

ORIGINAL RESEARCH PAPER

CALQUING AS A PRODUCTIVE MEANS OF MEDICAL TERMS CREATION

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ABSTRACT

Languages have always come into contact and influenced one on another. The result of such a contact are borrowings and calques. Borrowings are common in languages for special purposes where the foreign words are borrowed to fill lexical gaps. On the other hand, calques appear because of puristic attempts to limit the invasion of foreign words into the target language. The aim of this paper is to investigate calques, their typology in the Croatian medical language and to confirm calquing as a precious means of medical terms creation. This is a corpus-based study which included Croatian medical publications. The analysis distinguished three main types of calques: lexical, syntactic and semantic. In the group of lexical calques, we recorded literal calques, semi-calques and loan creations. Syntactic calques refer mostly to juxtaposition which is commonly found in medical terminology under the English influence. Semantic calques include metaphor and analogy. The research stresses the importance of calques and their potential to enrich Croatian medical terminology.

Keywords: calquing, Croatian medical terminology, lexical calques, syntactic calques, semantic calques



MAP EDUCATION
AND HUMANITIES

Volume 5

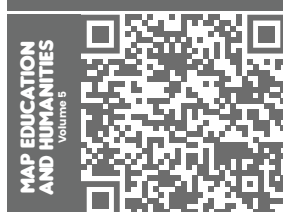
ISSN: 2744-2373 / © The Authors.
Published by MAP – Multidisciplinary
Academic Publishing.

Article Submitted: 06 July 2024
Article Accepted: 08 September 2024
Article Published: 09 September 2024



Publisher's Note: MAP stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

<https://doi.org/10.53880/2744-2373.2024.5.68>



HOW TO CITE THIS ARTICLE

Gjuran-Coha A. (2024). *Calquing as a Productive Means of Medical Terms Creation*. MAP Education and Humanities, 5, 68-80. doi: <https://doi.org/10.53880/2744-2373.2024.5.68>



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1. Introduction

Medical language is the language used by medical experts in their professional communication (Glesinger, 1965). It has more than 2500 years long history. It belongs to a group of languages for special purposes, which are characterized by different features. Terminology is the most prominent one. Due to the intensive language contacts, terminology is liable to changes, which are present at all language levels, but are most evident at the lexical level.

Accordingly, borrowing and calquing have always been the main sources of new terms. Borrowing refers to the complete transfer of a foreign language item (usually a lexical one, i.e. a loan word), and thus to the “importing” or acquisition of a foreign signifier and signified (Gomez Capuz, 1998). On the other hand, calquing refers to “loan translation” and substitution, i.e. reproducing the meaning of an item in another language through imitation, employing the target language’s signifiers or linguistic elements. In the literature, the distinction between loanwords and calques is presented in terms of opposition between *importing* and *substituting* (Deroy, 1956/1980; Haugen, 1950).

Languages for special purposes are also affected by language contact, especially in the era of globalisation, when the exchange of knowledge, ideas, goods has intensified. The Croatian language makes no exception. During its development, Croatian medical language has passed through different phases. Based mostly on Latin and Greek, Croatian medical terminology has changed and enriched during the history. Foreign terms denoting new medical discoveries were adopted into the Croatian language but were strongly opposed by language purists. Their attempts varied throughout the history, from extremely severe to moderate nowadays.

While in the previous centuries Croatian language was influenced by German, Italian, French, Hungarian and Turkish, during the last several decades it has been invaded by English. English terms are widely accepted in their original form and adapted to the Croatian language system. After some time, loan translations are created, but some of them never enter everyday usage.

The reasons for calque formation are different. Besides language purists’ attempts to resist the invasion of foreign/English words into

the Croatian language system, there is a care for preserving language and national identity. It could be achieved by standardized language and terminology. For this reason, the project Struna (strukovno nazivlje) started in 2008 at the Institute for Croatian Language and Linguistics with the aim of terminology standardization. So far, twenty-three terminologies have been standardized, out of which five belong to the field of medicine. While speaking about linguistic factors, semantic transparency plays a major role, as morphologically complex Anglicisms are frequently unknown to native speakers. Thus, they are replaced through calques, which reduces the cognitive load as calques usually converge with the morphosyntactic norms of the native language (González & Knospe, 2019). Provided that the equivalent is semantically transparent and supported by a sociolinguistic setting generally in favour of calques, it has a chance to replace a loan word.

The aim of the paper is to analyse calques in Croatian medical language and to confirm their importance in the enrichment of medical terminology. Our research will focus on lexical, syntactic and semantic calques.

At the beginning, it is necessary to refer to the result of two processes related to language contacts – *borrowings* and *calques*.

2. Borrowings vs. Calques

Borrowings and calques are the result of cultural and language diffusion and represent different forms of complex linguistic borrowing process (Turk, 1997). Borrowings or loanwords are words adopted from a source language and incorporated into a recipient language without translation.

On the other hand, calquing is a linguistic term for the direct translation of the morphemic elements of a foreign word into the equivalent (semantically matching) morphemes in another language. In other words, the target language equivalent thus produced is modelled after the source word or phrase (Ali, 2005). A calque occurs when a loan element does not appear in its integral form in a receiving language but is replaced by a native term (Thomason, 2001). It represents conceptual replica – or its close model sign found in the donor language (Onysko, 2007). Johanson (2002) treats calques as semantic or semantic combinational copies of donor language

signs. Matras and Sakel (2007) regard calques as outcomes of a mode of pattern replication which they opposed to instances of matter replication. Mahmoud (2013) views calquing as a process that involves both borrowing and translation and results in the creation of new expressions.

While the terms *loan translations* and *calques* are used synonymously, Croatian linguists differ *loan translations* and *calques* as two separate categories. The term *calque* is less specified, i.e. covers wider range of meanings and it is used to name latent influences on the lexical, semantic and syntactic level. The term *loan translation* refers to latent influences on the lexical level when the lexemes created by calquing are named (Turk, 2013).

Calques seem to appear as the result of puristic attempts aimed to resist loan words importation and stimulate the recipient language to create its own words (Turk, 2013).

While the loan words are easily recognized despite of their phonological and morphological adaptation, calques are much more difficult to identify.

Many authors focused their research on calques (Babić, 1990; Betz, 1949; Clyne, 1972; Klajn, 1971; Muhvić-Dimanovski, 1992; Muljačić, 1968; Schumann, 1965; Turk, 1997). Some authors study calques in the context of language borrowing (Deroy, 1956; Haugen, 1953; Weinreich, 1953). Besides, some authors deal with the theoretical aspects of calques and others analyse them with respect to different languages.

Generally, linguists agree with the definition of calques, but they show a disagreement in their classification and typology, which results in terminological unevenness. In some studies, one term implies different types of calques, and vice versa the same type is referred to with other terms. Serious disagreement is noticed in "border types": semi-calques, semi-loan words and loan creations. On the other hand, there is almost no difference in defining some categories, for example semantic loans (Turk, 2013).

Opposing views reflect a narrower and broader understanding of calques. In a broader sense, a calque refers to all the influences of one language on another, where the external form is not preserved, but the internal structure of the foreign

expression is transferred. In a narrower sense, the calque is a category that is generally referred to as a literal loan translation and represents a complete replacement of an element from the donor language with native elements, according to the member-for-member principle, while the entire foreign content is accepted.

In the following chapter we will explore typology and classification of calques in literature and we will discuss the typology used in this research.

3. Typology of calques

The general classification follows the linguistic levels at which calquing is realized. Thus, lexical calque, semantic calque and syntactic calque are distinguished, and each of these broader categories includes certain subcategories.

We will make a short review of calque classifications proposed by different linguists.

Betz's classification (1949) of calques served as a model to numerous linguists in their attempts to classify calques. Betz distinguishes six main categories, some of which include subtypes. Those six main groups can be classified into two basic groups: formal meaning creation and another non-homogeneous group for which no name is proposed. The following types belong to the first group:

1. Literal translation refers to faithful creative and meaningful copying of the model.
2. Partial translation refers to the partial transfer of a creative model or meaning.
3. Formally induced neologism denotes a new creation created under the influence of a foreign model in which the model is not imitated, but a new expression is created independently.
4. Semantic borrowing refers to giving a new meaning to a native expression.
5. Phraseological calque, where idiomatic phrases are translated word-for-word.
6. Syntactic calque refers to the acceptance of new syntactic forms.

This model was followed by Weinrich (1953) according to whom in a calque (loan translation) the model is reproduced exactly, element by element. He defines lexical calques as reproduction in terms of equivalent native words. He differs loan translation proper, loan rendition, loan creation and semantic loan. Weinreich differs a type of semi-calques in which one part is taken over and the other is calqued and refers to it as hybrid compound.

Jernej (1973) classifies calques into three groups: lexical calque, phraseological calque and syntactic calque.

Sørensen (1982) distinguishes hybrid loan, translation loan and semantic loan.

In his classification of calques, Gusmani (1983) differs structural calques which include literal calques and partial calques, semantic calques, syntactic calques, phraseological calques and morphological calques.

In more recent studies, linguists have different views on this matter. Görlach (2004) and Walsh (2016) divided calques into four types: loan translations, loan renditions, loan creations and semantic loans.

Ali (2005) focuses on identifying types of calques and assessing their role as a word-formation process in Modern Standard Arabic (MSA). The study is limited to terminological calques, but also touches upon some verbal phrases and expressions. The author identifies seven types of lexical (terminological) calques: full calques, partial calques, semantic calques, foreign-included neologisms, compound calques, hybrid calques, acronymic calques. He concludes that there is a strong tendency in MSA to avoid using loan words and instead uses native words through calquing to form new lexical items. Smith (2006) suggests five categories: semantic calque, phraseological calque, syntactic calque, loan translation and morphological calque. Another recent typology belongs to Larizgoitia (2010), who speaks about semantic, lexical, lexical-phraseological, lexical syntactic, phraseological, morphosyntactic and discourse calques. The author concludes that particularly in Basque and languages in a similar minority status, since the descriptive character of lexical calques makes them well suited for technical terminology and good way to avoid excessive surface borrowing.

Mahmoud (2013) investigates the influence of English as a foreign language on MSA from a linguistic perspective. He identifies calquing as one of seven types of structural or lexical manifestations of influence. According to the author, some calques take some time to integrate into MSA and thus make language sound foreign and sometimes in comprehensible to monolingual users of MSA.

Sandiuc (2018) draws a typology of calque but covers only certain types of calques present in the Romanian maritime terminology. The author explores lexical calque, semantic calque, phraseological calque and grammatical calque. The author concludes that most of the linguistic calques existing in the Romanian maritime vocabulary are lexical in nature.

González and Knospe (2019) investigate the variation of calques in European languages, especially Spanish and German, which show structural differences and reflect different attitudes towards English. Their study ranges from the factors favouring the coinage of calques to variations in their use and challenges concerning their identification. The study includes examples to identify the main patterns and trends in calquing.

Giaber (2023) explores the nature of lexical calques presenting from English-Arabic translation, identifying the lexical, cultural and cognitive implications of English-based lexical calques for MSA and its users. He investigates the views of native users of Arabic over the cognitive impact of lexical calques as loan translations in Arabic. The author concludes that lexical calque is a productive method of word-creation but has a strong power for framing the cognition of target language users.

In Croatia, Muhvić-Dimanovski (1992) analysed different categories of loan translations and compared them in different authors. In determining calques in the Croatian language, the author used criteria based on the morphological and semantic components of the sample and calques.

Turk (2013) also described calquing in theory and practice and supported the theoretical framework with examples from her own material.

Based on the review, we can conclude that calque-related terminology varies among authors. Some authors have general classification of calques and consider only a limited number of

broader categories. Others show more detailed classifications. The main disadvantage of the first approach is the lack of accuracy and unnecessary complexity of the second approach blurs transparency.

Our classification of calques is based on the specificity of the Croatian language of medicine. In our research we distinguish three main categories of calques: lexical, syntactic and semantic calques. Each of them is further divided in subcategories and we will briefly discuss each of them.

1. Lexical calques

A lexical calque is a new word created within a language under the influence of an external model (Betz, 1949). When the target language calques a foreign word, it uses its own formal resources to recreate a complex word in the source language—the language that supplies the pattern (Gomez Capuz, 1998). Gusmani (1983) observes that the foreign model needs to meet two conditions:

1. It must consist of more than one morpheme (bee polymorphemic), with a structure that is easily analysable,

2. It must also have a descriptive meaning, that is a meaning that is obtainable as the sum of its component parts.

In lexical calques, the way of transferring a foreign form can be complete, partial, or free. According to the way of transmission, literal translations, semi-translations, formally induced neologisms, partial translations, and phraseological calques are distinguished. We must note that the latter are not found in medical terminology, and therefore we will discuss the first three categories.

1.1. Literal lexical calques

In a literal lexical calque (loan translation), which shows the greatest faithfulness to the model by translating each of its components exactly, each morpheme of the model is translated using the closest equivalent morpheme in the target language (Lewandovski, 1990).

In literature, the views on literal loan translations were different. Some authors do not mention them explicitly, others mention them, but they differ from each other in their way of understanding literalness. For some authors, literal transmission refers only to the level of content, and

for others both to the level of content and the level of expression (Turk, 2013).

Muhvić-Dimanovski (1992) summarized the features of literal loan translations presented in the literature:

1. Complete substitution of elements from the source language with native elements,
2. Translation of a foreign model element by element,
3. Taking over the grammatical scheme and meaning, while replacing foreign morphemes with the native morphemes,
4. Expressing the “internal form” of a foreign word or expression by means of one’s own language,
5. Linear substitution of phrases from the donor’s language that can be analysed morphologically,
6. Combination of signs that already exist in the target language according to a foreign model.

The author concludes that with literal translations, it is important to adopt the complete content, which is then expressed in the recipient language with native elements.

1.2. Semi-calques

Although the term *Semi-calque* does not commonly appear in foreign linguistic literature, it is frequent among Croatian linguists. Semi-calques (semi-translations) are lexical forms in which a part of the expression is preserved in its original form (the original form is phonologically, morphologically and orthographically adapted, but recognizable as foreign), and the other part is literally translated. It is a borderline form between a loanword and a literal translation.

Considering the dual character of the acquisition, the term semi-loan word is used for this type of lexical transfer. It is a widespread type and numerous authors have dealt with this kind of calque. Many authors do not separate them from the wider group of hybrid compounds and use the terms *hybrids* or *hybrid compounds*. Other authors consider semi-calques to be a separate category. If the terms emphasize the untranslated,

i.e. borrowed part, in the literature they are called *semi-borrowings* (Muljačić, 1968). Terms that emphasize the translated element are recorded in the literature as semi-calques (Babić, 1986; Muhvić Dimanovski, 1992; Turk & Pavletić, 2001).

Semi-calques and hybrid compounds are very close but cannot be identified.

In defining these type of concept, Muhvić-Dimanovski (1992) starts from the criterion that if a foreign component appears in connection with any native one, then it is a hybrid loanword, and if the native component is a literal translation of one of the elements of the foreign model, it is a semi-calque.

1.3. Loan creations

Loan creation is a type of lexical innovation characterized by the creation of new words for a foreign term completely independent of the foreign model, as far as the formal side is concerned, whereby units are freely chosen from the native lexical inventory.

While speaking about this category, some authors are in doubt whether it is really a formally loan creation or a partial loan translation. Since partial loan translations also move away from the model, the question is whether a multi-word expression, which contains at least one model element, should be considered a partial loan translation or a loan creation (Muhvić-Dimanovski, 1992).

Some authors believe that this category should be excluded from loan translations, because a foreign model is not imitated here, but a new word is created completely independently of a foreign term (Babić, 1990; Lehnert, 1986; Schumann, 1965; Viereck, 1986).

Dabo-Denegri (2007) states that loan creations are not expressions that are motivated by cultural innovations, but the need to find appropriate expressions instead of those that exist in other languages.

2. Syntactic calque

Indirect borrowing is focused on the lexical area, but some influences can be noticed on the syntactic level. Most authors agree that the influence of one language on another is lesser at the grammatical level than the influence at

the lexical level. Other authors even doubt the possibility of a visible influence at the grammatical level because morphology and syntax are resistant parts of the language system (Turk, 2013). If such influences exist, they are difficult to determine and distinguish them from autonomous innovations. In a review of authors who study the possibility of foreign language influence on syntax, Turk (2013) states that many authors refuse the possibility of foreign language influence at the syntactic level and opt primarily for the independent development of syntactic phenomena in several languages. Others advocate the opposite opinion and use specific examples to prove the possibility of such an influence.

Croatian authors share similar views. Franolić (1979) believes that the influence of a foreign language on the syntactic level affects the fundamental structures of the recipient's language. The author thinks that it is precisely at the syntactic level that one should intervene in the defence of the recipient's language. Interferences at the syntactic level are manifested in the form of calques. Filipović (1986) mentions that the syntactic aspect of linguistic borrowing is based on direct borrowing. Muhvić-Dimanovski (1992) also believes that in the Croatian language there are some syntactic calques of German origin, which is a consequence of direct contact between the two languages, and such examples are more common in the substandard language.

In contrast, Dabo-Denegri (2007) maintains that syntactic calques are very rare in conditions of indirect contact between languages, so this refers to the possibility of syntactic calques in Croatian according to the French model.

In this category, the authors classify prepositional constructions and juxtaposition, which was previously known in Croatian, primarily due to the Turkish and German languages, and which intensified under the influence of the English language. Škara (1987) claims that the English language, although it did not introduce this innovation, certainly contributes to the sudden spread of this phenomenon.

3. Semantic calque

A semantic calque refers to a native word that has gained a new, additional meaning under the influence of a foreign word. Usually this means that the words meaning is broadened. Widening is

one productive means of creating new words in any language and terminology.

All authors who deal with calquing consider semantic calque and all agree with its definition. It is characteristic of semantic calque that new meanings are added to existing words in the recipient language under the influence of another language. Many authors refer to them as semantic borrowings or meaning borrowings (Turk, 2013).

In most cases, both the old and new meanings are used simultaneously, but sometimes the old meaning disappears from use. Some German linguists take a different view. They emphasise the similarity between semantic loans and semantic calques (Hofler, 1989), especially in terms of the transfer-mechanism. In both cases, a word in the source language lends one of its senses to a (conceptually or both conceptually and formally) corresponding word via metaphor or analogy. However, it seems to be a significant difference between a semantic loan and a semantic calque (Gomez Capuz, 1998), in that the latter generally involves a greater degree of deliberateness and artificiality and mainly occurs in translations. Semantic loans appear more natural and involve less conscious effort and occur spontaneously among bilingual speakers (Gomez Capuz, 2005).

Although the authors may disagree with the classification of calques, they underline the problem of their identification.

4. The problem of identification of calques

While speaking about loans and their identification, there is no doubt. They are mostly recognized as foreign words, although many of them fit well into the phonological and morphological system of the Croatian language. However, when we speak about calques, regardless of different approaches to the problem, the authors generally agree that determining calques is a much more difficult process than determining loanwords and requires a good knowledge of both languages.

Muhvić Dimanovski (1992) considers that the possibility of incorrect identification and assessment of calques is much greater because they are structures composed of native elements. Each calque is a potentially native form to which a foreign model provides a stimulus for realization. Carstensen (1979) claims that the latent influences

of one language on another are more difficult to detect than the evident ones, so it is difficult for a German speaker who does not speak English to recognize newer calques as expressions created by reproduction of English models. According to him, the problem of identifying calques is much more difficult than the identification of loanwords: they are easily overlooked and not recognized, or many expressions that arose in a language without external stimulus are considered calques.

During our research, we were also in doubt whether a certain expression should be considered a loan translation or not. Namely, in medical terminology, in the absence of an adequate Croatian equivalent, authors very often use definitions of certain terms, which can easily be identified as loan translations, even though they are not. Loan translations in the Croatian language are often multi-word expressions that, due to their length, do not fit well into the system. The appearance of longer and complex expressions or an attempt to convey the meaning element by element may indicate a loan translation.

Loan translations can be identified in various ways, such as the use of prepositional constructions, the juxtaposition of two nouns, the appearance of the same term in several languages, the mentioning of the original expression with the loan translation or using a foreign word in quotation marks. These two last cases are very often recorded in medical texts.

Klajn (1971) states that only forms that are not in the “spirit of the language” are considered calques, because this violates the principle of accepting only what corresponds to the system. As an important linguistic criterion in the identification of calques, the segmentation of the linguistic unit is considered.

In the previous chapters we focused on the theoretical background of calques, and in the following text we will present the results of our research.

5. Study analysis

This study is a descriptive analytical one based on the investigation of a corpus including Croatian medical publications.

5.1. Aims and methodology

The aim of the research is to investigate

calquing as a productive means of creating terms in Croatian medical terminology.

This is a corpus-based analysis whose methodology assumes an approach according to which previous theoretical assumptions are verified with examples from the corpus. To verify the examples, the terminological database *Struna* was used in the paper. Examples were collected manually from medical publications. Texts were thoroughly read, and the adequate examples were extracted. The corpus for analysis can be classified as follows: medical scientific books (2), scientific-professional journals (4) and professional-popular magazines (2). More precisely, the medical publications *Molecular Biology in Medicine* and *Cellular and Molecular Immunology* are scientific books and translated editions of original English publications, with a glossary of definitions and terms at the end. It is the author's approach, which led to the creation of loan translations. The journals included in this research publish articles in the Croatian language and are published several times a year. Scientific and professional journals are available in the database www.hrcak.hr. The scientific and professional journals included in the research are as follows: *Medicina fluminensis*, the journal of the Croatian Medical Association and the Faculty of Medicine of the University of Rijeka, *Liječnički vjesnik*, the journal of the Croatian Medical Association, *Acta medica Croatica*, the journal of the Croatian Academy of Medical Sciences, *Paediatrica Croatica*, the journal of the Croatian Pediatric Society and the Croatian Society for School and University Medicine, as well as the professional popular magazines *Medix*, a specialized magazine for the professional medical public, and *Narodni zdravstveni list*, a magazine of the Teaching department for Public Health of the Primorje-Gorski Kotar County. A representative sample, specific to the field of biomedicine and healthcare, was selected for the purposes of the work. Examples illustrative of calque typology were selected and classified into several categories. The analysis belongs to the qualitative type as the most suitable for this type of research.

5.2. Results and discussion

In addressing the typology of linguistic calque, we will focus on the categories representative of Croatian medical terminology, theoretically discussed in the previous chapter. Some of these categories are further subdivided depending on the type of structure and the degree of imitation of the source item.

5.2.1. Lexical calques

5.2.1.1. Literal lexical calques

In the research, we recorded literal loan translations, but sometimes we were in a dilemma about their classification.

We will mention examples recorded in the corpus:

- 1) *gensko skretanje* – Eng. *genetic drift*
- 2) *maksimalna koštana masa* – Eng. *peak bone mass*
- 3) *pogrešna sparivanja* – Eng. *mismatches*
- 4) *neposredno rani geni* – Eng. *immediate early genes*
- 5) *pomagački limfocit T stanice* – Eng. *helper T cell*
- 6) *protusmisleni RNK* – Eng. *antisense RNA*
- 7) *bolest mačjeg ogreba* – Eng. *cat-scratch disease*
- 8) *bolest poljupca* – Eng. *kissing disease*
- 9) *ciljni lijek* – Eng. *target drug*
- 10) *računalno podržavana kirurgija* – Eng. *computer assisted surgery*
- 11) *sindrom ukrućenog čovjeka* – Eng. *stiff-man syndrome*
- 12) *stanica ubojica* – Eng. *killer cell*
- 13) *visinska bolest* – Eng. *altitude sickness*
- 14) *željezna pluća* – Eng. *iron lung*

Furthermore, in medical texts we notice loan translations introduced with *tzv.* (so-called) to indicate the original English term:

- 15) ... početi terapiju lijekovima koji imaju najveću učinkovitost dokazanu u epidemiološkim i kliničkim istraživanjima (*tzv. evidence based medicine – medicina temeljena na dokazima*).

In the next case, the original English term is put in parentheses, but it continues to be used in the text regardless of the existence of the Croatian term.

- 16) *okidači (trigger) glavobolje su rjeđe zastupljeni, a najčešći trigger je nedostatak spavanja.*

In some cases, the English term is marked with quotation marks indicating its English origin, for example:

- 17) *...manje od 5 na 10000 ljudi. Takvi se poremećaji nazivaju bolesti siročadi („orphan diseases“) zbog toga što su prerijetki da privuku veći interes istraživača.*

However, although in this case it is a literal translation, this example needs a brief review. Namely, in this case we are not talking about diseases affecting abandoned children (as the name itself suggests), but about diseases that rarely appear, and with the aim of avoiding ambiguity, we suggest using the loan creation “rijetke bolesti” (rare diseases).

We also recorded prepositional constructions:

- 18) *hormon za oslobađanje gonadotropina – Eng. gonadotropin-releasing hormone*
19) *nabor za vezanje nukleotid – Eng. nucleotide binding fold*
20) *dijabetes ovisan o inzulinu – Eng. insulin dependent diabetes*

5.2.1.2. Semi calques

Semi-calques are also recorded in medical language. We classified them according to the order of native and borrowed elements, considering whether the foreign element is morphologically adapted or non-adapted.

a) Semi-calques or two-word expressions in which the native element is found in the first place, and the foreign element in the second place, for example:

- 21) *obojeni dopler – Eng. colour doppler,*
22) *slobodni radikali – Eng. free radicals,*
23) *stečena imunodeficijencija – Eng. acquired immunodeficiency,*

b) Semi-calques or two-word expressions in which the foreign element is in the first place, and the native element in the second place.

1. Adapted foreign element + native, for example:

- 24) *ultrazvuk – Eng. ultrasound,*
25) *asistirana oplodnja – Eng. assisted insemination,*
26) *informirani pristanak – Eng. informed consent,*
27) *genetski modificirana hrana – Eng. genetically modified food,*
28) *test probira – Eng. test screening test,*
29) *kontaktne leće – Eng. contact lenses.*

2. Non-adapted foreign element + native, for example:

- 30) *marker gen – Eng. marker gens,*
31) *balon kateter – Eng. balloon catheter,*
32) *booster cjepivo – Eng. booster vaccine.*

However, in some cases there is a doubt as to whether the mentioned examples should be considered literal translations or semi-calques because they are formed from loanwords that were accepted a long time ago and function as native words, for example *test, reprodukcija, sindrom, kontakt, modificiran, asistiran*, etc. A similar doubt is shared by Dabo-Denegri (2007) who says that if we adhere to the principle that the foreign element was transferred, i.e. not replaced, then such structures should be considered semi-calques.

5.2.1.3. Loan creation

In medical language, we record a certain number of examples that belong to this category, for example:

- 33) *stanje prilagodavanja u novoj zoni – Eng. jet lag.*

Anić and Goldstein (2009) define “jet lag” as “insomnia syndrome that occurs in airplane passengers after crossing several time zones.” In the English-Croatian medical dictionary, *jet lag* is defined as “disorder of biological rhythms due to a change in time zones”. It is evident from the example that the terms can be interpreted in various ways.

34) *glavobolja uzrokovana hladnim stimulusom* – Eng. *ice-cream headache*

35) *kontakt koža na kožu* – Eng. *kangaroo care*

In this case, it is a term used in perinatology (Eng. kangaroo care) that denotes a close bond between mother and child after childbirth. We also recorded the literal translation “klokanska skrb” (kangaroo care). Only from the context with a more detailed explanation the meaning of the term becomes clear.

36) *atipična kuga peradi* – Eng. *Newcastle disease*

The original English term expresses the place of appearance of the disease, while in Croatian it is freely created.

37) *atipična upala pluća* – Eng. *severe acute respiratory syndrome (SARS)*.

This neologism is very often used instead of the literal translation “teški akutni respiratorni sindrom” (severe acute respiratory syndrome). The neologism was created according to symptoms and similarities with other diseases.

38) *dovoljna opskrba hranom* – Eng. *food security*

Since the literal translation of the English term is not clear enough and does not correspond to the original term (food safety), a loan creation was created by free translation. We mention the following examples in which the native term is freely formed.

39) *dječja bolnica-prijatelj djeteta* – Eng. *baby friendly hospital*

40) *najnužnija skrb* – Eng. *comfort care*

41) *transfuzijsko praćenje* – Eng. *hemovigilance*

As can be seen from the examples, lexical calques are effective source of new medical terms.

5.2.2. Syntactic calque

Examples of syntactic calque are also present in medical language, and we record examples of juxtaposition that is common in medical texts:

42) *prostata specifični antigen* – Eng. *prostate specific antigene*

43) *laser akupunktura* – Eng. *laser acupuncture*

44) *stres fraktura* – Eng. *stress fracture*

45) *balon-kateter* – Eng. *balloon catheter*

The above examples were created under the influence of the English language. However, since the formative type of juxtaposition is not appropriate to the Croatian language, it should be replaced with an adjective and a noun wherever possible.

We also notice the following construction based on English:

46) *reakcija bori se ili bježi* – Eng. *fight or flight reaction*

Generally, calques follow the structure of the target language and are subject to its rules so that language specificity cannot be changed. However, Seidel (1958) notes that almost every part of the structure of a language can be imitated.

5.2.3. Semantic calque

We will mention examples from medical language:

47) *genetski inženjering* – Eng. *genetic engineering*

The term *inženjering* (Eng. *engineering*) expressed “a set of activities aimed at the rational and functional design of buildings or technical and industrial facilities”. However, this term has acquired an additional meaning, which refers to “the branch of biology that deals with the selection of genetic properties of an individual for the purpose of controlled breeding”.

48) *nova generacija antihistaminika* – Eng. *new generation of antihistaminic*

The basic meaning of the word *generacija* (Eng. *generation*) is “a group of individuals who have the same ancestor and represent one generation”, so it refers to people. The new meaning refers to the level of technological development and includes “all that belongs to the same time of appearance”.

49) *banka krvi* – Eng. *blood bank*

The basic meaning of the word *banka* (Eng. *bank*) is “an institution that mediates money transactions, takes savings deposits, circulates

loan capital and otherwise operates on the money and securities market". The additional meaning of the term is "a place where something is stored for a specific purpose". We also record

50) *banka genetičkog materijala* – Eng. *the bank of genetic material*

51) *banka matičnih stanica* – Eng. *the bank of stem cells*

52) *DNK – knjižnica* – Eng. *DNA library*

The term *knjižnica* (Eng. library) means "an institution where books are borrowed". In a new meaning in molecular biology, this term refers to "a set of cloned DNA fragments of a certain source", in other words *genoteka* (Eng. a gene library).

53) *kultura krvi* – Eng. *blood culture*

The meaning of the term *kultura* (Eng. culture) is "all material and spiritual goods, ethical and social values, which have been created by mankind". The new additional meaning refers to "microorganisms planted for research purposes". We also recorded

54) *kultura bakterija* – Eng. *bacterial culture*.

55) *plastična operacija* – Eng. *plastic surgery*

The adjective *plastični* (Eng. plastic) refers to something that is "made of plastic". Under the influence of English, the adjective *plastic* expanded its meaning, and *plastična operacija* (Eng. plastic surgery) expresses "a surgical procedure that replaces lost tissue or removes aesthetic defects".

56) *tumor marker* – Eng. *tumour marker*

The word *marker* (Eng. marker) refers to "an object that serves as a sign", while in the medical terminology under the influence of English, it acquired a new meaning "a substance, most often a protein that is produced to a greater extent by tumour cells, and sometimes, in response to tumour growth and the cells of our body".

57) *shotgun kloniranje* – Eng. *shotgun cloning*

Šotgan (Eng. shotgun) means "a rifle with a short, smooth barrel that ejects a large number of bullets". In the medical terminology of genetics, this term is used to denote the "rapid DNA sequencing technique".

58) *pametni lijekovi* – Eng. *smart drugs*

The adjective *pametnan* (Eng. smart), whose meaning is "having the ability to reason", under the influence of the English language, acquires a new meaning "targeted therapy that precisely acts on changes in cancer cells that cause their growth, division and spread". In this case, we are talking about medicines whose action is strictly directed and with no additional side effects.

59) *tiha bolest* – Eng. *silent disease*

In this case, it is an insidious disease that occurs and progresses without obvious symptoms.

60) *gama nož* – Eng. *gamma knife*

In this case, it does not refer to a knife as a hand tool for cutting and sawing but refers to "a high dose of precisely directed radiation".

61) *kolesterol, ubojica našeg vremena* – Eng. *cholesterol, modern killer*

The word *killer* is used for a person who takes another person's life. However, in this case, it refers to a substance that accumulates in blood vessels over the years and leads to their blockage. The process is long-lasting, without any symptoms that indicate the disease, but the outcome can be fatal.

As can be seen from the examples, many terms that are subject to semantic calquing are transferred from common language to medical language, usually through a metaphorical or metonymic transfer, thus facilitating contact between different fields.

6. Conclusion

In this paper we analysed calquing as a productive means of medical terms creation. Borrowings and calques are the most evident result of language contact. It is inevitable nowadays due to the globalisation process which affects different professions and languages for special purposes as well.

Calquing consists of the copying by translation and substitution of a foreign term. In other words, reproducing the meaning of an item in another language through imitation using signifiers and structures from the target language. A calque is the consequence and product of

calquing. In our study the following types of calques are distinguished: lexical, syntactic and semantic calques. Lexical calques are the most frequent. In this type we distinguish literal calques (maksimalna koštana masa, gensko skretanje), semi calques (ultra zvuk, asistirana oplodnja), loan creations (atipična upala pluća, kontakt koža na kožu). Syntactic calques are evident in juxtaposition (stres fraktura, prostata antigen). While speaking about semantic calques, we confirm the change and widening of meaning of already existing terms in Croatian language under the English influence (genetski inženjering, banka krvi). Calques are also the main defence against overwhelming loan words which are widely accepted. The study confirmed calques as a precious source of new medical terms.

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- Liječnički vjesnik, glasilo Hrvatskog liječničkog zbora.
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- Medix, specijalizirani časopis za stručnu medicinsku javnost.

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