

ANALYSIS OF RISKS AND IMPLICATIONS OF DOPING IN SPORTS PERFORMANCE IN THE CONTEXT OF THE 21ST CENTURY

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Abstract The content of this article emphasizes the study and significance of the problem of doping and its danger in the 21st century sports. The correlational relationship between the negative factors that cause the physical and mental health of the athlete's body is highlighted. Research hypothesis - it was assumed that doping has a negative impact and can be considered as the danger in the 21st century sports. The purpose of this study is to highlight the negative impact of doping as a danger in the 21st century sports. Objectives of this study: Dynamic analysis and evaluation of the negative impact of doping practice on sports performance in the context of the evolution of sport in the 21st century; Identify and highlight the risks, implications and consequences associated with doping in sport, highlighting its threats and effects on athletes, sports culture and competitiveness integrity; Investigate and synthesize relevant studies and previous research on doping in sport, highlighting trends, problems and evolution of this phenomenon in the 21st century. Conclusion: Information and education is an important means of preventing and reducing doping in sport. Combating cannot be limited to repressive or punitive measures alone. This can be successful if all parties involved are interested and work to combat doping.

Introduction: Recent advancements in sports training research have propelled significant progress, leading to an increased number of athletes achieving exceptional performances. Sports, being inherently competitive, are driven by a strong motivation to achieve outstanding results in athletic performance[19]. The desire to achieve great performances leads more and more athletes to resort to life-threatening drugs. The "cancer of world sport", as doping has been called, has encompassed all sports, being the most frequent cause of suspension of athletes. Doping is an increasingly serious problem in our country as well, considering that steroids are more and more accessible and many beginners resort to them without being informed about the side effects. Doping is the use of substances harmful to health in order to achieve sports performance. Doping does not only mean steroids, there is a long list of doping substances, used in the most diverse sports from shooting to cycling and from baseball to football (in bodybuilding the use of doping is only

more obvious, the goal being the increase in muscle mass, not necessarily more frequent or more intense [3]. Man's desire to improve his motor abilities by consuming certain substances has deep roots back in time, recorded throughout history, the perseverance and effort of athletes to reach the highest level of performance by shortening the road to victory. Such substances were used by the heroes of Scandinavian mythology, who are said to have increased their fighting strength more than 12 times, thanks to a drug extracted from a mushroom, by Greek athletes, who tried to increase their physical performance by consuming of stimulating herbs, by gladiators, who used stimulants when they fought in the Circus Maximus, stimulants that were also used by the knights of the Middle Ages when they were preparing for tournaments. With 3200 years BC, in China, the Ephedra plant was used, under the name of Ma Huang, with beneficial action on the muscular and nervous system. The beginnings of modern organized sport, recorded by the first edition of the "Cycling Race of 6 days" (1879), coincide with the use of the first substances for doping purposes; among these we can remember: the caffeine-based mixture used by the French team, the consumption of pieces of sugar soaked with essential oils used by the Belgians and even the beginning of alcohol consumption. The first death in sports caused by an overdose was recorded in the case of a cyclist, in 1896. All these examples certify the existence of empirical doping [18]. Etymologically, it seems that doping comes from the Flemish "to doop" as it appears in the dictionary in the 18th century. Of course, the attempts to stimulate power, strength, the desire to win can be found since the Romans, who organized fights between gladiators and where the winner, who was an adult, sought to win by all means. It seems that inscriptions were found from which it appears that in the chariot races the drivers absorbed a liquor (wine + honey), which gave them a certain power, a certain aggressiveness. Doping in today's sense can be talked about since the 20th century. Thus, during the years 1900 - 1936 in Japan, athletes used cardiotonics and nitrites (coronary vasodilators) before competitions; the II - World War established the effects of amphetamines (psychostimulants) on the nervous system, the German airmen, who carried out night bombings, receiving these substances before leaving for the mission to maintain the state of vigilance and aggressiveness. From here to the transition to sports was just one step. Post-war, when sports life resumed its course, the use of doping substances also appeared, amphetamines, antidepressants, sympathomimetics and cardio-respiratory analgesics, being the first groups of substances used by athletes on their own initiative or on the recommendation of some sports personnel (coaches, doctors, masseurs , etc.). At that time, anti-doping regulations were non-existent and the lack of specialized laboratories facilitated this action (doping), in an unscientific and risky manner. Who does not remember the Danish cyclist Olsem, who at the 1960 Olympic Games in Rome, competing in the 100 km race, led the team, in an oppressive heat of 33° C, he lost his life and at the necropsy, traces of amphetamines were evident in his body. A first concentrated

action at the European level is represented by the colloquium in Ouriage - les - Bains in France, on which occasion a first definition of doping is given (the use of substances unfamiliar to the body, which can harm health and sports ethics) and establishes a the first list of doping substances, which mainly include: amphetamine and antidepressant derivatives, cardio-respiratory analeptics, excitatory alkaloids of the nervous system (example: strychnine, etc.). But the desire of those interested in increasing their sports performance on artificial roads calls for other drugs. During the 1960s, a new class appears the anabolic steroids (testosterone derivatives) whose first use seems to have taken place in the USA with bodybuilders as a starting point. In the beginning, detection technologies were ineffective (gas chromatography, liquid chromatography, etc.). Only after the appearance of the first laboratories equipped with the gas chromatograph - mass spectrometer system (Koln - Prof. M. Donicke and London - Prof. A. Beckett) and the reaction of the International Sports Federations, mandatory anti-doping control was introduced at major competitions and added to the above list and anabolic steroids. On the Olympic level, the first official controls took place at the Olympic Games in Munich in 1972 for the so-called conventional substances; for anabolic steroids, the first official controls take place at the Olympic Games in Montreal in 1976 when several athletes lose their gold medals (mainly weightlifters) about a month after the end of the Olympic Games, which will create many discussions, which in the end will lead to an IOC decision that stipulates that the results of doping controls be made public within the competition, with the exception of the events from the last two days. It is the beginning of an open campaign, which starts from 1976 - 1980, on the one hand, those who search for and naturally find (having great material resources) new substances, which are not yet on the anti-doping list, and those on the other side of the barricade, the organisms officials, who after finding out about these new substances research them and then enter them on the anti-doping list. It is clear that between these operations there is a time difference of 4-6 years (see the case of testosterone, diuretics, placental chorionic gonadotrophin, etc.) which is in favour of those interested in cheating [2,

1,2]. Communication skills are essential for both teacher and student, and progress in learning or perfecting a sports game depends entirely on the quality of interaction between teacher and students. Doping is also an aspect that can influence learning and improvement in sport [4].

The use of the forecasting computer can create the possibility of obtaining large amounts of information in a short time, proving extremely important for estimating the most important parameters relating to somatic, functional, motivational, psychomotor, psychological and socialization aspects, including doping involvement [5]. In order to achieve the objectives of sports training, such as complete and specific physical development, improvement of technical and tactical aspects, management of psychological aspects, strengthening team spirit and

maintaining health, it is essential to clearly define training objectives and anticipate the factors involved in planning specific actions [11]. At the same time, it is crucial to also address doping by including preventive and educational measures in athletes' training to discourage and counter illegal and harmful practices in sport.

Material-method: Research hypothesis - it was assumed that doping has a negative impact and can be considered as the danger in the 21st century sports. The purpose of this study is to highlight the negative impact of doping as a danger in the 21st century sports. Objectives of this study: Dynamic analysis and evaluation of the negative impact of doping practice on sports performance in the context of the evolution of sport in the 21st century; Identify and highlight the risks, implications and consequences associated with doping in sport, highlighting its threats and effects on athletes, sports culture and competitiveness integrity; Investigate and synthesize relevant studies and previous research on doping in sport, highlighting trends, problems and evolution of this phenomenon in the 21st century. To study the problems of negative doping impact as a danger in the 21st century sports. In accordance with the purpose of the research, there were identified the tasks, among which the most important were the particularities, factors, role, periods, circumstances of the negative impact of doping as a danger in the 21st century sports. To study the measures taken by the state within the issue of promoting knowledge about the negative impact of doping as a danger in the 21st century sports, to analyze the amount of funding for the implementation of the tasks established in the fight against doping as a danger in the 21st century sports. Methods, techniques and technologies used in the study. Analysis and generalization of data from scientific-methodical literature, Study of statistical data, Control, Observation. Organization of research. In our research, we used scientific materials posted on the official Internet resources of government agencies, materials from scientific journals. From the analysis tools, modern methods of analytical information processing based on software tools were used which allowed us to select the data and develop methodical indications and conclusions.

Results: The introduction of out-of-competition doping controls will represent a new moment in the anti-doping campaign (1989). In the following we will make some assessments on the main classes of substances and doping methods. STIMULANTS. They increase the state of alertness, vigilance, aggressiveness of the body, reduce the perception of fatigue, induce a decrease in self-control and judgment, possibly leading to accidents. Among these, amphetamines have the worst reputation, being able to even lead to deaths, especially in conditions of hyperthermia, exhausting efforts (the case of the Danish cyclist at the Olympic Games in Rome, of the English cyclist Sympson in the "Tour de France" 1987, etc.). Sympathomimetic amines such as ephedrine and derivatives (in large doses) produce mental stimulation, increase blood flow and blood pressure, produce headache, tachycardia, anxiety, tremors. Attention to the use of local (nasal installations) or

general products in flu conditions, which contain ephedrine, cathine, phenylpropanolamine, etc. β -2 adrenergic Salbutamol, Salmeterol, Terbutaline, bronchodilators currently used in asthma are admitted with written notification and medical certificate (for Salbutamol there is a quantitative limit of 100 ng/ml urine). Attention to the consumption of natural products (eg Ginseng) that may contain ephedrine, caffeine, etc. NARCOTICS. (heroin, morphine) and opioids (methadone, pentazocine, pethidine and related compounds) lower the threshold of pain perception, produce euphoria and psychological dependence, depress the respiratory function, produce narcomania. ANABOLIZING AGENTS. - testosterone derivatives such as dihydro-chloromethyl testosterone, metandienone, nandrolone, stanozol, DHEA, etc. they are still used to increase muscle mass, muscle strength, power, psycho-aggressiveness. The main adverse reactions consist of: growth arrest in children and primary amenorrhea in girls if administered before puberty, psychological, cardiac, hepatic changes (cholestatic jaundice, liver tumors), prostate in men (cancer), reduction of testicular function, changes in girls (hypotrophy of the breasts, secondary amenorrhea, hypotrophy of the genital organs, increased hair on the face and body, voice changes, suppression of ovarian function, etc.). Pay attention to the nutrients that contain anabolic agents that are not written on the box or to the consumption of beef fed with anabolic agents. DIURETICS. - causes a rapid loss of fluids and some minerals (K, Na) from the body, being used especially in sports with weight categories. By diluting the urine, it can make it difficult to detect anabolic agents in the urine, but modern doping detection techniques overcome this difficulty. PEPTIDE, MIMETIC AND ANALOGOUS HORMONES. Pituitary growth hormone (somatotropin) is the most powerful anabolic hormone in the human body. Administered before puberty can induce gigantism and after puberty acromegaly, allergic reactions, cranial hypertension, diabetes, endocrine and behavioral disorders; before, when the product was prepared from the pituitary glands of corpses, it could induce Krentzfield-Jacob syndrome, but today it is prepared genetically. - Chorionic gonadotropin (example: Pregnyl) – hormone secreted by the placenta, which stimulates the production of androgens in the body (Leydig cells in the testicles in men and adrenal cortex in girls). It is controlled only in men. - Corticotrophins (example: ACTH) - are hormones secreted by the pituitary gland, which stimulate the secretion of cortisone by the adrenal cortex. Regarding cortisone: administration by injections, meds or suppositories is prohibited; administration through ocular, auricular solutions, or creams - dermatological ointments, etc. is allowed; administration through antiasthmatic sprays or local infiltrations is subject to notification accompanied by medical certificates. - Pituitary and synthetic hormones (example: LH) - increase the production of androgens in the human body. A last subclass is that of aromatase inhibitors (example: Femara, Novartis) which indirectly increase the androgens secreted by the adrenal cortex, especially in women, blocking their transformation into estrogens. It is considered

positive only in men. — Insulin like factors (example: IGF 1) - are hormonal factors secreted at the hypothalamus - diencephalic level and which induce an increase in insulin. They are used for anabolic effects. - Erythropoietin - a peptide hormone secreted at the level of the kidney stimulates the bone marrow to produce more red blood cells, which will ensure, through O₂Hb, an increased transit of O₂ to the muscles. Until now, the IOC has not validated the French method on urine and some international federations accept double control: blood and urine and declare a positive case only when both tests are positive; The UCI and FIS (International Ski Federation) determine the hematocrit and if it is over 50% (normal = 42-44%), they consider the case positive, prohibiting participation in the competition. Severe adverse reactions: thrombosis, allergic reactions, etc. — Insulin – the antidiabetic pancreatic hormone is used for its anabolic effects: it is only allowed if the athlete presents a certificate that he/she is an insulin-dependent diabetic. - Doping with blood and blood derivatives (auto- or hetero-) - ensures a surplus of red blood cells, therefore of Hb, favoring an increased supply of O₂ to the muscles; adverse reactions: incompatibility shock, transmission of serious diseases such as AIDS, viral hepatitis B and C, etc. - Oxygen transporters (example: RSR - 13, reticulated hemoglobin, etc.) and plasma expanders induce the same effects as above. — Physical manipulations (urine manipulation: bladder sample, addition of water or other liquids, bottle changes, etc.), chemical (pH manipulations: acidification - alkalinization) and pharmacological ("masking agents": Probenecid, Bromantane, higher Epitestosterone) of 200 ng/ml urine, etc.). — Alcohol - only at the request of a competent sports organization (example: IOC, International Sports Federations) - example: shooting, modern pentathlon and shooting biathlon, etc. - Cannabinoids (example: marijuana, hashish) - have hallucinogenic effects. It is checked only at the request of a competent sports organization (IOC, International Ski Federation, etc.). — Local anesthetics - with the exception of cocaine, are allowed even together with 1% adrenaline. Doping control is carried out only at the request of a competent sports organization (e.g.: International Boxing Federation, International Modern Pentathlon Federation). A medical certificate and written notification before control for local infiltrations are required only for these two international federations (name, sample, diagnosis, substance and quantity infiltrated, anatomical site and date, day, time). - Corticosteroids in infiltrations (example: Diprofos, Solumedrol) - are admitted with the obligation of written notification before the control. — Beta-blockers (example: propranol) - are substances that decrease the sympathetic tone (fear and mental tension) being used by some athletes for these effects apart from the use in pathology: arterial hypertension, migraines, heart rhythm disorders, angina pectoris, etc. Doping control takes place only at the request of competent sports organizations: auto-motorcycle, shooting, archery, pentathlon, biathlon, synchronized swimming, diving, ski jumping, etc. As adverse reactions we mention: sinus bradycardia with secondary cardiac and cerebral irrigation disorders, arterial hypertension, especially

skin allergies, etc. A reference moment is represented by the "World Conference on Doping", Lausanne, February 2-4, 1999, when for the first time in the history of sports, the IOC, the international sports federations, the National Olympic Committees, governmental and non-governmental bodies, mass - media that through the final decision (Lausanne Declaration) give a new turn to the anti-doping campaign. Among the main decisions we point out: the establishment of the international anti-doping agency (WADA, AMA) as the only non-governmental body independent of political leadership in the world; harmonization of sanctions in case of doping: two years for anabolic agents, although with the permission of FIFA (International Association Football Federation) and UCI (The Union Cycliste Internationale) it is admitted that following detailed investigations, sanctions of less than 2 years are also granted; the emphasis must be placed on the activity of education - information. Thus, at the Olympic Games in Sydney (2000), for the first time in Olympic history, blood samples are taken before the competition (304 tests for erythropoietin) and about 700 "out of competition" tests are performed right in Sydney before, during and after Olympic Games. Starting with 2001, WADA comes into its own duty and since August 2001 it has a new headquarters in Montreal. The anti-doping campaign has gained proportions, especially on the economic level: hundreds of millions of dollars are spent annually around the world for this action. Is it worth it, or not?, it's difficult to answer in the conditions of contemporary society (millions of people, including children, die daily from starvation, diseases, etc.). We would render as significant the answer of Prince Alexandre de Merode, the president of the IOC Medical Commission during an interview regarding doping. We completely agree with this global campaign against doping in sports, but We do not believe in eradicating doping, but only in mitigating this scourge, and We have three arguments: - Olympic sport (high-performance in general) has become a business, a show for which the spectators are willing to pay and the athletes are willing to take any risks regarding their own health in order to satisfy the demands of the public and win from a material point of view; — science (certain well-equipped and financially supported private laboratories) is involved in this action and it is difficult to assume that sports bodies can cope with it; - last but not least, We express a personal opinion, namely that cheating is part of the human being. In our country, there is the National Anti-doping Commission, established in 1966 and reorganized in 2001 by the Ministry of Youth and Sports, which carries out its activity in cooperation with the National Doping Control Laboratory, which belongs to the Ministry of Youth and Sports. The activity is carried out in accordance with the provisions of the Council of Europe (Monitoring Group of the Anti-Doping Convention). The activity directions are the following: - informative - educational activity regarding doping; preventive doping controls at major competitions and out of competitions; research on doping agents. GENES DOPING. Artificial genes produced in molecular biology laboratories, which "force" the body to produce a certain substance or hormone,

which will induce the desired effects. Practically, this doping can be done in three ways: - By injection - muscle fibers can directly absorb DNA. By injecting artificial genes into the muscles, which contain artificial muscle DNA, the muscle fibers will accept this DNA and the "new DNA" will modulate the characteristics of the muscle fibers (white, red, intermediate, etc.) — Transplants by viruses - the virus can be manipulated with, for example EPO genes; by injecting the virus into the muscle, the new genes will force the muscle to produce EPO. This has already been done on animals and seems to be effective for 1-2 years. - The introduction of cells with modified genes into the body - practically, cells can be extracted from the body, which in the laboratory are modulated with artificial genes and then reintroduced into the body. It is the most laborious method but achievable and controlled in molecular biology laboratories. Another method is to increase "transcription factors". In this way, the type of muscle fibers can be modified (altered), but increasing the muscle volume [7]. The phenomenon of illegal use of prohibited substances has increased a lot in recent years. As was natural, the educational factors directly involved in ensuring sports ethics and athletes' health mobilized and took measures in this direction. As a result, a dispute arose between those who use banned substances and sports organizations, as well as anti-doping laboratories. The factors that lead to the use of prohibited substances, their tolerance and the growth of the phenomenon are very diverse. The start of athletes to dope and in this way cheating, deceiving, lying to colleagues, officials, spectators, the whole world, has strong and deep roots both in the human being lacking self-control and morality, as well as in the social-cultural and economic environment. In the foreground is the athlete's personality structure, the tendencies and reasons being very varied and diverse, both in terms of origin and behavioral learning [6]. On the second level are the characteristics of the current sport, professionalized, commercialized, interested in performance and show, and not in the human being, this being subject to manipulations by patrons, sponsors, mass media, fans. On the third plane is society as a whole, with "modern" characteristics, in which the rush for a place on the podium creates myths and false heroes, in which unusual performances are publicized and where the man himself has become a commodity (athletes have become property of club owners). On the next level is the relationship of the athlete's personality with the sports and social-cultural environment. To the individual's tendencies to manifest his need for performance and social prestige, is added the enormous pressure of the environment, which demands performance at any cost. And this because high performance means a sports show and the show attracts a large audience in the arena, where there are advertisements, where the athletes wear t-shirts with the sponsors' emblems, or in front of the televisions where product advertisements appear not only during the breaks, but also during the event, interrupting its flow [8]. Methodological and organizational indications. Protecting the health and safety of athletes, Integrity and transparency, which requires

guaranteeing the honesty of sports events and declaring the illegality of cheating; Protecting vulnerable people, especially children; The dignity of people involved in sports and the impossibility of exploiting them. But also the rights and obligations of athletes: Autonomy, which implies the idea that the athlete uses his body freely; Information about doping agents and doping methods as well as the risks involved in their use; Competition in fair play conditions; Protection from any form of exploitation in economic interest; Participation in the application of the rules of ethics in sports. The adoption of the anti-doping convention marked an important moment in the fight against doping [9, 10,12, 13,14,16, 20].

Discussions: A study conducted by Buckley et al. It revealed that over 38.9% of young adolescents, anabolic steroid users, used these substances around the age of 15. Most users (47.3%) admitted to using these substances to improve their performance, and 27% to improve their physical appearance. Another study says that teenagers resort to various drugs and supplements, including anabolic steroids, in order to improve sports performance and their physical appearance. The prevalence of steroid use generally ranges between 4% and 12% among male adolescents and between 0.5% and 2% among female adolescents [17].

Acest studiu [16] contribuie la înțelegerea că această evoluție poate avea loc pe diverse căi și din motive variate, sugerând că steroizii anabolizanți pot reprezenta o poartă de acces către utilizarea altor substanțe de abuz. Generally, athletes administer anabolic steroids by stacking, or progressively increasing the dose over 6–12 weeks in order to then decrease it in the second part of the cycle. Various anabolic steroids tend to be used simultaneously, reaching doses that are 40–100 times higher than physiological levels [15].

Conclusions: Education and information are essential tools in preventing and reducing doping in sport. The approach to combating doping should not be limited to repressive or punitive measures, but involve all parties involved, who must cooperate and work together to combat this phenomenon. The more children and young people are involved in training and sport, the more important education and combating the harmful phenomenon of doping becomes. The pressure exerted on them to achieve performance can lead to the use of banned substances, even among adolescents. Educational efforts must focus on adequately informing young people and raising awareness of the negative effects of doping on sports health and performance. It is essential to create an environment where young athletes understand the serious consequences of using banned substances and develop a healthy and responsible outlook on their performance and goals in sport.

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