

HOPES GOING UP IN SMOKE

31st MAY,
INTERNATIONAL
NON-SMOKING DAY



By Denis Riché

Can cigarettes be detrimental to performance ? Smoking is certainly the most widespread menace of our times. Indeed, few countries or social or professional classes are free of the habit, whose disastrous consequences for people's health are well known nowadays. Even sportsmen often yield to temptation. Professional footballers, gym teachers, physical education students, coaches, drivers, sports doctors, current hopefuls or retired champions : any of them might abandon their fine health principles to "have a smoke" at least once a day.

However, a few questions plague unrepentant smokers. Are cigarettes really as bad as they say! Are their effects minimized or, on the contrary, exacerbated by sport? Does tobacco affect one's physical condition? Maybe we should take a look at such questions away from the smoke screen of theories or fiery radicalism!

CLEAN-AIR CAMPAIGNS

"Tobacco Kills". This was one of the slogans tried out to encourage smokers to give up their disastrous habit. The many press campaigns carried out by the Health Department now seem gradually to be bearing fruit. In fact, there is a growing public awareness of the risks of smoking. Fears of lung cancer, chronic bronchitis or cardiovascular disease, all of which are linked to smoking, have led to a fall over the last 20 years in the proportion of the French population who smoke (a).

Unfortunately, female smokers seem to have taken over from male ones (b), so much so that the percentage of the population using tobacco is still around 40%.

The French consume about 1,700 cigarettes per year and per person, but this average actually covers very varying situations. With cigarettes, there seem to be virtually no half-measures, the result being that society often seems to be split into two, smokers versus anti-smokers.

A joint study of the effects of tobacco and sport has enabled this problem to be viewed in a new light, because in addition to the serious diseases mentioned above (and regularly brought up in the press and by the medical world), tobacco is likely to lead to other ills which are very rarely talked about.

Considered to be minor problems, and therefore less often investigated, these consequences of smoking can cause changes in people's physical condition and health. Sportsmen will attach major importance to these aspects, and if they decide to play the Russian roulette game of cancer (c), could reproach themselves with ruining their physical condition with the habit, as

well as their chances of winning at their favourite sport.

The same applies to the effect of tobacco on sleep and the immediate effect of smoke inhalation on the maximum capacity for physical exertion.

CHOICE BETWEEN SMOKING OR SLEEPING

In the mid 1970s, several scientific studies showed that even light smokers (a few cigarettes a day) had problems in sleeping. Nicotine, the active ingredient of tobacco (see box), upsets the proper alternation between sleeping and waking phases. One reason is its ability to move to different parts of the brain, including the part which controls this rhythm.

For example, a study dating from about 10 years ago (1) looked at the lifestyle and hygiene habits of a sample of 725 men and 759 women. A questionnaire examined the subjects' tobacco and alcohol consumption, along with the quality of their sleep.

The conclusions of this study showed an inverse correlation (all other things being equal) between smoking habits and average duration of the subjects' nightly sleep. The nights averaged 7 hours 48 minutes for the female non-smokers and 7 hours 18 minutes for their male counterparts, while tobacco users slept on average 20 minutes less.

A similar study then tackled the question with relation not to a group of random subjects, made up in the main of sedentary individuals, but to a group of 92 physical education students (3). This enabled a precise account to be drawn up of the health of these young women, aged between 18 and 23. Twenty-two of them smoked regularly, i.e. about one-quarter of the group, a proportion which is found quite frequently amongst groups associated with sport.

This study provided informative data: the smokers would generally go to bed later than the non-smokers and, in addition, fall asleep less quickly. They would

Swiss campaign against smoking in sport.



mention remembering their dreams much more frequently than the other young women (a sign that they often woke abruptly) and their impression that they had had a disturbed night (a change in the "light", or restorative, sleep phase).

Does this impaired rest have obvious implications for sporting activity? Indeed! It is known that the consequences of fatigue are lessened, or even disappear completely, after rest. Smokers, owing to the cumulative effect of poorer-quality sleep, will therefore become slowly but surely more tired, and their capacity for concentration will decrease correspondingly. If it goes below a minimum threshold of attention, the risks of injury increase, in particular in disciplines combining speed and skill: such as skiing, tennis and gym. The study in question did, moreover, make this point.

It also underlined a loss of effectiveness, particularly in ball games or sports requiring precision (shooting, squash, etc.).

In addition, it raised the suspicion that cigarettes could adversely affect paradoxical sleep (dreaming phase), which scientists consider as essential for acquiring and memorizing complex movements.

A change in the quality of a night's sleep may well therefore impair the ability to learn new techniques, an ability which is nevertheless of paramount importance in physical education. Finally, the replies given by the students to certain questions showed that the 22 smokers experienced more health problems than their non-smoking counterparts.

BEFORE, DURING OR AFTER EXERTION

The action of nicotine on the nervous tissues may explain some of these phenomena, but nicotine is not solely responsible for the smoker's ailments. A large number of substances arising from tobacco combustion play their part in its harmful effects. One such substance is carbon monoxide (CO).

TOBACCO, NICOTINE AND GOUDRONS

Nicotine comes from "nicotiane", "Nicot's plant", named after the person who identified the active ingredient of tobacco in 1570.

Originally considered as a medicine (Nicot sent tobacco to Catherine de Médicis to treat her migraines), nicotine very soon proved to be the main factor in tobacco addiction. "Ask a smoker being poisoned by nicotine if he can give up the habit", Guy de Maupassant wrote succinctly.

A strong drug, nicotine is nevertheless not the most dangerous element of tobacco. The very high temperature of cigarettes produces in addition a very large number of toxic substances ($\pm 7,000$). The carcinogenic level of tobacco, i.e. its potential for causing cancer (particularly throat and lung cancer) stems from a class of products also present in smoked meats: "polycyclic hydrocarbons".

Likewise, it is known that the risks of cancer of the oesophagus increase with the consumption of tobacco and alcohol, and that the use of these two toxic substances together multiplies this risk (7).

Other dangerous substances are also to blame, such as nitrosamines (formed from nicotine) and acrolein (the cause of smoker's cough), which are found in hugely varying quantities in different brands.

A major complaint linked to smoking is stomach ulcers, as cigarettes, especially if smoked on an empty stomach, stimulate the gastric secretion and acidity which exacerbate this condition.

Unfortunately, even non-smokers are not safe from the dangers of tobacco; the consequences of passive smoking are increasingly well known nowadays (5, 6). The injustice is complete when it is considered that the smoke inhaled by those around the smoker contains about twice the amount of harmful tar and nicotine and about five times as much carbon monoxide as the amount which enters the smoker's lungs in the first place. Recently, various studies have showed that passive smoking is as toxic as cigarette smoking. For example, there is a higher incidence of respiratory illness in children of smokers (6), and the frequency of these problems increases in proportion to the parents' cigarette consumption.

Similarly, there is a very clear correlation between the risk of lung cancer in female non-smokers and the amount of tobacco consumed by their partners. Avoiding the company of smokers, who are dangerous for sportsmen however much they deny it, is therefore to be recommended... as far as possible !)

After smoke has been inhaled, this gas passes into the blood, where it quickly reaches an abnormally high level. In fact, it has a great affinity for haemoglobin (Hb), the pigment with the job of transporting oxygen. This makes the problems of smoking before physical exertion, polluted environments or smoky sports halls particularly acute. For if the carbon monoxide content of blood rises before physical exertion, this gas will combine in preference with the

blood pressure, enough to cause migraines in stressful or tense situations.

Another disastrous consequence : when the ventilatory flow reaches its maximum and the blood flow can no longer increase (VO₂ Max situation), the maximum quantity of oxygen reaching the muscles is reduced. This leads to a decline in performance and a premature appearance of lactic acid. This acid is a sign of the



Before or after exertion, cigarettes remain dangerous

sites of oxygen transport (haemoglobin), so that, for a given blood flow, a smaller quantity of oxygen will reach the tissues, thus allowing a smaller amount of energy to be produced.

In order to compensate for this fall, which is sometimes considerable (the carbon monoxide content of haemoglobin has been observed to be as high as 15% (4)), the blood flow increases, leading to raised

“anaerobic” metabolism and indicates that the sportsman is approaching the maximum pace that he will be able to sustain in competition conditions. In short, this premature accumulation of acid is associated, in athletes, oarsmen or cyclists, with a fall in their top speed.

A cigarette before physical exertion (fortunately very rare) is therefore a serious handicap. But a cigarette after physical

exertion (or after making love!) is no less harmful.

In fact, pulmonary vasodilation following physical exertion and the maintenance of a high blood flow create favourable conditions for the combination of haemoglobin and carbon monoxide. This smoking habit is unfortunately firmly rooted in collective sports (often with a fine disdain for the non-smokers sharing the changing rooms). It must be discouraged, since it is likely to lead to various phenomena confirmed in the study :

- female smokers complain more often of migraines, i. e. a decrease in the supply of oxygen to the brain ;
- female smokers are more likely to have gynaecological problems. A wide range of difficulties was reported, but abdominal cramps were the ones most often mentioned (probably due to an accumulation of lactic acid) ;
- loss of appetite to a greater or lesser degree is a result of the absorption of nicotine. In sportsmen who expend lots of energy and constantly need a correspondingly higher food intake, this anorexia can lead to deficiencies, all the more so since tobacco itself gives rise to a greater need for vitamin C (8), and possibly for vitamin B12 too. This increase in certain special requirements can be explained by the need to cope with the effects of free radicals formed in the cell under the influence of the constituents of tobacco smoke (5) (see "Sport et Vie", No. 2, page 21).

HOW TO STOP ALL YOUR CHANCES GOING UP IN SMOKE

So, can the use of tobacco be justified in certain sports ! There are sportsmen who argue that the occasional cigarette before an event helps them to channel their energy and cope with stress... doubtless thanks to the vasodilatory action of nicotine on the blood vessels of the brain. But in any case, this is a precarious balance,

created by habit, which they could no doubt achieve by means of less harmful methods, such as relaxation.

Thus, whether from the health or the performance point of view, tobacco is still detrimental to sporting activity.

In this respect as elsewhere, there is no smoke without fire...

D.R.

- a) In 1977, more than half (51%) of the male population smoked every day. In 1989, this proportion declined to 48%.
- b) During the same period, there was an increase in the proportion of female smokers from 29% in 1977 to more than 33% today. Young women (between 20 and 24) are the most diehard of smokers. Sixty-four percent of them smoke regularly.
- c) Cancer does not in fact depend on an accumulation of the harmful effects of tobacco. Each cigarette instead represents an independent risk... like a ticket in a macabre lottery. Of course, heavy smokers multiply the risks by increasing the doses.

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