



Editorial

Nanotechnology in Dental Diagnosis

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Over the last decade, nanotechnology has emerged as a key tool in various branches of medicine, and dentistry is no exception. Its application in dental diagnostics has enabled significant advances in the early detection of diseases, improving the accuracy of procedures and optimizing intervention times. From nanoparticles to highly sensitive biosensors, this technology is revolutionizing the way oral health professionals identify and treat oral diseases¹.

One of the main benefits of nanotechnology in dental diagnosis is its ability to help detect diseases in early stages. Nanobiosensors and functionalized nanoparticles have proven highly effective in identifying biomarkers associated with diseases such as dental caries, periodontal disease, and oral cancer. Thanks to these advances, dentists can implement preventive treatments more effectively, reducing complications and costs for patients^{1,2}.

In addition, nanotechnology is facilitating the development of more sensitive and less invasive diagnostic materials. For example, nanosensors incorporated into mouthwashes or dental



adhesives can detect changes in salivary composition that indicate the presence of infections or alterations in the oral microbiota. This real-time monitoring capability provides continuous tracking of oral health, improving the clinical response to potential conditions^{2,3}.

Another expanding field is nanotechnological imaging, in which contrast nanoparticles are used to enhance the quality of dental X-rays in conjunction with computed tomography, enabling more detailed visualization of anatomical structures and incipient lesions. This not only facilitates more accurate diagnosis but also reduces the need for invasive exploratory procedures¹.

However, despite promising advances, the implementation of nanotechnology in dental practice also faces challenges. Factors such as the regulation of new materials, production costs, and acceptance by the dental community and patients must be addressed to ensure its widespread adoption.

In conclusion, nanotechnology represents the future of dental diagnostics. Its ability to detect diseases in their early stages, improve the quality of diagnostic images, and develop real-time monitoring tools is transforming modern dentistry. With the continued advancement of research and the development of new applications, nanotechnology holds promise to enhance dental care and ultimately improve the quality of life for patients.

BIBLIOGRAPHIC REFERENCES

1. Joseph B. Nanotechnology in oral and dental diagnosis. In: Thomas S, Baiju RM (eds). *Nanomaterials in dental medicine* (pp. 33-49). Singapore: Springer, 2023. (Series *Materials horizons: from nature to nanomaterials*). DOI: https://doi.org/10.1007/978-981-19-8718-2_2
2. Sharifi S, Vahed SZ, Ahmadian E, Dizaj SM, Eftekhari A, Khalilov R, et al. Detection of pathogenic bacteria via nanomaterials-modified aptasensors. *Biosens Bioelectron.* 2020; 150: 111933. DOI: <https://doi.org/10.1016/j.bios.2019.111933>
3. Glowacka-Sobotta A, Ziental D, Czarczynska-Goslinska B, Michalak M, Wysocki M, Güzel E, et al. Nanotechnology for dentistry: prospects and applications. *Nanomaterials.* 2023; 13(14): 2130. DOI: <https://doi.org/10.3390/nano13142130>