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Characteristics of Medical Texts and Effective Reading Strategies

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Abstract: Medical text is characterized by a multitude of specialized vocabulary and complex sentence structures, posing challenges for comprehension. Therefore, researchers need a thorough understanding of the features of medical texts and mastery of specific reading techniques. This paper explores the vocabulary, sentence structures, and discourse characteristics of medical English texts, proposing several reading strategies to enhance the efficiency of non-native English speakers in reading medical texts and improving their proficiency in medical English. While this study identifies characteristics of translating medical texts, it acknowledges limitations such as insufficient depth of analysis and small sample size.

Keywords: Medical Texts; Reading Techniques; Medical Vocabulary; Complex Sentences.

1. Introduction

Modern medicine is experiencing flourishing developments worldwide, with English serving as the predominant language for writing a significant medical text [1]. Medical researchers striving to access the latest advancements globally must study medical English and master techniques for reading medical texts. Regardless of the level of English proficiency of medical researchers, they need to face the difficulties of the extensive terminology and complex sentences in medical texts [2]. Following the concept of "the unity of heaven and humanity" during reading can help create a conducive reading environment [3]. In this way, it helps researchers understand the characteristics of medical texts and improve the efficiency of medical text reading.

2. Vocabulary in Medical Text

2.1. Characteristics of Medical Vocabulary

Medical vocabulary is characterized by its high specialization and diverse types [4]. A large number of medical terms are extensively utilized, including terminologies related to medicine, medical technologies, and various disease names. For example, Antiviral adj. (antiviral; against filterable viruses); Ribavirin n. (ribavirin; a nucleoside analogue). Additionally, for the sake of readability and convenience in writing, authors often employ abbreviations and acronyms in medical texts. For instance, SARS-CoV-2 abbr. (severe acute respiratory syndrome coronavirus 2); RT-PCR abbr. (reverse transcription-polymerase chain reaction); IgG abbr. (immunoglobulin G).

2.2. Reading Skills of Medical Vocabulary

Medical vocabulary is renowned for its vast quantity and high degree of specialization, posing significant challenges for readers of medical English. This paper categorizes medical vocabulary based on its characteristics into medical terms, semi-medical terms, and non-medical terms, and provides specific reading recommendations for each category [5].

2.2.1. Medical Vocabulary

Medical vocabulary refers to specialized terms commonly found in medical articles, often with specific and singular meanings. Examples include compound nouns (e.g., tachypnea, Rhinorrhea, lymphopenia), words from old English specifically used in medical contexts (e.g., fever[feferfiðrum], worm[wyrm], wound[**wund**), pus[pūs]), specialized verbs (e.g., auscultate, sterilize, pasteurize), and adjectives (e.g., sterile, puffy).

When encountering words in Old English that are specifically used for medical meanings, as well as certain special verbs and adjectives, it is often necessary to use assistance tools to understand their meanings. For example, when reviewing surgical reports, consulting a dictionary (such as *Google Translate*, *Medical Dictionary*, *PubMed*, etc.) to find the meanings of terms like "auscultate" (to listen) or "sterile" (free of germs) helps in accurately grasping and mastering relevant medical knowledge. For compound words in medical terminology, analyzing their roots and affixes can also help in deducing their meanings. For instance, tachypnea n. can be broken down into (tachy- [rapid] + -pnea [breathing]); Rhinorrhea n. into (rhin/o [nose] + -rrhea [discharge]); lymphopenia n. into (lymph/o [lymph] + -penia [deficiency]).

2.2.2. Semi-Medical Vocabulary

Semi-medical vocabulary refers to terms that are widely used in general English and can also be used in medical English. For example, the noun "cell" has various meanings in general English such as a single room, a prison cell, or a battery, while in medical English it specifically refers to a biological cell; "adult cell" denotes a mature cell. Similarly, "concentration" in general English means the act of focusing, whereas in medical English it refers to content or density. "Toilet" in general English denotes a bathroom, whereas in medical English it refers to cleansing a wound. "Culture" in general English means customs or arts, whereas in medical English it refers to the cultivation of organisms. Another example is "pupil," which in general English means a student, but in medical English, it refers to the aperture in the eye.

Semi-medical vocabulary appears frequently in medical texts and can be confusing due to its multiple meanings.

Therefore, it is crucial in medical terminology learning to continuously accumulate these terms, compare their medical and general meanings, and thereby enhance accuracy in vocabulary comprehension. For example, use a list format to help differentiate and memorize the meanings of medical terms.

Table 1. Use a list format to help differentiate and memorize the meanings of medical terms

Vocabulary	General Meaning	Medical Meaning
Cell	single room, a prison cell, or a battery	biological cell
Concentration	the act of focusing	content, density
Toilet	bathroom	cleansing a wound
Culture	customs, arts	cultivation of organisms
Pupil	younger student	the aperture in the eye

2.2.3. Non-Medical Vocabulary

Non-medical vocabulary refers to words that do not inherently possess medical meanings but are used in medical English with extended meanings to maintain coherence in medical text reading. For example, "obstinate" generally means stubborn, but in medical English, it often extends to describe a disease that is difficult to treat. Similarly, "upset" generally means to disturb emotionally, but in medical English, it frequently refers to gastrointestinal discomfort.

These vocabularies maintain a direct relationship between their medical and general meanings. To understand such vocabulary professionally, it is essential to strengthen the accumulation of medical background knowledge. When encountering unfamiliar terms, we can make a guess about their meanings based on medical context and background knowledge. For example, in the sentence "The patient is suffering from an obstinate infection that has not responded to standard antibiotics," the general meaning of "obstinate" is very stubborn. Given the context, where the infection has not responded to standard antibiotics, "obstinate" here means that the infection is difficult to control and eliminate. Similarly, in the sentence "After eating the undercooked food, she experienced an upset stomach," the term "upset" generally means something disturbed or not functioning normally. In this context, "upset" refers to symptoms such as nausea, pain, or indigestion caused by undercooked food. Therefore, "upset" indicates that the stomach is experiencing discomfort or disturbance.

3. Complex Sentences in Medical Text

3.1. Characteristics of Medical Sentences

Medicine is a natural science characterized by objectivity and precision in medical texts. Passive voice is often used in medical texts to convey objectivity, with constructions including forms such as "be," "are," "is," or phrases introduced by "by." For example, "ARDS developed in 20% after a median of 8 days, and mechanical ventilation was required in 12.3%." Clauses are frequently used in medical texts to express complex concepts. Common constructions include noun + "that" clauses and noun clauses introduced by "of." For instance, "Many randomized clinical trials are ongoing to assess the efficacy of remdesivir in treating moderate or severe COVID-19 infection, and it remains unclear what the clinical effects of remdesivir on COVID-19 are." To maintain conciseness, to maintain conciseness, some authors use ellipses in medical texts, often omitting subjects or objects in sentences. For example, "If experiencing symptoms, get tested immediately."

3.2. Reading Skills of Medical Sentences

Medical texts written in English are characterized by long and complex sentences compared to those written in Chinese, which typically have simpler sentence structures [6]. Therefore, Chinese readers must be mindful of these linguistic differences when reading English texts, consciously breaking down each component of English sentences to better understand their meaning. Here, we list some reading techniques for understanding passive voice constructions, noun + "that" clauses, noun clauses introduced by "of," and ellipses in sentences.

3.2.1. Passive Voice

In medical English, passive voice is frequently used to highlight the objectivity of medical procedures or results. For clearer comprehension, readers can convert passive constructions into active voice [7].

Example Sentence: The constitution of the receptor-binding gene region is very similar to that of SARS-CoV, and the virus has been demonstrated to utilize the same receptor, the angiotensin-converting enzyme 2 (ACE2), for entrance into respiratory cells.

When facing such sentences, readers need to take the following steps to aid comprehension of the original text. First, identify the passive structure and locate the marker "be verb + past participle," such as "has been demonstrated." Next, determine the subject of the sentence (the recipient of the action in passive voice) and the verb. For example, in "The virus has been demonstrated," the subject is "the virus," and the verb is "has been demonstrated." Finally, attempt to transform the passive sentence into an active sentence to achieve a clearer understanding of the sentence's meaning. Reconstruct "The virus has been demonstrated to utilize the same receptor" as "Scientists have demonstrated that the virus utilizes the same receptor."

3.2.2. Noun + "that" Clause

In this sentence structure, the "that" relative clause modifies the preceding noun, and the entire noun phrase acts as an appositive, explaining the specific content of the noun.

Example Sentence: The development of methods for the counting of red cells and for measuring hemoglobin concentration led to the realization that the common infections, that ravaged the world, such as pneumonia, tuberculosis, and typhoid fever, were all associated with low red cell and hemoglobin values.

When encountering such sentences, you can follow these steps to aid in understanding the original text. First, identify the main noun and the clause. In this sentence, the main noun is "realization," and the clause refers to "that the common infections...were all associated with low red cell and hemoglobin values." Next, grasp the complete meaning of the clause, which is "These infections are associated with low red cell and hemoglobin values." Finally, analyze how the clause enhances the meaning of "realization," leading to the overall meaning: "People realized that these common infections are related to low levels of hemoglobin."

3.2.3. Noun Clause Introduced by "of"

In medical texts, sentences often include multiple "of" phrases to ensure linguistic accuracy, which can pose challenges for readers whose native language is not English.

Example Sentence: The rate of secondary COVID-19 disease attacks varied from 1 to 5% among tens of thousands of close contacts of verified cases in China.

When reading, you can use the following techniques to aid comprehension. First, identify the main noun and structure, clarifying the subject "the rate of secondary COVID-19 disease attack," the predicate "varied," and the scope "among tens of thousands of close contacts of verified cases in China." Next, break down the sentence components to understand each part individually. Then, integrate the understanding of each part to grasp the overall meaning of the sentence: "The rate of secondary COVID-19 disease attack varied from 1 to 5%." + "This variation was observed among tens of thousands of close contacts of verified cases." + "These verified cases were located in China."

3.2.4. Elliptical Sentences

Elliptical sentences in medical texts omit redundant or obvious words to make the sentence more concise. This omission can sometimes lead to ambiguity, requiring readers to infer the missing imformation to fully understand.

Example Sentence: Upon suspicion of COVID-19 disease, infection control actions should be executed and public health officials visited.

When encountering such sentences, it's important to first identify what has been omitted. In the example, "and" should connect two similar actions, indicating that "visited" has omitted "should be." Moreover, "should be executed" and "should be visited" lack an subject for the verb phrase. Secondly, use context and surrounding information to deduce the omitted content and complete the sentence's meaning. Ultimately, the complete meaning of the sentence is "Upon suspicion of COVID-19 disease, healthcare workers should execute infection control actions and visit public health officials."

4. Medical Text Discourse

4.1. Characteristics of Medical Discourse

Medical English, as one kind of technical English, is characterized by high functionality and utility. When reading medical texts, the primary focus is on extracting the original text content to avoid misunderstandings or misinterpretations. Authors typically structure their writing framework according to the type of text, which helps readers fully understand the content and intentions of the literature [8]. Therefore, the writing style in medical English often emphasizes clarity and precision to ensure the accurate and effective transmission of information [9].

4.2. Reading Skills of Medical Discourse

Mastering the reading skills of medical discourse is crucial when reading medical texts. Firstly, understanding the structure of the text is key. Identifying the structural features based on the type of medical text helps in quickly comprehending it. For instance, in medical papers, common sections include *Introduction*, *Methods*, *Results*, *Discussion*, and *Conclusion*. It is essential to read through and analyze each paragraph, focusing particularly on logical connections and transitions between paragraphs to ensure the coherence of the discourse. Identifying and grasping key information, especially in the *Results* and *Discussion* sections, which typically contain the authors' main viewpoints and research findings, is paramount. Finally, through repeated reading and summarization, gaining an in-depth understanding of the text's ideas and structure contributes to enhancing comprehension and application of medical knowledge.

5. Conclusion

The vigorous development of modern medicine has also led to the gradual establishment of a systematic approach to medical English. This paper analyzes the characteristics of medical texts from three perspectives: words, sentences, and discourse, and proposes targeted reading techniques aimed at improving efficiency in reading medical texts. However, due to the limited length of this paper, there is insufficient depth in the discussion of reading techniques for medical text, and the sample size used is rather limited. Both of these aspects need further improvement.

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