www.sada.co.za / SADJ Vol. 80 No.9

Personalised Dentistry and Genomics: A Vision for the Future of Oral Health Care

SADJ OCTOBER 2025, Vol. 80 No.8 P466-P467

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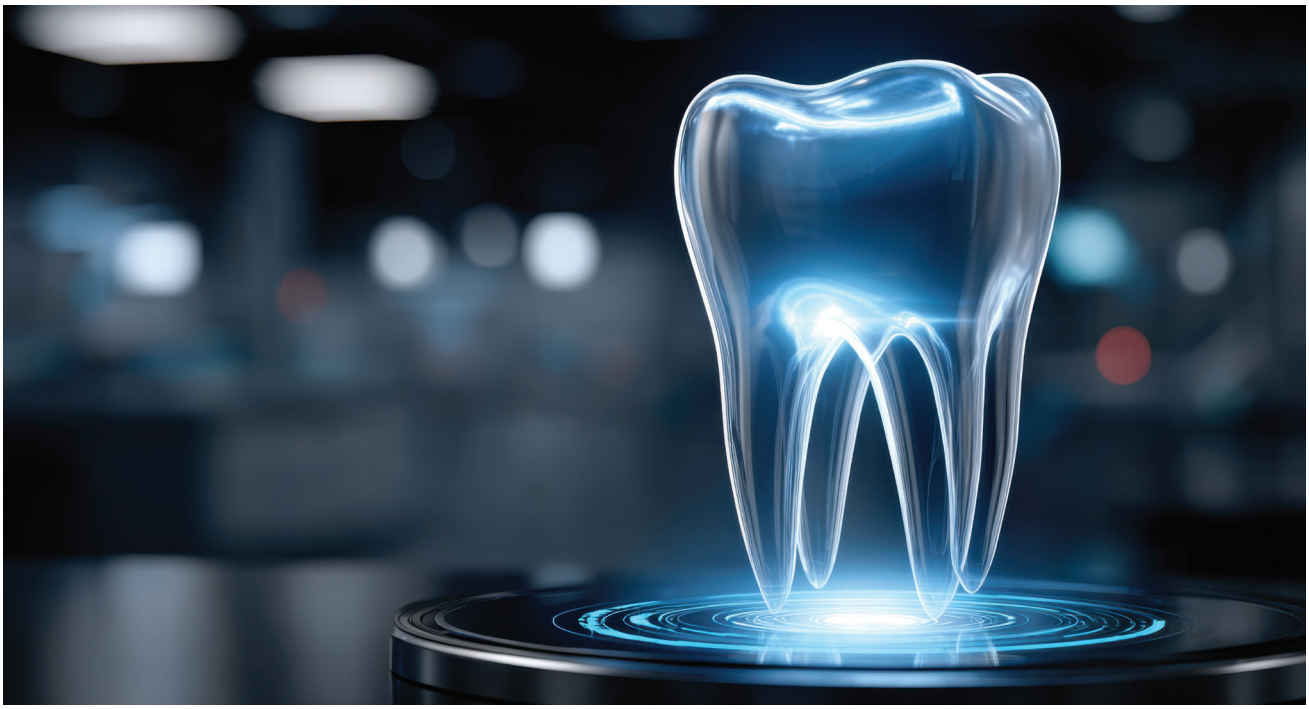
One revolutionary development that sticks out as we consider dentistry's future is the use of genomics in dental treatment. Genetic science advancements are making it possible to move away from a one-size-fits-all strategy and towards one that customises therapy for each patient. This development, sometimes known as precision or personalised dentistry, holds great potential for bettering patient outcomes by providing a route to more focused prevention, precise diagnosis, and customised treatment regimens.

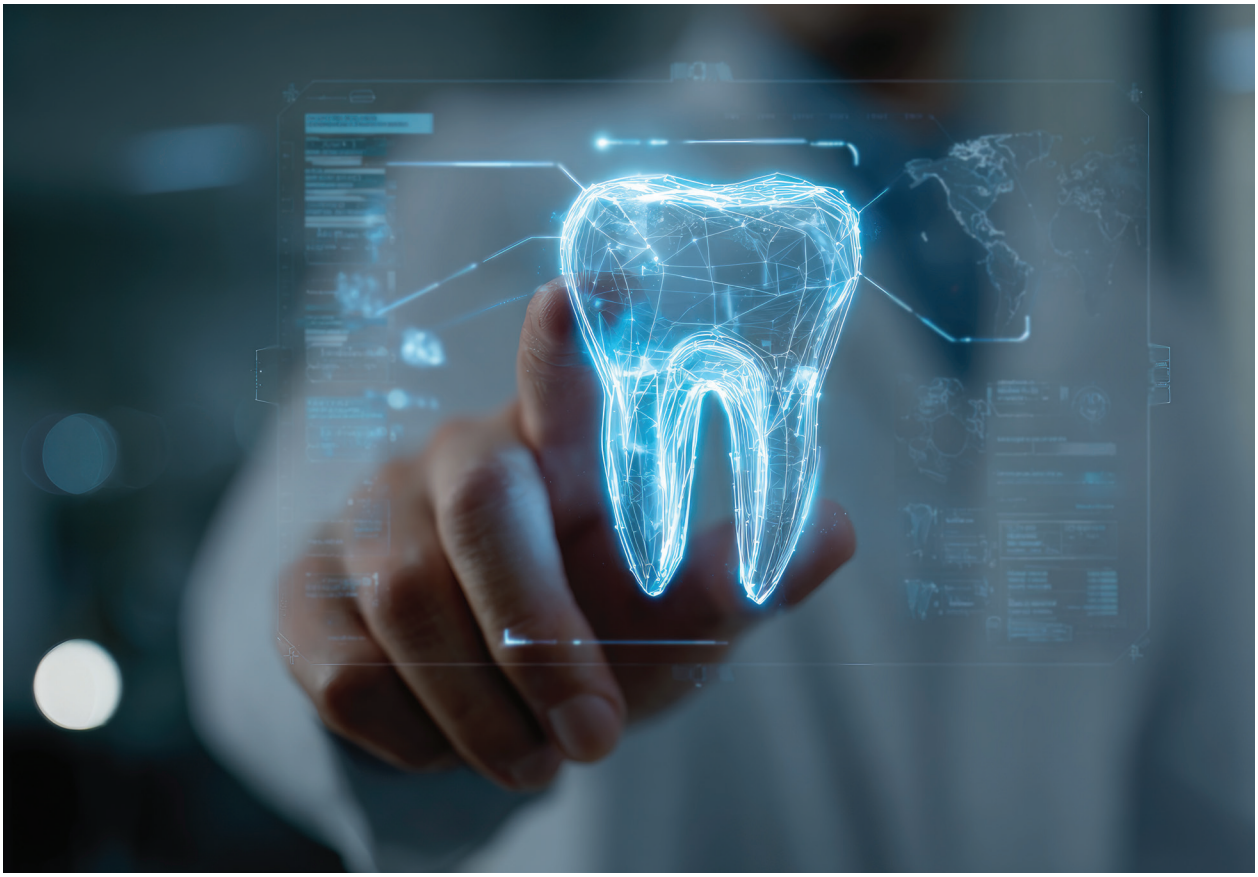
The Rise of Genomics in Dentistry

Understanding the genetic underpinnings of many medical illnesses, including oral diseases, has advanced significantly thanks to genomic research. In the past, dental care has mostly addressed symptoms rather than underlying causes by following standardised treatment methods. Dentists are already starting to determine patients' genetic susceptibilities to particular ailments, like dental caries, periodontal disease, and even some forms of oral cancer, thanks to the integration of genomics (Wong et al., 2021). For example, genetics plays a role in the development of periodontal disease, one of the most prevalent and complicated oral health issues. According to research, some DNA variations can make people more susceptible to periodontal disease, which can result in long-term inflammation, bone loss, and even tooth loss if left untreated (Kornman, 2018). By identifying these signs, early interventions and individualised care strategies may be able to slow the progression of the disease.

Predicting and Preventing Disease through Genetic Markers

Perhaps the most intriguing feature of personalised dentistry is the ability to anticipate danger and take preventative measures before a disease appears. Proactive measures that extend beyond the conventional area of dental care are made possible by genetic markers, which offer insightful information about a patient's risk profile. For instance, more intense preventive measures like fluoride varnishes, sealants, and specialised oral hygiene regimens may be beneficial for patients who have been found to be genetically prone to dental caries. Especially in high-risk patients, this strategy can dramatically cut the incidence of cavities, improving dental health outcomes and possibly reducing treatment costs over time. Likewise, genomics presents encouraging developments for the treatment of diseases of the temporomandibular joint (TMJ). A higher risk of TMJ issues has been linked to abnormalities in specific genes, according to research. Dentists can monitor and treat these cases more proactively by knowing a patient's genetic risk, which could improve the quality of life for patients who suffer from these frequently incapacitating illnesses (Smith et al., 2020).





Personalised Treatment Planning: The Future of Dental Care

Genomic-based personalised treatment planning has the potential to significantly alter the dental care industry. Instead of depending just on general recommendations, treatment plans can be customised to meet the unique requirements of each patient once genetic markers have been found. Individual response profiles may necessitate more regular periodontal maintenance visits, specialised cleanings, and potentially supplementary therapy such as antibiotics or anti-inflammatory drugs for patients with a genetic susceptibility to aggressive periodontitis.

Furthermore, pharmacogenomics—the study of how a person's genes influence how they react to medications—is becoming a crucial tool in dentistry. Drug prescriptions can be guided by pharmacogenomic insights, guaranteeing that patients receive drugs that are both efficacious and compatible with their genetic profiles. Pharmacogenomics is an essential part of individualised dental care since it lowers the risk of negative reactions and increases overall treatment efficacy (Van Dijk et al., 2019).

Ethical Considerations in Genomic Dentistry

Despite the obvious advantages of genetics in dentistry, there are also moral questions. Concerns regarding data security and privacy are raised by the gathering and storing of genetic data, especially when sensitive data like genetic predispositions is involved. As medical practitioners, it is our responsibility to make sure that strong data protection procedures are in place to protect patient privacy and gain their confidence in the responsible use of genetic information. Furthermore, accessibility issues may arise due to the expense of genomic testing. Only those who can afford genetic testing will benefit from these cutting-edge interventions, and if personalised dentistry is not properly managed, it may worsen health disparities. As leaders in the dentistry field, it is our responsibility to promote laws and procedures that guarantee everyone, regardless of financial situation, fair access to individualised care.

Charting a Path Forward for Personalised Dentistry

Although the use of genetics in dentistry is still in its infancy, there is a lot of promise for improvement. By encouraging research, funding training programs, and supporting legislative frameworks that make it easier to incorporate genetics into clinical practice, the South African Dental Association (SADA) is dedicated to advancing personalised dentistry. By doing this, we may set the stage for more proactive, effective, and patient-centered dental care in the future. The application of genetics in dentistry presents an intriguing future for us to envision. We have the chance to revolutionise oral healthcare through personalised dentistry by providing precisely customised therapies that cater to the individual needs of every patient. In addition to improving the standard of care, adopting these innovations brings us one step closer to a future in which everyone can attain ideal dental health. At SADA, we want to remain on the cutting edge of these advancements and make sure that our members have the skills, resources, and encouragement they need to succeed in this new dental care era. Even though personalised dentistry is still in its infancy, it has the potential to completely transform oral health.

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