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Prelations in Periodontics- A quest.

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Abstract: *Advances in periodontal science and practice over the last decade have radically changed the understanding of periodontal diseases and have opened new, exciting prospects for both medical and surgical therapy of periodontal diseases. Establishment of the aetiology and pathogenesis of periodontitis, understanding of the unique genetic and environmental susceptibility profile of affected subjects, and recognition of the systemic implications of periodontal infections are the key research findings.*
Key words: *Periodontics, Periodontal treatment, Lasers, Tissue engineering*

I. Introduction

Periodontics is a dental specialty concerned with the prevention, diagnosis, and treatment of functional and structural diseases of the periodontal membrane and related tissues that surround and support the teeth. Degeneration or inflammation of these tissues can be caused by various systemic or local diseases or by poor oral hygiene. In some cases the cause is not established. Most commonly, periodontal diseases are caused by hardened bacteria, called bacterial plaque, which adheres to teeth and destroys periodontal tissue. The most prevalent periodontal disease is periodontitis, inflammation of the periodontium. If untreated, periodontitis leads to resorption of the portion of the jawbone that supports the teeth.

AAP treatment guidelines stress that periodontal health should be achieved in the least invasive and most cost-effective manner. A new study published in the American Academy of Periodontology's Journal of Periodontology found another reason to maintain healthy teeth and gums. Researchers found that gum disease, also called periodontal disease, can significantly impact a person's quality of life.

The study, titled "Impact Of Periodontal Disease Experience On Oral Health-Related Quality Of Life," found that those with periodontal disease (as indicated by bone loss) experienced a worse oral health-related quality of life, including functional limitation, psychological discomfort, and social disability. Many had difficulty pronouncing words, and experienced a decline in tasting the flavor of and eating foods. In addition, sufferers of periodontal disease reported feeling insecure, tense, embarrassed, and irritated, often finding it difficult to relax and do normal daily activities. Our understanding of the etiology, diagnosis, and treatment of the periodontal diseases is continuously evolving. Periodontology in the year 2013 is different than what it was some years ago, and the specialty will be different in the future. Assessment of patients will be more specific, and the development of risk profiles will allow identification of individuals who require greater or lesser amounts of care. Therapy can then be directed to the specific needs of each patient. Surgical periodontics will be focused on regeneration, not resection. Lastly, as patients continue care on a maintenance schedule, their status will be assessed by sensitive tests that will predict the onset of an active phase of disease so that appropriate interceptive treatment can be provided.[1] Many new technologies have been developed or are being developed that could enhance the ability to diagnose, predict, and treat periodontitis. Newer treatment strategies may allow clinicians to achieve limited or more robust regeneration of the periodontium. New or refreshed approaches to disease control are being pursued that will benefit those suffering from chronic periodontal disease. In addition to novel therapeutics, there has been increasing focus on the development of more sensitive and specific diagnostic tests for periodontal diseases. Such tests will allow the clinician to determine whether a patient has active disease and what sort of attachment loss might be expected if the patient is not treated. By developing newer diagnostic tests, it also may be possible to detect and monitor active disease during therapy.[2]

Periodontitis affects a subset of the population and our current thinking is that progression of periodontal disease may be either continuous or cyclical. These features make screening and diagnostic tools desirable in the management of this disease. Although many potential markers exist, several difficulties hamper our ability to declare them diagnostic tests with proven utility. The 'gold standard' for active periodontal disease is not available and inflammation due to gingivally confined lesions (gingivitis) and periodontal inflammation which results in attachment loss is a potential confounder of any test based on assessing the host response elements of the disease. Although much is written about the need for markers of current or future disease which will prevent us from overtreating pockets, the time, effort and cost involved in testing these sites has to be

balanced against the relative ease and speed of routine therapy such as root planing. In addition, we are still some way from the development and validation of reliable host or microbial testing methods. In terms of screening tests for diseases such as the early-onset forms of periodontitis, the research and development on diagnostic tools involving genetic polymorphisms, specific genes, systemic antibodies or leucocyte cell surface markers of the patients, may become a clinical reality in time. One could envisage chairside tests using blood from thumb pricks being capable of determining a young individual's risk of developing disease at a later age, and thus the need for a timely prevention programme. Before applying any test we should reconsider what treatment planning effects a positive or negative result will have, and any test which does not influence the treatment plan is redundant. Whether periodontal diagnostic tests will be developed which will indicate to the clinician the need for various treatment regimes other than root planing, is still an open question. Periodontal diagnostic tests are still at an early stage of development and much work remains to be performed to fully validate their utility such that they become an important and cost effective aspect of clinical treatment planning, screening or patient monitoring.[3]

Tissue Engineering..

Based on an extensive review of the latest literature concerned, analyses and evaluation of the method of the periodontal tissue engineering are done. The development of the periodontal tissue engineering in the fields of the seed cells, modifier genes, cell factors, and scaffold materials provided a brand-new thinking and method for complete regeneration of the periodontal tissues. The periodontal tissue engineering has an excellent future but many problems still require a further study and a satisfactory solution.[4]

Newer approaches!

Regenerative procedures using barrier membrane technology are presently well established in periodontology and implantology. Guided Tissue Regeneration (GTR) and Guided Bone Regeneration (GBR) are based on the premise that barrier membrane materials will promote selective cell re-population and subsequent reconstitution of the periodontal attachment apparatus as well as bone. However, because the predictability of these techniques can be variable, the application of this technology may frequently be restricted to specific case types. There has been increasing interest in the possibility of pharmacologically enhancing regeneration of periodontal and osseous tissues, thereby ultimately providing a more significant and predictable clinical outcome. Bone Morphogenetic Proteins (BMPs) have been isolated, cloned and evaluated in various pre-clinical and clinical models. The results of recent studies involving regeneration of alveolar bone in conjunction with implant therapy and regeneration of PDL attachment with BMPs have been very encouraging. In particular, rhBMP-2 has been shown to promote a degree of osseous and periodontal repair which is significantly greater than that previously seen with conventional GTR/GBR therapies and/or the use of various osseous grafting materials.[5]

Cell and Gene Based therapeutic approaches

Inflammatory periodontal diseases are a leading cause of tooth loss and are linked to multiple systemic conditions, such as cardiovascular disease and stroke. Reconstruction of the support and function of affected tooth-supporting tissues represents an important therapeutic endpoint for periodontal regenerative medicine. An improved understanding of periodontal biology coupled with current advances in scaffolding matrices has introduced novel treatments that use cell and gene therapy to enhance periodontal tissue reconstruction and its biomechanical integration. Cell and gene delivery technologies have the potential to overcome limitations associated with existing periodontal therapies, and may provide a new direction in sustainable inflammation control and more predictable tissue regeneration of supporting alveolar bone, periodontal ligament, and cementum.[6]

Lasers

Advances in technology are changing the ways that patients experience dental treatment. Technology helps to decrease treatment time and makes the treatment more comfortable for the patient. One technological advance is the use of lasers in dentistry. Lasers are providing more efficient, more comfortable, and more predictable outcomes for patients. Lasers are used in all aspects of dentistry, including operative, periodontal, endodontic, orthodontic, and oral and maxillofacial surgery. Lasers are used for soft and hard tissue procedures in the treatment of pathologic conditions and for esthetic procedures.[7]

Clinical lasers are of two types. Soft lasers are essentially an aid to healing, with relatively few rigorous studies available to support their use. Surgical hard lasers, however, can cut both hard and soft tissues, replacing the scalpel and drill in many areas. After initial experiments with the ruby laser, most clinicians have been using argon, carbon dioxide, and now Nd:YAG systems. The first dental laser based on a Nd:YAG engine provides handpieces of similar size to conventional instrumentation, and being fed by a fibre-optic "cable," has the flexibility for intra-oral use that the carbon dioxide lasers, widely used in oral surgery, lack. Furthermore,

extensive clinical investigation has demonstrated their safety in clinical practice, and the fact that procedures can usually be performed without a local anaesthetic is obviously seen as an advantage by patients. Sterilizing as it cuts, the Nd:YAG laser promises to find uses not only in caries removal and soft tissue surgery but also in periodontics and endodontics.[8]

New ideas and advancing technology

Extensive clinical studies over the last two decades have documented the effectiveness of both non-surgical and surgical periodontal therapy. When deemed necessary, surgery is usually performed as an elective phase of therapy, within a programme of ongoing maintenance care. Traditionally surgical therapy has been aimed at the treatment of the periodontal pocket by resective procedures. However, research has now focused on reconstructive surgery, with the objective of regenerating the structure of the lost periodontium (cementum, periodontal ligament and also alveolar bone). With advancing technology, materials and surgical modalities that have been advocated to facilitate periodontal reconstruction fall into the following main categories: 1. Chemical and biochemical conditioning agents, e.g. citric acid, fibronectin, tetracycline, growth and differentiation factors. 2. Transplants of autogenous or allogeneic (osteogenic or osteoinductive) materials, e.g. osseous coagulum, decalcified freeze-dried bone allograft. 3. Implants of alloplastic (osteoconductive) 'filler' materials, e.g. hydroxyapatite, tricalcium phosphate. 4. Guided tissue regeneration (GTR) utilising membranes, e.g. Teflon (e-PTFE), collagen, polylactic acid. 5. Combined techniques, e.g. GTR and allograft/alloplast. The scientific evaluation and the role of these reconstructive surgical procedures in contemporary dental practice is discussed in this paper.[9]

II. Conclusion

Because of the rapid change in periodontal science and knowledge, the periodontal education must be based on "show, deliberate, choose, and do" in dental curricula.

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