WORD-FORMATION OF MEDICAL TERMINOLOGY IN ENGLISH & PROCESS OF TRANSLATION INTO ARABIC

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ABSTRACT

Language vocabulary can be changed and expanded in order to cop with the infinite world and state-of the art terminology medical innovations. New words can be added, and the meaning of already existing words can be altered. Accordingly, new words can enter a language by means of the process of word formation rules

This paper is to discuss derivation morphemes in the filed of medical terminology, and the process of translating them into Arabic. These medical morphemes are complicated so that understanding what derivation morphemes are is important. The paper then is to spotlight on neologisms, hyphenated medical compounds, and process of trasnlating them with special reference to the theory of Meaning-Based Translation .

Key Words: word formation- morphems- prefixes- suffexis – Source language – target language- neologisms – Hyphenated Compounds

Introduction:

Due to that fact that most current Arabic medical terminology has been transmitted from English, it is important to highlight the patterns of the formation of new medical terminology in English. It is vital for the translator, in order to be able to translate English medical terminology efficiently, to have the ability to identify this type of English terminology and be able to split them into their basic morphemes. This process will pave the way for the translator towards a comprehension of how to reach to a semantic derivation, thus creating an target language (TL) equivalent; in this case an Arabic equivalent.

1- Features of Medical Terminology in the Source Language (English):

Medical Terminology uses words created by the use Latin and Ancient Greek prefixes and suffixes. According to Hutton (2002: 1), most roots are derived from Greek or Latin words; whereas other roots are of Arabic, Anglo-Saxon or German origins. It is notable that such Latin and Greek vocabulary/terms are characterized by the use of the same suffixes and prefixes

consistently, which tend to refer to a particular case or medical state. While medical terminology is known to be very difficult and complex, yet it becomes easy to understand after understanding the pierce suffixes and prefixes that build up these morphemes. Lynch (cited in Wright and Budin, 1997: 346) states that medical terminology is composed of five syllables: roots, suffixes, prefixes, and a combining vowels (the letter o in most cases).

2- Derivational Morphology of Medical Terminology in English:

As mentioned earlier, the majority of medical terminology are being derived from ancient Greek and Latin. Through the pass of time, all those derived morphemes become naturalized in the appropriate language; English and Arabic in this case. Morphemes are considered as the language´s smallest meaningful unit (Lim Kiat Boey, 1975 : 37). The term calcemia, for example, consists of two meaningful units or morphemes, *cals* and *–emia*. The morphem cals forming the word refers to a mineral chemical element that is normaly present in the human body in certain normal levels. Whereas,*–emia* is a suffix meaning blood, or the presence of a given substance in the blood. Subsequently, the two morphemes co-locate together to form a two-syllable word (*calcemia*) carrying a lexical meaning that refers to the levels of calcium in blood.

Delahunty and Garvey (2010) state that derivation is the process of creating separate but morphologically related words. It is a process that involves one or more changes in word form. It can involve adding a prefix and/or a suffix, resulting in the production of new medical terminology. They went to define a morpheme as: "the smallest part of a word that has grammatical function or meaning; it is not the smallest unit of meaning". Stageberg (1999) gave support to Delahunty and Garvey´s definition, stating that:

> a morpheme is a short segment of language that meets three criteria: it is a word or a part of word that has meaning; it cannot be divided into smaller meaningful parts without violation of its meaning ; and it recurs in differing verbal environments with a relatively stable meaning.
>
> Stageberg (1999)

Based on the above, it is understood that medical terminology are made up of morphemes, and once learning a reasonable number of morphemes (with usually suffices and prefixes), the meaning of such terms would be clear. The Term Hypercalcemia , for instance, contains a bound morpheme (*hyper-*) which adds new information to the word calcemia, which means, according to Oxford dictionary: (an abnormally large amount of calcium in the blood). All bound morphemes like (*hyper-)* are called derivational morpheme. Noting that a derivational morpheme is defined as a morpheme which produces a new lexeme from the base (Bauer, 1988: 12), forming a new term. Sari (1988: 82) suggests that derivational morphemes are bound morphemes which create or derive new words by either changing the semantic meaning, part of the speech or even

both. For example, if the bound morpheme hyper- has been replaced by hypo-, then the lexical meaning of the term (calcemia) would change presenting a new medical case meaning low levels of calcium in blood.

2.1 The process of Medical Terminology Formation:

The process of forming and creating medical terminology involves a number of linguistic rules. There is a logic process that is to be applied when creating a term. A vowel sound is included in the word root in order to add a smoothing action to the word´s sound when adding a suffix. Accordingly, a new term with an attached vowel called a combining form (word root + vowel) is formed. In English, the letter -o-, added to the word root is known to be the most common vowel used in the formation of medical terminology.

Examples:

hepatomalacia (*hepat/o/malcia*) – softening of the liver

gastroenteric (*gastr/o/entric*) – Relating to the stomach and intestines Gastrodynia gastrodynia (gastr/o/dynia) – pain in the stomach

Angiographi (angi/o/graphy) – x-ray study of the blood vessels

Myoplasty (my/o/plasty) – surgical repair of a muscle

2.1.1 Derivational Prefixes:

A prefix is a short word part that provides modification to word roots. It is to be placed before (the initial position) of the added root. Medical prefixes are in most cases derived from Greek and Latin words (Hutton, 2002: 2). Plag (2003) states that prefixes can generally be attached to verbs, nouns and adjectives. Below are some examples:

a) Prefixes of Degree:

Prefix	Meaning in English	Examples
hyper-	high, abnromal, over, increased	Hypertension
Hypo-	low, abnormal, below, decreased	Hypocholesterolmia
Pan-	of everything, all	Pantomogram

b) Negative Prefixes:

Prefix	Meaning in English	Examples
a-, an-	lack, abssence, without	anemia
Anti-	againt	antibiotic
Contra-	in opposition to	contraindication

c) Prefixes of Number:

Prefix	Meaning in English	Examples
mono/o-	one	monocyte
Tri-	three	trimester
quadri	four	quadriplegia

d) Prefixes of Color:

Prefix	Meaning in English	Examples
erythr/o	red	erythrocyte
leuk/o-	white	leukocyte
melan/o-	dark	melanoma

In general, prefixes do not require any modification to be applied on a word root, as prefixes normally end in a vowel or a sound of a vowel. In some minor cases, prefixes may slightly assimilate in a word, where a *syn-* is altered to *sym-* (both in the meaning of: together, with, joint with..etc.) according to Moby's Medical Dictionary, 9th edition, or *in-* altered to *im-*., acco

Examples:

Symbiosis (*sym/bio/sis*) – The biologic association of two or more species.

Synthroid (*syn/thr/o/id*) – a hormon replacment for a hormone normally produced by throid gland.

2.1.2 Derivational Suffixes:

A suffix is a word that is placed in the rear position of a term which is to modify a root. A suffix may indicate whether the term is a noun or an adjective (Cohen, 2007: 18). Plag (2003: 86-98) presents four categories for suffix: nominal suffix, verbal suffix, adjectival and adverbial suffixes.

Most derivational suffixes in English change the part of speech. The derivational suffixes that never change the part speech are not that much.The derivational suffixes that tend to not change speech part are (*–ist)* (meaning a practitioner of a medical science), in **audiologist** and **psychosomaticist**; (*-ology*) (a certain science or a medical specialism) in **adenology** and **cardiology**. Important to note that suffixes could either be:

(a) in need of the combining-vowel form, or;

(b) not in need of the combining-vowel form , as they are proceeded by a vowel already.

Cohen (op. cit: 17) highlights that suffixes that form nouns and adjectives commonly used in medical terminology.

According to Cohen, suffixes can convert roots into nouns. She divides suffixes into two general categories: a) functional or semantic prefixes: those that refer to medical conditions, and b) those that convert roots into the names of medical specialties or specialists.

Below are some examples of medical suffixes which represents Cohen´s classification:

Examples:

a) **Suffixes for medical specialisms:**

Suffix	Meaning in English	Examples
-iatrics	A branch of medicine	pedriatics
-iatry	A practic of or a sciene	psychiatry
-ics	Knolwedge, skill or practices	pharmaceutics

b) Suffixes referring to a Medical Condition:

Suffix	Meaning in English	Examples
-ia	Refers to certain names of diseases	malaria
-itis	Refers to inflamation of an organ	gastritis
-sis	Refer to a medical state or condition	nephro**sis**

c) **Medical Adjectivial Suffixes**:

Suffix	Meaning in English	Examples
-al	characterized by	neural
-ary	Belonging to, related to	medullary
-ous	Full of, characterized by	filamentous

3- Translation of Newly-Formed Medical Terminology to the Target Language (Arabic):

The translation of English medical terminology might be considered as a difficult and complicated task. Nevertheless, this process becomes much easier once the translator gains experience in the proceeds of the word-formation of

medical terminology and methods of decoding its morphemes. Worthy to mention that decoding the medical term is very important in retrieving the intended meaning behind the given medical term. The most prominent approach is based on determining the meaning of the medical term by finding out its components, and to separate them into individual elements. This requires the translator to break-down the term and to evaluate the meaning of the suffix first, secondly the prefix, and finally the root of term. Some tend to start at the end of the term, working towards the beginning, whereas some other prefer starting at the beginning of the term and going towards the end. Applying this process would make it much easier, help gaining a great deal of new vocabulary and would defiantly assist the translator in producing and retrieving the adequate translation. Most other like to start at the beginning of a word and work towards the end.

Example*:*

The term (**otorhiolaryngology)** is seperated in to five individual elements, in which every one carries its own meaning: (*oto*= ears, *rhin*= nose, *laryng*=throat, *ology*=the study of, *o* =combining vowel).

Oto/rhin/o/laryng/ology = The study of the ears, nose and throat

Anyhow, for translators of limited experience in this field is requested to not fully depend of this approach, as doing that might result in serious translation defaults. Besides term parts carry more than one meaning, so it is also necessary for the translator to determine the context in which the term is being used. For instance, the translator might inaccurately, by reasonably depending on the literal interpretation of each morpheme, translate the term (**cardiectomy**) into Arabic (عملية إزالة القلب) meaning the heart removal, wrongly assuming that source term means surgical removal of all or part of the heart:

(*cardi*=heart, *ectomy*=surgical removal of all or part of)

Whenever he becomes in doubt, the translator should verify the result of his process by looking up a medical terminology dictionary as a final judge. The correct interpretation of the term (cardiectomy), as quoted in medical dictionaries is: (surgical removal of the upper end of the stomach). It is assumed that the prefix cardi-refers to the the stomach´s upper end called (cardiac), i.e. the end toward the heart.

It is vital for a translator to be certain of the accuracy of his translation, he is ought to always refer to accredited medical dictionaries and double check the meaning. Failure to do this might result in inaccurate translation of his task.

3.1 Neologisms:

Dictionaries generally define neologism as "a new word or a new meaning for an established word". It shall refer, as well, to the invention of new words when the target language has no existing equivalents or when the existing equivalence are considered to be unsatisfactory, then, there could be other options for developing neologisms. On the other hand, Peter Newmarks considers neologisms as "newly come lexical or existing units that acquire a new sense"(Newmark,1988:140). Whereas, Galperine presents a new classification for neologisms, stating that terminological neologisms are those which designate newborn concepts (Galperine 84-85).

According to summaries cited in Terminifo (4/1998), Neologisms can be classified as following:

a) ***Primary Neologisms:*** Neologisms which are formed when a new term refering to a new concept that is still unknown to the target language (TL) is created in order to represent a new concept in a given language.

b) ***Translated Neologisms***: Neologisms which are formed when a new expression is created in the target language (TL) to reflect an already existing term in the source language (SL)

Special focus is to be paid hereinafter to innovative medical terminology, which represent 'Primary neologisims' and the process of translating them based the theory of Meaning-Based Translation.

3.2.1 Hyphenated Medical Terms:

A hyphenated compound is a combination of two or more words that have become unified in form and meaning through frequent use together. Wisniewski considers compounding as a process that puts together words in order to build a new concept that does not refer to two things and pronounced one word (Wisniewski: 2007). Hyphenated compounds consist of words that enjoy their own lexical meaning, but come together to function as a single term. Crabtree and Power (1985) suggests: "compounding is a process that forms newly words, but not from bound affixed but from two independent words". Noting that the words by which such compounds are composed of can be free morphemes or words composed by derivation affixes. Booij (2002) states that hyphenated compounds are the most common way of making new lexems. Normally, compounds are created by combining two words, and of which one of them functions as a pre-modifier of the head word.

Types of Hyphenated Medical Terms:

As earlier mentioned, everyday medical break-through´s introduce new hyphenated prefix compounds that function as a modifier and followed up by an

abbreviation, a capitalized word, or in some cases a letter. The below stated terms were subjected to semantic analysis (meaning interpretation), then re-expressed in the receptors language.

- **Hyphenated prefix joined to an abbreviation:**

non-Hodgkin lymphoma		الورم الليمفاوي اللا هودجيكيني
anti-RNA	**Anti- Ribonnucleoprotein**	أضاد البروتين المستخلص من النواة
non-AIDS-related infection		عدوي غير مرتبطة بمرض نقص المناعة

- **A hyphen is used after a term that modifies a phrase:**

Non-small-cell lung cancer	سرطان الرئة ذو الخلايا الغير صغيرة
Non-insulin-dependent diabetes mellitus	مرض السكر الغير معتمد على الأنسولين

- **Hyphenate adjective plus noun indication temporary cases:**

4-inch scar	ندبة بحجم 4 انتش
5-day growth	5 أيام من فترة النمو
8-month pregnancy	الشهر الثامن من الحمل

- **Hyphenated terms and abbreviations indicating ratios:**

A-G ratio	(Albumin to Globulin ratio)	نسبة الألبومين إلى الغلوبولين
D-N ratio	(Desxtrose to nitrogen ratio)	نسبة الدكستروز للنتروجين
BUN-Creatanine ratio	(Blood urea nitrogen to creatanine ratio)	نسبة نتروجين البولة مقابل الكريتانين

- **Hyphenated Adjectives with Participles:**

FDA-approved system	=	Food & Drug Administration a system approved by	نظام مجاز لدى هيئة الغذاء والدواء
Cell-Based Repair Technology	=	a Technology of using living cells as agent ticutherape	تقنية العلاج القائم على الخلية
clinically-proven MelaFind	=	that is melanoma Skin examination tool clinically proven	جهاز الكشف عن سرطان الجلد المتبث اكلينيكيا

3.2.2 The Meaning-Based Translation of Hyphenated Medical Terminology:

Based on the theory of Meaning-Based Translation, translation is a process based on the theory that makes it possible to abstract the meaning of a phrase from its forms and to re-produce that meaning with a very different form in the target language. According to Larson:

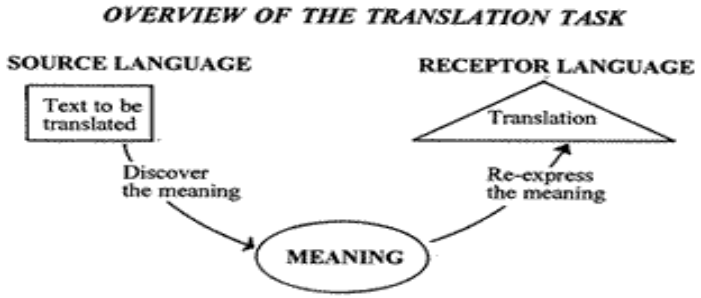
> Translation, then, consists of studying the lexicon, grammatical structure, communication situation, and cultural context of the source language text, analyzing it in order to determine its meaning, and then reconstructing this same meaning using the lexicon and grammatical structure which are appropriate in the receptor language and its cultural context (Larson, 1998-3)

For Mildred Larson, translation consists of transferring the source term into the target language,without distorting the meaning which must be kept constant. The form of the source becomes subject to change and to turn to the form of the target language. It is understood that the form represents the language´s grammatical surface structure, whereas, the meaning represents the semantic deep structure.

Examples:

New medical Concept	interpretation	Suggested Translation in Arabic
Tele-Medicine Speech	Online speech terapy	التطبيب عن بعد لمشاكل النطق
StemGenex-Stem Cell Therapy	A group that offers effective stem cell treatment	العلاج بالخلايا الجذعية الجينية

Worth mentioning, that a translation based on the semantic structure of the language takes also into account the communication context: historical setting, cultural setting, intention of the author, in addition to different types of meaning contained in the explicit/implicit information of the text. Besides referential and structural meaning, situational meaning is considered as an important factor that would help the translator interpret the culture of the author or any other cultural information given in the text. In short, these steps involve analysis of the text, comparison with the source text, evaluation of the final product.



Larson 1998, p.4

According to Larson, it is suggested that the translator is supposed to set forth a systematic contrast between the concepts involved in both cultures and to decide on the importance of the meaning to be transfered. In that sense, Larson's theory joins Newmarks´s componential analysis, who presents different meaning hierarchies within a text, starting from the most important and reaching to the least. Nida highlights that¨ "comparing a source language word with a target language word which has a similar meaning but is not an obvious one-to-one equivalent, by demonstrating first their common and then their differing sense components" (1988:114).

The translator is expected first to make himself familiar with the medical term by performing excessive reading on the source language concept in order to make a clear understanding on such new concept. Then, decide on the most suitable technique that would help in rendering the correct equivalent of the target language concept. This, of course, would involve a process of word formation.

Conclusion:

Everyday, the field of medicine introduces all sorts of innovative discoveries for new medical procedures, medication and technologies. The translator in most cases face difficulties in creating an adequate neologism that would serve the same meaning of the concept in the target language. It is understood that medical terminology are made up of morphemes, and once learning a reasonable number of morphemes and gaining experience in the proceeds of the word-formation of medical terminology and methods of decoding its morphemes, the meaning of such terms would be clear. On the other hand, most innovative medical terminology, which represent 'Primary Neologisims' are to be translated in terms of a meaning-based theory that depends on the linguistic semantic structure, taking into account different types of meaning contained in the explicit/implicit information of the term. Besides the referential and structural meaning, situational meanings. The Meaning-Based Theory joins Newmarks´s componential analysis, which presents different meaning hierarchies within a text, starting from the most important and reaching to the least.

References:

Bauer, Laurie. Introducing Linguistic Morphology. Edinburgh. University Press, 1988

Booij, Geert. The Grammar of Words: An Introduction to Linguistic Morphology. 2nd Edition. New York: Oxford University Press Inc, 2002.

Boey, Lim Kiat. An Introduction to Linguistics for the language Teacher: Singapore University Press, 1975.

Cabtree, Monica and Joyce Power. An Introduction to Language. 4th Edition. Chicago: Holt, Rinehart and Winston Inc, 1985.

Cohen, Barbara Janson. Medical Terminology: An Illustrated Guide. 5th ed., Philadelphia: Lippincott Williams & Wilkins, 2007.

Delahunty, Gerald, & Garvey, James. The English Language: From Sound to Sense. Perspectives on Writing. Fort Collins, Colorado: The WAC Clearinghouse and Parlor Press, 2010.

Galperin, Ilya Romanovich. Stylistics. Higher Publishing House, 1977

Hutton, Andrew. An Introduction to Medical Terminology for Health Care: A Self-Teaching Package, 3rd ed., Edinburgh: Churchill Livingstone, 2002.

Larson, Mildred. Meaning-based translation: A guide to cross-language equivalence. Lanham, MD: University Press of America and Summer Institute of Linguistics, 1998.

Nirmala, Sari. An Introduction to Linguistics. Jakarta: Departemen Pendidikan dan Kebudayaan,1988.

Newmark, Peter. A Textbook of Translation. Hemel Hempstead: Prentice Hall International, 1988

Plag, Ingo. Word-Formation in English. Cambridge: Cambridge University Press,2003

Wisniewski, Kamil. Word Formation Processes: How New Words Develop in the English language. New York: Blackwell, 2007.

Wright, Ellen & Budin, Gerhard. Handbook of Terminology Management. Vol. 1: Basic Aspects of Terminology Management, Amsterdam: John Benjamins, 2001.

Stageberg, Norman. An Introductory English Grammar. Chicago: Holt, Rinehart and Winston Inc., 1999.

Online Resources:

https://en.wikipedia.org/wiki/Medical_terminology. (Retrieved: October 7th, 2016).

http://www.google.com

Online Specialised Dictionaries:

The On-line Medical Dictionary http://cancerweb.ncl.ac.uk/omd

The Unified Medical Dictionary (UMD) Eng-Arab Medical Dictionary <http://www.emro.who.int/umd/>

Webster's Online Dictionary http://www.websters-online-dictionary.org