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THE MORPHEMIC ANALYSIS OF DENTAL TERMS AS AN IMPORTANT WAY OF TERM DEFINITION IN THE CONTEXT OF MULTILINGUAL DICTIONARY COMPILING

ABSTRACT

The issue of the morphemic analysis of medical terminology is a crucial factor in terms of translation strategies and compilation of a terminological dictionary. The research was conducted in the context of author's current lexicographical work called as English-Ukrainian-Russian defining dictionary of dental terms. To provide the user of the dictionary with reliable techniques to construct the meaning of terms, morphemes relative frequency in the area of dentistry have been determined.

KEYWORDS: dental term, dictionary compiling, morphemic analysis, word formation, translation

STRESZCZENIE

Zagadnienie analizy morfologicznej określeń stomatologicznych jest kluczowym czynnikiem w zakresie strategii translacyjnych i kompilacji słownika terminologicznego. Badania przeprowadzono w kontekście aktualnej pracy leksykograficznej autora zwanej angielsko-ukraińsko-rosyjskim definiującym słownikiem terminów stomatologicznych. Aby zapewnić użytkownikowi słownika niezawodne techniki konstruowania znaczenia terminów, określono względną częstość morfemów stosowanych do formowania słów w dziedzinie stomatologii.

SŁOWA KLUCZOWE: pojęcie stomatologiczne, kompilacja słownika, analiza morfologiczna, słowotwórstwo, tłumaczenie

INTRODUCTION

Nowadays English language is a lingua franca of medical science as well as “medical translation is one of the growth areas of translation”, at least in the case of English-Ukrainian and English-Russian translation (Wakabayashi 1996: 356). However, a long time before Greek and Latin were the core languages of medicine and, as a result, a great number of anatomical nomenclature and the

names of pathological conditions and diseases came from Latin and Greek into many languages appropriately.

Due to this fact, internationally recognized medical terminology is presented in the lexicons of the majority of Indo-European languages. On the one hand, such phenomenon is a way to an effective terminology standardization that is very useful for patient safety and inter-professional communication in the area of medicine. However, the other side of the story is that parallel borrowings from Greek and Latin languages have caused another problem, which translators often deal with, and that challenge is synonymy. Moreover, the presence of Greek and Latin international medical terminology slightly put the nationalization process of medical terms on the back burner.

The current research is dedicated to transforming of above stated disadvantages into advantages through morphemic analysis of medical terms, particularly dental terms. The morphemic analysis of medical terms may help partially to overcome the stated difficulties and challenges, which are associated with defining the term meaning and translation activities as well.

Moreover, the issue of morphemic analysis of dental terms and the issue of term definition are crucial factors in the context of compilation a multilingual defining dictionary of dental terminology (currently authors are deeply engaged in the compiling of English-Ukrainian-Russian defining dictionary of dental terms).

Translators and researchers in the area of medical terminology often face a variety of problems; particularly, they often deal with a number of challenges such as medical terminology management, lexical equivalence of medical terms, translation quality issues as well as medical terminology standardization (Karwacka 2015: 271). Thus, the idea to compile English-Ukrainian-Russian defining dictionary of dental terms has not arisen spontaneously.

Taking into account the above stated problems, we may outline some extralinguistic and intralinguistic reasons to compile such kind of lexicographical work.

The extralinguistic reasons are as follows:

- lack of English-Ukrainian-Russian explanatory dictionary of dental terms;
- the growing role of English language in medical communication in the context of globalization;
- strengthening the international cooperation in the area of dentistry;
- development of innovative treatment methods as well as new dental equipment.

The intralinguistic reasons are as follows:

- an urgent need for systematization and standardization of Ukrainian dental terminology in relation to English terminology system;
- an attempt to facilitate the translation process in the area of dentistry using subword segmentation as an instrument for term definition;
- compiling an electronic version of multilingual dental dictionary based on traditional paper-based ones with the possibility to build in the CAT-tools.

This study provides a contribution to facilitating and enhancing the translation process in biomedical domain using morphemic and semantic characteristics of medical terminology, particularly terminology of dentistry.

The aims of the current essay are as follows:

- 1) to highlight the ways of term formation, which are useful and productive in terms of extending the ability of the user to translate medical terminology;
- 2) to systematize the productive means of term formation including affixation (prefixation, suffixation) and compounding processes.

Medical translators Katrin Herget and Teresa Alegre (2009: 13) pointed out that “medical language belongs to the so-called language for specific purposes, which differ from everyday language above all in the specificity of the terminology and in that they are used in communication between professionals”.

However, medical terminology is popularized due to the rapid development of media and communication technologies as well as to globalization tendencies, and therefore today’s medical terminology becomes an integral part of everyday language.

In addition, health care is a widespread concern, and patients expect their doctors to provide them with more and more detailed information.

In other words, the relevance of the research is reinforced day-by-day, because there is a permanent need not only for translators or for medical professional, but general populations including patients to receive more detailed information about health care issues.

MATERIAL AND METHODS

The dental terms analyzed in this essay were selected from a variety of different sources including more than 15 scientific articles in the dentistry domain, 10 case studies, 2 clinical guidelines and protocols as well as learning modules in different areas of medical science that were translated from English into Ukrainian or Russian. Additionally, in the process of morphemic analysis the world-recognized medical dictionaries, particularly dictionaries of dental science such as Farlex Partner Medical Dictionary; Dorland’s Medical Dictionary for Health Consumers; Mosby’s Dental Dictionary were used.

In addition, a textbook “Dental Terminology” by Charline M. Dofka (2012), which is not a strict dictionary of dental terms, but rather a word bank with pronunciation guides and definitions applied to practice areas of dentistry, was very useful in terms of morphemic analysis. Moreover, it reflects the view of the problem from a different angle, considering that the author is not a linguist, but a dental professional.

Also, we have analyzed dental terms in the aspect of morpheme absolute frequency through evaluation of previously published dictionaries in the area

of dentistry such as English-Russian dictionary of dental terms by Repin and Krivtsova (D.1) (2006), which contains more than 12 000 entries, as well as Mosby's Dental dictionary (D.2) (2012), which contains more than 10 000 entries.

DISCUSSION

Charline M. Dofka (2012: 4) states that “Dental terms like other medical terms are formed by combination of small grammatical units, so-called morphemes, linked in a “building block”. To understand the terms meaning it is necessary to know basic morphemes and the methods of combining such “building blocks” within a term. Hence, the understanding of dental term meaning results to equivalent terminology translation and dental texts overall.

As far as we know, every science has its own unique terminology. For this reason, Charline M. Dofka (2012: 5) emphasizes that “Dental terminology involves the study of words and terms related specifically to the dental sciences”. However, why should we consider the dental terminology separately from the medical terminology system?

Actually, we consider dental terminology only in the background of the whole medical terminology, because there are a large quantity of general medical terms which are common for each branch of medicine (e.g. *artery*, *cervical*, *ischemia*, *joint*, *vein* etc.). Meanwhile, dentistry as a science has its own terms, which in the context of other branch of medical science may have other meanings (e.g. *adhesion* in dentistry *vs.* *adhesion* in surgery or *occlusion* in dentistry *vs.* *occlusion* in cardiology etc.). Thus, the dental terminology system should be systematized by means of the specialized dictionary compiling to provide monosemy of terms. Since the dental terminology system contains the major part of morphologically complex words, the morphemic analysis of terms is quite important.

C. Lovis and colleagues have observed that the “morphologically complex words (MCWs), and particularly the so-called neoclassical compounds, form more than 60% of the neologisms in technico-scientific domains, and especially in the biomedical field” (Lovis et al. 1995: 28–32; Namer et al. 2004: 235). Morphological or morphemic analysis, i.e., the process of decomposing a complex word into its constituent parts, has proved useful to “avoid the need for costly, repetitive maintenance of specialized dictionaries to account for these new terms” (Hahn et al. 2001: 230; Lovis et al. 1995: 28–32; Schulz et al. 1999: 892).

Therefore, the issue of morphemic analysis of dental terms and definition of their meaning are crucial factors in terms of compilation a multilingual defining dictionary of dental terminology.

The subword segmentation process may reveal *affixes* such as a prefix that modifies the term, a single or “multiroot” structure that provides the foundation to the term, and a suffix that qualifies the word meaning.

Analyzing the term formation or structure of term, we may highlight following:

- the affixes that are placed at the beginning of the word are called prefixes, which qualify the word by indicating such things as the quantity, color, size, condition or location (*inlay*, *devitalization*, *dissection*, *maleruption*, *subacute* etc.).
- a root provides the basic foundation and meaning of the word. A dental term may have more than one root (called as compounds).

Words may be simple words or they may be complex words composed of several elements, i.e. compounds or derivatives. Compounds consist of two or more free morphs (roots), which may or may not be glued together by a linking element (e.g. *temporomandibular*, *dentoalveolar*, *dentinoenamel*, *mandibulofacial*, *dentogenesis*, *glass-ionomer* etc.). Derivatives consist of at least one free morph (a root), which forms the base of the derivative, and one or more bound morphs (affixes) (e.g. *pericoronitis*, *hypersensitivity*, *gingivitis* etc.) (Høy 2017: 14).

- the affix that is placed at the end of term or is added to a root, is called a suffix, which qualify the meaning expressed by the root of term or “either change the part of speech or grammatical content of the word” (Høy 2017: 14).

For example, we have analyzed the term *aer/odont/algia*:

Where *aer-* stands for “air”, *-odont-* stands for “tooth/teeth or those who is associated with teeth” and *-algia*, which is denoting pain in a specified part of the body.

Therefore, knowing morphemes, which are used in medical texts, particularly in the area of dentistry, we may construct the definition of dental term: “*Dental pain caused by either increased or reduced atmospheric pressure*”.

Prefix *aer-* means “air”, but you may wonder what is the idea behind the prefix *aer-* that in this medical term stands for “*change in atmospheric pressure*”?

However, the golden rule of translation says that high-quality and equivalent translation is impossible without translator’s understanding of the subject of translation (Fischbach 1962: 464). Translator’s expert knowledge in the area of dentistry is an important factor of high-quality translation, because it allows realizing that air does not directly affect the vital functions of the human body, but changes in atmospheric pressure are capable to have an influence on the functioning of organs or systems of certain people.

Similarly, we analyze the term *peri/implantitis*:

Prefix *peri-* means “around, about”, root *-implant-* stands for “*dental implant*” and suffix *-itis* is denoting *names of inflammatory diseases*. Therefore, *periimplantitis* is an inflammation of tissues around dental implant.

We have systematized the most common prefixes and suffixes used in dental terms through the estimation of dental dictionary entries in English-Russian dictionary of dental terms by Repin and Krivtsova (D.1) and Mosby’s Dental

dictionary (D.2), and as a result, we have determined the most frequently used prefixes and suffixes.

The most common prefixes used in dental terms in D.2 and D.1 are presented below in Table 1 as well as the most common suffixes of dental terms used in D.1 are presented below in Table 2. All results are sorted in decreasing order of D.1 values. The results of such estimation are shown in the Figure 1 and 2.

Table 1. The most common prefixes used in dental terms in Mosby's Dental Dictionary (D.2) and English-Russian dictionary of dental terms by Repin and Krivtsova (D.1)

Word element (Prefix)	Absolute frequency		Meaning	Example
	D.1	D.2		
im-(=in-)	93	82	1) in, on, within, into or toward 2) not, lack of, opposite of	– <i>implant, inlay</i> – <i>immobilization, inoperable</i>
ex/o-	87	89	away from, outside, out of	<i>excavation of carious dentin, exfoliate</i>
inter-	81	44	in the middle of	<i>interdental, interalveolar</i>
anti-	81	54	against, opposite, counteractive	<i>antiedemic, antidontalgic, antibiotic</i>
peri-	67	44	around	<i>periodontal, periimplantitis, periapical</i>
sub-	62	57	beneath, less than the normal or typical, inferior	<i>subacute, sublingual</i>
dis-	54	25	1) separation, apart 2) to remove 3) not, un-	– <i>dissection</i> – <i>to disinfect</i> – <i>discoloration, disorder, displacement</i>
de-	52	34	1) to do the opposite, away, off 2) to remove entirely	– <i>devitalized tooth</i> – <i>dehydration</i>
hyper-	43	107	abnormally increased; excessive	<i>hyperplasia, hypersensitivity</i>
hypo-	34	77	under, below	<i>hyposalivation, dental hypoplasia, hyposensitivity</i>
intra-	27	22	inside of, within	<i>intracellular, intracoronal</i>
ante-	22	19	before	– <i>anteposition, anterior</i>
pre-	59	38		– <i>premolar, premature, premedication</i>
mal-	21	16	bad, poor, abnormal	<i>maleruption, malocclusion, malnutrition</i>
trans-	21	22	through	<i>to transplant, transseptal</i>
infra-	4	8	low, below; situated, formed, or occurring beneath	<i>infraclusion, infradentale (lower alveolar point)</i>

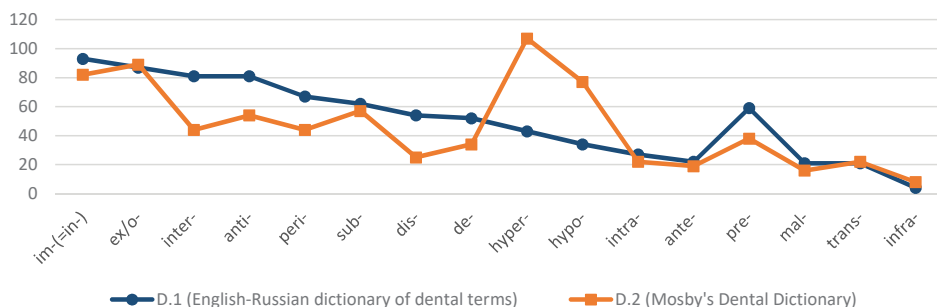


Figure 1. The most common prefixes used in dental terms in Mosby's Dental Dictionary and English-Russian dictionary of dental terms by Repin and Krivtsova

Table 2. The most common suffixes used in dental terms in English-Russian dictionary of dental terms by Repin and Krivtsova

Word element (Suffix)	Absolute frequency in D.1	Meaning	Example
-itis	244	inflammation of	<i>gingivitis, alveolitis</i>
-osis	156	1) (specified) action, process, or result 2) increase in a pathological condition	– <i>diagnosis, chondrosis</i> – <i>thrombosis, paradontosis halitosis</i>
-oma	114	a tumor or neoplasm	<i>fibroma, osteosteoma</i> <i>But: zygoma</i>
-(o)tomy	46	surgical incision	<i>alveolotomy, apicotomy</i>
-plasty	42	molding, formation, or surgical repair on a (specified) body part or by (specified) means	<i>osteoplasty, cheiloplasty, palatoplasty</i>
-ist	39	practitioner of a certain science	<i>orthodontist, radiologist</i>
-ectomy	38	excision; surgical removal	<i>gingivectomy, pulpectomy, alvelectomy</i>
-algia	31	pain, painful condition	<i>neuralgia</i> <i>alveolalgia</i>
-graphy	19	kind of printing or process of recording	<i>odontography, orthopantomography</i> <i>oscillography</i>
-graph	32		
-gram	17	a recording, usually by an instrument	<i>odontogram, orthopantomogram, oscillogram</i>

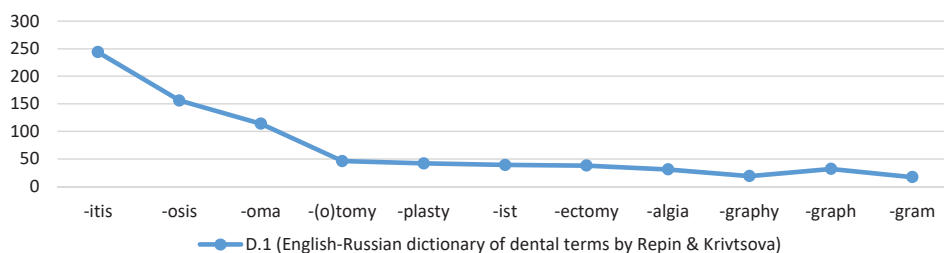


Figure 2. The most common suffixes used in dental terms in English-Russian dictionary of dental terms by Repin and Krivtsova (D.1)

We may conclude that the most frequently prefixes according to the analysis of dental terms containing in Mosby's Dental Dictionary and English-Russian dictionary of dental terms by Repin and Krivtsova are *im-(=in-)*, *exo-*, *inter-*, *anti-*, *peri-*, *sub-*, *dis-*, *de-*, *hyper-*, *hypo-* and the most frequently suffixes used in English-Russian dictionary of dental terms by Repin and Krivtsova are *-itis*, *-osis*, *-oma*, *-(o)tomy*, *-plasty*, *-ist*, *-ectomy*, etc. However, the more affixes we know, the more terms definition we may construct. The most frequently used affixes should be paid attention particularly, because there is a risk to confuse it with the similar word root (e.g. *imaging* vs. *implant* etc.).

CONCLUSION

Knowing the meaning of medical roots and affixes and their equivalents in other language (in our case in Ukrainian and Russian) is useful and invaluable tool not only for medical professionals or medical translators, but for everyone who has the aim to extend own lexical resources in the area of medicine.

To provide the user of multilingual defining dictionary of dental terms with the reliable tool to construct the meaning of dental terms, we should register all affixes as dictionary entries and give explanation regarding their meanings, usage and etymology.

In addition, the above stated issues are important in the context of modern realities, when medical and dental terminology are used not only by medical professionals, but also penetrates widely into everyday life of each person as well as is popularized in educational publications, TV programs, web sites, etc. Thus, we may conclude that medical and, particularly dental terminology have become an integral part of the linguistic world view of each person, and, therefore, the knowledge of the basic word elements (affixes and roots used in medical texts) allows to construct the term definition after morphemic analysis of the term.

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