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Over the past 20 years there have been some exceptional advances made in periodontology. Many of these have led to changes in our thinking and our approach to periodontal therapy. In 1999, the American Academy of Periodontology (AAP) devised a "new" classification system for the periodontal diseases. From this some 50 different types of periodontal conditions were identified which were considered worthy of individual classification. Clearly this was an unwieldy system and in reality it was dis-tilled down to three main types of plaque-associated periodontal diseases: gingivitis, chronic periodontitis and aggressive periodontitis.

While the appropriateness of the terms "chronic" and "aggressive" have been debated they have served as a framework for both clinicians and researchers to define specific types of periodontal disease with identifiable clinical parameters. It also provided a framework for understanding management protocols and outcomes. Nonetheless, over time it has become evident that such a classification system (chronic and aggressive) may be too simplistic because of the heterogeneity of the periodontal diseases. Therefore, it may be timely to revisit such a classification system and determine whether current understanding of the epidemiology and pathology of these diseases can be used to better define them.

However, it is worth noting that in the past 25 years there have been at least 10 different classification systems proposed, none of which have been fully adopted. Clearly there remain a number of important challenges in this field. Since chronic and aggressive periodontitis are heterogeneous groups of diseases, for example, there will be unique subcategories based on their multifactorial nature based of microbial, host response and thinking of how the subgingival microbiota interacted not only with itself but also the host. Notwithstanding this, research through the 1990’s and 2000’s began to question the role of the biofilm and its component bacterial consortia in the overall process of development of periodontitis. While it was very clear that periodontitis cannot, and periodontitis cannot be caused by the absence of bacteria, it was becoming increasingly obvious that clinically there were some patients who, despite the presence of considerable plaque deposits, had become very compelling, indeed the relevance of oral health to overall health and general well-being was recognised by the US Surgeon General in a landmark publication titled "Oral Health in America". This document for the very first time articulated the importance of oral health in an holistic approach to medical care. Despite the title, it was clearly not a global scene from this the concept of periodontal medicine gained further traction and its central hypothesis stated that periodontal infection and environmental components. At present, apart from "plaque-associated" designation, the current AAP classification is not based on cause-related criteria.

Recognition that bacteria are necessary but not sufficient for periodontitis to develop

During the 1990’s a very important conceptual advance occurred in our understanding of dental plaque and its interaction within the subgingival environment. The recognition that subgingival plaque existed as a biofilm with its own microenvironment and communicative properties changed our did not develop periodontitis. On the reverse it was also evident that any plaque, which had very minor visible deposits of plaque yet developed very advanced and destructive periodontitis.

These observations led to a major paradigm shift in periodontology in which it was realised that although plaque was necessary for periodontitis to develop, it was not sufficient for it to develop. Indeed it became evident that in addition to dental plaque, environmental and host response factors were critical for the clinical manifestation of periodontitis. With this came a new more informed management process for our patients which suggested that in addition to management of oral hygiene patients must be assessed for other factors which would lead to the development of periodontitis and these must be controlled in order for treatments to be successful. Indeed, it is now recognised that dental plaque (and its constitutive elements) accounts for only 20 per cent of the risk for developing periodontitis and thus the other 80 per cent of modifying and predisposing factors must be taken into account when diagnosis and treating the periodontal diseases.

Development of the sub discipline of Periodontal Medicine

The term “Periodontal Medicine” was first proposed by Offenbacher in 1997 as “a broad term that defines a rapidly emerging branch of periodontology focusing on new data establishing a strong relationship between periodontal health or disease and systemic health or disease”. It arose with the emerging evidence suggesting that a number of systemic conditions and periodontal disease were inter-related. By 2000 the evidence that oral health and systemic health should not be separated

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environmental conditions surrounding the periodontal treatment of intrabony pockets of bone transplantation in the oral cavity and the development of biological or clinical plausibility. It looks promising but no doubt work still to be done significant progress has been achieved in the past decade.

Diabetes is now well recognised to be a significant risk factor for development of periodontitis and conversely periodontitis has become considered to be a significant modifying or risk factor for glycaemic control in diabetes. Other conditions for which there is good evidence to support interrelationships with periodontitis include cardiovascular disease, rheumatoid arthritis, obesity and renal disease. It remains to be established whether treatment of periodontitis has any impact on systemic conditions but there is emerging evidence to indicate this may be the case for diabetes, cardiovascular disease, rheumatoid arthritis. Unfortunately, this has become an opportune field of research and to date some 58 conditions have been claimed to fall within the periodontal disease/systemic disease axis, most of which have little or no biological or clinical plausibility.

Understanding that periodontal regeneration is biologically possible

Regeneration of damaged periodontal tissues as a result of periodontitis has been considered the ultimate goal of periodontal treatment. Over the decades many procedures have been advocated, mostly associated with root surface conditioning and implantation of bone substitutes into periodontal defects as a means of obtaining periodontal regeneration. Unfortunately, these early concepts were naïve owing to a poor understanding of the requirements for periodontal regeneration, namely the encouragement of new cementum, bone and periodontal fibres. Filling a periodontal defect with a substance which had no relevance to the normal anatomy of bone in bone rather than studying the natural healing processes required to regenerate the periodontal attachment apparatus. Ignorance of the contribution of the various tissue components in periodontal wound healing explained the widespread misuse of different implantation in the treatment of intrabony pockets which unfortunately still pervades some areas of periodontology.

It is now recognised that regenerative treatment of periodontal defects with an agent or procedure, requires that each functional stage of reconstruction be ground in a biologically directed process. With such complex approach general studies of Karring, Nyman and coworkers from Gothenburg in Sweden led to the development of guided tissue regeneration (GTR) as a treatment modality. While this additive approach did advance it became evident that while periodontal regeneration and bioactivity was clinically very difficult to achieve on a reliable basis owing to a vast range of patient and operator variables.

More recently we have seen the development of biological agents and preparations which, when applied onto root surfaces, can result in significant regeneration of damaged periodontal tissues. The use of such agents offers an alternative approach to periodontal regeneration with equivalent, and sometimes superior, results compared to GTR procedures. However, as has been noted for GTR, the clinical outcomes using biological agents can be variable and further work is needed to improve their clinical utility. Moreover, the use of mesenchymal stem cells and genetic modulation of periodontal cells have been explored for the purposes of achieving periodontal regeneration. The future looks promising but no doubt there is a considerable amount of work to be done before reliable and predictable periodontal regeneration becomes a reality.

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