NON SURGICAL PERIODONTAL THERAPY- A REVIEW

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Abstract

Periodontitis is the second most common disease of the oral cavity and affects majority of the population. Periodontal disease is an inflammatory condition that exhibits a complex interaction between pathogenic bacteria, environmental and acquired factors and host related factors. One of the most common causative factors for the disease is dental plaque.In the last few decades, there have been several advances in the treatment modalities for the same. Therefore, the aim of various treatment options is the eradication of dental plaque. The methods range from something as simple as tooth brushing and oral hygiene practices to those administered by a dental professional. There are various chemical methods and mechanical methods for the same. There are also certain methods like the usage of mouthwashes and local drug delivery that can be used in addition to any type of periodontal therapy. The therapeutic modalities can be surgical or non-surgical. Keeping the patient at the centre of equation, non-surgical periodontal therapy is more acceptable to the patient and is also easy to perform and not very complex. In the present review, several options for the management of periodontal disease through non-surgical periodontal therapy have been discussed along with recent advances for the same.

Key Words: Non surgical periodontal therapy (NSPT), periodontitis, recent advances in NSPT.

Introduction

Periodontitis is a chronic inflammatory disease affecting both hard and soft tissues of the oral cavity.[1-3] Periodontitis is the second most prevalent dental disease next to dental caries. Periodontitis shows a progressive destruction of the alveolar bone and periodontal fiber apparatus with subsequent and sequential migration of the junctional epithelium apical to the tooth surface.[4] One of the most common and prevalent causative factor of the disease is the accumulation of bacterial plaque.[5,6] Therefore, the aim of the various therapeutic approaches that are available is to eliminate bacterial plaque.

Periodontal diseases are the most common cause of tooth loss in the modern world. According to data from the World Health Organization report calculus and gingival bleeding, which primarily indicates poor oral hygiene, are most prevalent in adults from all regions of the world while advanced disease with deep periodontal pockets (≥ 6 mm) affects approximately 10% to 15% of the adult population[7]

The current paradigm of etiopathogenesis for periodontitis proposes that thoughperiodontal diseases are pathogen and site specific, thehost- microbial interactions that leads to overproductionof destructive enzymes and pro-inflammatory mediatorsdetermine the extent and severity of tissue destruction [8,9].This shift in paradigm has resulted in better understandingof the underlying host immune responses and to developmentof novel treatment strategies that may enchance therapeutic outcomes and overall clinical management ofperiodontitis patients.

Treatment of periodontitis is directed primarily towards the reduction of pathogens embedded in the subgingival biofilm[10]. Non-surgical periodontal therapy (NSPT) has been shown to improveclinical attachment levels (CAL) and probing pocketdepths (PPD) in mild to moderate periodontitis cases with probing pocketdepths of less than 6 mm11. In the treatment of deep pockets (> 6 mm) surgical periodontal therapy resultsin greater PPD reduction and clinical attachment gain[11]. Chronic periodontal disease can be successfully treated by NSPT provided adequate plaque control is maintained throughout the supportive phase of treatment[12]. NSPT includes both mechanical and chemotherapeutic approaches to minimize or eliminate microbial plaque associated with the periodontal tissues, tooth surfaces and within other niches in the oral cavity [10,13] and to improve host immune-inflammatory response in the periodontal tissues.

The present review highlights the various non-surgical therapeutic modalities of periodontal disease and also provides insights into current advances of the same.

Mechanical non surgical periodontal therapy

Oral Hygiene Practices

Tooth brushing is the method which is widely used by most of the individuals for their daily oral hygiene. However, it seems that most patients are unable to achieve sufficient total plaque control at each brushing. Newer technologies such as powered toothbrushes have been developed that may improve plaque removal and simplify the task. The powered toothbrushes have many advantages and have the inherent potential to improve plaque removal as well as enhance patient motivation. Also, rotation oscillation powered brushes were shown able to significantly reduce plaque and gingivitis in both the short and long-term. But, On the other hand, Deeryet al.[15] found

no evidence of a statistically significant difference between powered and manual brushes.

Addition of several chemical agents in toothpastes aims to decrease plaque and gingival inflammation. Among them the stannous fluoride and triclosan-containing toothpastes demonstrated a better antiplaque and anti-gingivitis effect than conventional dentifrice.[16,17]. Slot et al.[18] The evidence for the chlorhexidine gel was not conclusive. However, brushing with a chlorhexidine dentifrice was shown to be effective, the related tooth discoloration may have a negative impact on patient's compliance.

Interdental cleaning is supposed to be crucial to improve and maintain gingival health. The interdental areas are difficult to be reached by toothbrushes alone. Several adjuncts have been used and investigated for their effectiveness such as toothpicks, interdental brushes andfloss,. Many dentists would confess that everyday flossing is of paramount importance for maintaining good oral health. Although, the ability of individuals to perform high quality flossing is questionable. There are some studies that show flossing in addition to toothbrushing decreases gingivitis but the evidence regarding plaque reduction is weak and unreliable. Hence, the routine instruction for everyday flossing is not supported by scientific evidence and should only be given on an individual patient basis when high quality flossing could be achievable.[19,20] Lastly, oral irrigators are another aid proposed as adjuncts of tooth brushing. Although there is evidence suggesting that oral irrigating reduces signs of gingival inflammation and improves gingival health, it has no beneficial effect in reducing visible plaque.[21]

Scaling and Root Planing

Hand instrumentation and sonic or ultrasonic scalers have been shown to be very effective in slowing down the rate of periodontal diseaseprogression, reduce bleeding on probing and probing-pocket depths, reducing the risk of tooth loss and improve gingival health.[12,22] Use of hand scalers has been referred to as "gold standard" inmechanical periodontal therapy[23] but it is very timeconsuming, requires more skill, and is tiring for both dentistand patients. On the other hand, ultrasonic instrumentationimproves patient compliance and requires less timefor thorough debridement.

Laser (Light amplification by stimulated emission ofradiation)

The use of lasers has been recommended for past few decadeswithin the periodontal pocket for subginigival debridement, reduction of subgingival bacterial loads and scaling and root planing (SRP). But its clinical effectiveness inthe treatment of periodontal diseases remains debatableamong clinicians and there is dearth of clinical evidencefor their benefit over traditional mechanical therapy.[24] Among the different wavelengths of lasers most commonly used for periodontal treatment are:

Er: YAG laser seems to provide the most suitable characteristics for different types of periodontal treatment. To be specific, it shows the most promising results for root surface treatment and is safe and efficient for use in periodontal bone surgery when used with concomitant water irrigation.

Erbium-Chromium doped: Yittrium-Selenium Gallium- Garnet (Er. Cr: YSGG) laser is commercially available as Waterlase. It uses a patented combination of laser energy and water by a process called Hydro photonics, to perform a wide range of dental procedures [25.]

Photodynamic therapy

Antimicrobial photodynamic therapy (PDT) is a non-invasivetreatment modality, which involves an oxygendependentphotochemical reaction that occurs upon lightmediated activation of a photosensitizing compoundbound to the target cell. This reaction leads to the generationof cytotoxic reactive oxygen species, predominantlysinglet oxygen[26,27] and hence can be very effectivein anaerobic infections like periodontitis. The light sourcecould be a low-power laser[28,29] or light emitting diodes[30.]There are only few systematic reviews and well designedresearch articles published on clinical effectiveness of PDTover conventional periodontal therapy.

Chemotherapeutic approaches in NSPT

Chemotherapeutic agents:

The effects of mechanical therapy might be enchanced using antimicrobial agents which further suppress the remaining pathogens. Various chemotherapeutic agents are now available for treating periodontal diseases. Systemic anti infective therapy (oral antibiotics) and local anti infective therapy (placing anti infective agents directly into the periodontal pocket) can reduce the bacterial challenge to the periodontium.[31]

Four generations of antiseptics that includes:

- I generation: Antibiotics, quaternary ammonium compounds, sanguinarine and phenols
- II generation:, Bipyridines, quaternary ammonium compounds, bis biguanides, phenolic compounds, halogens, enzymes, metal ions,surfactants, oxygenating agents, urea, amino alcohols, natural products, saliflour, and agents that enhance the redox potentials.
- III generation: Effective against specific periodontogenic organisms
- IV generation: Probiotics are incorporated in mouthwashes

Conclusion

Non-surgical periodontal therapy continues to advanceand newer therapeutic modalities are being developedto make the after-effects more predictable and last longer. This review covers various non-surgical periodontal therapies, which should be considered as first line measures for treating periodontal disease before resorting to surgical approaches.

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