Title: Tackling the Learning Curve of Medical Terminology: Experience of a Medical Student with a Background in Classical Languages

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Contributor Role	Role Definition	Authors 1	2	3	4	5	6
Conceptualization	Ideas; formulation or evolution of overarching research goals and aims.	X					
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Discussion Points:

- At the start of medical school, did you feel intimated by all the new medical terms?
- #MedicalEducation
- By learning a finite number of Latin and Greek roots, you can logically understand most medical terms.
- Did you learn Latin and Greek before or during medical school?
- How do you approach unfamiliar medical terms?

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ABSTRACT

Upon entering medical school, many students encounter a steep learning curve when handling the vast and intricate vocabulary that healthcare workers use daily. Since the basis of medical terminology has developed from the roots of classical languages, it would theoretically be helpful to provide medical students with a foundational knowledge of Latin and Greek. My experience with learning classical languages before entering medical school has allowed me to have a formulaic approach when tackling unfamiliar medical terminology. By breaking up medical terms like *transsphenoidal hypophysectomy* into their respective roots, I can create a quick definition for myself before being given any formal teaching on the matter. The primary advantage of this learning style is that it reduces the burden of memorization on the student. The lectures from the medical school help refine the preliminary definitions, which makes memorization much easier since students already have a basic framework for each new term encountered. However, certain considerations need to be kept in mind when utilizing the classical approach to understanding medical terminology. For example, the Latin and Greek roots cannot define eponyms like Wilson's disease, named after the person who discovered the disease, or provide information on medications as their names originate from non-classical origins. Overall from my experience, the benefits of the formulaic approach make it a valuable tool during the initial years of medical school when the content is taught in a classroom setting and it can provide the foundation for an easier transition into the clinical environment.

Key Words: *undergraduate medical education; medical student; terminology; anatomy; history of medicine*

THE EXPERIENCE.

In Canada, medical schools accept students with a wide variety of past experiences. In my class alone, I have peers with diverse backgrounds such as nanotechnology engineering, forensic psychology, and English literature. Their unique perspectives help enrich my learning experience by expanding my perceptions. Likewise, my undergraduate experience was unique. Though my core degree was a Bachelor of Health Sciences at McMaster University, a typical program for many pre-med students, I also completed a Concurrent Certificate in the Language of Medicine and Health.

This concurrent certificate focuses on allowing students to explore the origins of medical terminology through courses centered on Latin, Greek, and linguistics. The logic behind this certificate is that medical terminology has stemmed from the roots of classical languages and therefore, students with a basic understanding of these languages will be better equipped to understand medical terms. The professors use a formulaic approach to medical terminology by essentially fragmenting the medical terms into various Greek and Latin roots.[1] Therefore, students can learn a small number of classical roots and comprehend most medical terms. Figure 1 demonstrates an example of the formulaic approach used in the Ancient Roots of Medical Terminology courses.[1] In the following paragraphs I will describe my experience with learning the classical approach to medical terminology and its applications in medical education.

One of the most daunting aspects of medical school is the sheer volume of content that students must study. My program is an accelerated three-year medical program and therefore, every three months in my first year I must learn a new organ system. This involves a new set of medical terms in several domains (e.g., histology, anatomy, and pathophysiology). My background in medical terminology has proved useful in adjusting to this new learning curve posed every semester. When I see a new term, I can use the Latin and Greek roots that I have learned to get a general sense of the word before I even learn what it means. For example, when we were reading a case about a pituitary tumour, we came across a procedure named *transsphenoidal hypophysectomy*. Most students in my class were overwhelmed by this seemingly complex term; however, I was able to use the formulaic approach to create a quick definition for myself - “the cutting out of the pituitary gland through the sphenoid bone.” This is a reasonable deduction, especially for a student with no formal teaching on this topic. The lectures from the medical school help me refine my preliminary definitions, which makes memorization and understanding much easier and less intimidating since I already have a basic framework for each new term I encounter.

During the gastrointestinal unit, we encountered a series of confusing terms when discussing pathologies of the biliary tract. Terms such as *cholangitis*, *cholelithiasis*, *choledocholithiasis*, *cholecystitis*, and *cholecystectomy* were difficult to differentiate as they look and sound similar. I created a handout for my class as shown in Figure 2 which displayed the formulaic approach to these terms and the response was amazing! By learning the individual roots, my classmates were able to better differentiate these terms which reduced the amount of memorization needed.

DISCUSSION.

Over the past few decades, there has been a reduction in hours spent on teaching anatomy in medical school.[2,3] In my experience, the decreased amount of formal teaching makes anatomy an especially daunting topic for students which may even turn them away from pursuing careers in surgery, an anatomy-heavy discipline. On this point, Smith *et al*. integrated medical etymologies into their gross anatomy course and found that students reported an enhanced learning experience.[4] Furthermore, a study by Stephens *et al*. found that medical students with a background in Greek and Latin performed better in anatomy examinations.[5] Although Latin and Greek are not used as formal languages of communication anymore, my experiences and these studies both demonstrate that the study of medical terminology can be a worthwhile endeavour for those seeking a career in healthcare.

The formulaic approach to medical terminology only provides a basic template of the medical term, and therefore cannot be expected to provide clinical context. For example, *plasmapheresis* can be translated using the roots, as "the removal of blood plasma." However, this definition leaves out the fact that in the procedure the plasma is replaced by another solution or treated and then returned to the body. Therefore, it is crucial to use classical roots only as a starting point rather than as a guide for clinical decision-making. Also worth noting is that eponyms such as *Wilson's disease,* because they are based on a person, place, or thing, cannot be defined using roots.[6] Lastly, not every part of medicine is derived from classical languages. One of the biggest pillars of medicine is pharmacology and many of the drug names originate from their chemical composition or colloquial language. Therefore, it could be that the benefits of the formulaic approach are beneficial in the first few years of medical school when the content is taught in a classroom setting, but that it becomes less versatile as we progress into the clinical environment.[7]

In my experience, learning classical roots has allowed me a smooth transition into medical school. Since my classmates showed a great interest in the formulaic approach, I have partnered with the Classics Department at McMaster University to run a 6-week medical terminology course for McMaster medical students. I encourage other medical students to find ways to receive formal teaching in medical terminology before or during their early years of medical school as it can provide a strong basis for the following years. If you are unable to find a formal course, all is not lost. Be attentive, and find patterns in the terminology; just as you know by now that *x-itis* is "the inflammation of x" and *x-ectomy* is "the cutting out of x", so too there are many more patterns out there for you to discover!

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SUMMARY - ACCELERATING TRANSLATION

Title: Tackling the Learning Curve of Medical Terminology: Experience of a Medical Student with a Background in Classical Languages

Before medical school, I completed a Concurrent Certificate in the Language of Medicine and Health which entailed completing courses in Latin, Greek, and linguistics. This certificate introduced me to the roots that make up the various medical terms in our vocabulary. Therefore, students who pursue this certificate can break down complex medical terms into their respective Latin or Greek roots and create logical definitions of most medical terms without prior formal teaching.

The transition into medical school can be difficult for many students and one of the most intimidating aspects tends to be learning the new terminology that healthcare professionals use daily. The primary benefit is that the skills I gained from having a background in Latin and Greek have helped reduce the amount of memorization that I need to do in medical school. Since I can create preliminary definitions of most medical terms using the roots, the lectures serve the purpose of filling in the gaps rather than teaching the topic from the beginning. Past studies have shown that medical students have responded positively to anatomy classes that integrate teachings of medical etymologies. The medical students with a background in classical languages performed better on evaluations compared to their classmates who did not learn the Latin and Greek roots.

Some considerations need to be taken into account with using classical roots to define medical terms. They only provide a basic anatomical or physiological definition which is not sufficient enough to be used in a clinical setting. Further research and teachings are required to transform the preliminary definitions into usable knowledge to guide clinical decision-making. Additionally, medical terms named after a person, place, or thing, cannot be defined with this approach as they do not originate from Latin or Greek roots. Lastly, this strategy is limited to many of the medical terms in pharmacology as these terms have generic names and brand names that are based on the chemical composition and company label.

In conclusion, I believe learning the Latin and Greek roots is beneficial for many medical students especially during the early years when they are overwhelmed by the sheer number of medical terms. Students will have an easier time navigating the lectures and will be able to focus on the clinical aspects more if they are not worried as much about memorization. This strategy is not a replacement for clinical experience, but rather a tool upon which students can use when facing unknown medical terms.

FIGURES AND TABLES.

Figure 1. Formulaic Approach Applied to a Common Medical Term

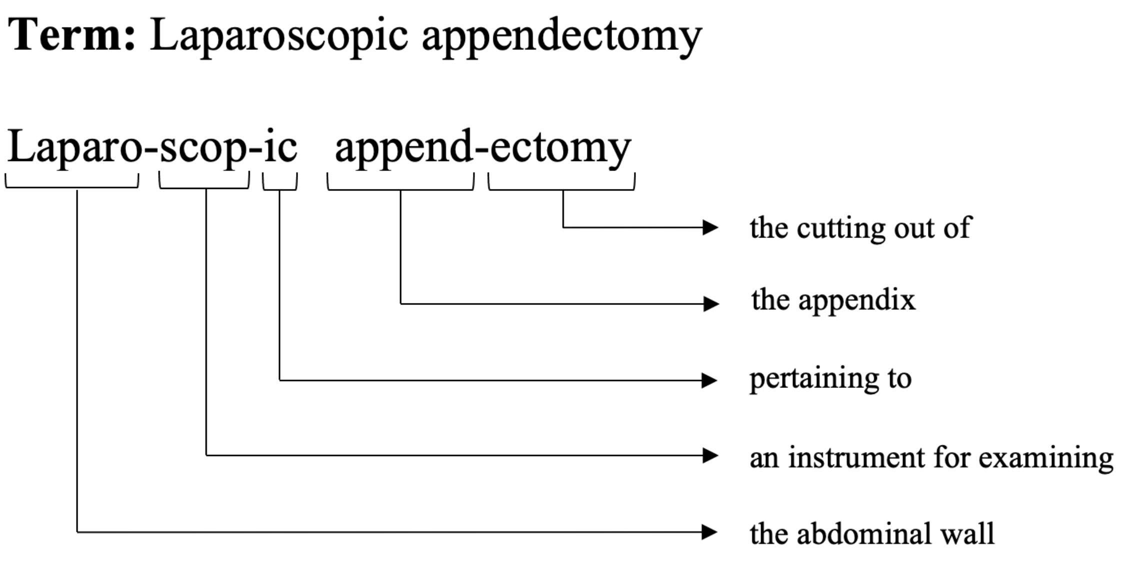

Figure 2. Biliary Tree Pathologies Handout

Roots

Cholecyst-	Gallbladder
Cholangi-	Bile duct
Choledoch-	Common bile duct
-lith	A calculus in(volving)
-iasis	The abnormal presence of
-ectomy	The cutting out of
-itis	The inflammation of

Definitions

Cholangitis	The inflammation of the bile duct
Cholelithiasis	The abnormal presence of a calculus involving bile
Choledocholithiasis	The abnormal presence of a calculus in the common bile duct
Cholecystitis	The inflammation of the gallbladder
Cholecystectomy	The cutting out of the gallbladder