



Revolutionizing oral and maxillofacial surgery: ChatGPT's impact on decision support, patient communication, and continuing education

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Artificial Intelligence (AI) has pervaded various domains of medicine, revolutionizing healthcare delivery and decision-making processes. Oral and maxillofacial surgery, a specialized field at the confluence of dentistry and medicine, is poised to benefit from the integration of AI technologies. In oral and maxillofacial surgery, the integration of AI technologies promises to enhance the precision and efficacy of the interventions. ChatGPT, a state-of-the-art language model, holds particular promise because of its natural language processing capabilities and expansive knowledge base^[1].

Decision support in treatment planning

Oral and maxillofacial surgeons often encounter complex cases that require meticulous treatment planning. ChatGPT can serve as an invaluable ally by processing vast amounts of patient data, including medical histories, imaging results, and clinical notes^[2]. The capacity of the model to analyze and comprehend intricate details can contribute to more informed decision-making and assist surgeons in formulating comprehensive and personalized treatment plans. This approach has the potential to significantly improve patient outcomes and reduce the margin of error in surgical interventions.

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Enhancement in diagnosis and management

The capabilities of ChatGPT can extend beyond decision support in treatment planning to include the diagnostic phase of maxillofacial surgery. By processing and analyzing intricate patient data, including medical histories and imaging results, the ChatGPT can contribute to the diagnostic process. Its ability to comprehend complex details may aid in refining diagnosis and formulating comprehensive management strategies. This expansion aligns with the model's potential to enhance precision and efficacy throughout the patient care continuum^[3].

Augmenting patient education

Expanding on the role of the model in patient education, ChatGPT's natural language generation capabilities have emerged as a powerful tool for conveying information to patients in a comprehensible manner. To further enhance patient education, ChatGPT can be integrated into educational materials, such as brochures and online resources. Customized content generated by the model can cater to individual patient needs and address specific concerns and questions. This personalized approach fosters a more patient-centric communication strategy that aligns with the principles of shared decision-making and improves overall patient satisfaction and compliance. A recent study found that ChatGPT can generate paragraphs of text designed for patients' educational purposes. The content generated by ChatGPT was easily understandable, highlighting its potential as a tool for creating patient-friendly educational materials in the context of dermatological diseases^[4].

Enhancing patient communication

Effective communication between healthcare providers and patients is fundamental for successful treatment outcomes. The natural language generation capabilities of ChatGPT can be harnessed to bridge the communication gap between surgeons and patients^[5]. The model can easily generate understandable explanations of complex surgical procedures, potential risks, and postoperative care instructions. This not only empowers patients with a better understanding of their treatment, but also fosters improved adherence to postoperative care regimens. Furthermore, the ChatGPT's multilingual capabilities can facilitate communication in diverse healthcare settings, break down language barriers, and ensure that every patient receives clear and comprehensible information.

Continuing education and knowledge dissemination

Staying abreast of the latest developments in oral and maxillofacial surgery is of paramount importance for practitioners in this dynamic field. ChatGPT plays a role in facilitating learning in the realm of oral and maxillofacial surgery. While it does not break down complex surgical techniques or detailed anatomical structures, it can contribute by providing information and insights into the field, helping practitioners to stay informed about emerging trends^[6]. This can benefit both seasoned professionals and trainees by providing a readily accessible source of up-to-date information. The model's ability to process and generate content across various languages can also contribute to a globally connected community of oral and maxillofacial surgeons, facilitating knowledge exchange on an international scale.

Potential concerns and ethical considerations

Although the potential benefits of integrating ChatGPT into oral and maxillofacial surgery are significant, it is crucial to address potential concerns and ethical considerations^[7]. Patient privacy and data security are paramount, and safeguards must be implemented to ensure responsible and secure use of AI tools. Additionally, the ethical implications of relying on AI for decision-making in healthcare settings must be carefully considered. Striking a balance between technological advancements and ethical considerations is imperative to maintaining the trust and confidence of both healthcare providers and patients.

Potential use of AI in research

Apart from ChatGPT's role in patient communication, decision assistance, and ongoing education, it is crucial to acknowledge the wider influence of AI in promoting research in the field of oral and maxillofacial surgery. ChatGPT, a cutting-edge language model, plays a pivotal role in various stages of the research process.

Ideation and Study Elaboration: The ability of ChatGPT to comprehend natural language makes it easier to generate ideas and elaborate on studies. Researchers can input preliminary concepts or research questions, and the model can assist in refining and expanding these ideas based on their extensive knowledge base^[8].

Article Redaction and Consideration of Copyright: During the redaction of research articles, ChatGPT's linguistic prowess proved to be valuable. It assisted in formulating clear and coherent sentences, contributing to the overall structure and readability of the research manuscripts^[9]. Because the model creates text by learning patterns from several sources, it is important to acknowledge the possible risks of copyright issues.

Enhancing efficiency in literature review

The literature review process was expedited by the model's speedy processing and generation of information in several languages^[10], which also helps to foster a more globally linked research community in oral and maxillofacial surgery by keeping researchers up-to-date on the most recent advancements.

Enhanced specificity for oral and maxillofacial surgery (OMFS)

Considering the integration of ChatGPT into the landscape of Oral and Maxillofacial Surgery (OMFS), it is imperative to delve into the unique challenges and intricacies faced by practitioners in this specialized field. Oral and maxillofacial surgeons often encounter complex cases involving a myriad of factors, such as facial trauma, pathology, and dental and skeletal anomalies. ChatGPT, with its natural language processing capabilities, has the potential to address the specific demands of OMFS by assisting in the interpretation of intricate diagnostic information and aiding in the formulation of comprehensive treatment plans.

In the realm of Oral and Maxillofacial Surgery (OMFS), ChatGPT emerges as a powerful tool with the potential to significantly impact decision support, particularly in complex scenarios. For instance, consider a case involving intricate mandibular reconstruction, where precision is paramount to achieve optimal aesthetic and functional outcomes. Here, the ability of ChatGPT to analyze voluminous patient data, interpret medical imaging, and comprehend intricate details becomes crucial, contributing significantly to more informed decision-making^[11].

Extending its application to diverse scenarios within OMFS, we consider another instance involving craniofacial trauma. In cases where a surgeon is confronted with multiple fractures, ChatGPT proves its versatility by processing extensive information, including medical histories, imaging results, and relevant literature^[12]. This model's proficiency in generating timely insights into optimal treatment strategies exemplifies its utility in addressing varied and complex scenarios, demonstrating its potential to enhance precision and decision-making in the field of OMFS.

Comparison with other specialties

While acknowledging the broader applicability of AI technologies across surgical specialties, OMFS presents distinctive challenges. A comparative analysis with otolaryngology, for example, highlights that both specialties often deal with facial structures; however, OMFS involves a unique interplay of dental and maxillofacial considerations. The need for seamless integration with dental data and the close relationship between oral health and facial aesthetics set OMFS apart, demanding a specialized approach to AI integration.

Introduction of relevant evidence

Although the field is still in its early stages of adopting AI technologies, such as ChatGPT, preliminary evidence from related specialties provides insights into its potential benefits. Studies on plastic surgery^[13,14], oral surgery^[15], and craniofacial reconstruction^[16-18] have demonstrated the feasibility and advantages of integrating AI models in decision support. While OMFS-specific evidence is currently limited, these experiences serve as a foundation for exploring the applicability of ChatGPT in our specialized domain.

Focus on OMFS

The choice of OMFS as the focal point of this article stems from its inherent intricacies, unique challenges, and potential for AI technologies to address specialized needs. OMFS is characterized by an

intricate interplay between dental and maxillofacial considerations, necessitating a comprehensive and personalized approach to treatment planning. By explicitly addressing these unique aspects, our article aims to provide valuable insights and solutions tailored to the OMFS community, positioning it as a targeted and relevant exploration within the broader context of surgical specialties.

In summary, the integration of ChatGPT into oral and maxillofacial surgery represents a new era of possibilities. ChatGPT has the potential to be a transformative force from enhancing treatment planning and patient communication to supporting ongoing education in the field. However, as with any technological advancement, ethical considerations must guide the responsible integration of AI into healthcare. As oral and maxillofacial surgery continues to evolve, embracing the potential of ChatGPT as a doctor's right-hand man may lead to more efficient, personalized, and informed patient care, ultimately improving outcomes and advancing the field into the future.

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Conflicts of interest disclosure

All the authors declare that they have no known conflicts of interest in terms of competing financial interests or personal relationships that could have an influence or are relevant to the work reported in this paper.

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