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A Public Health Perspective on Personalized Gingival and Periodontal Health

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ABSTRACT:

Background: We look at individualised periodontics from the standpoint of public health. Whether or not they are patients inside a health-care system, everyone may be healthy by establishing and maintaining the conditions and circumstances necessary for this to happen. One of the most common causes of tooth loss and a disorder with a modest prevalence is periodontitis, for which the idea that everyone is susceptible has long been debunked. Even though plaque must exist, it is unknown which individuals may eventually develop periodontitis. It is not well known how the contributing processes work in this process. Periodontitis is currently thought to be the body's immunological reaction to plaque, which involves a complicated interaction of plaque composition, genetic make-up, general health, lifestyle factors, and social factors. Plaque clearance alone may be sufficient to avoid periodontitis despite its complicated origin and progression. Severe periodontitis is the sixth most prevalent chronic inflammatory illness in the world, yet only many people with periodontitis are unaware that they have it because it rarely hurts. It can cause considerable morbidity and financial hardship if neglected.

Periodontitis is a serious and underappreciated public health issue. The study, teaching, and practise of periodontology may be revolutionised through individualised periodontics. Early breakthroughs in diagnostic and prognostic testing using non-invasive samples, such saliva and gingival fluid, are encouraging. These could aid in pinpointing the individuals with gingivitis who will eventually develop periodontitis. Contrarily, people who are most

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susceptible to periodontitis are also the least able to pay costly clinical treatments. On the one hand, periodontal health can be attained simply by effective daily personal plaque control and quitting smoking. On the other hand, high-cost, cutting-edge scientific developments in periodontics are extremely important and vital.

Keywords*:* Periodontitis, Periodontology, Public Health

INTRODUCTION:

The search for a "magic marker" that may pinpoint people with a high risk of developing periodontitis has long piqued curiosity. Hirschfeld & Wasserman's widely cited retrospective cohort studies and a string of studies by McGuire & Nunn have shown that it is impossible to predict which teeth or sites will experience periodontal decay, even in patients who consistently comply with their clinicians' advice to maintain good plaque control and schedule regular maintenance appointments. Other efforts to create a risk-assessment profile have come up short in terms of their applicability. The most well-known tool for resource allocation and recall interval determination is the Periodontal Risk Assessment, which was created to classify patients based on their average risk levels. [19] The extra benefits of this tool for patient care and therapy are still unknown, hence its use in the clinical setting has been constrained. [10] In general, periodontology's current susceptibility/risk-assessment techniques are still in the early phases of development.

In this context, tailored periodontics is the sector where the most cutting-edge research is being conducted to identify those who are most susceptible to developing and worsening periodontitis. Simply put, it entails using biomarkers to predict susceptibility to periodontal disease, select the best course of action, and improve treatment outcomes. [1] Such a strategy is founded on the medical model, the dominant orthodoxy in healthcare, which places the emphasis on biological (pathological) explanations for bodily aberrations [2]. Its underlying tenet is that people can only maintain their health by accepting the "patient role" and submitting voluntarily to the diagnostic and therapeutic interventions of the various healthcare professionals. This stratified, tailored, and/or precision medicine method is also referred to as "personalised medicine." [2, 3] The phrase was first used in relation to genetics, but it has since come to cover a wide range of individualised data, including the molecular or cellular causes of health and disease.

It could be argued that the medical and dental fields have always practised personalised medicine because professionals regularly take a patient's age, sex, family history, lifestyle, psychosocial needs, and economic situation into account when determining a diagnosis, designing a treatment plan, and determining their prognosis. However, by modern standards, this conventional approach to patient diagnosis and care is, at best, empirical. It is still a "one-size-fits-all" strategy despite being supported by some data. For instance, broad-spectrum systemic antibiotics are frequently used as the first line of treatment for bacterial infections. In terms of efficiency or safety, this pharmacological regimen is not the best one (for reasons

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such as drug resistance or adverse patient reactions). Based on unique biomarkers, personalised medicine would allow patients to receive the most efficient and secure therapeutic agent as their initial course of treatment (immunological, genetic or epigenetic). By properly establishing a custom plan for each individual patient, such an approach could maximise clinical outcomes, cost effectiveness, and patient happiness. [16] Although the process of research, development, and clinical implementation takes time and money, there are already many examples of customised medicine in use today.

An emerging parallel concept in periodontology

Personalized periodontics is a newly developed parallel concept in periodontology that aims to assess disease activity in real-time and forecast therapy success and post-treatment stability. [12-13] In this idea, doctors could focus on patients before the onset of disease rather than waiting for a change of more than 2 mm of attachment loss before a certain site may be regarded to have progressed. [14] Therefore, patients could undergo a chairside test to decide whether (for instance) the use of antibiotics or a regenerative strategy is the best initial approach instead of employing nonsurgical debridement as the first line of care. Costs, ethical and legal difficulties, as well as potential social problems like insurance and data ownership, are all present in this subject. Although personalised periodontics is still in its infancy, its application is approaching reality. [15] It should be incorporated into standard periodontal practise during the following ten years.

However, because it would only focus on those who requested assistance, individualised periodontics is ineffective at improving periodontal health at the community level. Dental care consumption varies widely depending on socioeconomic status, ethnicity, and even sex. Any able-bodied individual should be able to execute efficient brushing and interproximal cleaning, which are essential for maintaining periodontal health. [16-17] The long-term preservation of periodontal health also includes an important role for professional oral care. [18] Unambiguous data show that among patient groups who are periodontally susceptible, frequent professional dental visits and superior at-home oral hygiene techniques are useful in achieving periodontal stability and tooth durability. [15-19]

The cherry-picked subjects, who were highly motivated and received state-of-the-art treatment, were adhering to a prescribed stringent recall routine and maintained impeccable dental cleanliness, which is a significant caveat of those findings' lack of generalizability. The reported long-term retention of patients on maintenance programmes in private periodontal practise is low (40% in the first year with an attrition rate of 10% every year thereafter); even high fee-paying specialist practise patients frequently do not heed professional recommendations. The majority of the general population struggles frequently to maintain adequate and long-lasting plaque control, and the longer-term oral health effects of that struggle can be severe. [20] Smoking prevalence has been progressively dropping in affluent nations since 1976; in New Zealand, it dropped from 36% to 16% between 2014 and 2015. [20] And in the USA, from 34% to 18% between 1978 and 2013. [16] Alarmingly, despite

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the fact that smoking rates have mostly decreased among the wealthiest, socioeconomic disparities in smoking prevalence have significantly increased. Similar to this, groups with higher socioeconomic positions have higher leave rates, but groups with lower socioeconomic positions see little to no change. [17-19]

As a result, in New Zealand, residents of the poorest neighbourhoods have the highest frequency of current smokers (28%), while residents of the richest communities have the lowest proportion (8%). [18] The prevalence of periodontitis in that nation reflects these disparities. 77 Significant correlations with other dental health-related activities, like self-care, were also found. Three different paths of plaque control were identified in a 40-year birth cohort study (n = 1037) conducted in New Zealand to evaluate longitudinal trends in plaque control. Only 39% of the cohort had plaque levels that improved steadily with age, and this group not only had significantly better periodontal and dental health by the time they were 32, but was also more likely to regularly visit a dentist as they got older. About 12% of people had high plaque levels that got worse over time, while 50% of the cohort's plaque levels showed no improvement. This problem is not unique to New Zealand's somewhat "Darwinian" system of adult dental care, which prohibits the State from funding routine dental care after a person turns 18. [14]

Findings

In light of these findings, it's critical to recognise that the worse dental health of those who are less fortunate is not due to their own personal negligence. In reality, the only factor related with a lack of access to dental care in that Swedish study was a financial one; other factors, including a fear of the dentist or the disappearance of pain, were not included. Other research have demonstrated that personal neglect in lower socioeconomic position groups does not account for social differences in oral health. The socioeconomic gradient in oral health was not explained by dental attendance or self-care practises in a sample of 3678 dentate Australian adults. [19] Although missing teeth were significantly associated with socioeconomic status, even after controlling for dental behavioural factors, this association persisted (routine check-ups, episodic visits, brushing and flossing).

The same results were shown by data from the third US National Health and Nutrition Examination Survey 1988–1994. People in the lowest socioeconomic position were about five times more likely to have periodontitis than those in the highest socioeconomic position, even after accounting for all health-related behaviour markers (smoking, dental visits, and fruit and vegetable eating). [19] Other oral parameters like gingival bleeding and perceived oral health also showed similar relationships. Even after accounting for all activities, income and education remained significant predictors of almost all oral health indicators, indicating that there is a relationship between socioeconomic status and oral health that is unrelated to health habits. In fact, a recent study showed that institutional "classism" is established in healthcare and that the way dental caries were treated was greatly influenced by socioeconomic status. Mejia et al. [20] used data from the Australian National Survey of

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Adult Oral Health 2004–2006 to discover that, although mean decayed, missing, and filled teeth (DMFT) scores showed a modest socio-economic position difference in overall disease experience, a distinct social gradient was visible when the DMFT index's individual components were examined. The lowest income group had a significantly higher percentage of decayed teeth than the highest income group (34.5% vs 13.9%), more teeth were "missing" (83% vs 66%), and fewer teeth had been filled in the lowest income group than in the highest (7.7% and 9.7%, respectively). Untreated degradation showed the biggest differences, with lower income groups bearing the majority of the burden of untreated illness and treatment requirements. Even though they did not look into periodontal therapy in that study, the results probably would have been the same.

The whole idea of personalised periodontics is based on the presumption that patients will arrive for some type of screening in a timely and appropriate manner, be diagnosed, and then receive a treatment plan that is most likely to be able to restore their periodontal health. Our biggest criticism of this strategy is that, in most health systems throughout the world, it is likely to only be available to the social strata who can afford it, and those who need this intervention the most will continue to have the lowest chances of being able to receive it. Personalized periodontics is therefore likely to be a niche service for a limited fraction of the adult population, similar to the situation with adult dental care in nations like New Zealand.

CONCLUSION:

In conclusion, individualised periodontics may fundamentally alter how we see, study, and use periodontology. Early breakthroughs in diagnostic and prognostic testing using non-invasive samples, such saliva and gingival fluid, are encouraging. These could aid in pinpointing the individuals with gingivitis who will eventually develop periodontitis. Contrarily, people who are most susceptible to periodontitis are also the least able to pay costly clinical treatments. On the one hand, periodontal health can be attained simply by effective daily personal plaque control and quitting smoking. On the other hand, high-cost, cutting-edge scientific developments in periodontics are extremely important and vital. Focused strategies have been developed to improve oral health and reduce disparities since the World Health Organization finally formally integrated oral health into its chronic disease prevention programme in 2003. These include supporting a global health governance framework, promoting a healthy lifestyle, promoting oral health for those most vulnerable in the community (such as schoolchildren and older people), water fluoridation, and oral health research. The main issue will be to transform cutting-edge technology, like tailored periodontics, into resources that are pertinent to public health and to make them widely available.

Conflicts of interest

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