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Doping of Athletes

(Working Party, 15th and 16th January 1963)

Review of the problem as it exists
in the various member countries
(Item IV of the Agenda
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BELGIUM

(General study by the National Institute
of Physical Education and Sport (INEPS))

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The problem of doping in athletic circles

Extracts from the study on doping by
the National Institute of Physical
Education and Sport

I. INTRODUCTION

Doping is a serious problem which at one time threatened to become normal practice in respect of racehorses and which is now liable to contaminate all other sports if adequate preventive measures are not taken. We therefore propose to tackle the subject by indicating the importance which this Institute has already attached to it. The problem is a crucial one, first of all because it is likely to damage or even completely distort the very spirit of competition, - bringing discredit on its moral value, turning away the public who are tired of dishonest practices and thus leading sport to its own ruin. The problem is equally serious on account of the unfortunate, and in some cases dangerous, consequences of such harmful practices on the organism of young people who repeatedly and unrestrictedly use harmful drugs, with the result that sport becomes no longer a source of health but of physical degradation.

We believe that this evil has fortunately not yet attained alarming proportions, but that is no reason for minimising its gravity. It is precisely in order to stress that gravity that we have selected examples from various sports to illustrate the insidiousness of the danger.

Here in Belgium the problem was brought to the notice of the general public by a lawsuit which harshly revealed the practice of doping among racing cyclists. The case was heard in February 1959 by the Courtrai Court of Summary Jurisdiction and the judge, Mr. De Valck, sentenced a trainer, Noël Van Overbeke, for the illegal practice of medicine. The accused had distributed two cachets to the members of his team, and in particular to a young man called Van Houtven. The latter had been instructed to take the first cachet after covering 40 kilometres and the second after 80 kilometres. On analysis it was revealed that in taking these cachets Van Houtven had,

within approximately one hour, swallowed a quantity of poison equal to the maximum dose authorised by the Belgian pharmacopoeia for a whole day.

A house search revealed that the trainer possessed a whole arsenal of medicines. The Deputy Public Prosecutor stated in his indictment:

"This courtroom would be too small to hold all the sports trainers who employ such practices Everyone does it, and the competitors themselves ask the trainers to do it, but that is neither an excuse nor an argument."

Counsel for the accused made the following statements on his client's behalf:

"All the trainers are doing it. If a trainer does not have a well-stocked medicine chest he is considered to be of no use."

This example taken from the Belgian press has its counterpart in the majority of foreign publications. The French review "Sport et Vie" recently published, in its January 1960 edition, an enquiry into the "great illusion" of doping. It is stated in the introduction to the article that cycling champions such as Louison Bobet and Rik Van Steenbergen receive letters and visits from young athletes anxious to find out "what they ought to take to win". The authors of the article are dismayed to note that the problem has increased greatly over recent years; moreover whereas formerly stimulants were used under cover the practice is now carried on quite openly. They report that, during the 1959 Tour de France, Bernard Gauthier finished the time lap foaming at the mouth and in a dreadful state; he admitted having used half a phial of stimulant. Marcel Bidot, technical manager of the French team, asked about the use of stimulants by racing cyclists, said:

"I am betraying no secret by saying that they take more than they should. I cannot and I do not wish to quote individual cases on account of my official position. But I can say that three-quarters of racing cyclists today take dope. I am well placed to know this as I visit their rooms every evening during the Tour. I am always horrified by what I see."

Taking another sport and another country here is a statement by the UPI Agency transmitted from Barcelona on 12th July last:

"Spain qualified for the finals of the Davis Cup, European zone, by beating the British three to two.

"The outstanding form of the Spanish players has now been explained. Dr. Vidal Saval, official doctor to the Royal Tennis Club of Barcelona has said that he gave the player Andres Gimeno "injections of large doses of testosterone" (male hormone).

"Gimeno had seemed tired the previous evening and during the doubles had left all the work to his partner. On Saturday, however, Gimeno played brilliantly and defeated Billy Knight in four sets. That brought Spain equal to Great Britain at two all and Santana's win brought final victory to Spain."

In those laconic terms the Spanish dispatch might be a temptation for those to whom victory alone counts, no matter what means are used to achieve it. The following example will, however, show the other side of the picture.

In Germany various articles, in particular in the magazine "Der Stern", have been written about the spread of the practice of doping. It reports the following confession by the French boxer, Robert Cohen, on his fight against the Siamese Songkitrat:

"It was a hard fight. In the thirteenth round I felt my strength leave me ... Back in my corner I warned my manager, Gaston Charles-Raymond, that I feared the worst for the final two rounds. But my second, Bobby Diamant, immediately passed me a little bottle saying "Drink this, it is a stimulant which acts rapidly and effectively". I swallowed the liquid and in a few seconds felt all my strength return. A few moments later the referee held up my arm - I was world champion, but it had happened in a dream. I do not know how I reached the dressing room, and even today my memory is completely blank from the end of that famous thirteenth round to the next morning ... I simply remember nothing. I have been told that some hours after the fight I was violently sick and that I then lay in bed unconscious. But the one thing I do know is that from that day onwards I have not been the same man in the ring. At the very moment when everyone thought I had attained my best form I had in fact come to the end of my career ...".

The Italian press also contains various warnings against doping. Let us quote an article by Giuseppe Ambrosini in "La Gazzetta dello Sport" of 16th April 1959. The initiative does not always come from the sportsmen themselves as that paper states in its issue of 18th April, which bears the following headline "All champions with methyl hydroxide". The article describes the discovery of the effects of this drug by two American doctors who claim that the drug will make it possible to reduce the world record for the mile by ten seconds. "La Gazzetta dello Sport" comments on this statement that athletes are all protesting against the use of the drug.

This brief summary shows that the press in Belgium and elsewhere is convinced that the practice of doping is spreading. It is therefore of vital importance to examine ways and means of halting this harmful habit which is endangering the very spirit of sport.

The first step might be to inform athletes of the dangers of using such methods. A press campaign might be effective and for this reason we intend to include in a later number an article on the harmful physiological effects of drugs used as stimulants. It is however useless to hope that such warnings will be fully effective, since there will always be some who will not hesitate to resort to methods dangerous to health in the false hope of shining in a competition.

A press campaign might perhaps influence the latter category of athletes in so far as it would show them the inefficacy of certain drugs which have acquired a false reputation as stimulants. We can quote the results of research carried out by this Institute which has revealed the total ineffectiveness of various products, in particular when employed by an athlete who is not fatigued. In other words, most of the drugs are of no benefit to an athlete in good form.

Another method which might do away with doping would be to control the sale of the drugs in question. But such a step would be inadequate. In fact, for some ten years now in Belgium amphetamines have been obtainable from chemists only against medical prescription. These drugs are the most widely used for doping at present, but they can nevertheless be surreptitiously obtained by sportsmen who wish at all costs to procure them.

Methods of supervision by sports administrators must also be considered. Preventive detection would be extremely difficult to effect. It would of course be possible to carry out spot checks of drinks used as "refreshment" by an athlete. But the drug could easily be disguised by the sportsman. It often takes the form of tiny pills which can be easily concealed. La Cava also says he has heard of small plastic phials which can be hidden in the mouth or in the cheek and which the athlete crunches at the appropriate moment. He says that an attempt was made at preventive supervision during the Olympic Games in Helsinki by examining the contents of boxers' thermos flasks but the results were negative.

Preventive checks on drug taking would reveal only agents which take immediate effect and would do nothing to prevent excessive use of a number of products which are absorbed for days or weeks before contests. Such chronic abuse frequently involves only relatively harmless drugs, but they are used to excess. In most cases they are vitamins which could not be placed on inspectors' black lists, but the effect of which may be harmful or dangerous if they are employed to excess - as they often are: some athletes are known to take regularly a quantity of vitamin tablets sufficient to induce digestive disorders.

Finally, could not doping be controlled by medical examination of the athlete? This method would not be easy to implement either. Most stimulants do not produce sufficiently clear or specific clinical effects for detection to be possible by normal medical examination.

Laboratory analysis of the blood or urine would have to be carried out. In the case of racehorses the rules to prevent doping involve analysis of the saliva of suspected animals.

At present, analysis of blood samples taken from athletes would require amendments to our legislation, such as was made to provide for the detection of alcoholism in traffic accidents.

There is however a simple, quick method of solving the problem. The amphetamines referred to above are without doubt the drugs most commonly used for doping. While they can be detected in the blood soon after absorption, they can also be detected in the urine. They are eliminated by the kidneys, but some two days after ingestion. Writers who have studied the effects of amphetamines have shown that their progress is halted in the liver before elimination by the kidneys, which explains the relatively long delay before they appear in the urine.

There seems to be no legal difficulty in examining the urine of an athlete suspected of taking dope. The Italian authorities have instituted appropriate regulations following the proposals of Professor La Cava. In view of the importance of this action, we think it worthwhile to quote the full text of the agreement concluded between the Italian Cycling Union (UVI) and the Federation of Italian Sports Doctors (FMSI):

- "1. The FMSI and the UVI undertake to disseminate as widely as possible elementary information on the dangers resulting from the use of such substances.
2. The UVI undertakes to co-operate with the FMSI in abolishing doping by adopting the following rules:
3. (a) The UVI shall forward to the FMSI the calendar of national competitions and regional committees of the UVI shall forward programmes of regional competitions as and when these are fixed.
- (b) The FMSI shall, for each contest where it considers such action necessary, appoint an inspector to investigate the use of drugs by competitors. The inspector shall be provided with a document signed by the President of the FMSI and shall be authorised by the organisation arranging the contest to investigate the refreshment taken by competitors and to subject them to clinical examination without interfering with the normal progress of the contest. He shall travel in a special car so as to be able to follow all stages of the contest as he desires. The inspector shall also be authorised to take the necessary samples for analysis (with the exception of blood samples) and if necessary ask that any suspected competitor be retained in a place indicated for clinical examination for a period not exceeding fifty hours.
- (c) Competitors who refuse to comply with this request for reasons considered unjustified by the Central Medical Committee of the FMSI shall be barred by the UVI from taking part in contests for an indefinite period until disciplinary action has been taken. Disciplinary action against any found guilty of doping shall be taken by the UVI at the proposal of the Central Medical Committee of the FMSI in the case of competitors belonging to member organisations of

the UVI and by the FMSI in the case of its sports doctors. The services of the medical inspector shall be paid for by the FMSI; the UVI shall pay the cost of accommodation and food for competitors detained under observation if the results of the examination are negative, whereas if the results are positive the cost shall be paid by the competitors. This agreement shall make no change in UVI health regulations at present in force."

The above provisions brought into force in Italy appear to be an excellent security measure against the spread of doping. Similar proposals have on several occasions been suggested in Belgium and pertinent articles on the subject have appeared in the review "Sporakerel" over the signatures of Drs. Ostyn, Dirix and Cleas. But the warning cries do not seem to have been heeded by the organisers of those sports in which doping is most widely practised. It now seems high time for them to take effective action if they do not wish to see sport become a real toxicomania for certain athletes.

II. DEFINITION OF DOPING

The definition of the word doping is disputed. The new Comprehensive Standard Dictionary states that the noun "dope" refers to any thick liquid, for example which may be used as a foodstuff. However the word is commonly used to mean a drug which affects the senses. By extension it also means a "tip" on the race course, a forecast based on the knowledge that a drug has been used and even certainty as to the result before a match or contest. The verb "to dope" means to make a person or animal absorb a liquid foodstuff. Colloquially the word implies the administration of a drug which affects the senses, and was first used in this meaning in referring to racehorses.

The word "doping" (in French) comes from the present participle of the verb wrongly used as a noun in the sense of the word "dope". Thus two essential characteristics of doping appear from the etymology: the behaviour of the subject is artificially altered and the agent used is a drug.

In French "un doping" is a substance which alters the behaviour of the subject when expending energy by processes other than those of normal physiology. Demole includes under the title of "doping" any process of unfair stimulation used by athletes. In our view this definition is incomplete.

To Chailley-Bert doping is the use of drugs or other forms of stimulant, during training and before or during competition liable to improve an individual's performance. This definition is close to the etymology of the word. But, as La Cava points out, in that case massage before a contest would also be considered as a form of doping.

The rules of the International Amateur Athletic Federation indicate as dope all substances which are not in current use and which result in increasing the effort made by contestants beyond that of which they are normally capable. La Cava points out that although caffeine is a dope it is nevertheless in current use in every-day life in the form of coffee. He considers that dope is a stimulant or ergogenetic substance, not a foodstuff, used to improve competitors' performance artificially in a competition.

This definition seems close to the etymological meaning of the term since it includes the idea of a substance not used as a foodstuff, therefore a drug, and also the idea of affecting behaviour. It does not however seem to be either complete or quite correct. There are in fact certain chemical bodies which are neither stimulants nor foodstuffs but are intermediaries of the metabolism of work and as such may improve performance without affecting behaviour. Moreover the active substances are not necessarily stimulants since the behaviour of certain subjects may be improved by tranquillising drugs which remove inhibitions, but are not ergogenetic.

It is therefore extremely difficult to define dope. The problem is further complicated when it is realised that a substance used currently as a drink has a much more marked effect if its active ingredients are administered in the form of an injection. The most typical example of this is coffee and caffeine.

The age and sex of the subject doped must also be taken into consideration. This is particularly necessary when using hormones as ergogenetic agents. The effects of injections of male hormones on a young man cannot be compared with those induced by the same substances in adolescents or old men and even less with those induced in women.

Finally, the time of application and the period of action of the drug must also be taken into account. The preparation of an athlete by polyvitamin treatment during the months preceding a contest cannot be compared with the immediate

effect of an injection given a few moments before the contest. The best definition of dope seems to be close to its etymological meaning namely that dope is any substance administered for the purpose of artificially altering the performance of a subject.

Certain psychological influences, such as the cheering of a crowd, appear to play a role comparable to the effect of drugs.

III. CLASSIFICATION OF AGENTS WHICH AFFECT PERFORMANCE INVOLVING THE EXPENDITURE OF ENERGY

These can be divided into metabolising agents, pharmacological or chemical agents which do not act predominantly as metabolising agents, and physical agents.

1. Metabolising agents

These act chiefly either as an initial metabolising agent or as an agent affecting the metabolism of persons at work.

They can be divided into special foodstuffs and intermediary metabolising agents.

A. Special foodstuffs:

Sugar, water, sodium chloride and bicarbonates.
Ethyl alcohol can also be included in this category.

B. Intermediary metabolising agents:

Gelatine, the potassium or magnesium salts of aspartic acid, hormones, vitamins, enzymes, A.T.P. and oxygen.

2. Pharmacological agents

These drugs are neither foodstuffs nor metabolising agents, or at least neither of these functions is their principal role. They act chiefly on the central nervous system either as stimulants or tranquillisers and therefore tend to affect the subject's behaviour. Sometimes doping drugs directly affect cardiac circulation or functioning.

Pharmacological agents can be classified as follows:

A. Agents which act principally on the central nervous system.

These include:

(a) stimulants of the central nervous system:

amphetamines, purine bases, tropeines, camphor and physiologically similar bodies, strychnine and nicotine.

(b) sedatives of the central nervous system:

these include particularly meprobamates and barbiturates administered in constant doses.

B. Agents having direct acute action on the heart or blood vessels:

nitrites.

3. Physical agents

Nitrites, nicotinic acid and β -pyridilcarbinol.

4. Psychological means

IV. CONCLUSIONS

When considering the pharmacodynamic action of the various agents which affect working output or performance the first clear observation is that all drugs currently used for doping have undesirable or even harmful side effects obvious even in repose.

All substances classified as stimulants of the central nervous system may have pathological effects on the user's health. Moreover, as La Cava says, substances which stimulate the central nervous system delay or suppress the warning sensations of fatigue. They therefore suppress the symptom which normally warns an individual that he has exceeded his limits yet they do not do away with the fatigue or toxine caused by it.

Apparently, therefore, all agents classified as stimulants of the central nervous system must be rejected for use in sport since the aim of sport is to bring the athlete to the full development of his mental and physical powers.

Sedatives of the central nervous system seem to have a place apart with regard to doping. These substances may undoubtedly be useful for nervous persons whose mental tension is increased by competition, thus lessening their physical and nervous powers. But even in this case the drugs must be administered for short periods and in moderate quantities only.

Agents which have acute effect on the cardiac arteries - i.e. particularly nitrites - are dangerous on account of their side effects on cerebral circulation, the central nervous system and the hemoglobin. Peripheral vasodilators such as nicotinic acid and its derivatives have caused serious accidents during sports competitions.

Foodstuffs and agents of the normal metabolism of work are the only substances which affect output without harming the organism. In this category sugar is particularly useful for stamina tests and water and sodium chloride when the competition takes place in a hot atmosphere, in which case desoxycorticosterone may be of specific advantage if used for the purely therapeutic purpose of combating exhaustion.

Bicarbonates may contribute to combating acidosis resulting from muscular effort. Ethyl alcohol is more or less useless in small doses since its effect in overcoming stage-fright may be better achieved by using nerve sedatives. Large doses of the substance are harmful both to the final performance and to precision. Among the intermediary metabolising agents gelatine has practically no effect. On the other hand vitamin C and the vitamin B groups may play a contributory role. Triphosphoric adenosine seems to be useful. The usefulness of oxygenotherapy is disputed and it is difficult to employ. Hormones should be used almost exclusively for therapeutic purposes. Androgen steroids seem however to be useful in the training of women athletes but they must be employed with extreme care. Androgens are valuable in aiding recovery from fatigue and for the treatment of old people. The potassium and magnesium salts of aspartic acid have a biological role which, in theory and according to experiment, is favourable during physical effort and recuperation from it. According to Laborit they provide an element which aids the elimination of acid H ions which **indicate fatigue** while they integrate themselves in a physiological mechanism, the synthesis of the urea. Clinical and sports experiments carried out by Laborit and his assistants, in particular by Thiébault, in regard to athletics seem to corroborate the good results promised by aspartic acid and its salts.

Physical agents such as ultra-violet rays seem to be of little interest.

Finally, psychological methods are long-term undertakings and can scarcely be assimilated to the methods listed above.

On the basis of the foregoing it seems that the following agents which affect performance must be rejected for use in athletics:

1. All stimulants of the central nervous system:

This group includes:

- (a) The racemic amphetamines (Benzedrine, Pervitine) and the dextrorotatory amphetamines (Maxiton, Dexedrine, Ortedrine, Actedron, etc.);
- (b) The purine bases (caffein, kola, etc.);
- (c) The tropeines (atropines, cocaine);
- (d) Camphor and similar bodies (at least taken internally);
- (e) Strychnine and ammonium salts;
- (f) Nicotine.

2. Substances having acute action on the heart or blood vessels, such as nitrites (trinitrine), nicotinic acid and β -pyridyl-carbinol (Ronicol);

3. Ethyl alcohol

This list includes practically all the common drugs used in doping.

Certain sedatives of the central nervous system such as tranquillisers (meprobamates) seem to be beneficial for anxious or highly excitable subjects. Treatment must be of short duration and very moderate.

Simple nervous diathesis should be counteracted rather by barbiturates which too, must not be used to excess.

Only special foodstuffs (sugar, water, sodium chloride, bicarbonate of soda) and the normal intermediary agents of the metabolism of work (vitamins, certain enzymes, triphosphoric

adenosine and the potassium and magnesium salts of aspartic acid) seem useful for sports competitors without inducing harmful effects. The effect of them is rather to reduce fatigue or to speed up recuperation rather than artificially to improve performance.

A similarity can therefore be noted between current clinical data and the subject of this article: substances which make it possible to improve performance without harmful effects are often those used for the correction of certain unbalanced states met with in human pathology. This finding seems to us to augur well for the future.

Moreover it seems obvious that a performance is more valid when it is the result of harmonious physiological balance and rational training than of the taking of drugs.

V. SUMMARY

The authors have studied adaptation to effort before and after the administration of doping substances. Tests have been carried out on 10 young persons in good physical condition, who came forward as volunteers. The tests always took place in the morning when all previous fatigue was ruled out.

Work was sustained for 35 minutes at two successive degrees: the first degree demanded a sub-maximal effort of 600 Kg/min. for 30 minutes and the second for a supra-maximal effort of 1,200 Kg/min. for five minutes.

After a test without doping the same effort was repeated several times at intervals of one week, each time after the absorption of a doping substance. Four different agents were administered successively, viz.: - dextrorotatory amphetamine, a mixture of sodium and potassium aspartate, of sodium meprobamate and of ethyl alcohol. Finally a test was carried out after administration of a placebo.

In order to estimate the course of adaptation to effort the following physiological measures and biochemical checks were carried out during each test: blood pressure, frequency of heartbeat and breathing, consumption of oxygen and utilisation factor of oxygen. The electro-cardiogram was read systematically. The fluctuations of the blood were followed by the estimation of lactacidemia. All these tests were repeated during both degrees of effort as well as during the first 15 minutes of recuperation following cessation of

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activity. Finally the volunteers were subjected to tests to estimate their ability in the psychotechnical field before and after effort.

In those conditions the different factors of adaptation to effort were modified under the influence of the drugs used, some favourably, others unfavourably. The general effect can be considered either as worthless or as unfavourable; consequently no doping agent seems to benefit the execution of effort by a young, healthy and untired person.