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DOPING IN SPORTS IN ANCIENT AND RECENT TIMES

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SUMMARY

Doping in sports is the use of forbidden techniques and/or the assumption of prohibited substances by athletes in order to increase physical performances. The origin of the word doping is today still discussed; however some sources indicate that an African tribe, the Kaffirs, gave the name of "dop" to a beverage that was largely consumed in religious ceremonies as a stimulant drink.

Diet modifications were among the most widely used procedures to increase physical performance in sports in the classical world. Beside diet measures, the assumption of "magical" potions deriving from the vegetable and animal realms to improve physical fitness and sportive performance is documented both in ancient Greece and Rome. The composition of these preparations is not yet fully clear, but they probably contained stimulants such as alcohol or hallucinating mushrooms.

Vegetal stimulants were largely used in the nineteenth century, a period in which pharmacology and laboratory medicine were established and achieved remarkable scientific results.

In the twentieth century different chronological and operative phases may be detected in the evolution of doping practices. To prevent these practices, from the sixties an intense struggle against doping in sports was begun at an international level. Doping in sports is unfair with respect to competitors and dangerous for health.

Key words: Doping – Sports – Medicine - History of Medicine

Background

Doping in sports is the use of forbidden techniques and/or the assumption of prohibited substances by athletes in order to increase physical performances. Doping is specifically defined nowadays as the presence of at least one of the anti-doping rule violations set forth in article 2.1 through 2.8 of the World Anti-Doping Code[1].

The origin of the word doping is still being discussed; however some sources indicate that an African tribe, the Kaffirs, gave the name of "dop" to a beverage that was largely consumed in religious ceremonies as a stimulant drink [1,2]. Other sources report that Zulu warriors used "dop", an alcoholic beverage deriving from cola and grape skins[1,3], and elsewhere in Africa runners used vegetal derivatives, especially cola, to enhance endurance and improve physical resistance[1,4]. This continent therefore appears to be the one in which the word originated.

Different stages may be traced in the use of the term "doping" from its first appearance in the English language. The "Oxford English Dictionary" [5] indicates a citation from an 1889 American newspaper furnished in Albert Barrère and C.G. Leland's "Dictionary of Slang, Jargon and Cant" as the first attested use of the word: "Doping is the stupifying men with tobacco prepared in a peculiar way". Here, as may be seen, doping is specifically associated with tobacco assumption. The next attestation of doping is from the Daily News of 14 November 1900: "'Doping' meant the administration to a horse of certain medical preparations, with the object of either stimulating or retarding the animal's progress in a race". In this case there is documentation of the use of activating substances in the sport of horse-racing. Only in 1913, in the Daily Mail of 11 March, is the term found for the first time referring specifically to the doping of athletes: "'Doped' Athletes… It is well known… that the Russian skaters take such stimulants [as strychnine]" [5].

Today many substances may be used to exalt sports performances, while in the remote past the quantity and quality of doping principles were more limited, though present and at least partially recorded.

Doping in ancient times

In ancient times systems supposed to increase physical performances, whether appropriately, legally or otherwise, appear to have been available. Adopted preparations were probably not very effective, even if a placebo effect could not be ruled out [6].

In the third millennium B.C. in Mesopotamia the use of the opium poppy was widespread among persons who used it for its exhilarating characteristics, and it is assumed that ancient Egyptians too made use of opiates to improve their physical performances [7]. In the American continent, the Aztecs ate the hearts of the human beings they sacrificed, convinced that in this way they could assimilate the force and bravery of others; they also consumed substances extracted from the cactus to enhance their resistance to physical activity and fatigue [7].

Diet interventions, such as the increase in the protein content of the diet itself, were among the most widely used interventions to improve sports results in the ancient world. An example is the case of the famous wrestler Milo of Croton, from the so-called Magna Graecia area of southern Italy, who won six consecutive Olympic Games in the course of the VI century B.C., adopting a diet extremely rich in beef, including bull testicles: several kilos a day together with abundant red wine, with the probable addition of stimulating substances. Bull testicles may, to some extent, be considered the precursors of twentieth century doping through the assumption of steroid hormones (testosterone) to increase muscular mass and power [1,8]. Another example is the case of Charmis of Sparta (Greece), who won the stadion race at the Olympic Games in 668 B.C. [9], and who adopted a diet of cheese and dried figs. With regard to power beverages, wine enriched with activating principles predominated,

but water too, drunk in great quantities and particularly with addition of marine salt, seeds and other substances, was considered an optimal integrator. In the third century B.C. some Olympic athletes, to improve physical performance during the Games and to better tolerate pain and fatigue, ate particular mushrooms and consumed special bread to which analgesic substances had been added [7].

Given that the winners of the Olympiads were considered extraordinary persons, and since victory furnished not only a notable reputation but also practical advantages, the incentives to adopt every means to win were strong [10,11]. Furthermore, the relevant aim was not participation, as the French founder of the International Olympic Committee Pierre de Coubertin is later alleged to have said ("L'essentiel ce n'est pas d'avoir vaincu mais de s'être bien battu" - "The fundamental thing is not to have won but to have competed well"). Victory was the only objective.

The assumption of "magical" potions deriving from the vegetable and animal realms to improve physical fitness and sportive performance is documented both in ancient Greece and Rome. The composition of these preparations is not yet fully clear, but they probably also contained stimulants such as alcohol or hallucinating mushrooms. In ancient Greece sesame seeds were considered "doping agents", in particular for long-distance runners. Before Hippocrates and his medical school (V-IV centuries B.C.) magic and physical fitness were closely linked: in Hesiod's Theogony, for example, Hecate, the goddess of magic and the underworld, was identified as the mythological deity deemed to concede victory to human athletes [12]. Moreover, since the ingestion of magical potions on the part of an athlete could be retained to be the suggestion of a god or goddess, such a practice was not always considered outside of the rules.

The Greeks also developed a considerable knowledge of plants and of their activity. In the IV century B.C. Theophrastus of Eressos (Lesbos), a pupil of the famous philosopher Aristotle, wrote fundamental botan-

ical treatises, the "Enquiry into Plants" and "On the Causes of Plants", in which he accurately described the effects of a large number of plants and the effects of the poppy, cinnamon and myrrh [7].

In Rome, gladiators are reported to have adopted stimulants and mixtures to increase the physiological threshold of pain and fatigue[3]. Circus games in the capital of the Roman empire could not really be termed sports activities, since rules were not generally present; on the other hand, they certainly provided an optimal motivation for the necessity of elevated physical activity and prolonged exercise, given that the competitors were highly stimulated to strengthen their bodies not only to win, but also, and mainly, to stay alive. Different substances were used for this purpose, particularly elements derived from the fungus Amanita Muscaria and from other fungi and plants[10]. Moreover, the doping of animals was present, since some chariot racers gave their horses specific mixtures, including hydromel (consisting of water, honey and oats) to increase their speed and resistance [13].

Doping in recent times

In the nineteenth century, a period in which pharmacology and laboratory medicine were established and achieved remarkable scientific results, vegetal stimulants were largely adopted. Ranging from caffeine to coca leaves to morphine and to atropa belladonna, in the eighteen hundreds a variety of activating agents are recorded in use, and were refined in their modality of preparation and assumption [9,14,15]. This same period documents further developments in doping techniques in the adaptation of specific principles or compounds to selected typologies of athletes. Examples are the use of explosive nitro-glycerin for sprinters, functional for the typically brief, concentrated and violent anaerobic effort of these runners, and the administration of anti-fatigue substances, such as morphine, for athletes involved in endurance sports activity, typically races lasting hours or

even days [16]. The example of the employment of nitro-glycerin, elaborated by the Italian chemist Ascanio Sobrero in 1847, shows how, in the nineteenth century, the preparation of synthetic compounds, later improved in the course of the twentieth century, furnished increasingly powerful drugs for the doping armamentarium.

In the second part of the nineteenth century, before the first edition of the modern Olympic Games (1896), some specific episodes involving doping may be remembered. In 1865 one of the first recorded cases of doping in swimming was documented during the Amsterdam Canal event, in the report of the assumption of unnamed drugs capable of increasing physical performance. Two years later some Belgian athletes were known to have assumed sugar together with ether, and some French cyclers to have used preparations containing high doses of caffeine to compete in six-day cycling races (9). By the end of the nineteenth century there is good documentation of the use of many doping substances in sports competitions, including nitro-glycerin, strychnine, morphine, various typologies of alcoholic beverages and testicular juices [17].

In the twentieth century the evolution of doping practices continues in different chronological and operative phases.

Between the twenties and the fifties psycho-stimulant agents capable of lowering appetite and fatigue sensation were used, in particular amphetamines, taken to increase the thresholds of pain and distress and to trigger euphoria [18,19]. The tragic case of the British cyclist Tom Simpson, who died during the Tour de France as late as 1967, proves the continuing use of amphetamines.

Between the sixties and the eighties hormones, and specifically steroids such as testosterone, began to be assumed to increase muscular mass and consequently to enhance strength and endurance abilities (8). Previously used doping agents continued to remain [20].

In the last few decades more sophisticated doping procedures have become available for athletes, including haemotransfusion and artifi-

cial erythropoietin, so as to augment the haematocrit and to heighten oxygen transportation to tissues by red blood cells. Masking agents, such as diuretics, have been used to cover the assumption of illegal drugs [21]. More recently, newer doping systems have appeared, in particular gene doping. At the present time doping procedures in sports develop their action synergizing their effects upon various organs and apparatuses simultaneously, targeting many different body complexes at the same time. There has consequently been an expansion of the body systems concerned in doping, so that now the endocrine, the nervous, the muscular and the circulatory ones can be involved.

To contrast doping, from the sixties in particular, an intense battle of information and intervention regarding this practice in sports has been carried out. In France in 1963 and in Belgium in 1965[1,22,23], the earliest anti-doping legislations were established. Still in the sixties, the Council of Europe Committee for Out-of-School Education (1963) identified doping in sports as "the administration to or use by a healthy individual … of any agent or substance not normally present in the body … and/or of any physiological agent or substance … when introduced in abnormal additional quantities and/or by an abnormal route and/or in an abnormal manner, … with the purpose and effect of increasing artificially and in an unfair manner the performance of that individual during the period of competition".

In the eighties the European Conference (1984) defined doping in sports as the use of prohibited substances in breach of the rules of the competent sports organizations, and five years later the Council of Europe Anti-doping Convention defined doping as "the administration to sportsmen or sportswomen, or the use by them, of pharmacological classes of doping agents or doping methods".

At the beginning of the nineties the IAAF Handbook (1992-1993, Rule 55) established that an offence of doping took place when a forbidden substance was detected in the tissues or in the fluids of the body of an athlete, when an athlete took advantage of a forbidden

technique, or when an athlete was recognized as having adopted or taken advantage of a forbidden substance or technique [1,24,25]. Still more recently, the World Anti-Doping Agency (WADA) defined gene or cell doping as the "non-therapeutic use of genes, genetic elements and/or cells that have the capacity to enhance athletic performance", and this typology of doping was included in the 2003 International Olympic Committee List of Prohibited Substances and Methods (26). Anti-doping consciousness has become more generalized, in parallel to the progressively more sophisticated and effective counter-measures in the whole world [27].

Conclusions

Doping in sports has always existed, and has in turn given rise to various methods used for its detection [28,29]. The challenge posed by doping agents in sports to detecting systems has prompted the constitution of a continuously improving network of anti-doping measures targeted at the prevention and early identification of non sportive practices. Time has revealed the concomitant menaces to and perils for human health related to doping. In consequence of this, the battle against this practice is motivated not only by the obvious necessity for fairness but also by that of health preservation and is thus not only repressive but propositive, aiming at guaranteeing the well being of increasingly performative athletes. Doping-free sports consequently involve both equity and health.

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