Beyond Conventional Approaches: The Promising Future of Digital Oral Health Solutions

Sir,

This letter is intended to draw attention to the importance of digitisation in the study of oral biology and to examine its recent developments and potential in the future. Digital technology integration has completely changed many facets of healthcare, and oral biology is no exception. This letter attempts to lay out the achievements made thus far and speculate on potential future advancements in this intriguing subject.

In recent years, digitisation has quickly gained momentum, opening up various possibilities for oral biologists to further study, diagnose, treat, and improve patient care. Both patient records and electronic health records (EHRs) have advanced significantly. These digital archives make it easier for people to share, access, and store knowledge about oral health, which promotes open communication and collaboration between experts in the field. EHRs also facilitate thorough patient management by improving diagnosis accuracy, long-term planning, and monitoring.

Another area where digitalisation has made significant advancements is the field of imaging. Digital radiography, cone beam computed tomography (CBCT), and intraoral scanning have fundamentally altered how dental health problems are perceived and comprehended. These developments provide three-dimensional, high-resolution images that enable close examination of the oral anatomy. Additionally, image analysis software and artificial intelligence (AI) algorithms can aid in the identification and early detection of dental problems, facilitating faster patient recovery.1

Digital tools are used in oral biology for more than just speedy diagnosis and treatment. Applications of virtual and augmented reality (VR/AR) have become effective teaching aids.2 With the ability to practice challenging procedures virtually, dental students can now develop their skills and rely less on traditional cadaveric models. In addition, digital platforms offer opportunities for tele-dentistry, allowing for remote consultations and follow-ups, especially in underdeveloped regions with little access to dental care. In the long run, digitisation in oral biology has promising futures. One area of advancement is precision dentistry, which blends modern technology with customised treatment plans. Because of the digital workflows like virtual smile design and computer-aided design and manufacture (CAD/CAM), dental restorations including crowns, bridges, and implants may be made with incredibly high precision and individualisation. The development of bioprinting techniques for the regeneration of oral tissue may also be made possible by advancements in tissue engineering and regenerative medicine, providing patients with complex oral imperfections with new options.

Furthermore, the use of AI and machine learning (ML) methods in oral biology has enormous potential. These tools can aid in the processing of huge quantities of data, making it simpler to identify biomarkers, predict the onset of diseases, and enhance the effectiveness of treatments.3 AI-driven solutions have the potential to enhance healthcare decision-making by providing data-backed suggestions and reducing human error. By enabling precise image detection and analysis, AI techniques have played an instrumental role in revolutionising oral radiology. Through the use of x-ray and intraoral image analysis, these instruments excel at diagnosing dental disorders like cavities and periodontal diseases.4 For instance, in order to treat gum illnesses more precisely and manage oral health as a whole, algorithms interpret pocket depths.5 AI simulations that forecast tooth mobility using 3-D models are useful for orthodontic planning and help orthodontists provide precise treatments. In the field of pathology, AI helps pathologists diagnose oral cancer more effectively by giving them access to extremely accurate assessments of tissue pictures.6 The importance of understanding and addressing the ethical implications of digital oral health solutions matches the growing need to implement AI techniques. Prioritising patient privacy with the goal of ensuring equitable access to AI technologies is crucial. This means adopting robust security protocols and transparent data management practices while ensuring that technological improvements are compatible with individual rights and universal access to healthcare.

Finally, the futuristic method of digitising oral biology has already paved the way for a lot of advancements and is still transforming the field. Digitalisation has a huge potential to improve oral healthcare, from more effective patient management to cutting-edge imaging techniques, VR simulations, and precision dentistry. The results of continued research and development may lead to more advancements, which will undoubtedly revolutionise the market and allow for the creation of more effective techniques for the prevention, diagnosis, and treatment of oral diseases.

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REFERENCES

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