Editorial

Nanorevolution: Trends and future perspectives

In the ever-evolving landscape of modern dentistry, the integration of cutting-edge technologies has become pivotal in transforming traditional practices. One such revolutionary stride has been witnessed in the realm of conservative dentistry and endodontics through the advent of nanoparticles. As research continues to unfold the vast potential of these tiny wonders, it is evident that we are now standing at the brink of a Nano-Revolution that is about to reshape the future of oral health care on an international scale.[1]

The study conducted by Zakrzewski *et al*.[1] shed light on the remarkable strides made in utilizing nanoparticles to enhance the precision and efficacy of conservative dental procedures. From restorative dentistry to root canal therapy, the impact of nanoparticles is proving to be a game-changer, promising a paradigm shift in the way we approach dental treatments.

The core strength of nanoparticles lies in their ability to reach microscopic spaces, allowing for a level of precision, previously unattainable. In endodontics, this property becomes particularly valuable during root canal procedures, where thorough disinfection and sealing of the canal system are paramount. Nanoparticles, with their superior penetration ability, ensure comprehensive elimination of bacteria and debris, as demonstrated in a study conducted by Balsaraf *et al*.[2] where the examination of the antibacterial and antibiofilm efficacy of different cationic nanoparticles such as chitosan and silver, for root canal disinfection was done, thereby reducing the risk of posttreatment complications and promoting long-term success.

Furthermore, the incorporation of nanoparticles in dental materials has revolutionized restorative dentistry. Researchers have successfully incorporated nanoparticles into composites, adhesive systems, and dental cement like glass ionomer and endodontic sealers to improve the mechanical properties, wear resistance, and esthetics.[3,4] Mineral trioxide aggregate reinforced with nanoparticles as demonstrated by Bichile *et al*.[5] and Samiei *et al*.[6] have led to an enhancement in the physical properties of the material. Nanotechnology has been shown to not only extend the lifespan of dental restorations but also elevate the overall patient experience by providing durable and aesthetically pleasing restorations.

Beyond their mechanical prowess, nanoparticles have displayed remarkable antimicrobial properties, mitigating the risk of secondary infections. This is particularly significant in conservative dentistry, where preventing bacterial infiltration is crucial for the preservation of natural tooth structure. The potential to create nanomaterials, as demonstrated in a study conducted by Jhamb *et al*.,[7] with inherent antibacterial properties opens up new avenues for the development of restorative and endodontic materials, which include irrigants, intracanal medicaments, and gutta-percha coated with nanoparticles, all of which actively contribute to the success of root canal treatment.

The International dental community must embrace this Nano Revolution with open arms, recognizing its transformative impact on treatment modalities and patient outcomes. Collaborative efforts between researchers, clinicians, and industry professionals are essential to further explore the diverse applications of nanoparticles in conservative dentistry and endodontics. International conferences and symposiums should provide a platform for sharing findings, and fostering innovation for establishing global standards for the incorporation of nanoparticles into routine dental practice.

As we navigate the uncharted waters of this Nano Revolution, it is crucial to remain vigilant about the ethical implications, safety considerations, and long-term effects of nanoparticle use in dentistry. Rigorous research and comprehensive clinical trials will be instrumental in ensuring that the promises of nanoparticles translate into tangible benefits without compromising patient well-being.

In conclusion, the incorporation of nanoparticles in conservative dentistry and endodontics marks a pivotal moment in the evolution of dental care. As we stand on the precipice of a new era in dentistry, the integration of nanoparticles promises to be the catalyst for innovation, precision, and improved oral health on a truly global scale.

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