ANATOMICAL TERMINOLOGY AND INTERNATIONAL STANDARDIZATION

Roxana Elena Doncu
Lecturer, PhD, "Carol Davila" University of Medicine and Pharmacy, Bucharest

Abstract: Following the principles laid out by Eugene Wüster and the Vienna school of terminology, which asked for reducing the ambiguity and increasing the precision of terminology, The Federative Committee on Anatomical Terminology (FCAT) and the International Federation of Associations of Anatomists (IFAA) developed an international standard on human anatomical terminology, which was published in 1998. The Latin terms for each structure of the body are presented alongside the terms in current usage in English-speaking countries. While extremely useful as a source of reference for those who study anatomy which can prevent misunderstandings and medical error, Terminologia Anatomica does away with the Greek synonyms for the major organs and structures of the body, and restricts the use of eponyms. My paper will discuss both the relevance of international standardization and of the diachronic perspective embedded in synonymy and eponymy.

Keywords: terminology, standardization, anatomical nomenclature

1. Introduction: A Short History of Terminology

Although today the discipline of terminology is part of linguistics, more specifically applied linguistics, the practice of compiling terminology and carrying out extensive classifications goes back to the beginnings of modern science. In the 18th century, the father of modern chemistry, Antoine Lavoisier showed an interest in reforming chemical nomenclature and wrote the first extensive list of chemical elements (*Methode de nomenclature chimique*, 1787, and *Nomenclature chimique, ou synonymie ancienne et moderne, pour servir a l'intelligence des auteurs*, 1789). The Swedish botanist, physician and zoologist Carl Linnaeus, in his seminal work *Systema Naturae* formalized the binary system (genus and species in Latin), which is used nowadays to refer to living organisms, thus setting the basis for modern taxonomy. It appears thus that the terminological work was first and foremost the concern of specialists from different scientific fields. Due to the increasing internationalisation of science and the spread of technology in the 19th and 20th century, the need for a unified terminology was variously expressed by scientists, technicians and engineers.

The founder of modern terminology was the Austrian engineer Eugen Wüster (1898 - 1977), who put forward a theory of systematizing terminology (General Theory of Terminology) and described methods for the formation of new terms in his doctoral dissertation. For Wüster, it was necessary that terminological work be done by subject specialists. Temmerman identifies five main tenets of the terminology theory elaborated by the Vienna school of terminology: 1) the concept has priority over the term 2) concepts are unambiguous and can be ascribed a place in a system 3) concepts should have a traditional definition 4) a term is assigned to a concept permanently and 5) terms and concepts should be studied from a synchronic perspective. (4)

The terminological unit is different from the linguistic unit. The famous Saussurean observation, that the relationship between signifier and signified is unmotivated, or arbitrary does not hold for terminological vocabulary. There is no difference in stability or variation between the term and the concept, as the second tends to be as stable as the first. As Felber, another important representative of the General Theory of Terminology notes

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While in linguistics word content and word form are regarded as a unit, in terminology concept and designation (= term, symbol, abbreviation) are separated. They form together a terminological unit. A permanent assignment concept-term, which is necessary for communication, is either given by linguistic usage orestablished deliberately by an act of will by individuals or specialists of terminology commissions. (182)

This is the principle of univocity, which determines that only one term is used to designate one concept, and one concept is referred to by only one term. As an engineer, Wüster was more interested in the standardization of the vocabulary of special languages, and he viewed the standardization of terminology, with the purpose "to unify concepts and systems of concepts, to define concepts, to reduce homonymy, to eliminate synonymy" (qtd. in Temmerman 11) as fostering agreement on the terms used and thus improving international business and scientific communication.

2. International Standardization of Anatomical Nomenclature

Following the principles of the Vienna school of terminology, aiming to reach a common scientific language that will mediate international integration and global scientific exchange across various medical specialties, the International Federation of Associations of Anatomists (IFAA) developed and brought out three books on anatomical terminology: *Terminologia Anatomica* (1998), *Terminologia Histologica* (2008) and *Terminologia Embryologica* (2013). These were developed by FCAT (Federative Committee on Anatomical Terminology), later renamed FICAT (Federative International Committee on Anatomical Terminology), a committee made up of experts working in the field of anatomical science. Recently, FCAT/FICAT became web-based, as will all their future publications. They define themselves as a body concerned with

high level biomedical anatomical terminology. It has wide relevance to the international anatomical community, and indeed to all health sciences, as well as to scientists, educators, writers (scientific and journalistic) and the general public. It provides a rigorous, precise common vocabulary, which is simple to use and encompasses pure and applied (clinical and basic scientific) aspects of Anatomy. As such it is fundamental to unquivocal communication within and between disciplines (fipat.library.dal.ca)

In accordance with Wüster's aim of creating a methodology for the formation of new terminological units, FIPAT declare that their terminologies "are designed to be flexible so as to enable to continual refinement by making new introductions and by taking account of new developments, such as the continual generation of new terms in areas of clinical practice and of anatomical science".

In the FIPAT systematized terminologies, the Latin terms for each structure of the body are presented alongside the terms in standardized English. The motivation of the choice of these two languages is rather pragmatic. Whereas standardized English is seen as the lingua franca of modern biomedical science, Latin is considered out of its historical context (as the former lingua franca of modern medicine) and regarded both as an excelent means for ensuring global "unequivocal communication" and a stable reference point for the translation of anatomical terms into vernacular languages. Unlike standardized English, Latin "has the unique advantage of being apolitical".

Terminologia Anatomica, like all FICAT/FIPAT terminologies, strives toward a concept of objectivity which can be defined best in Daston and Galison's terms as "the view from nowhere", a perspective that tries to efface the position of the knowing subject. Anatomical eponyms, which refer to the personalities involved in the discovery, re-discovery or description of anatomical structures, have been excluded. The withdrawal of eponyms from anatomical nomenclature is a recent development – early modern terminologies established in Basel (1895), Jena (1935) and Paris (1955) included them. That this is a consequence of the controversial history of eponyms and of their reference to disputed historical subjects, and not

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because of the general objective of reducing synonymy is proven by the presence of other synonymous terms, which are all, without exception, descriptive. Below there is a list of anatomical terms as they appear in the *Terminologia anatomica*, next to the excluded eponyms.

Latin term(s) in Terminologia Anatomica	English term(s) in Terminologia Anatomica	Eponymous terms
Ampulla hepatopancreatica ampulla biliaropacreatica	Hepatopancreatic ampulla biliaropancreatic ampulla	Ampulla of Vater
Insulae pancreaticae	Pancreatic islets	Islets of Langerhans
Tuba auditiva, tuba auditoria	Pharyngotympanic tube, auditory tube	Eustachian tube
Tuba uterina, salpinx	Uterine tube	Fallopian tube
Foramen venosum	Sphenoidal emissary foramen	Foramen of Vesalius
Plexus myentericus	Myenteric plexus	Auerbach's plexus
Ductus parotideus	Parotid duct	Stensen's duct
Area subcallosa	Subcallosal area, subcallosal gyrus	Broca's area
Excavatio rectouterina	Recto-uterine pouch	Pouch of Douglas
Vena magna cerebri	Great cerebral vein	Vein of Galen
Aponeurosis palmaris	Palmar aponeurosis	Dupuytren's fascia
Sulcus hypothalamicus	Hypothalamic sulcus	Monro sulcus
Glandulae lacrimale accesoriae	Accessory lacrimal glands	Glands of Krause
Glandulae intestinales	Intestinal glands	Lieberkuhn's glands, crypts
Processus styloideus ulnae	Ulnar styloid process	Lister's tubercle
Glandulae urethrales	Urethral glands	Glands of Littre
Sinus aortae	Aortic sinus	Sinuses of Valsalva
Sella turcica	Sella turcica	Turkish saddle

3. Why have eponyms been excluded from the international standardized anatomical terminology?

Eponyms in medicine have a long tradition, and they celebrate both outstanding medical personalities that have influenced the development of medicine, like Galen, Vesalius and Leonardo da Vinci and individuals that have contributed their small share to the progress of medicine by discovering or describing certain anatomical structures. The age of eponymy was the 19th and the first half of the 20th century, when technical invention and unbounded scientific optimism created the climate for a lot of discoveries. The large-scale invention and use of eponyms during this period came with the scientific predominance of the English and German medical communities, who published their discoveries and research

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questions in widely read scientific journals. Ferguson explains how the name of the Waterhouse-Friedrichsen sydrome derived from two simultaneous descriptions of the disease by Rupert Waterhouse and Carl Friedrichsen. (1) However, after the post-structuralist turn (and the Foucaultian description of the binome power/knowledge), when international scientific committees became more aware of the political ideologies that infused science at all times, the use of eponyms became a contested practice. What sparkled the debate – which lasted for almost a decade in the medical journals – was the dilemma of "Reiter's syndrome", a disease named after Hans Reiter, a German doctor in the upper echelons of the National-Socialist party and the president of the Reich Health Office, who authorized experimentation on concentration camp prisoners in Buchenwald. Other famous cases included the "Hallervorden-Spatz disease", first described by Julius Hallervorden and Hugo Spatz (1922), two German physicians that later participated in the Nazi euthanasia programme and "Wegener's gramulomatosis", a rare disorder described by Friedrich Wegener, who, as a military doctor, had conducted autopsies on Jewish concentration camp inmates, while the office he worked in performed experiments on living subjects. An extensive list of all the 'tainted' eponyms has appeared in an article authored by Rael Strous and Morris Edelman "Eponyms and the Nazi Era:Time to Remember and Time for Change". By far, the most famous case was that of the Pernkopf atlas: Eduard Pernkopf (1888-1955), the dean of the Vienna medical school, and a member of the Nazi brown shirts, used over 1000 bodies of executed Nazi victims as models for his four volume atlas (*Topographical Anatomy of Man*) which was celebrated by many as "one of the most important anatomic atlases since the work of Vesalius" (qtd. in Strous and Edelman). Pernkopf, a strong supporter of the Nazi euthanasia and racial hygiene programme, became the dean of the Vienna medical school in 1938, and started his office by purging 153 Jewish scientists (among whom there were three Nobel laureates) from his academic staff. Strous and Edelman note that the illustrators of the atlas were also "active Nazi party members who incorporated small swastikas and SS insignia into their signatures." (209) The debate around the Pernkopf atlas has centered on whether it is ethical to continue using such a "tainted" work. Anatomists pointed out that the atlas was an invaluable tool due to the intricacy of its drawings and the "regional stratigraphic"[1] approach. Hildebrant argues persuasively in favour of the continuing use of the atlas, as it is "one of the very best in terms of accuracy", and quotes Spiro, who notes that the Pernkopf drawing can serve a double role "more than teaching anatomy, they remind us of the horror that any "objective" science can impose." (97)

4. Terminology and specialized languages

Medical terminology is the vocabulary used by specialists in the field of medicine and biomedical sciences for the purpose of communication. As a subcode of the more general code of the general language, a specialized language includes a field-specific vocabulary which is used in a professional communicative context by competent or expert users. The injunction of precision and exactitude is fundamental for term formation. Thus, while terminology in itself is a domain regulated by specialists, terminography (the description and compilation of lists of terms) is a work that can be undertaken by linguists-terminographers. Synonymy and eponymy are problems that should be understood linguistically. Whereas descriptive synonyms are accepted and included in the *Terminologia Anatomica*, eponyms have been excluded. Yet in communicative contexts eponyms are preferred. They lack precision and exactitude, and one eponym may refer to two different

1As Dr. Sabine Hildebrandt explains, 'stratigraphic' means that showing "multiple layers of dissection with an emphasis on fascia shown and reflected, approaching the subject from superficial to deep dissection in great detail." (91)

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anatomic structures simultaneously[2], yet they favour succintness, which is essential in communicative contexts where doctors do not have time to lose (like, for example, giving information to a colleague about a trauma patient who needs to be operated on the spot). Also, as Aronson notes, eponyms are preferred when "there may not be an alternative satisfactory descriptive term" (2). In this capacity, they may serve as provisional terms for labelling something "about which present knowledge is insufficient" (Brunt, 51). In the doctor-patient communication, many medical eponyms serve as euphemisms that help physicians avoid stigma or racial prejudice (like in the case of "Down's syndrome", previously referrred to as "mongolism"). In an article entitled "Medical Eponyms Revisited", Brunt summarizes the whole dilemma of the use of eponyms:

The potential for confusion and error inherent in medical eponyms and their lack of informational content suggest from a logical point of view that their shortcomings far outweigh their advantages and appear to present a strong case for their gradual elimination. An examination of the present state of medical English, however, reveals that their creation and use continue to flourish. It has been pointed out above that even some of the earliest anatomical eponyms are still current despite the strictures of the NA[3]. In addition, it is worth noting that there are few areas of medicine which do not employ eponyms, and that most specialties are characterized by an abundance of them. (55)

The preference for eponyms can be explained by the role they play as reminders of the stories and narratives that led to the discovery of an anatomic structure or the invention of a surgical instrument or approach. For example, Abel noted that "Eponyms are medicine's scientific biography in haiku; short biographical histories of the men and women whose names have become attached to an anatomical structure, a disease, a procedure, an instrument, etc." (82) Gall argued that many physicians endorse the use of eponyms since they belive that "that an appreciation of the scholarly nature of the science might be implemented by a recognition of the contributions of one's forebears." (56) Although they lack accuracy and can lead to confusion, eponyms, by their reference to historical people and historical events bring a diachronic perspective to bear on the description of medical terms.

5. Conclusion

Although medical terminology is part of a system of communication and discourse that can be called a special language (English for the purpose of medical communication), the problem of eponymy shifts our attention from the characteristics of specialized languages to those of natural languages. Synonymy and especially eponymy in medical terminology emphasize the link between the specialized languages and the natural language that they are a subset of. They show that the one term-one concept specification of standardization is not a feature of terminology, but only a desideratum of terminologists and a construction.

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2The opposite may be also the case: two eponyms may differentiate between two forms of the same thing, such as Sydenham's and Huntington's choreas.

3*Nomina Anatomica* (NA) was the international standard for anatomic terminology before the TA (*Terminologia Anatomica*).

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