F/E ratio were monitored at different time frame of a day for healthy population, competing athletes, and healthy humans after administration of hydrocortisone acetate and methylprednisolone.

Healthy humans. Thirteen healthy humans aged 21–50 years; 6 male and 7 female, constituted the reference populations. The statistical analysis has shown that F/E ratio are 0.3 – 0.9 at morning, 0.2 - 0.6 at daytime and 0.1 – 0.3 at night.

Athletes. Sample from three competing athletes (age 20-32 yr, female and 2 males) were selected to obtain individual information about their F and E urinary excretion. The mean values for F/E ratio were 0.6 ± 0.2 . After moderate training session the mean values were 0.3 ± 0.15 , and after heavy training workload associated with stress the mean values were 0.8 ± 0.2 . These results show that moderate training decrease F/E ratio, while competition do increase F/E ratio.

Therefore, possible variations of F/E ratio for healthy populations and competing athletes are within 0.1 - 1.0 range, which might be considered as a norm.

Results: *Hydrocortisone acetate administration, 125 mg.* Before administration F/E ratio was 0.4, and after administration F/E ratio was 1.5 during five hours.

Methylprednisolone (MP) administration, 16mg. Before administration F/E ratio was 0.3, after administration F/E ratio was 0.03 for 4 hours, than 0.04 for another 12 hours, meantime concentration of MP went below WADA cut-off level of 30 ng/ml after 12 hours. After 36 hours F/E ratio was still at 0.07, and the concentrations of F and E were significantly suppressed which is typical after synthetic corticosteroids abuse and considered as indirect marker of such manipulations.

Routine doping control. F/E ratio monitoring protocol was applied to 266 urine samples collected from athletes, males and females, of different “traumatic” sports e.g. gymnastics, weightlifting or football. The results gave 43 cases with F/E greater than 1, ranging in 1.0-3.0; and 2 cases with F/E ratio of 4 and 8. Only one case with $F/E < 0.1$ was observed. In all remaining 220 samples F/E ratio was in conventional range of 0.1 – 1.0.

Discussion and Conclusions: Significant increase of F/E ratio appears after administration of exogenous cortisol. Since athletes are alerted about synthetic corticosteroid abuse, they might use synthetic analogs of cortisol. Therefore F/E ratio monitoring might be used as a screening procedure to select samples for the further confirmatory analysis to be developed in the nearest future. Significant decrease of F/E ratio may indicate possible synthetic corticosteroid abuse. Our monitoring protocol does not require any changes in routine doping control operation procedures, and is recommended as a helpful tool for gathering of important analytical information.

INTERNATIONAL CONVENTION AGAINST DOPING IN SPORT

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Introduction

On 19 October 2005, the 33rd session of the UNESCO General Conference unanimously adopted the International Convention against Doping in Sport. While this was a landmark occasion for UNESCO, as a practical demonstration of its important role in international standard-setting, it has significant implications for the future of sport.

Discussion

The purpose of the Convention is to promote the prevention of and the fight against doping in sport, with a view to its elimination. The Convention represents the first time that Governments around the world have agreed to apply the force of international law to anti-doping. It has been drafted to give effect to the Code, creating obligations on nations to take steps in accordance with its principles. The Code is not legally binding for Governments therefore a Convention was required. Accordingly, the Convention helps to formalize global anti-doping rules, policies and guidelines that will help to provide an honest and equitable playing environment for all athletes. Such actions must be complementary to those actions being taken by the sporting movement, as any lack of harmonization has the potential to be exploited to perpetuate doping.

Conclusions

All Governments are urged to take the necessary steps to ratify the Convention so that future generations are able to enjoy and excel in doping-free sport.

CHANGING THE WAYS WE WORK: NEW ROLES FOR SCIENTISTS

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Introduction: The ways we work live, work and play have changed significantly in recent times. Ben Johnson's positive drug test at the Seoul Olympics in 1988 has led to radical change in anti-doping efforts. Our research over the past four years has helped to understand how the role of one group of anti-doping workers has changed (Kazlauskas & Crawford, 2004, 2005, 2006). This poster presents findings from that research about the changed role of one group of anti-doping workers: the scientific directors of anti-doping laboratories.

Materials and Methods: This study drew on the developmental work research method used by organisational studies researchers including activity theorists Yrjö Engeström (2005) and Roberta Hill and her colleagues (2005). Qualitative data was elicited from members of stakeholder groups using surveys, semi-structured interviews, short questionnaires, and participant observation of scientific meetings. Public documentation was also researched and analysed. Participants validated the notes of their own interviews and reflected on them. Some made further observations in the form of comments on the analysed collated data or articles prepared for publication.

Results: The study's participants acknowledged the contribution of scientists working in accredited doping control laboratories to anti-doping efforts. Participants identified three main focuses for the activity of the scientific directors of the laboratories: routine forensic analytical work, productive scientific research, and participation in governance activities. As well as personal integrity, commitment and multi-disciplinary managerial expertise, the study's non-scientific participants pointed to the need for better communication between themselves and anti-doping scientists. Whilst one group of stakeholders stressed the need for anti-doping scientists to take on an investigative role, another group emphasised the importance of a role that would allow them to act as independent experts in doping cases.

Discussion: Scientific and general anti-doping practitioners recognised the complex nature of the activities carried out by the directors and staff of the laboratories. The critical importance of the accurate detection of doping by athletes resulted in the requirement for accredited laboratories to routinely conduct accurate and defensible analyses as well as carry out scientific research to improve existing and to address evolving doping techniques. The study's results indicated that general anti-doping practitioners place considerable emphasis on communication between themselves and their scientific colleagues to promote clearer understanding of scientific matters and to identify athletes who may need to be "watched" more closely. In particular, anti-doping scientists and sport lawyers expressed frustration because of the involvement of scientists without relevant expertise in doping cases, although for different reasons. Anti-doping scientists were annoyed by the inappropriate acceptance of external expert opinion in doping cases, and lawyers by their inability to access the expertise that only anti-doping scientists possessed. General practitioners also noted the increased management skills needed by the scientific directors if they are to effectively supervise scientists from the variety of disciplines required to deal with the expected expansion of anti-doping science as it responds to athletes' use of new unacceptable strategies to enhance their performance. Whilst general anti-doping practitioners held varying views about the involvement of anti-doping scientists in governance activities such as policy development, the directors expressed their dissatisfaction about by their lack of involvement in anti-doping decision-making,

Conclusions: The internationalisation of anti-doping efforts has changed the ways anti-doping practitioners work. This study has highlighted the changed criteria for anti-doping scientific work and outlined new challenges for these scientists. Further research will explore the roles of other anti-doping workers in this complex evolving context.

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CURRENT PHYSICIAN KNOWLEDGE OF THE PROHIBITED LISTS

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Introduction: Only physicians are allowed to sign the Therapeutic Use Exemptions (TUE) of the prohibited lists in national sports organizations. Several studies have reported the current knowledge of the prohibited lists of practicing physicians. These studies, of variable size, have involved different physicians with different degrees of knowledge in different countries through out the world. Consequently, the literature was reviewed to determine the current knowledge of practicing physicians of prohibited lists.

Materials and Methods: Several online medical databases for all studies of measurements of practicing physician's knowledge of the prohibited lists were reviewed and included in the analysis.

Results: 931 practicing physicians in four studies identified. The literature included studies from 1997 to 2006. 490 practicing physicians participated in the studies.

Discussion: Current physician knowledge of prohibited lists is limited and of the 490 responding practicing physicians doping issues are encountered daily. Further research and education of all practicing physicians is recommended since only physicians are allowed to sign the Therapeutic Use Exemptions (TUE) of the prohibited lists.

Conclusion: Current physician knowledge of prohibited lists is limited and doping issues are encountered daily by practicing physicians.

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A CONTROL PANEL FOR DETECTION OF SUBSTANCE'S USE, ABUSE AND MISUSE IN NON-PROFESSIONAL ATHLETES: THE PREVENTION AS A PRIMARY ROLE OF THE EMILIA ROMAGNA REGIONAL ANTIDOPING CENTER (MODENA, ITALY)

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Introduction

It is well known that substances and drugs intake to improve athletic performance represent a diffused phenomenon even in non professional sport practice, however it is difficult or impossible to program antidoping controls in non professional athletes. In this light seems of great importance the diffusion of a improving clean sport culture particularly in non professional athletes. The Emilia Romagna Regional Antidoping Center, in its prevention's policy program proposed a biochemical test panel for a health periodic free check-up control for non professional athletes. This panel is featured by parameters whose alteration could suggest a probable or possible use of doping agents or substances.

Materials and Methods

The program is structured in three steps: a first phase, just completed, concerned the organisation of meeting and lessons at sport's associations, clubs, schools, gyms, places of sport for a good sensibilisation of non professional athletes on healthcare relevance; the second phase will concern the collection and storage sample for analysis ; the third phase will be the evaluation the test's results.

The first phase of our program has been characterized presenting explicative and clear lessons about dangerous effects of drugs and doping agents and about the relevance of a correct and periodic clinical check-up for every kind of athlete. The second phase (sample collection and analysis) will be conducted at Sport's Medicine's Department and at Clinical Pathology Department in BLU Laboratory of "Nuovo Ospedale Estense" of Modena. The analysis will be conducted mainly by immunometric and clinical chemistry methods to explore and evaluate the health condition. Antithrombin III, HDL and total cholesterol value, oestradiol, estrone, FSH, gonadotropins, C protein and total proteins value, LDL/HDL ratio are anabolic steroid's use markers; thyroid's hormones, potassium, triglycerides as beta-blockers markers; urine density, serum electrolytes value, urine PH as diuretics use markers; hematocrit, hemoglobin, red blood cells, ferritin, A glycoporphine, index and ratios of erythrocytes, index and ratios of reticulocytes, transferrin soluble receptor, reticulocytes value, syderemia, transferring value as EPO's use markers; Beta hCG, FSH, LH, testosterone as gonadotropine's use markers; glucose value, h-GH, IGF-BP3/IGF-BP2, IGF-BP2, IGF-BP3, IGF-1, IGF-1/IGF-BP2, ALP isoenzymes as human Growth Hormone's use; vanylmandelic acid, AMPc, ATP, urine catecholamines, chetonic bodies, NEFA, triglycerides as stimulants use markers. The Third phase (results evaluation and communication) will be featured by direct interviews to athletes, test analysis results discussions. In case of suspected substance's use the subjects will be invited to a deepening with clinical or psychological consulting, in addition the positive samples may be undertaken to a further analytical evaluation by actual substance intake determination by Mass Spectrometry, coupled by gas chromatography or liquid chromatography (MS/GC or MS/LC).

Results

We contacted 227 non professional and semi-professional athletes, 180 accepted our program proposal to evaluate their health status ; the sample collection is actually running.

Discussion

The athletes involvement demonstrated a very good interest in our program, a great agreement to an health status evaluation. This seems us an encouraging result and a good start point to end the project. The not interested athletes probably contains subjects that are afraid for the demonstration of substances or doping agents intake. In this view, this percentage looks an indirect indication of doping substances use as it is not probable that an athlete refuses a free and periodic health control for indifference or low interest on healthcare.

Conclusions

In spite of the positive agreement for our healthcare program by involved athletes, the Emilia Romagna Regional Antidoping Center, will make more significant his work for prevention. Is very important to highlight the athletes' percentage not in agreement with our healthcare prevention proposal. It could be useful inviting them for a psychological and clinical deepening or at least for a call at our counselling online services (free telephone line, email counselling) to take a scientific and clear information about effects and problems potentially related to substances use or misuse in sport. Our counselling online service guarantees a full respect of privacy. This kind of approach could be well accepted for athlete afraid about a social judgement and could be a first aid to solve doping agents use damage.

THE IMPLEMENTATION OF IAAF ANTI-DOPING RULES ON NATIONAL LEVEL COMPETITIONS IN SLOVENIA

Malovrh T.

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Introduction

Recently doping has become a big threat to the real spirit of sport. We can only estimate the exact extend of this unpleasant phenomenon and in order to reduce it, only a well considered and fine planned fight against it will bring the desired results. The effective fight against doping starts with good education concerning doping and its risk of abuse. The fight supports strict informing of potential doping users by anti-doping rules. To achieve this, sports federations should organise lectures for athletes, coaches, doctors, parents and also for sport fans. On their web sites basic information and anti-doping rules in official languages of the country must be included; a web site should contain chapters about the anti-doping fight and internet connections to IAAF and WADA. Finally, for the efficient doping control all legal rules for necessary procedures should be officially accepted and harmonised with a country's legislation; otherwise doping abusers will try to find procedural mistakes.

Material and methods

AFS created an official web site chapter about fighting against doping. According to IAAF regulations the chapter includes a short article with all basic information about doping and also obligatory forms necessary for doping control in the Slovene language. Some of the expressions in the text are in bold and by clicking on them, one can get additional information, link, form or regulation. Majority of the top ranking Slovenian athletes and all Slovenian local Athletics clubs were specially informed about the chapter at the web site, both by post and e-mail. In the field of doping control we have organised for many years in-competition controls at national level competitions and during the last two years also out-of competition controls with a great help of previous education and assistance of web site doping chapter.

Results

In the field of education only a poor response was observed, because athletes and coaches accepted education as a new task and duty. Moreover, expert articles about doping published in athletics magazines were only desultory checked out. Visiting the anti-doping chapter on AFS web site was not in range of our expectations. Athletes and coaches accepted in-competition controls, but in some cases there still exist disapproval and complaints mostly in sense of the selection of athletes and explanation of its methods. Out-of competition controls caused a rather big contradiction and the people involved referred to juridical formality. In spite of a very well spread information about controls in the athletic circles, we found positive cases in both, in- and out-of competition controls.

Discussion and conclusions

Athletes, coaches and team doctors are self convinced to have the satisfactory knowledge about doping and its regulations. From the experience at hearing in positive cases the most frequent excuse however is ignorance. In further way of procedure, the athletes involved often collaborate with their own legal representative and they defend themselves in public with excuse interviews. Eradication of doping in sport is practically impossible, but efforts on education on one hand, and strict out-of and in-competition controls on the other will reduce this unpleasant trend. All the efforts oriented towards the fight against doping might change the people's mind. As a result the relation of sponsors towards sport will also change. In conclusion, all active countries in athletics should accept a common programme on fight against doping and anti-doping legislation. Strict preventive and curative measures should more often take place at national level competitions.

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THE STRATEGY OF NATIONAL ANTI-DOPING AGENCY OF ROMANIA REGARDING PREVENTION AND FIGHT AGAINST DOPING IN SPORT

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Romanian Government, consistent in its policy of doping eradication in sport, decided to set up by G.D. 1091/ 2005 National Anti-Doping Agency public institution with juridical personality, under Government's umbrella, coordinated by the Prime-Minister, through Prime-Minister Chancellery, as specific body with decisional autonomy in anti-doping activity.

The paper work presents the strategy of National Anti-Doping Agency of Romania regarding prevention and fight against doping in sport.

A first objective of National Anti-Doping Agency has been the development of a legal frame harmonized with Convention against doping of European Council, with its Additional Protocol as well as with World Anti-Doping Code.

In this regard, the following normative acts have been elaborated and came into force:

- Law 227/2006 regarding prevention and fight against doping in sport;
- G.D. 1091/2005 regarding the approval of organizational structure and of organizing and functioning regulation of National Anti-Doping Agency;
- Law 302/2006 for ratifying the Additional Protocol to Convention against doping (Strasbourg 1989), adopted on Warsaw, on September 12th, 2002. National Anti-Doping Agency also elaborated the following normative acts, which are now in process:
 - Law for the acceptance of International Convention against doping in sport, adopted within the frame of General Conference of UNICEF, on Paris, on October 19th, 2005;
 - Law regarding the athletes' use of nutritional supplements;
 - Law regarding the fight against illicit trafficking of prohibited substances and/or methods.

National Anti-Doping Agency develops its activity based on the following four programs: **education and information, testing, research and international cooperation.**

In our activity, **the education and information program is very special** as it means prevention of doping in sport. Within this program, there have been launched the following educational campaigns: **"No to doping!"** and **"Champions for a Clean Sport!"**

No education program, no matter how well it is elaborated and applied, will be efficient unless doubled by a coherent testing program.

Through **the testing program** for 2006, National Anti-Doping Agency intended the increasing of tests number conducted in a year, insisting on the increasing the number of tests conducted out/of/competition, no notice as well as on target testing.

The other two programs, **research and international cooperation**, are also very carefully treated.

The information and education activity is supported by the publications of National Anti-Doping Agency, as well as by **its informative and propaganda materials:**

1. **Informative Magazine "Clean Sport"**, edited in Romanian and English.
2. **Booklets:** "Therapeutic Use Exemptions" and "Athletes Rights and Responsibilities. Sanctions"
3. **Poster:** "13 Steps in Doping Testing"
4. **The list with medicines** commercialized in Romania that contain prohibited substances and/or methods.
5. **WADA's Prohibited List.**

PLACE AND ROLE OF NATIONAL ANTI-DOPING SYSTEMS IN THE STRUGGLE AGAINST ILLEGAL CIRCULATION OF DOPING SUBSTANCES

Example of the National Byelorussian Athletics Team

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National Anti-Doping Agency, National Athletics Team

The Byelorussian Anti-Doping System is clear and open for high-grade international cooperation.

By the 34th article of the Law «About physical training and sports» use of pharmacological drugs and other methods of a dope in sports is forbidden.

Ratification on 21-th December 2005 both chambers of Parliament «Conventions against application of a dope» the Council of Europe has discovered new page in struggle against application of pirate drugs and methods in sports. From this moment on the Byelorussian authorities the responsibility for acceptance of all complex of measures, directed on elimination of a dope from sports lies.

Right after ratification of the Convention by the Ministry for sports and tourism the new establishment «National Anti-doping Agency» has been organized, basic which purpose of building is realization on a national level of efforts of the state in struggle against application of a dope in sports.

The basic coordinating function in a general anti-doping system the surveillance in Belarus performs the Inter-Ministerial coordination anti-doping Council, built with the purposes of perfection of the surveillance a national anti-doping system.

Building of this Council allows operatively and to decide quality questions in range the surveillance anti-doping as a result of interacting the various ministries, National Olympic and steam-Olympic committees, Federations on kinds of sports and other interests. Thus activity Interdepartmental coordination anti-doping Council is called to promote an adjudicating international sporting organizations of severity of efforts in business of struggle against a dope, put on a governmental level.

Hence, ratification of the Convention and building of Coordination Council and anti-doping Agency have allowed finishing practically now making up national anti-doping services in Belarus.

The first serious walk undertaken by coordination Council development of the position controlling carriage, storage, import, diffusions and sale Doping Drugs and substances, i.e. a complex of measures, directed on limitation of availability of a dope is.

On a final stage of this work building national anti-doping laboratories is planned.

Perfectly understanding, that development National anti-doping systems is the long process, including many factors legislative, financial and a human nature, we perceive, that made work on its building is not concluded at all.

Considering a role and a place of track and field athletics in the program Olympic Games now within the limits of national anti-doping programs the project outside of competitive screening the prohibited substances at sportsmen of national junior team is developed by a combined team. Screening includes research wet on anabolic steroids, and also blood and urine on erythropoietin. Criteria of an estimation are those, accepted IAAF: Hb, Hct and Ret. At excess of the specified parameters research of the developed common analysis of blood on haematologic analyzer "ADVIA-120" and the subsequent definition EPO by immunologic method by a method in addition is carried out. In total it is planned to spend double inspection about 60 sportsmen.