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THE LANGUAGE OF SPORTS MEDICINE

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INTRODUCTION

The close relationship between physical activity and health has been understood since ancient times. The Greeks were aware of the benefits of physical activity, recognizing it as a fundamental means for the wellness of both the body and the mind (Morente, 2020). Starting from the seventeenth century, researchers began to take an interest in sport as a field of investigation, and many scholars scrutinized the way the human body changes as a result of movement, laying solid foundations for the birth of modern sports medicine. Over time, the ever-increasing diffusion of sports practice worldwide has led scholars to enhance studies in the sports field, creating a new branch of specialization: Sports Medicine and Physical Exercise.

This book intends to investigate the language of sports medicine, with particular reference to its terminology, trying to fill a gap in linguistic studies on specialized discourse. Research in specialized languages has so far scrutinized several fields of knowledge, from economics to law, from information technology to tourism, and studies have also been carried out on the language of medicine (Gotti, 2003; Gotti, 2015; Gotti and Meyer, 2006; Gotti *et al.*, 2015; Maglie, 2009; Wulff, 2004) and the language of sport (Beard, 1998; Kowalikowa, 2009). However, little attention seems to have been paid to the language resulting from the union of these two domains. This is quite surprising if we consider that medicine and sport are among the disciplines that have the most

intense relationship with everyday life and that the birth of sports medicine as a branch of traditional medicine dates back to more than a century ago.

It is hard to provide a precise definition of *sports medicine*. It is an umbrella term due to the vastness of approaches of specialized knowledge it encompasses in both the medical and sports fields. The enormity of expertise involved in sports medicine makes the vocabulary of its language rich and varied, with the lexicon covering several different domains. The two macro areas of communication which sports medicine language falls into are *medicine* and *athletics*, and within these two broad areas of knowledge there is a multitude of interdisciplinary and intertwined sciences. Two major objects of study in sports medicine are nutrition and doping, which have undergone rapid progress and changes over the last few decades (Lux and Vinther, 2023). In the preface to the 2006 third edition of the *Oxford Dictionary of Sports Science and Medicine*, the author, Michael Kent, manifests the need for an updated version of the dictionary that can include all the new terminology related to the rapid advances in sports medicine in general, and nutrition and doping in particular:

> In the 8 years that have elapsed since the publication of the second edition of this dictionary, sports science and sports medicine have continued to expand at an amazing pace. Much new research has been carried out, particularly in sports nutrition and the application of genetic engineering to sport. This wealth of activity has generated new terms and concepts, defined and explained in the third edition. New research findings have required changes to many old terms and concepts. In addition, there have been major changes to doping legislation brought about by the establishment of the World Anti-Doping Agency in November 1999, just after the publication of the second edition. This has necessitated a complete revision of entries related to drugs and ergogenic aids (Kent, 2006: v).

The writing of the present book was motivated by the fact that the interaction of sport and medicine has created a 'new' discipline, new in content and forms, though obviously sharing the fundamental knowledge of both medical and sports sciences. More precisely, the basic

conceptual system is that of traditional medical specialties and sports disciplines, and therefore in sports medicine a large amount of terms that belong in the domain of medicine and sport can be found, but the combination of medical science and human movement science has given rise to a branch of medicine that also has its own vocabulary, history, and classification systems.

The book is divided into four chapters. The first chapter addresses the difficult question of providing a precise and consistent definition of what sports medicine is today, due to the complexity and breadth that the discipline encompasses. The chapter also provides an overview of the history of sports medicine to underline the importance that human beings have always given to the strong relationship between health and physical exercise. It further shows how central past studies on the topic have been for the birth and development of the modern science of sports medicine.

The second chapter offers an overview of the history of the language of sports medicine. It retraces the works of the past that represent precious sources of lexical and terminological information and testify to the parallel advancement of medical science applied to sports disciplines and prevention of human health problems.

The third chapter explores the multidisciplinary and interdisciplinary nature of sports medicine by focusing on the area of nutrition and supplementation. The chapter also investigates the most widely used eponyms in the linguistic domain of sports medicine, whose description is carried out parallel to the debate on the appropriateness of these expressive forms in the medical field.

The fourth and last chapter is entirely devoted to the language of doping, a crucial topic in the sports medicine field due to the importance it has today not only for the athlete's health but also for the image of sport throughout the world from an ethical perspective.

The investigation of sports medicine terminology mostly takes into account research articles included in some of the most authoritative scientific journals in the field. As for doping, in particular, the analysis also considers the code of the World Anti-Doping Association, the reference document that contains the set of rules on which all anti-doping programs are based at an international level.

The study is also supported by consultation of both specialized medical and sports medicine dictionaries, as well as other lexicographical tools.

CHAPTER I

SPORTS MEDICINE: A COMPLEX DISCIPLINE WITH A LONG HISTORY

1.1. Towards a definition of sports medicine

Sports medicine, also referred to as sports and exercise medicine, is difficult to define mainly due to the wide range of expertise that the discipline involves. It encompasses a very wide spectrum of knowledge ranging from preventive to therapeutic practices and from diagnostic to rehabilitation concepts. Sports medicine bridges the gap between medical science and human movement in the promotion of health and exercise, and physicians in the field are trained in all aspects of the management of athletes and physically active individuals in both normal and pathological conditions (Sharma and Kailashiya, 2022). The main areas of interest in sports medicine include the following features: assessment of capacity to professional and non-professional sports and physical activity, exercise for health, traumatology, doping, and nutrition. Hence, a large variety of professionals are also involved in the sports medical field, including, physical therapists, trainers, exercise physiologists, kinesiologists, psychologists, and nutritionists.

A comprehensive description of the knowledge that is demanded of physicians engaged in this discipline is provided by Ergen (2016: 342), who says:

> Athletes and active individuals demand expertise and sport-specific knowledge, for issues varying from musculoskeletal to environmental stresses;

> cardiological to dermatological and endocrinological to psychological. The moral, legal and health-related challenges (such as doping) surrounding professional athletes further contributes to the unique and complex picture presented to the doctors who treat them. Finally, prevention is an area of increasingly specialised interest, knowledge and expertise. Many believe that sports medicine will make its most significant contributions in the area of prevention. The benefit to health and quality of life from participation in physical activity – at all levels – is clearly apparent.

A sports physician is also responsible for certifying the suitability for professional and non-professional sports practice and carries out tests and evaluations to identify any health problems that may discourage sports practice (Rodríguez-Sanz, 2023). The examination includes an accurate clinical assessment of the subject with particular attention to the musculoskeletal system, cardiovascular function (usually with the execution of an electrocardiography, stress test and heart ultrasounds), and respiratory function (with spirometry) (Farzam *et al.*, 2024; Teixeira *et al.*, 2014). As nutrition is a very important component of sports activity, a sports physician also provides advice on the most appropriate diet for an athlete according to the type of sport practiced. S/he assists during sports activity, manages sports injuries, and provides recommendations for injury prevention (Knapik, 2015). A sports medicine professional also deals with anti-doping practices and procedures (Tandon *et al.*, 2015). Moreover, s/he is concerned with functional assessment, which consists in engaging the athlete in a series of useful tests to understand the level of training, his/her potential related to the activity carried out, and any problems associated with the work done (Manske and Reiman, 2013).

The broadness of sports medicine as described above has led to a lack of *communis opinio* about an exact and comprehensive definition of the discipline. In this respect, McCrory (2006: 955) states that

> there is no universally accepted definition of sports and exercise medicine (SEM). The nature of the discipline has changed over time and continued to do as SEM begins to clarify its scope more clearly and delineates itself from the traditional medical specialties.

It is interesting to note that several descriptions of sports medicine exist, and these show the variable scope of the discipline. The following are selected extracts, taken from authoritative medical dictionaries and ranging from the most restricted to the broadest and detailed definitions:

> The branch of medicine concerned with injuries sustained through sport (*Collins Medical Dictionary*, www.collinsdictionary.com).

> The field of medicine concerned with physical fitness and the diagnosis and treatment of both acute and chronic sports injuries sustained during training and competition (*Black's Medical Dictionary*, 2017: 618).

> A branch of medicine concerned with athletic conditioning and nutrition, the treatment and prevention of athletic injuries, and the improvement of athletic performance (*Merriam-Webster's Medical Dictionary*, www.merriam-webster.com).

As can be seen, the three definitions above share the common core of sports/athletic injury management and prevention; however, there is a gradual and progressive widening in the scope of the discipline, that from just being limited to sports injury control extends to all physical fitness and to a crucial aspect of human exercise, namely modifications and adaptations occurring in the body in response to sports. In this respect, more comprehensive definitions include such descriptions as that provided by the Medical Council of New Zealand, which states that sports medicine is

> the medical care of the exercising individual, including the assessment and management of patients with musculoskeletal injuries and medical problems arising from sporting activity. Sports physicians possess expertise in general medicine, orthopaedics and rehabilitation plus allied sports sciences including nutrition, biomechanics, exercise physiology and sports physiology (*in* McCrory, 2006: 956).

It is considered important to underline that the lack of consistent definition of what exactly sports medicine is and what priorities it has

also depends on the geographical area of reference. For example, the Australian College of Sport and Exercise Physicians shows a traditional view, which also illustrates the wide scope given to the discipline:

> A wide-ranging discipline incorporating aspects of disease and injury prevention, the management of the medical problems of exercising individuals, the management of soft tissue injuries sustained with exercise, the prescription of exercise for both improving physical fitness and treating disease. It also looks at the discrete exercise needs of certain population groups such as the elderly, those with disabilities and children. It provides expertise in the medical needs of sporting individuals, sporting teams and sporting events. It covers aspects of the medical care of individuals exercising in extreme environments and deals with pharmacological and ethical issues involved in drugs and doping in sport. Research in SEM is particularly concerned with injury prevention, enhancing physical function, understanding and improving impairment and enhancing the rehabilitation of injuries (*Australian College of Sport and Exercise Physicians*, www.acsep.org.au).

By contrast, as McCrory (2006: 956) highlights, the UK Intercollegiate Board of Sport and Exercise Medicine "reflects more of a public health element than the traditional views:"

> SEM is a discipline that draws upon basic and applied biomedical and clinical sciences for the furtherance of knowledge and ensuring best practice in the diagnosis and management of SEM clinical problems. The discipline is relevant to the whole population and seeks to promote health, to prevent disease or injury, to apply optimal treatment and rehabilitation and to measure outcomes (*UK Intercollegiate Board of Sport and Exercise Medicine*, *in* McCrory, 2006: 956).

The reference definition of sports medicine at an international level is provided by the Fédération Internationale de Médecine Sportive (FIMS), which does not limit the meaning to only injury prevention and treatment but also includes the consequences of inactivity on human health:

> It embodies theoretical and practical medicine which examines the influence of exercise, training and sports, as well as the lack of exercise,

> on healthy and unhealthy people of all ages to produce results that are conducive to prevention, therapy and rehabilitation as well as beneficial for the athlete himself (*FIMS, Fédération Internationale de Médecine Sportive*, www.fims.org).

The lack of a globally shared opinion on the nature of sports medicine has led McCrory (2006: 955) to manifest the need for a better definition of its boundaries and to state that a clear description should be carried out by government regulations as the only way to the process of recognition of the discipline as a new medical specialty. In this respect, sports medicine is *new* because if on the one hand it is a discipline where several traditional specialties converge and overlap, on the other hand the interaction of a multitude of specialties makes this discipline unique and requires broad expertise on the physician's part. A distinctive trait in sports medicine is the approach to the musculoskeletal system as compared to other specialties, above all orthopedics. Even though both orthopedic surgeons and sports physicians specialize in the treatment of the musculoskeletal system, there are important differences in the two disciplines. While an orthopedic surgeon is mainly concerned with injuries that require surgery, a sports physician concentrates on non-surgical conditions, and refer a patient to the surgeon only when injuries do not respond to non-surgical treatments (Rhon and Tucker, 2022). A sports physician trains in the sports field, while an orthopedic surgeon specializes in the surgical treatment of musculoskeletal injuries. Furthermore, as already mentioned, a sports physician is also concerned with injury prevention and nutritional advice. The preventive aspect in sports medicine further extends to the study of the effects that a specific activity produces on the organism and its possible shortcomings, as well as to the prescription of physical activity for sedentary people. A sports physician's expertise also finds application in the treatment of injuries not necessarily related to sports activity but occurring in other types of situations (e.g., car accidents) or related to the aging process. Finally, a sports physician plans the most appropriate treatments for the recovery from sports injury and physical activity resume, in collaboration with other health professionals (Kraemer *et al.*, 2009).

1.2. An overview of the history of sports medicine

The history of sports medicine goes back to ancient times. Sharma (2022: 1) reports that "the origins of exercise-is-medicine seems to date back to Indian Indus Valley and Chinese Yellow River civilizations." However, the first written documents regarding the benefits of physical exercise on human body date back to the fifth century BC, when the ancient Greek physicians used to prescribe movement for psychophysical well-being and also treated athletes for game-related injuries after the Olympics and any athletic competitions. The Greeks "developed a systematic approach to the body that upheld a close connection between exercise and medicine" (Berryman and Park, 1992: xi). Herodicus (484-420 BC) was the first physician to consider bad health as a result of an imbalance between diet and physical activity. He was firmly persuaded that the correct combination of these two elements in a person's lifestyle could maintain good levels of health; hence the recommendations on the importance of balanced diet and sufficient physical movement that Herodicus gave to his patients (Georgoulis *et al.*, 2007: 315). Herodicus, who was a physician and a pedotribe (physical educator), carried out the first known study of what was named "therapeutic gymnastics" or "gymnastics medicine", and served as a mentor to Hippocrates (460-375 BC), commonly regarded as the "Father of Medicine" (Hill, 2019: 93). Thanks to his in-depth studies on exercise and diet, Hippocrates found out that "eating alone will not keep a man well; he must also take exercise. […] Food and exercise, while possessing opposite qualities, yet work together to produce health" (*in* Tipton, 2014: 113). Hill (2019: 95) provides an account of the history of sports medicine, and reports that besides being considered the chief compiler of approximately 78 treatises about Greek medicine known as the *Corpus Hippocraticum* and covering almost all fields of medicine, Hippocrates also wrote two works, *Regimen in Health* and *Regimen in Acute Diseases*. The former deals with several topics including nutrition, exercise and physical activity, and also devotes an entire chapter to "athletes in training"; the latter, which was compiled in 400 BC, discusses a large number of different diseases and disorders, and also gives much space to the importance of exercise and training. Hippocrates introduced one of the most original concepts

of his thought, that of "regimen", namely a condition where balanced diet and physical exercise – together with hygienic and environmental conditions – determine and maintain a good state of human health. Hippocrates's theories and studies strongly influenced the Greco-Roman physician and philosopher Galen (200-129 BC), whose works influenced medical knowledge until the Renaissance. Galen was the author of an extensive essay on gymnastics exercises, included in a major work on health entitled *Hygiene (De Sanitate Tuenda)* (MacAuley, 1994: 32). Central to Galen's theory of health are the concepts of balance (*summetria*) of elements and correct function of organs, and the notion of latitude (*platos*). In this respect, Galen was influenced by Aristotle's view of a structurally hierarchical organization of the body. More precisely, Aristotle had theorized that pairs of dynamic qualities constitute the four elements that compose the sublunar cosmos: hot and dry constitute fire; hot and wet, air; cold and wet, water; cold and dry, earth. At a higher level, the four elements compose the body's homogeneous parts, roughly comparable to what today we call tissues (bones, blood, tendons, etc.). These heterogeneous parts, in turn, exist in non-uniform combinations, forming a still higher organizational level, the level of heterogeneous parts, comparable to what today we define organs (liver, heart, eye, etc.) (see Penella and Hall, 1973: 282-283). Galen added four substances to the Aristotelian hierarchical levels of the body. These substances were referred to as "humors" by the Greeks and described by Hippocrates in the treatise *Nature of Man* (ca. 400 BC). In this work, Hippocrates explains that the human body consists of four major fluids or humors, on whose balance the good health depends, whilst their imbalance and separation is a cause of diseases (see Carter, 2012: 15; Jouanna, 2012: 335). The Four Humors Theory influenced both Western and Eastern medicine until the birth of modern medicine in the sixteenth century marked its end (Javier, 2014: 72). The turn in the history of sports medicine and the study of human movement occurred thanks to the work of Girolamo Mercuriale, usually known by his latinized name Hieronymus Mercurialis (1530-1606) and the author of *De Arte Gymnastica*, a six-volume scientific treatise, published in 1569, which sanctioned the birth of sports medicine. This work is considered the first comprehensive book that explains human movement and it

represents a bridge between the classical Greco-Roman period and the modern era. As a matter of fact, Mercurialis reconsidered the teachings of the ancient Greeks and reintroduced them to the Europeans (Caine *et al.*, 2013: 7).

Seventeenth-century sports medicine was also enriched by the studies of another important physician and physiologist of the time, i.e. Santorio Sanctorius (1561-1636), a friend and student of Galileo, and Professor of medicine in Padua, who was one of the first researchers to study human metabolism (Renbourn, 1960; Ergen, 2016), making an important contribution to quantifying what he defined the "perspiratio insensibilis", the passive vapor diffusion of water through the epidermis. He developed instruments to measure and quantify metabolic change and carried out a large number of tests and experiments with a weighing chair he constructed himself, thus introducing quantitative research into physiological change and laying the foundations for self-quantifying technology (Hollerbach, 2023).

Later, the studies of the Italian physiologist Giovanni Alfonso Borelli (1608-1679) represented an important shift in the theory of the human movement. Borelli, often described as the father of biomechanics (Pope, 2005), linked movement to mechanical laws. He published two major works on this topic, *De Motu Animalium I* (1680) and *De Motu Animalium II* (1685), where the human body was described as a series of levers moved by the muscles, which were elastic and dynamic and therefore needed to be exercised effectively to maintain health. Borelli, whose studies mainly focused on the anatomy and biomechanics of the knee joints, introduced some innovative concepts about muscle structure, functioning, and classification (Piolanti *et al.*, 2018: 169). His "pioneering attempt to explain muscle function in terms of mathematical and physical principles" (Bruce Fye, 1996: 599) represented a shift in human movement practice and exercise and first and foremost made an important contribution to modern knee biomechanics. During the Enlightenment period, the benefits of physical movement and exercise were further given more emphasis thanks to such important works as *Medicina Gymnastica*: *A Treatise Concerning the Power of Exercise* (1705), by the English medical writer Francis Fuller, and *Essay on Health and Long Life* (1724), by the Scottish physician George

Cheyne, who recommends a wide range of physical exercises (Batchelor, 2012; Caine *et al.*, 2013). Medical gymnastics now had a more scientific position and was increasingly accepted in the medical field, also thanks to other important and influential publications such as the work by Nicholas Andry *L'Othopédie ou l'art de prévenir et corriger dans les enfants les difformités du corps*. This work, published in 1741, was translated into many languages and became immediately famous all over the world for the emphasis given by the author to bone plasticity and rehabilitative properties in children (Caine *et al.*, 2013; Kohler, 2010).

Another important contribution to the growth of sports medicine was made by the German surgeon August Bier, who had a pivotal role in establishing it as a discipline. Besides being the first physician to perform spinal anaesthesia and intravenous regional anaesthesia (also referred to as *Bier's block*), Bier organized the first lectures in sports medicine at the University of Berlin in 1919 (Lazovic Popovic, 2016: 576). Bier's activity was carried out after a crucial period for the growth of the sports medicine discipline, i.e. after the First German "Congress of Scientific Investigation of Sports and Physical Education" was organized in Oberhof, Germany, in 1912. The congress included topics such as the importance of physical education within a hygiene view and the impact of regular exercise on the cardiovascular system. Another German doctor who largely contributed to consolidating sports medicine as a discipline was Arthur Mallwitz, who is considered the founder of modern sports medicine (Pigozzi *et al.*, 2018). Together with Carl Diem, "one of the most outstanding sports personalities and Olympic promoters of modern times" (Schenk, 2021: 93), Mallowitz encouraged the idea of a German Academy for Physical Exercise, which was inaugurated in May 1920 (Berg and König, 2002: 4). Other medical professionals followed in the sports medical world, with the English physiologist Archibald Hill winning the 1922 Nobel Prize for unravelling the distinction between aerobic and anaerobic processes, introducing physiological concepts and paradigms still in use today (Bassett, 2002: 1567). It was in the same year that the first sports medical journal was published, more precisely by the French Society of Sports medicine (SMEPS). Later, in 1928, physicians from 11 countries taking part in the II Olympic Winter Games in St. Moritz founded the "Association

International Medico Sportive" (AIMS), changed into Fédération Internationale de Médecine Sportive (FIMS) in 1934. Initially, the federation was mostly a European organization until the International Olympic Committee (IOC) recognized it as the "designated competent international organization for biological and medical research on medicine and sport and medical care of athletes" (Ergen, 2014: 266). Later, FIMS was recognized as a non-governmental organization by the World Health Organization and by the International Council of Sports and Physical Education (ICSPE) in 1960. In 2003, FIMS celebrated 75 years of its foundation in all five continents. Today, FIMS is a solid and well-structured association that unites sports physician from 117 countries and is constantly concerned with the promotion and development of sports medicine worldwide. Promotion activities are performed through courses, in particular the Team Physician Development Courses, publications, the most important being the FIMS Team Physician Manual, and international events like the FIMS Biannual World Congress.

CHAPTER II

THE LANGUAGE OF SPORTS MEDICINE IN THE PAST
SOME NOTES ON THE HISTORY OF THE LANGUAGE OF SPORTS MEDICINE

As discussed in the previous chapter, it was in ancient times that the relationship between physical exercise and health was discovered and emphasized. In this respect, Hill (2019: 93) states that "without Herodicus, Hippocrates and Galen, our understanding of exercise and medicine in sport would be incomplete."

Sports medical terminology evolved parallel to progress in the medical sciences and allied disciplines over time. Today's sports medical terminology – as well as medical terminology in general – is made up of ancient terms and terms of recent coinage.

One of the main characteristics of sports medical terminology (and medical terminology in general) is that most terms are of Greek and Latin origin, and still today the word-formation process continues to develop through the interconnectedness of these two classical languages. Medical terminology dates back to very ancient times. The Hippocratic writings in the fourth and fifth centuries BC extensively deal with physical exercise-related medical issues but also encompass all aspects of the medical knowledge of that time, with numerous denominations of diseases and symptoms being displayed. With reference to medicine in general, it is worth mentioning some of the most important ones. Wulff (2004: 187) reports *catarrah* (downflow), *diarrhea* (throughflow), *dyspnea* (bad breathing), *melancholic temperament* (associated with black bile) and *podagra* (a foot trap). The scholar also discusses the important changes that

took place at the beginning of the first century AD. The Roman aristocrat, encyclopedist and presumed physician Aulus Cornelius Celsus wrote *De Medicina*, a treatise in Latin, which represents the oldest document after Hippocrates's writings and the most important source of medical knowledge dating back to the Roman Empire. *De Medicina* was based on Greek sources and Celsius had to deal with the difficulty that most terms had no Latin equivalents. Wulff (2004: 187) explains how Celsus solved this problem, which is of great interest from a linguistic perspective. First Celsus used the Greek terms in their orthographic forms in his Latin text. Afterwards, he latinized the original terms by writing them in Latin letters and replacing Greek endings with Latin ones (e.g., *stomachus*). Finally, he maintained the imagery of the Greek words by translating them into Latin, such as, for example, *dentes canini* from Greek *kynodontes* (dog teeth). In this way, it was possible to assimilate the shape of anatomical parts to musical instruments (e.g., tuba=trumpet), animals (e.g., helix=snail), armour (thorax=breastplate), tools (fibula=needle), etc. During the Middle Ages, many Greek medical texts were translated into Arabic, a language that left its traces in the medical terminology. During the Renaissance, Greek and Arabic works were translated into Latin, starting the era of medical Latin (Wulff, 2004: 187). However, modern languages gradually began to gain ground starting from the sixteenth century (Marečková *et al.*, 2002: 581). As terminology was of classical origin, the language of medicine showed common traits. Some languages adapted classical endings to their norms, as in the case of French (e.g., *ulcère gastrique*), while others borrowed names and anatomical terms in their original form, as in the case of Germanic languages, such as Dutch, German, and Scandinavian (e.g., *ulcus ventriculi*). As for English, although belonging in the family of Germanic languages, much of its vocabulary was (and still is) of classical origin and followed the Romance model, naturalizing terms to the lexical and syntactical rules of English, including the adjective placed before the noun (e.g., *gastric ulcer*) (see Wulff, 2004: 188). In the nineteenth century, Francis Adams, a Scottish surgeon who practised medicine in Banchory from 1819 to 1861, made an important contribution to the diffusion of Greek medical texts. At that time, no English versions of the classical medical literature of the Greeks, Romans and Arabians existed, thus leading Adams, almost

entirely self-taught, to remedy this deficiency (Adam, 1997: 53). In 1849, Adams published *The Genuine Works of Hippocrates*, which "was the first systematic translation of Hippocratic texts from Greek that set out the entire system of Hippocratic medical thought for an English-speaking audience" (Karimullah, 2020: 2). Adams took four months to complete the translation, which was described by Charles Singer, a prominent doctor and medical history lecturer from London, as "probably the most widely read of any work on medical history in the language" (*in* Nature, 1942: 286). The importance of Adams's work also lies in his endeavour in translating Hippocrates directly from the original texts, based on the Greek writings edited by the French philologist and physician Emile Littré. As a matter of fact, previous English translations of Hippocratic works existed but they mainly consisted of sixteenth-century English versions from Latin and were limited to individual treatises.

Adams was not the only translator of Hippocrates's writings, as William Henry Samuel Jones, a Cambridge philologist, classicist, and ancient historian, made another impressive contribution to the spread and reception of Hippocrates's medical concepts. Furthermore, Jones was the primary editor and translator of the 1931 Loeb complete edition of the Hippocratic corpus (Karimullah, 2020: 3). First and foremost, as highlighted by Karimullah (2020), both Adams's and Jones's translations played a primary role in the adaptations of Hippocrates's medical semiotic theory for nineteenth and early twentieth-century English audiences, shaping the way British physicians who consulted those translations understood Hippocrates's legacy. By means of collocation analysis, Adams's and Jones's translations showed that "the translators linked knowledge with semiotic terms more strongly in English than in Greek" and introduced distinctions between the terms *symptom* and *sign* into Hippocrates's thought that could not exist in the core corpus of the source texts (Karimullah, 2020: 14). In this respect, Holmes (2015: 193) reports that the "word *symptōma*, rather than originating as a medical term, enters Greek medical writing at some point after the fourth century BC" and that the word first appeared "in non-medical contexts from the fourth century BC, particularly in the sense of 'misfortune'". Holmes (2015: 193) also states that it is possible to trace back the occurrence of *symptōma* as a technical term to as early as Erasistratus

(304 BC-250 BC), a Greek anatomist and physician, with its use being confirmed by Galen "who expends some effort in trying to pin down its precise meaning within a larger semantic network, thereby rescuing it from the muddier waters of his predecessors." However, while modern Anglo-American medicine makes a distinction between what the physician can observe at a physical examination (signs) and what the patient experiences (symptoms), which might not be necessarily observable (e.g., pain), the semantic value attributed by Galen to *symptom* does not coincide with the one we find in modern languages. Holmes (2015: 203-204) reports that in a passage from Rufus of Ephesus's treatise on the interrogation of patients, the first century AD Greek physician "criticizes a reliance on *symptōmata* at the expense of listening to the patient", and thus "we would seem to have further confirmation of the distance between the ancient and the modern *symptom*."

The desire to reconcile the medical conceptual system of the Hippocratic era with the knowledge achieved in the field in the modern era is expressed in the following words by Adams (1849: vii):

> That I have imposed upon myself a very serious additional task, by engaging not only to give a true version of the language of my author, but also to expound his opinions, and place them, so to speak, in juxtaposition with those of the present age, will be readily admitted; and I have reason perhaps to apprehend, that I have thereby exposed myself to the strictures of a certain class of critics, who have formed to themselves a very different ideal of the duties of a translator, fancying that he ought merely to concern himself with the words of the original author, and not venture to sit in judgement on the doctrines.

Beyond the commitment itself that the hard task carried out by Adams entailed (he will say later "the arduous duties which I had undertaken"), the author's words are of remarkable importance as for the role a translator of classical texts plays, especially when these contain medical issues that must be rendered somehow intelligible to a target audience several centuries later. As a matter of fact, Adams accompanies his translation with a series of comments and explanations not only to make the medical concepts of the classical age more understandable to

his time but also due to concrete difficulties in Hippocrates's writings, "especially irregularities of syntax, with a somewhat rude and inartificial mode of constructing his sentences" (Adams, 1849: 22).

With reference to sports medical terminology, Adams's and Jones's translations include the terms *fracture*, *sprain*, *concussion*, *contusion*, *dislocation*, *injury*, *fall*, *blow*, which showed Hippocrates's knowledge of these topics, as testified in his treatises "On Fractures" and "On the Articulations". He also had important intuitions, which were ahead of his times and are still valid today. For instance, when writing about fractures and dislocations, with which he was very acquainted as having had to deal with several accidents during public games, he also described the term *club-foot*, a congenital deformity of the foot, and stated that it was not a dislocation, as was believed, but "merely a declination of the foot", which could also be treated without any surgical operation. The deformity is still faced today with non-surgical interventions unless strictly necessary. Hailed as the first physician to have separated medicine from religion (he was the first to say that epilepsy was not due to evil forces but to a brain disease), in the treatise *On Injuries of the Head* Hippocrates describes six specific types of cranial trauma, namely *fissured fractures*, *contusions without fracture*, *depressed fractures*, *dinted fractures*, *cranial lesions distant from the scalp wound*, and *wounds above cranial sutures* (Chang *et al.*, 2007: 2). Gahhos and Ariyan (1985: 178) report that Hippocrates's "general principles of fracture management include the value of early reduction, strict fluid diet after reductions of large joints, keeping sites of fracture warm and changing splints as the swelling resolves." The scholars also state that Hippocrates provided descriptions of dislocations mentioning "two patterns which are similar to the common 'anterior dislocation of the lunate' and 'perilunar dislocation'", and "treated pressure sores and wound infection with frequent dressings, application of heat and mechanical debridement." Koutserimpas *et al.* (2024: 123) declare that "Hippocrates's contributions to Orthopaedics and Traumatology are unprecedented, making him a true pioneer in this field, while the basic principles that he presented were further studied and confirmed in the nineteenth and twentieth centuries. If Hippocrates is considered the father of medicine and his medical knowledge influenced medical science for many centuries

later, Galen is generally regarded as the father of sports medicine as "he was the first to devote a major portion of his time to this field of endeavour" (Snook, 1978: 128). First and foremost, Galen was firmly persuaded that health was not just the absence of disease but a condition of balance where exercise, which was not considered as mere movement but as a structured and vigorous physical activity, played a major role. Of the types of exercises he mentioned in his writings, he privileged those performed with the use of a small ball:

> The form of exercise deserving our attention is therefore that which has the capacity to provide health of the body, harmony of the part, and virtue in the soul, and these things are true of the exercise with the small ball (*in* Berryman, 2012: 210).

Most importantly, Galen provides precise definitions of some key terms concerning human movement, primarily that of "exercise". Galen's most important discussion on exercise and its importance for human health from childhood to old age can be found in *Hygiene* (or *Health*), first translated by Montraville Green (1951), followed by the translation by Johnston (2018), while *Thrasybulus* was translated by Singer (1997). Book 2, entitled "Exercise and Massage", is divided into 12 chapters, the second of which, "Purposes, Time, and Methods of Exercise and Massage", includes a precise concept of "exercise" as distinct from mere "movement". He writes:

> To me it does not seem that all movement is exercise, but only when it is vigorous. […]. The criterion of vigorousness is change of respiration; those movements which do not alter the respiration are not called exercise. But if anyone is compelled by any movement to breathe more or less faster, that movement becomes exercise for him. This therefore is what is commonly called exercise or gymnastics (*in* Berryman: 210).

The definition of exercise provided by Galen almost 2,000 years ago involves features that are still valid today, as it already contains the basic distinction between movement, conceived as any form of physical

activity that involves muscles and uses energy, and exercise, considered as a set of structured and planned movements (e.g., body building). In this respect, the following definitions of "exercise", drawn, respectively, from the *Oxford Dictionary of Sports Science and Medicine* (2006) and a scientific article on rheumatoid arthritis, are reported:

> exercise: Any set of movements designed to train or improve a skill. Exercise may be spontaneous and playful, but it is usually performed with a specific objective (e.g., to become healthier, or to prepare for a competition) (*Oxford Dictionary of Sports Science and Medicine*, 2006: 193).

> "Exercise" or "exercise training" is a subset of leisure time physical activity that pertains to planned, structured, and repetitive bodily movements, aimed at improving or maintaining fitness, physical performance, or health (Cooney *et al.*, 2011: 2).

Moreover, "Galen explained that 'there are two types of material which produce and maintain the good condition: regimen and exercise'" (Berryman, 2012: 211). On the basis of these two elements, Galen developed a scale that included various levels of health conditions, ranging from "impairment of function which occurs in illness" to the highest of function, which Galen called "peak of good condition" (see Berryman, 2012: 211).

Besides being a remarkable and influential work till the Middle Ages and the modern era, and considered the most important contribution on exercise, diet and health regimes in the antiquity, Galen's *Hygiene* stands for the concept of health contained in it, a concept that is still the basis of health science and sports medicine today, namely a balance between diet and physical exercise. When Galen deals with physical exercise, he refers to a condition where diet and exercise stand on an equal level, that is neither of the two components must dominate. In this respect, Berryman (2012: 211) reports that in *An Exhortation to Study*, "Galen tends not to endorse athletic activities" and "wrote negatively about athletes." He also says:

> He accuses them of "neglecting the old rule of health which prescribes moderation in all things" and observes "they spend their lives in over-exercising, in over-eating, and over-sleeping like pigs". Galen further suggests that athletes "exceed the proper measure in exertion", are "in miserable pain", and when they stop competing, "most parts of their bodies become deformed" (Berryman, 2012: 211).

As well as representing a significant contribution to the history of sports medicine, Galen's *Hygiene* and *Thrasybulus* are also two important works from a linguistic, cultural, terminological as well as translation point of view. As Singer (2023: x) explains, it is not easy to translate from ancient Greek into modern English when dealing with health-related technical terms, as our understanding of medical issues, "in the ancient world as now, is closely dependent on our theoretical conceptions concerning the body and its functioning." In this respect, Singer (2023: xix) specifies that a Greek treatise about *onkoi* may appear as dealing with oncology if translated based on the knowledge of modern medicine but actually in ancient times this term had a multiplicity of applications regarding growths and swellings and basically conveyed the meaning of "mass", but "the ancients had no conception of cell multiplication" nor did they make "any distinction between benign and malignant growths." Likewise, in medicine applied to sports injuries in ancient times, no distinction was made, for example, between the modern concepts of "sprain" and "strain" because in the medical knowledge of that period there was no difference between a muscle-tendon injury and an injury affecting ligaments, but reference to "pain", one of the consequences of these kinds of injuries, was often made. In this respect, the words Hippocrates used most often to refer to pain were "algos", "algema", "odyne", and "ponos" (Astyrakaki *et al.*, 2010: 189). In distinguishing different kinds of fractures, Hippocrates describes 'stalklike' (*kaulēdón*), 'splinterlike' (*schidakēdón*), 'radishlike' (*rhaphanēdón*), and 'comminuted' (*alphitēdón*); however, Hippocrates did not know this terminology, which was introduced by later physicians (see Roselli, 2021: 222). Moreover, of the several types of injuries that Hippocrates included in his works, those regarding the head are considered the most important, both for the accuracy with which

the skull is described and for the classification of the injuries offered. More specifically, in Hippocrates's treatise *On Wounds in the Head*, the Greek physician distinguishes different types of skull trauma and provides detailed description of each of them, showing deep knowledge of skull anatomy, including shape, structure, thickness, and suture lines. In this respect, Panourias *et al.* (2005: 181) report that this work "reveals Hippocrates was a pioneer in treating head injuries." Beyond the interest it may arouse from the point of view of the history of medicine, *On Wounds in the Head* also has relevance on a linguistic and terminological level. As a matter of fact, Hippocrates developed his classification of injuries to the skull, accompanied by the related terminology. The terms used by Hippocrates were different from those of the other physicians who succeeded him. Soranus, for example, a physician of Ephesus of the second century AD, made a classification of fractures involving the skull which does not exactly correspond to Hippocrates's. In the first chapter of *On Signs of Fractures*, Soranus lists eight varieties of fractures, namely *rhōgmē*, *enkopē*, *kamarōsis*, *engeisōma*, *empiesma*, *aposkeparnismos*, *apēkhēma*, *and heligma*. He also names another type, *thlasma*, in chapter 9 (see Bilgisi, 2018: 22-23). In *De Vulneribus Capitis*, Hippocrates classifies fractures as

> *rhōgmē*, *phlasis* (=*thlasis*), *esphlasis* (=*eisthlasis*) *hedra* and *contre-coup* which he just explained without using any technical term. He also uses the term diakopē, which corresponds to *enkopē* in Soranus' classification, but he indicates that *diakopē* of any size is a *hedra* as long as the rest of the bone around the *diakopē* keeps its natural place, but, if the bone is crushed in, it is called *esphlasis* (Bilgisi, 2018: 23).

If on the one hand, Soranus provided a detailed account of the various types of fractures involving the skull, on the other hand he never mentioned the related symptoms. By contrast, his predecessor Celsus offered a description of the possible several symptoms related to the fractures, such as, for example, obscurity of vision, spasms, speechlessness, paralysis but did not make any direct list for a classification of skull fractures, even though "he mentions 'fissure', 'contre-coup' and 'depressed fracture'" (Bilgisi, 2018: 23). Generally, the terminology of

fractures varied depending on the physician who described them and based on the extent of the experience of clinical observation that had been made. Current medical knowledge allows distinction between symptoms correlated with fractures involving the skull itself and those resulting from damage to the various regions of the brain, using modern instrumental means for final diagnosis. As will be discussed in more detail later, even today there is no homogeneous terminology for the various types of fractures or muscle injuries related to the practice of sports activity, with consequent lack of clarity in communication and information.

CHAPTER III

THE LANGUAGE OF SPORTS MEDICINE TODAY

3.1. The multidisciplinary and interdisciplinary nature of the language of sports medicine

As already highlighted in the previous chapters, sports medicine covers several interconnected areas of specialized knowledge, which makes the discipline a very wide and diverse field of study. The multidisciplinary and interdisciplinary nature of sports medicine is reflected in its language. As for the terminology, in particular, Taylor *et al.* (2011: 1) defines it as "a highly descriptive mix of athletic, lay, and medical language."

Depending on the topic covered, e.g., functional assessment, sports-related injuries, nutrition, etc., the semantic field treated varies but the interplay among the macro domains of sports medicine constantly arises from the discourse, as in the following example:

> Patients with hypertrophic obstructive cardiomyopathy have an increased risk of sudden death with exertion and should therefore be restricted from all competitive sports. Low intensity recreational sport can only be undertaken if there is mild left ventricular hypertrophy and no history of arrhythmias (Soni, 1997: 386).

The semantic field of the extract above is the relationship between sport and heart disease. Such medical terms as "hypertrophic obstructive cardiomyopathy", "left ventricular hypertrophy" and "arrhythmias" are discussed in relation to the risks that could result from the degree of intensity of physical activity. Thus, a person suffering from the diseases just now mentioned needs to comply to suitable sports activities.

One of the topics where the interaction of the various disciplines that sports medicine encompasses seems most evident is nutrition. The extract below, taken from an article about the efficacy of creatine on health, may serve as an illustration:

> Creatine is one of the most popular nutritional ergogenic aids for athletes. Studies have consistently shown that creatine supplementation increases intramuscular creatine concentrations which may help explain the observed improvements in high intensity exercise performance leading to greater training adaptations. In addition to athletic and exercise improvement, research has shown that creatine supplementation may enhance post-exercise recovery, injury prevention, thermoregulation, rehabilitation, and concussion and/or spinal cord neuroprotection. Additionally, a number of clinical applications of creatine supplementation have been studied involving neurodegenerative diseases (e.g., muscular dystrophy, Parkinson's, Huntington's disease), diabetes, osteoarthritis, fibromyalgia, aging, brain and heart ischemia, adolescent depression, and pregnancy. These studies provide a large body of evidence that creatine can not only improve exercise performance, but can play a role in preventing and/or reducing the severity of injury, enhancing rehabilitation from injuries, and helping athletes tolerate heavy training loads (Kreider, 2017: 1).

In this extract, the issue concerning creatine supplementation of athletes is addressed from different disciplinary perspectives, as evidenced by the vocabulary used, which covers the sports field and various areas of medical knowledge and related disciplines. Indeed, "exercise performance", "athletic and exercise improvement", "training loads", and "athletes" itself fit perfectly in the sports domain. Moreover, the concepts conveyed by "high intensity exercise performance" and "training adaptation" are relevant to sports physiology, whereas terms such

as "ergogenic" (that gives energy), "intramuscular creatine concentrations" and "thermoregulation" belong in the field of biochemistry and general physiology. Medical terms are numerous, ranging from "post-exercise recovery" and "injury prevention", pertaining to rehabilitation medicine, to "concussion", a term used in traumatology. Likewise, terms including "muscular dystrophy", "Parkinson's" (disease), "Huntington's disease", and "brain ischemia" are related to clinical neurology. Furthermore, other conditions like "osteoarthritis" and "fibromyalgia" are used in the field of rheumatology, while "diabetes" represents a metabolic disease and "heart ischemia" involves the world of cardiology. Sports language has tight connections with the psychiatry and psychology domains, especially correlated with "adolescent depression". Finally, "pregnancy", despite having fully entered standard language, falls within the field of obstetrics and gynecology.

The occurrence of terms from various branches of medicine and sports science as evidenced in the extract above highlights the breadth of the discourse on supplementation and thus nutrition and their importance in sports and physical activity in general, which can be analyzed from a variety of interrelated disciplinary perspectives. The lexicon used is a manifest expression of the threefold relationship between nutrition (although in the example limited to creatine intake), health prevention, and physical performance.

3.1.2. *A focus on eponyms*

The interconnectedness between sport and medicine in the language of sports medicine can be found in some types of eponyms, more precisely those where the denomination of an anatomical part of the human body combines with the name of a given sport or a kind of athlete to form a medical term usually referring to a sports injury. Two examples are, respectively, *tennis elbow* and *jumper's knee*[1].

What is usually referred to as an "eponym" is defined by Crystal (2008: 171) as "the name of a person after whom something (such as an

(1) As mentioned in the introduction to this book, the eponyms of the language of sports medicine will be also discussed within the more general debate about their use in medical discourse.

invention or a place) is named". However, since the term *eponym* literally means "upon a name" (from Greek *epi* "upon", + *onyma* "name"), and there is no specific reference to whether the name is proper or common nor any indication of whether it refers to a person, thing or place, in this work all terms containing proper names of people, things or places, as well as common names in general will be considered eponyms in all respects (for a classification of types of eponyms, see Cappuzzo, 2008: 25-28).

Eponyms have always been an object of debate among physicians, linguists, and writers. Some state that they should be extensively maintained as they honor people who would otherwise be forgotten; others argue that they are obscure and inaccurate, and therefore should be substituted with their corresponding descriptive terms. In an article about the "power of eponyms", Quasim (2023: 2636) discusses eponyms as being not just linguistic phenomena but also important cultural elements "since they demonstrate one's effect on society and history […]. They also demonstrate how society prioritizes specific accomplishments or attributes […] and are a cultural phenomenon that illustrates the dynamic connection between individuals, language, and society." If, on the one hand, eponyms act as 'shortcuts' that allow one to express a concept without the need for detailed descriptions, on the other hand their use might generate confusion and semantic obscurity. Eponyms do not make direct reference to what they convey, contradicting the principles of referential precision and transparency so appreciated by specialists (see Gotti, 2003: 36-40). In other words, they can be misleading and potentially harmful. With regard to this, Waseem *et al.* (2005: 1) discuss *Finkelstein's test*, a term used to refer to a procedure carried out to diagnose *De Quervain's tenosynovitis* (the inflammation of the sheath that surrounds tendons) in people with wrist pain, and generally used in the orthopedic field of hand surgery. The authors found that the specialists who had been contacted to provide the meaning of *Finkelstein's test* had given three different descriptions of it, as the eponym had been incorrectly referred to in scientific literature for over 50 years, which might generate possible misdiagnoses and mistreatments.

However, although descriptive medical terms are generally more accurate than eponyms as they provide information about the object they

refer to (diseases, injuries, procedures, medical instruments, etc.), on the other hand, they do not always prove to be precise and correct in relation to the meaning they are used with. An example from the language of sports medicine is *lateral epicondylitis*, which is used to refer to a common sports injury generally occurring in racket sports, and employed as a synonym of *tennis elbow*. De Smedt *et al.* (2007: 816) discuss the terminological issue around this kind of injury. They say that "pain around the lateral epicondyle is known by a variety of names, and was described as periostitis, extensor carpi radialis brevis (ECRB)-tendinosis and epicondylalgia", with the most common terms being "tennis elbow" and "lateral epicondylitis". The scholars report that "the use of the terms 'periostitis' and 'epicondylitis' was questioned over time, as histological studies failed to show inflammatory cells (macrophages, lymphocytes and neutrophils) in the affected tissue." They also say that the injury in question was also referred to as "angiofibroblastic tendinosis" by Nirschl *et al.* (2004: 587), due to the presence of fibroblastic tissue, and these findings led the researchers to conclude that a more appropriate term to refer to the injury was "elbow tendinosis", which defines a degenerative process rather than an inflammatory condition. In this respect, in medical discourse the suffix of Greek origin *-itis* is conventionally used to form a term that denotes an inflammatory condition or process of the organ or tissue the term refers to (e.g., *gingivitis*, inflammation of the gums). Instead, the other suffix, of Greek origin too, *-osis* is generally used to refer to a degenerative condition or process involving bones and joints. However, this suffix is also commonly utilized in several medical domains conveying the general meaning of altered state (e.g., *neurosis*, *calculosis*), the presence of manifestations of the same type in limited or widespread areas throughout the body (e.g., *neurofibromatosis*), and deviations in the physiological balance (e.g., *leukocytosis*) (for further investigation in the use of *-itis* and *-osis* in medical language, see Cappuzzo, 2022: 14-15). In this respect, analogous to *tennis elbow* is the eponym *jumper's knee*, also called *patellar tendinitis* (or *tendonitis*), used to refer to an overuse injury that occurs when jumping, running, and frequent changes in direction damage the patellar tendon, causing knee pain. Santana *et al.* (2023: 11) report that "contrary to traditional belief, a jumper's knee

does not involve inflammation of the knee extensor tendons" and that "studies dating back 40 years describe jumper's knee as a degenerative condition".

Another consideration about the eponym *tennis elbow* is its degree of terminological appropriateness. More precisely, it can be stated that the *signans* is not entirely correct in relation to the *signatum*, as only "half of tennis players develop pain around the elbow, of which 75% represent true tennis elbow" and "tennis players make up only 10% of the patient population" (De Smedt *et al.*, 2007: 816; Lenoir *et al.*, 2019: 241). This means that only 37.5% of all tennis players develop tennis elbow, while the remaining part develop an injury other than the actual tennis elbow, and, even more, 90% of the patient population that develop tennis elbow do not practice any tennis. People affected by the injury perform activities like carpentry, plumbing, and construction working (Kiel and Keiser, 2024: 1).

A similar example of eponym from sports medicine where the surface form of the term is not fully adequate to the meaning it is used with is *golfer's elbow*, which is employed to denote another injury of the elbow due to overload or overuse, and commonly referred to by the technical term "medial epicondylitis". Kiel and Keiser (2024: 1) report that despite the name, golfer's elbow is not only caused by playing golf but by several other sports such as archery, bowling, javelin throwing, and similar activities. Most importantly, the scholars say that "more than 90% of cases are not sports-related." Furthermore, the injury called *golfer's elbow* is also referred to by other terms, i.e., *thrower's elbow*, *pitcher's elbow*, *tendinosis*, *epicondylalgia*, and the above-mentioned *medial epicondylitis*. This terminology 'variety' – or, rather, confusion – is due to the fact that the injury that is referred to is not yet well-known and, first and foremost, to the lack of *consensus* about whether the injury is basically an inflammatory (epicondyl-*itis*) or a degenerative (tendin-*osis*) condition.

Perera *et al.* (2023: 1) state that arguments against the use of eponyms include "that they are an outdated and archaic form of communication." They also maintain that the presence of eponymous terms can create confusion in clinicians, especially when dealing with a multitude of terms that refer to a specific type of injury. Moreover, the authors report that "in ankle fractures alone there exist greater than nine different

eponymous terms, which potentially only aid to confuse rather than clarify." In this respect, when discussing the value of eponyms as lying in their correct understanding of the meaning, "without which their use can be confusing and even dangerous", Waseem *et al.* (2005: 4) state that "this is particularly true in classifications of ankle fractures." Several physicians and students have described ankle fractures over time starting from the early nineteenth century, and different classification systems have been made carrying the names of the scholars who have studied and observed them. *Bosworth*, *Cotton*, *Lauge-Hansen*, *Le Fort*, *Pott*, *Danis-Weber* are some eponymous denominations of ankle fractures, with the *Lauge-Hansen* and *Weber* classification systems for malleolar fractures being the most common in use (see Tartaglione *et al*., 2015).

One of the main problems that arise from the use of eponymous terms is when the same eponym is employed to express different meanings. An example in sports medical language is *Barton's fracture*, a term that according to the description of the American orthopedic surgeon John Rhea Barton should be limited to injuries involving the dorsal or posterior margin of the distal radius (see Waseem *et al.*, 2005: 4). Instead, due to Ellis incorrect description of *Barton's fracture* as the anterior marginal features of the distal radius, both anterior and posterior injuries of the radius were and are still referred to as *Barton's fracture*, which might result confusing and even possibly misleading in clinical practice, thus requiring each time correct descriptions.

3.2. Misuse of sports medicine terminology

One aspect of the language of sports medicine that deserves attention concerns misuses of terminology. Taylor *et al*. (2011: 1) describe the language of sports medicine as a "rich" and "vivid" language that can be "confusing" because "many terms are used improperly or have developed different meanings over time".

The authors also state:

> the importance of using consistent and proper terms helps research findings to be more accessible and understandable to the audience.

> But more importantly, misuse of the language can affect patient care. Physicians in the same group using different definitions of terms could compromise patient care when interacting on a common patient. This could also extend to health care support such as nurses, nurse practitioners, physician assistants, physical therapists, athletic trainers, and more (Taylor *et al.*, 2011: 1).

In this section, the inappropriateness of some terms or phrases of sports medicine terminology will be investigated. Taylor *et al.* (2011: 1) mention the case of the improper use of the terms *strain* and *sprain*, which are often confused with each other. *Strain* is an "injury to a muscle or tendon due to excessive mechanical stress" (*Oxford Dictionary of Sports Science and Medicine*, 2006: 531). This term is often confused with *sprain*, which denotes "an acute injury to a ligament owing to excessive mechanical stress" (*Oxford Dictionary of Sports Science and Medicine*, 2006: 523), also defined in more detail as "an injury to a ligament as a result of abnormal or excessive forces applied to a joint, without dislocation or fracture" (*Stedman's Medical Dictionary*, 2006: 1816).

Other inappropriately used terms are *arthritis* and *x-ray*. As previously discussed, the suffix *-itis* is conventionally used to refer to an inflammatory condition, as distinct from *-osis*, which denotes a degenerative process. Taylor *et al.* (2011: 1-2) state that "arthritis is often used incorrectly to describe a degenerative joint; the term *arthrosis* may be the accurate term." In this respect, Cappuzzo (2022: 16-19) scrutinizes the use of *osteoarthritis* as another term where the suffix *-itis* is inaccurate in relation to the use with which the term is employed, namely a degenerative non-inflammatory condition of the joint, mainly due to aging, as the following two descriptions register:

> *This word is a misnomer in that the dominant pathologic process is degeneration rather than inflammation.* Arthritis characterized by erosion of articular cartilage, either primary or secondary to trauma or other conditions, which becomes soft, frayed, and thinned […]; mainly affects weight-bearing joints, is more common in old people and animals. SYN arthrosis, degenerative arthritis, degenerative joint disease, osteoarthrosis (*Stedman's Medical Dictionary,* 2006: 1388).

> A non-inflammatory degenerative type of arthritis marked by degeneration of the articular cartilage, overgrowth of bone at the margins, and changes in the synovial membrane. […]. Also called degenerative joint disease (*Dorland's Illustrated Medical Dictionary,* 2019, https://www.dorlandsonline.com/dorland/home).

Similarly to *arthritis* and *osteoarthritis*, another term that Taylor *et al*. (2011: 1) report as inappropriately used is *patellar tendinitis*,

> which histologically should be called *tendinosis*" […]; "however, the term *tendinopathy* is a better descriptor for the clinical diagnosis. This distinction may seem insignificant to some people, but when terminology interferes with accurately teaching students, residents, and patients, it is a real problem because our language loses clarity (Taylor *et al*. (2011: 1).

The non-inflammatory process of the disease which the inaccurate term *patellar tendinitis* refers to is also discussed in a study by Stasinopoulos (2014: 1), who writes:

> Patellar tendinopathy is characterized by the absence of inflammatory cells and prostaglandins and an increased presence of fibroblasts and disorganized collagen (1). Therefore, this condition is not inflammatory as physicians had thought but is a degenerative condition. […] Patellar tendonitis is also an incorrect term for clinical diagnosis because the condition is not inflammatory but is degenerative as mentioned (Stasinopoulos, 2014: 1).

As for the use of *X-ray*, this term is employed instead of *radiograph*, as attested by *Stedman's Medical Dictionary* (2006: 2159), where it is registered as a "synonym of radiograph". What is referred to by the term *radiograph* is "the image produced by the emission of electromagnetic radiation through the body." In the use of *X-ray* instead of *radiograph*, a sort of synecdoche takes place, where a substitution occurs of the object with the medium through which that object is created.

A similar phenomenon can be found in *surgery*, which is used instead of *operation*. *Surgery* refers to "the branch of medicine concerned

with the treatment of disease, injury, and deformity by physical operation or manipulation" (*Stedman's Medical Dictionary* (2006: 1877), while *operation* denotes "any surgical procedure" (*Stedman's Medical Dictionary* (2006: 1370), and thus the act performed by the surgeon. This is another example where the substitution of one term with another takes place through a relationship of semantic closeness between concepts; in this specific case, the name of a branch of medicine is used to refer to the act with which that field achieves its activity.

It is noteworthy that although from a strict linguistic perspective most of the above examples have been categorized as mistakes, they are actually only language conventions belonging in that specific language community. Thus, they cannot be really considered as mistakes but rather as uses.

One of the most complex aspects of sports medical terminology that Taylor *et al.* (2011: 2) highlight concerns the classification of sports injuries. Muscle lesions are the most frequent category of injuries in athletes (see Delos, 2013: 346), and for this reason the scientific community asks for a correct, universal, unambiguous, and exhaustive description of them. The issue mostly concerns the terminology of muscle strain injuries, which has undergone continuous changes over time. This phenomenon has led to an overlapping of several different classification systems and ultimately generated confusion, thus hindering clarity in medical communication. According to Taylor *et al*. (2011: 6), there is no correct classification for muscle strain injuries as these kinds of injuries are classified using a terminology similar to that employed for ligament injuries, that is based on classification criteria that take into account mechanical testing. Thus, muscle strain injuries are traditionally classified as Grade I, Grade II, and Grade III, corresponding, respectively, to the descriptions *Mild*, *Moderate*, and *Severe*. The scholars argue that since muscle strain injuries can be assessed on the basis of such factors as tenderness, muscle strength, swelling, and ecchymosis, besides the presence of a defect in the muscle-tendon unit, they should be classified using four fundamental terms, i.e. *interstitial strains*, *intramuscular strains*, *partial ruptures*, and *complete ruptures*. However, this classification system has been criticized as lacking predictive value. Therefore, other alternative proposals have been made over time, "with

the aim of developing uniform muscle injury terminology and giving each severity grade prognostic value" (Grassi *et al.*, 2016: 39). More precisely, at the end of 2013, a new classification system was created by the Italian Society of Muscles, Ligaments and Tendons (ISMULT), who released guidelines for muscle injuries, thus coining the terms *proximal injury*, *middle injury*, and *distal injury*. This new terminology, which referred directly to the location of the injury, was considered more useful because it allowed prediction of the future development of a specific injury. A similar classification, created by the British Athletics Medical Team, developed a five-grade classification system based on the severity of the injury, and coined the corresponding terms *muscle soreness*, *small muscle tears*, *moderate muscle tears*, *extensive muscle tears*, and *complete muscle tears*. Later, in 2015, a new comprehensive classification system was developed by the medical team of FC Barcelona in collaboration with the Aspetar Medical Staff. Besides location and grading scale, this classification system also considers frequency of the condition, and the anatomical parts injured, and more precisely whether the damage entails involvement of tendons. Thus, the classification includes such additional acronyms and terms as *R0*, *R1*, and *R2*, described, respectively, as *first episode*, *first re-injury*, and *second re-injury* (Grassi *et. al*: 2016: 45).

Although injury classification systems have improved over the last years, there is still little *consensus* as to how to describe and determine the prognosis of a specific muscle injury (Hamilton *et al.*, 2017: 255). The lack of universal criteria for the classification of muscle injuries necessarily entails lack of uniformity in the terminology used, which has become a cause for concern among specialists.

CHAPTER IV

THE LANGUAGE OF DOPING

Sports medicine also encompasses an area that has received increasing attention in the last few decades, i.e., doping (Lauritzen and Solheim, 2024). This is because the intake of athletic performance-enhancing drugs has grown exponentially in the sporting world, and doping not only exists in professional sports, but also affects amateur athletes who are making increasing use of substances to enhance physical ability (see Mazzeo *et al.*, 2018: 1669) as well as people who engage in activities for aesthetics or lifestyle reasons (McNamee and Tarasti, 2011). Thus, doping has become a broad-spectrum social problem. It is a complex phenomenon, in which athletes who participate at a competitive level find themselves in a context of large economic interests. They suffer strong psychological pressure due to the huge profits that are offered in the event of winning a competition (see Endo *et al.*, 2023; Pluhar *et al.*, 2019). "The practice of using drugs to affect performance in a race or other sport" (*Oxford English Dictionary*, https://www.oed.com/) goes back to the ancient Olympic games, when athletes used to eat figs to improve their performance (Holt *et al.*, 2009: 320). Doping substances were also used during the Roman Empire for racing horses, who "were doped with various blends of substances aimed to increase their speed and stamina; gladiators have also been mentioned as users of strength-increasing agents" (Vlad *et al.*, 2018: 530). With the advent of pharmacology in the nineteenth century, an ever-increasing number

of athletes began to take drugs to enhance their performance. However, the consumption of drugs soon brought negative health effects, which led to the gradual introduction of laws to prohibit the use of substances aimed at improving physical performances.

The origins of the term *doping* are still an object of discussion. The *Oxford English Dictionary* (https://www.oed.com/) reports that the first attested use of *doping* goes back to 1889 as included in Barrère and Leland's *Dictionary of Slang, Jargon and Cant*: "Doping is the stupefying men with tobacco prepared in a peculiar way" (*in Oxford English Dictionary*, https://www.oed.com/). Thus, it seems that doping was initially associated with the assumption of tobacco. However, Cantelli Forti (*in Treccani*, https://www.treccani.it/) reports that the same dictionary refers to doping as a mixture of opium and narcotics used for horses. The *Online Etymology Dictionary* (https://www.etymonline.com/) registers *dope* as an American English word dating back to 1807 with the meaning of

> sauce, gravy; any thick liquid", from Dutch *doop* "thick dipping sauce", from *doopen* "to dip". Used generally by late 19c. for any mixture or preparation of unknown ingredients" (*Online Etymology Dictionary*, https://www.etymonline.com/).

The dictionary also registers the extended meaning of *doping*:

> Extension to "narcotic drug" is by 1889, from practice of smoking semi-liquid opium preparation. Meaning "foolish, stupid person" is older than this (1851) and may be from the notion of "thick-headed", later associated with the idea of "stupefied by narcotics" (*Online Etymology Dictionary*, https://www.etymonline.com/).

It also seems that "dope" is "an ancient expression that referred to a primitive alcoholic drink used as a stimulant in South African ceremonial dances" (Lippi and Guidi, 1999: 345).

The word *doping* can also be investigated from a translation point of view. It is well-known that many English terms have entered the lexicon of other languages as loanwords, in their adapted or non-adapted forms. Adapted forms are, for example, the French *dopage*, the Spanish *dopaje*, and the Portuguese *dopagem*, while Italian, German, Dutch,

and Scandinavian languages have borrowed the complete original form *doping*. As for the Italian language, in particular, the Treccani encyclopaedia (https://www.treccani.it/) records the equivalents *drogaggio* and *drogatura*, which, however, never seem to be actually used to refer to the administration of drugs to athletes or animals before or during competitions to increase their competitive performance. *Drogaggio* is used above all in technical-scientific language to indicate the introduction of controlled quantities of foreign atoms into a pure compound (usually a crystal) in order to modify its properties (Treccani, https://www.treccani.it/). The adapted term *dopaggio*, used by Umberto Eco in *Storia della civiltà europea* (*in* Treccani, https://www.treccani.it/), is not widespread, while commonly used terms are the adjectives *dopato* and *dopante*, as well as the verb *doparsi*.

Doping is a topic that can be scrutinized from several perspectives. It involves medical issues, when referring to the misuse/abuse of performance-enhancing drugs, legal aspects as it causes rule breaking, and ethical matters, as fairness in sport is the aim of anti-doping policies and practices. Therefore, the language of doping is a mixture of medical/athletic vocabulary, and legal and ethical terminology. The anti-doping jurisdiction, which is regulated by the World Anti-Doping Agency (WADA) (https://www.wada-ama.org/en), the main international anti-doping association, is committed to protecting athletes' health and safeguarding fair sport worldwide. WADA has created a list of prohibited substances and methods, whose description intertwines sports language and legal language. An excerpt, taken from the entry "Consequences of Anti-Doping Rule Violations" contained in the World Anti-Doping Code (2021), may serve as an example:

> An Athlete's or other Person's violation of an anti-doping rule may result in one or more of the following: (a) Disqualification means the Athlete's results in a particular Competition or Event are invalidated, with all resulting Consequences including forfeiture of any medals, points and prizes; (b) *Ineligibility* means the Athlete or other Person is barred on account of an anti-doping rule violation for a specified period of time from participating in any Competition or other activity or funding as provided in Code Article 10.14. […] (*World Anti-Doping Code*, 2021).

Such legal terms as *forfeiture*, *rule violation*, *ineligibility* and *code* (*article*) intersect with sports vocabulary and sports medicine vocabulary like *athlete*, *disqualification*, *medals*, *competition*, *points*, and (*anti-*) *doping*. In this respect, Isidori (2014: 71), who discusses the need for a philosophical-educational approach to the debate on doping, highlights that "the discourse on doping in sport today revolves around two types of registers, that is the classificatory-descriptive one (typical of the medical perspective) on the one hand, and the normative-sanctioning one (typical of the vision presented by law as a science) on the other hand."(1) Regarding, in particular, the medical-sports component of the discourse on doping, the most evident expression is in scientific literature, where ample space is often given to the evaluation of performance-enhancing substances, and risks related to the health of professional and non-professional athletes are widely examined. The extract below, from a research article by Adami *et al.* (2022: 560) and published in the *European Journal of Preventive Cardiology*, classifies the main doping substances and describes how their assumption acts on the body:

Table 1. Prevalence of adverse analytical findings by substance category in WADA Anti-Doping Administration and Management System (ADAMS) – (WADA, 2019 Anti-Doping Testing Figures).

Anabolic agents	43.66
Beta-2 agonists	3.66
Beta-blockers	0.48
Cannabinoids	3.11
Chemical and physical manipulation	0.05
Diuretics and other masking agents	16.20
Enhancement of oxygen transfer	0.05
Glucocorticosteroids	5.50
Hormone and metabolic modulators	8.66
Narcotics	0.72
Peptide hormones, growth factors and related substances	3.30
Stimulants	14.62

The Olympic Games from 1968 to 2012 revealed that the majority of positive re-tested samples contained metabolites of exogenous anabolic androgenic steroids (AAS), but the list of the WADA banned drugs is extensive. […]. AAS are widely used not only

(1) The translation is mine. The original text is as follows: "Il discorso sul doping nello sport si muove oggi tra due tipologie di registri, che sono il classificatorio-descrittivo (tipico della visione medica) da una parte, ed il normativo-sanzionatorio (tipico della visione prospettata dal diritto come scienza) dall'altra" (Isidori, 2014: 71).

by athletes competing in power or strength sports but also in endurance sports to aid in recovery and strength. The simultaneous use of AAS and erythropoietin is common both in strength and endurance athletes. AAS act by activating androgen receptor (AR) signalling. Moreover, increased testosterone levels inhibit glucocorticoid action and protein catabolism. These mechanisms in combination with the stimulation of growth hormone and insulin-like growth factor-1 (IGF-1) axis cause muscle protein formation. These effects are enhanced when combined with regular training, leading to increased muscle mass and strength and reduced fat body mass. Significant increases in physical performance and strength have been observed in double-blinded randomized trials comparing AAS vs. placebo (Adami *et al.*, 2022: 560).

As can be seen, the authors of the article offer a table of the main categories of doping substances as included in the Anti-Doping Administration and Management System database created by WADA. The classificatory list is accompanied by a description of how these substances work and the effects that they cause on the body. The extract represents a good example of how the discussion on doping from a medical perspective is characterized by the use of lexemes (verbs, nouns, adjectives) that indicate the processes implemented and the changes determined by the intake of performance-enhancing drugs. The verbs *activate* and *inhibit* are used to illustrate the functioning mechanism through which doping drugs act on the body. Though both verbs are borrowed from standard language, in the discourse on doping they acquire a more specific meaning in relation to the object they refer to.(2) They are widely used in the field of pharmacodynamics, which is the study of "the effects of drugs in the body and the mechanism of their action" (Ernstmeyer and Christman, 2023: 22). Another lexeme included in the extract above and borrowed from standard language with a more precise meaning is *stimulation*, which is widely employed in the discourse about doping (likewise, the corresponding verb "stimulate" is also very frequent). This is because the substances taken to increase physical performance function as activators of mechanisms capable of obtaining certain effects. Thus, for example, amphetamines, ephedrine, methyl ephedrine, cocaine, and other "stimulants" elicit the central and peripheral nervous systems to improve reflex activity and concentration, while steroid hormones,

(2) For an investigation of the specialization process of standard language words in specialized discourse, see Gotti (2003: 54-56).

which belong in the category of anabolic substances, cause muscle hypertrophy, reduction of fat mass, increase in strength and recovery capabilities. In this respect, further key words in the text are the verbs that introduce the effects determined by doping substances, such as *cause* and *lead*, and the expressions that refer to the effects themselves caused by the substances, therefore *muscle protein formation*, *increased muscle mass and strength*, *reduced fat body mass*, and *increases in physical performance and strength*.

As already mentioned above, the World Anti-Doping Code provides a list of substances and methods that are prohibited in sport. The glossary is a very rich source of doping-related terminology. The substances are divided into three main macro categories, that is "Substances and methods prohibited at all times", which includes anabolic agents, peptide hormones, beta-2 agonists, hormone and metabolic modulators, and diuretics and masking agents; "Substances and methods prohibited in competition", which encompasses stimulants, narcotics, cannabinoids, and glucocorticoids; and finally, "Substances prohibited in particular sports", which only comprises beta-blockers. All three categories include denominations of substances that are drugs in all respects. The second category, for example, includes names of drugs that belong in what is commonly referred to as *narcotics*, e.g., *Buprenorphine*, *Dextromoramide*, *Diamorphine (heroin)*, *Fentanyl and its derivatives*, *Hydromorphone*, *Methadone*, *Morphine*, *Pentazocine*, *Tramado*.

As explained from the beginning in the Table of contents of the glossary (p. 2), some of the above-mentioned substances are used for the treatment of specific diseases, disorders, or conditions, e.g., pain, including that deriving from musculoskeletal injuries. Similarly, such substances as *Beclometasone*, *Betamethasone Budesonide*, *Ciclesonide*, *Cortisone*, *Deflazacort*, *Dexamethasone*, *Flunisolide*, *Fluocortolone*, *Fluticasone*, which belong in the category of drugs called *corticosteroids*, are used for the treatment of diseases and disorders like asthma, anaphylaxis, allergies, inflammatory bowel diseases, and many other conditions. Instead, *Acebutolol*, *Alprenolol*, *Atenolol*, *Betaxolol*, *Bisoprolol*, *Bunolol*, *Carteolol*, *Carvedilol*, *Celiprolol*, *Esmolol*, *Timolol* are part of the category of drugs referred to as *betablockers* and are used for the treatment of various cardiovascular diseases.

All the denominations mentioned so far refer to substances used to improve physical performance. Betablockers, for example, lower the heart rate, and thus give a sense of calm and quietness that are sought by athletes involved in sports where the slightest tremor of the arm can make the difference, such as shooting or archery.

It could be argued that the names of all the aforementioned substances do not specifically belong in the language of doping but in the language of medicine in general, and in the language of pharmacology in particular. If on the one hand these denominations refer to drugs used in medicine for the treatment of various diseases and conditions, on the other hand when referring to their use in the field of sport, they acquire a more specific meaning, that can be defined as 'drugs taken to alter athletes' physical performance'. What changes is the *purpose* for which these substances are used in sport as compared to medicine in general, *viz.* modification in physical ability, and *not* treatment of diseases. It is from this perspective that it can be stated that all the above-mentioned names of substances belong in the language of doping, as well as the generic names of the categories of drugs they fall into, that is *corticosteroids*, *betablockers*, *narcotics*, along with the countless other denominations of substances that are listed in the WADA glossary. In other words, they are terms 'borrowed' from medical language in general and semantically redefined in sports medicine language when used in specific contexts.

Another category of terms that can be identified in the language of doping is represented by those lexemes that belong in standard English and have undergone a high level of redefinition and therefore specialization of their meaning. Two examples are *tampering* and *trafficking*. Both terms are included in the World Anti-Doping Code and discussed in the context of "Anti-Doping Rule Violations". In standard English, the verb "tamper" means "to meddle or interfere with something so as to misuse, alter, corrupt, or pervert it" (*Oxford English Dictionary*, https://www.oed.com/). Thus, for example, a database can be tampered with, or an anti-theft device. In the language of doping, the term *tampering* assumes more specialized meanings, by including the following uses, as specified in WADA's Code:

> *Tampering*, or *Attempting to Tamper*, to alter the integrity and validity of *Samples* collected during *Doping Control.* Including, but not limited to: Sample substitution and/or adulteration, e.g., addition of proteases to *Sample* […] (*WADA*, *The Prohibited List*, "Chemical and Physical Manipulation").

In the extract above, tampering refers to samples (usually of blood or urine), the "integrity" and "validity" of which are manipulated during anti-doping controls. A more detailed explanation of *tampering* is provided in the World Anti-Doping Code (2021: 176-177):

> Intentional conduct which subverts the Doping Control process but which would not otherwise be included in the definition of Prohibited Methods. Tampering shall include, without limitation:
>
> – offering or accepting a bribe to perform or fail to perform an act;
> – preventing the collection of a Sample;
> – affecting or making impossible the analysis of a Sample;
> – falsifying documents submitted to an Anti-Doping Organization or TUE committee or hearing panel; procuring false testimony from witnesses;
> – committing any other fraudulent act upon the Anti-Doping Organization or hearing body to affect Results Management or the imposition of Consequences;
> – any other similar intentional interference or Attempted interference with any aspect of Doping Control.
> (*World Anti-Doping Code*, 2021: 176-177).

The Australian Government reports some examples of *tampering*:

1. altering identification numbers on a Doping Control Form during testing
2. breaking the bottle at the time of sample analysis
3. altering a sample by adding a foreign substance, or
4. giving a false statement, evidence or documents in an anti-doping investigation. (*Australian Government*, https://www.sportintegrity.gov.au/what-we-do/anti-doping/anti-doping-rule-violations)

In the list of fraudulent actions provided above, the term *tampering* includes any aspect of an anti-doping control violation, from altering analyzed samples to threatening possible witnesses or providing false testimony, thus acquiring a broad semantic value.

Trafficking is another term that has been borrowed from standard language and has acquired a more specific meaning in the language of doping. What in standard English is "the activity of buying and selling something illegally" (*Oxford English Dictionary*, https://www.oed.com/) becomes "trafficking or attempted trafficking in any prohibited substance or prohibited method by an athlete or other person" (World Anti-Doping Code, 2021: 23). The semantic value of *trafficking* lies in the object of the activity the term refers to, namely "illegal substances" and/or "methods". In this respect, the Australian Government provides the following definition:

> Athletes or other Persons bound by an anti-doping policy can receive a sanction for Trafficking or Attempting Trafficking Prohibited substances or Prohibited Methods.
> Trafficking includes:
>
> – selling
> – giving
> – transporting
> – sending
> – delivering, or
> – distributing
> – a Prohibited Substance or Prohibited Method physically or by any electronic or other means.
>
> Trafficking can include supplying Prohibited Substances to people who are not athletes (*Australian Government*, https://www.sportintegrity.gov.au/what-we-do/anti-doping/anti-doping-rule-violations).

Another term that has been borrowed from common language and has been semantically redefined with a more specific meaning in the lexicon of doping is *clean*. This adjective is usually used as a collocate of *sport* to describe physical activities where no use of performance-enhancing

drugs is made, thus becoming a synonym of *fairness* and *integrity*, with the latter being "used frequently in the anti-doping literature, boasting sizeable literature presence" (Petróczi and Boardley, 2022: 7). *Clean* can also be found as a collocate of other lexemes, which may refer to settings, conduct, or players, as in the case of "clean-sport environment", "clean behavior", or "clean athletes" (Dimeo, 2016; Petróczi and Boardley, 2022; Veltmaat *et al.*, 2023). The language of doping also shows terms that have been formed by combining lexemes borrowed from specific disciplines with already existing terms, thus forming neologisms with precise meanings. The most significant example is *gene doping* (also referred to as *cell doping*), where *doping* combines with *gene*, a term borrowed from biology. *Gene doping* refers to the "nontherapeutic use of cells, genes, genetic elements, or modulation of gene expression, having the capacity to enhance performance" (World Anti-Doping Agency, 2008). The *Oxford English Dictionary*'s earliest evidence of *gene doping* is from 2000, when it appeared in an article by Denis Campbell, published in the *Guardian*, and entitled *Genetics and drugs*. The following is an extract:

> Forget steroids, dietary supplements, stimulants, diuretics and everything else unscrupulous sportspeople take. By 2010, sport will be dominated by ultra-fast, super-strong, muscle-bound Frankenstein athletes whose record-breaking feats owe as much to genetic medicine as to the gymnasium. The science of 'gene-doping' will have replaced the culture of pills, injections and masking agents. Want to run faster? A gene injection will sort it out. […]. Dick Pound, vice-president of the International Olympic Committee, is aghast at the possibilities opened up by gene-doping. 'Are we going to create a generation of monsters, of made-to-order humans, a race of specialised people who only do sport?' Disaster or not, genetically-modified sportsmen are the future. The IOC has already been warned that it is a question of when, not if, gene-doping starts happening (*Oxford English Dictionary*, https://www.oed.com/).

Other terms that are closely related to *gene doping* are *gene transfer*, *gene editing*, and *gene silencing*, which refer to the different forms that the technology of gene doping can take. More precisely, they refer to advanced genetic modification procedures "that are becoming increasingly mature" (Lu *et al.*, 2023: 2) and whose development has allowed

the treatment of various genetic diseases. However, research has discovered that these techniques "may cause an increase of body weight and muscle mass and a significant improvement of muscle strength" (Brzeziańska *et al.*, 2014: 251), sparking interest in the sports community despite numerous health risks. *Gene transfer*, *gene editing*, and *gene silencing* is a nomenclature that has already been adopted by the domain of genetics, falling under the more generic expression of *gene therapy*, which is used to refer to a technique that modifies a person's genes to treat diseases. Like other terms already discussed, also *gene transfer*, *gene editing*, and *gene silencing* assume a more specific meaning when considering the purposes with which the technologies referred to by these terms are applied in the context of doping practices.

Finally, as mentioned earlier in this chapter, the issue of doping also involves ethical questions. The World Anti-Doping Code includes a section on sports ethics entitled "Fundamental Rationale for the World Anti-Doping Code", which states:

> Anti-doping programs seek to preserve what is intrinsically valuable about sport. This intrinsic value is often referred to as "the spirit of sport". It is the essence of Olympism, the pursuit of human excellence through the dedicated perfection of each person's natural talents. It is how we play true. The spirit of sport is the celebration of the human spirit, body and mind, and is reflected in values we find in and through sport, including:
>
> – Ethics, fair play and honesty
> – Health
> – Excellence in performance
> – Character and education
> – Fun and joy
> – Teamwork
> – Dedication and commitment
> – Respect for rules and laws
> – Respect for self and other Participants
> – Courage
> – Community and solidarity
>
> Doping is fundamentally contrary to the spirit of sport (*World Anti-Doping Code*, 2015: 14).

The expression "spirit of sport" summarizes and embodies the several fundamental tenets included in the list above, where sport is praised as a very important component of human life. It is not just amusement and well-being but first and foremost a means that has a high educational power in that it allows one to develop the values of respect for oneself and the others, for rules and laws, as well as honesty and loyalty. However, Ekmecki (2016: 2-3), who discusses questions about anti-doping policies and practices in the context of medical ethics, states that the code and the anti-doping strategies have been subject to criticism by the ethics community as no substantial definition of the expression 'spirit of sports' exists, and that the fight against doping "is based on questionable ethical grounds consisting of dubious claims about fairness in sports and terms such as 'level playing field'".

The arguments on doping from an ethical point of view revolve around the principles of the educational value of sport for the individual, beyond the desire to win at all costs, and fairness in sports activity, and thus the search for equal conditions in any events or competitions.

In a broad sense, the doctrine of ethics studies the foundations that allow individuals to assign to human behaviors a deontological and normative status, thus distinguishing them as right and lawful, compared to behaviors that are considered illicit or wrong. In medical ethics, in particular, the issues regard life and death, "and medical ethics is concerned with the obligations of the doctors and the hospital to the patient along with other health professionals and society" (Markrose *et al.*, 2016: 1).

Therefore, the language of doping that focuses on medical ethics shows a vocabulary that belongs in a varied and broad semantic field. More precisely, the vocabulary comprises a lexicon inherent to the legal and medical spheres as health and rule violations are crucial aspects. However, the discourse on doping from a medical ethics standpoint also includes terms that belong in the domains of philosophy and psychology, as complex tenets are addressed and discussed. In this respect, one of the most debated issues since ancient times is the concept conveyed by the term *autonomy*. McLeod (2005: 107) summarizes its meaning by stating that

> autonomy is mostly a philosophical term of art, one that philosophers use in a myriad of ways: that is, to refer to demonstrating an ability to govern oneself, to acting rationally, to having certain rights, to choosing freely, etcetera,

and adds, with respect to athletes and sport:

> When we govern our own actions and choices, we are autonomous; when someone else does so, we are not (McLeod 2005: 108).

The term *autonomy* is frequently found in sports medical literature about doping, especially when discussing young athletes' choices, as the following extract illustrates:

> After analyzing how influential conceptions of childhood, privacy, and autonomy apply to young athletes, I argue that legitimate expectations of privacy and autonomy in the context of doping are not being recognized in sport. This vulnerable athletic population, by definition, has not developed the capacity to make rational, independent decisions and therefore should not be held to the same level of fault or face the same consequences as adult athletes who commit anti-doping rule violations. In summary, age ought to matter more than it currently does (Teetzel, 2022: 2).

Other widely discussed major concepts in dealing with ethical issues about doping are those of *privacy/confidentiality, fairness*, *justice*, and *non-maleficence*. In the following extract, all these aspects of the discourse on doping are discussed:

> The spirit of sports includes ethics, fair play and honesty. Anti-doping practices are based on this ethical ground and supported all through the world […].
> Medical ethics is involved in this discussion because of the crucial role of physicians in anti-doping policies and practices as well as developing and administering ergogenic substances or methods for athletes. This role of physicians raises ethical questions regarding physician-patient

> relationship, principle of non-maleficence, privacy and confidentiality of patient, and fairness and justice in the macro allocation of resources (Ekmekci, 2016: 1).

The extract above, as will be clarified later in the article from which it is drawn, deals with the obligation towards the athlete-patient to provide urine or blood samples whenever requested. The excerpt highlights one of the main issues that emerge from the discussion on anti-doping practices, i.e., respect for the principle of non-violence, and athlete's confidentiality in the doctor-patient relationship regarding anti-doping practices. These concepts are highlighted by such terms as *privacy* and *non-maleficence*. The former is the most discussed term within the debate on doping and anti-doping practices. *Privacy* refers to a concept that has evolved over time. It has undergone important changes with the advent of technology and the consequent easier access to personal information. Cifaldi (2023: 35-36) states that "one of the biggest issues with legal privacy protection is that it is hard to offer a complete legal definition of it." The first appearance of the term *privacy* in written form goes back to 1890 as included in the renowned paper "The Right to Privacy", by Louis Brandeis and Samuel Warren (Glancy, 1979). "The Right to Privacy" has been a very influential work and it is considered the most important essay in the history of American law as it introduces the concept of privacy in the modern sense of the term (Parent, 1983). Considering the potential threats of photography and the press of that time, the right to privacy is described by Brandeis and Warren as "the right to be left alone", which basically demanded protection against the unwanted disclosure of individuals to make feelings, fact and thoughts become public domain. With the advent of modern technology, the terms *privacy* and *right to privacy* have assumed increasing importance and there is still much debate about what is referred to exactly. Lukács (2016: 256) states that it is not possible to provide an exhaustive definition of *privacy* and *protection of privacy* mainly because in an era of rapid technological progress of the information society, these issues "can be related to the fact that privacy has a very close connection with human dignity, freedom and independence of the individual."

In the context of ethical issues on anti-doping policies and practices,

privacy is a much-debated term, first and foremost as for athletes' own perception of what privacy entails for their lives, and how far they are willing to expose themselves to technology monitoring of their whereabouts. Valkenburg *et al.* (2014: 216) highlight that the majority of elite athletes consider the whereabouts system as an important element negatively affecting their experience of being elite athletes. Most importantly, the authors distinguish three different terms, that is *physical privacy*, *informational privacy*, and *decisional privacy*. *Physical privacy* concerns access to people and their spaces and is similar to Brandeis's and Warren's concept of the "right to be left alone"; *informational privacy*, which traces its origins back to the popular press, has become a concept of major concern parallel to the evolution of information technology and advances in bioinformatics; finally, *decisional privacy* refers to the interference with personal choices.

The term *privacy* has not yet found unanimous definition mainly because the boundaries between the private, public, and personal dimensions of the concept referred to have not been well-defined to date. Undoubtedly, when addressing the sports world, which "is a particularly interesting arena for privacy issues" (McChrystal, 2001: 397), the term acquires a particular value, not only due to the strict anti-doping measures that athletes must constantly undergo but rather to their repercussions on athletes' personal and professional lives, as well as to the complexity of the phenomenon *per se* in this particular environment, where athletes are frequently not even aware why particular personal data are collected and to what end (see Green *et al.*, 2023).

CONCLUSIONS

Sports medicine is a vast, complex, and multidisciplinary branch of medicine. It is the result of centuries of study and observation of how the human body changes according to physical activity and the role that the latter plays in the prevention of diseases. In this regard, throughout history there have been many scholars who, with their commitment, have contributed to the birth of the modern science of sports medicine.

By offering an overview of the terminology of the discipline, this book mostly intended to highlight the uniqueness of sports medicine within the medical sciences, which lies on the vastness of a domain that covers a multitude of specialties. Sports medicine involves a spectrum of expertise that not only covers manifold branches of medicine and related fields, but also extends, besides sports sciences, to the conceptual systems of different domains, like law and ethics. It follows that the lexicon of the language of sports medicine is characterized by a multidisciplinary specialized vocabulary that reflects the breadth of this area of knowledge. As occurring in specialized discourse in general, the language of sports medicine also comprises terms that have been borrowed from general language, some of which have undergone a process of semantic redefinition, acquiring more specific meanings.

The multidisciplinary nature of the language of sports medicine was also discussed regarding the discourse about doping, a complex issue that can be investigated from several interrelated perspectives. Within

this context, attention was given to the legal-ethical term *privacy*, whose meaning has evolved over time parallel to the rapid progress of information technology.

Space was also devoted to an investigation of sports medicine eponyms, some of which represent the most evident linguistic manifestations of the union between sports and medicine to address sports-related conditions from a medical perspective. The analysis was framed within the more general debate on the adequacy or inadequacy of eponyms in the medical field, due to the lack of referential precision and transparency as compared to most of their corresponding descriptive terms.

Furthermore, since sports medicine includes a range of terminology related to the prevention, diagnosis and treatment of sports-related injuries, the crucial question concerning the lack of a standardized classification system for muscle injuries was discussed, as well as the consequent absence of universal corresponding terminology. This issue raises concerns in the scientific community due to the possible repercussions on clinical practice, including misdiagnosis, problems in patient care, inconsistent treatment protocols, and incorrect communication among specialists.

Finally, a consideration at an educational level within the context of English for Specific Purposes is made. Teaching the language of sports medicine in undergraduate courses where English is learned as a foreign language implies acquisition and understanding of the terminology of key concepts related to health, human movement science, injury prevention and treatment, as well as to legal and ethical issues when dealing with correct behavior in sports in a broad sense. The teaching material should cover all these disciplines to enable learners to acquire the necessary multi-disciplinary terminology proficiency that will be useful to communicating in this specific field of knowledge in the English language. To this purpose, syllabuses should also prioritize characteristics of sports language, highlighting some important mechanisms that regulate word-formation processes. This can contribute to consolidating learners' terminological and cognitive foundations. Furthermore, knowledge of the origin of words and their history can help promote a more conscious use of specialized terminology.

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