

EDITORIAL

PMPR and Host Modulation Therapy in Periodontal Diseases

Existence of bacterial plaque biofilm at the dento-gingival areas usually initiates gingival inflammation.¹⁻³ Plaque is a thin film that forms on the tooth surface due to poor oral hygiene, and if not regularly removed, it can harden up and form calculus. As plaque harbors a large number of bacteria, inflammation can occur in the gingival tissues.^{4,5} Keeping the areas plaque-free would be the prime concern to maintain periodontal health.^{6,7} Taking oral hygiene care at home by toothbrushing and interdental cleaning may be sufficient for those patients who practice near-perfect oral hygiene but it is not an effective way of promoting the resolution of gingival inflammation.⁸ Non-surgical periodontal therapy by means of scaling /root planing and polishing at 6-month intervals may be needed to fill up the gaps.^{9,10}

PMPR (professional mechanical plaque removal)

The management of the crown and root surfaces of tooth during periodontal treatment, as well as the control of dental plaque biofilm and calculus, are referred to as professional mechanical plaque removal (PMPR).^{11,12} In the past, it was referred to as scale and polish, i.e., supragingival mechanical biofilm control, supragingival scaling, root surface debridement and root planing, and polishing.^{13,14}

In general, PMPR should be considered in cases failing to reach a periodontally healthy condition at a re-evaluation visit after oral hygiene instructions (OHI) implementation. The goal of supragingival PMPR focused intervention is to remove calculus deposits and accessible plaque biofilm from the crown of tooth (1st step).^{11,12} The aim of subgingival PMPR targeted therapy is to clear the tooth's root surface of calculus, endotoxin, and plaque biofilm (2nd step).^{11,12}

Scaling is a component of every PMPR-based intervention, whether it is stated explicitly as a scaling session using both hand and /or ultrasonic devices.^{15,16} Studies address implementation of PMPR with air polishing with powder containing sodium bicarbonate¹⁷, glycine¹⁸ or erythritol-chlorhexidine¹⁹, and /or application of a diode laser²⁰. Besides these, professionally administered local adjuncts consisted of subgingival applications of an ornidazole-chlorhexidine gel²¹ or gingival infiltrations of organic coconut oil or organic sesame oil with a microneedling technique²².

HOST MODULATION THERAPY

Periodontal diseases are polymicrobial, multifactorial diseases, and there are many host factors involved in determining the individual susceptibility to disease.²³ Therefore, effective treatment of periodontal disease can enhance general health, highlighting the vital connection between dental care and overall wellbeing.²⁴

In addition to traditional periodontal treatments, host modulation therapy (HMT) has been suggested.^{25,26} HMT modifies the harmful features of the host inflammatory response to the microbial biofilm by using systemic or local antimicrobial medications as supplements to traditional periodontal therapy.²⁷⁻²⁹ One of the first and most well-known of these treatments makes use of the anti-inflammatory qualities of doxycycline at a sub-antimicrobial dose (20 mg doxycycline hyclate).^{30,31} While HMT utilizing sub-antimicrobial dosage doxycycline may lead to statistically significant improvements in patient outcomes compared to those attained by PMPR alone, though the clinical relevance of these improvements is less clear.^{30,31} As of right now, there is no proof that the low dosages of antibiotics used in this treatment plan are linked to the emergence of antibiotic resistance.^{32,33} However, patients must take systemic medication for extended periods of time (up to nine months) in order to receive host modulation therapy, which may affect compliance.^{26,34} Liver enzyme-related side effects have also been documented, and the therapy's cost-effectiveness is unknown.²⁶ Observing such evidences, the British Society of Periodontology (BSP) implemented European S3 (BSP-S3)-level evidence-based treatment guidelines for stage I – III periodontitis.³⁵

The development of this guideline did not particularly look at the use of additional host modifying medicines, such as statins, bisphosphonates, probiotics, non-steroidal anti-inflammatory drugs, Omega-3 polyunsaturated fatty acids, and metformin.²⁶ However, clinical practice (BSP-S3) guidelines in the United Kingdom (UK) do not recommend using systemic sub-antimicrobial doxycycline in addition to subgingival instrumentation.³⁵

CLINICAL PARAMETERS

Monitoring plaque levels: Plaque biofilm control is essential to reduce gingival inflammation during treatment and to prevent relapse in the maintenance phase of management.^{11,12} Low levels of plaque are associated with periodontal stability. It'd be beneficial to reach targets for improvements in plaque levels, such as $\leq 20\%$ or $\geq 50\%$ reduction from baseline values.³⁵ Plaque control can be effectively pursued following oral hygiene instructions (OHIs). Although it has been shown that OHI may be effective in controlling gingivitis irrespective of the additional use of PMPR.³⁶⁻³⁹ It can be speculated that in specific conditions, OHI alone may be insufficient to restore gingival health.⁴⁰

Monitoring gingival bleeding: In most instances, oral hygiene practices are linked to bleeding that occurs superficially from the gingival margin (i.e., marginal bleeding) as opposed to the base of a periodontal pocket.^{41,42} A healthy periodontium would have marginal bleeding levels of $\leq 30\%$, or a reduction of $\geq 50\%$ from baseline readings.⁴³

Monitoring periodontal probing pocket depth: Probing pocket depth reduction and maintenance after treatment is a sign of disease resolution and stability.⁴⁴ According to the 2017 World Workshop on the Classification of Periodontal and

Peri-Implant Diseases and Conditions, a patient with periodontal health is defined as a full mouth bleeding on probing score (FMBS) <10%, and probing pocket depth (PPD) ≤3 mm with no clinical attachment loss.⁴⁵

Antimicrobial medication: Local and systemic antimicrobials, have been proposed as adjuncts to professional mechanical plaque removal (PMPR) in patients with a diagnosis of periodontitis.^{46,47} Though there is widespread evidences that inappropriate use of antibiotic therapy is linked to the increasing incidence of bacterial resistance⁴⁸, along with the numerous side effects associated with antibiotic therapy.^{49,50} Because of this, routine systemic antibiotic administration in addition to subgingival instrumentation in patients with periodontitis is not advised by UK clinical practice (BSP-S3) guidelines.³⁵

Assessing the response to periodontal treatment: The continuous evaluation and monitoring of the patient's condition following active therapy and during maintenance is an essential component of periodontal management.^{51,52} After treatment, patients are usually evaluated six to twelve weeks later.^{53,54}

It is likely that OHI might not be enough to restore gingival health, which would justify the use of PMPR in addition to OHI (i.e., PMPR + OHI). Considering these, a single PMPR session following OHI and HMT may successfully improve periodontal health and raise self-efficacy scores.

Keywords: PMPR, mechanical biofilm control, scaling and root planing, root surface debridement, host modulation therapy, OHI.

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