Commentary

Probiotic – An emerging therapy in recolonizing periodontal pocket

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ARTICLE INFO

Article history:

Received 3 August 2016

Accepted 18 September 2016

Available online 28 September 2016

Keywords:

Probiotics

Local delivery

Recolonization

Periodontal pocket

ABSTRACT

One of the etiological factors in the pathogenesis of periodontitis is reduction or the absence of the so-called “beneficial bacteria”. Most of the globally applied treatment approach is based on subgingival bacterial elimination but recolonization with less pathogenic bacteria is seen within weeks. Therefore, researchers have started focusing on shifting the current treatment approach from specific bacterial elimination to restoring periodontal pocket with beneficial bacteria. This alteration in the ecology of niches from the one with the pathological plaque to the one with the biofilm of commensals can be achieved via subgingival application of probiotics. This article suggests the important prospects of subgingival delivery of probiotics in guiding periodontal recolonization with beneficial bacteria and emphasizes research in this study field.

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Probiotics are live micro-organisms which, when administered in adequate amounts, confer a health benefit on the host. The specific distribution of bacteria that colonizes periodontal pocket at any given time can be altered with the ‘Replacement therapy’, also known as ‘probiotic therapy’. Probiotics might not only suppress the emergence of endogenous pathogens or prevent the superinfection with exogenous pathogens; they might also protect us through the promotion of a beneficial host response. The subgingival use of probiotics as a local bacteriotherapy, with an inhibitory effect on periopathogens is a promising concept in treating periodontal disease but, their effectiveness when delivered locally in periodontal pocket is still unknown and needs to be explored.

The complex microbial picture of the pathogenesis of periodontal disease makes it to be a difficult therapeutic target. The primary microbial factor contributing to plaque-related periodontal inflammation is a shift in the content of the oral microflora or “dysbiosis”. It is thus particularly notable that chronic periodontal infection appears to follow the “microbial shift” hypothesis. It is noteworthy that the “lack of beneficial organism” from a biofilm may contribute similarly as the “presence of a pathogen” in causing the disease. Unfortunately, the reduction in periopathogens through conventional periodontal therapies is only temporary and recolonization is

seen within weeks to months with re-establishment of more aggressive microbiota.¹ Over years, antibiotics are being used for local delivery in the periodontal pocket. Although being a viable therapeutic option, antibiotics can have potentially damaging effects through the perturbation of the oral microbiota as it kills useful bacteria along with harmful bacteria. Addressing the growing concern over multidrug resistance through antibiotic usage, there has been renewed interest in bacterial replacement therapy in recreating healthy microbial environment.

The different types of vehicles used to administer probiotics in periodontal disease are tablets, powder, lozenges, mouth rinses, toothpaste, chewing gum and periodontal dressing. Recently, subgingival delivery of probiotics is emerging as new mode of application. The concept of replacing the pathogenic bacteria in the gingival sulcus with beneficial bacteria is called guided periodontal pocket recolonization. Teughels et al. proved the concept for guided pocket recolonization (GPR) approach in treatment of periodontitis in their study done among beagle dogs.² Their study revealed that when beneficial bacteria were applied in periodontal pockets adjunctively after root planning, subgingival recolonization of periodontopathogens was delayed and reduced, as was the degree of inflammation, at a clinically significant level. Thereby, Nackaerts et al. found that bone density within periodontal pockets treated with beneficial bacteria improved significantly in dog model which indicated the potential effect of a subgingival application of beneficial species in periodontal pockets.³ As application of the beneficial bacteria seemed to improve the microbiological outcome of the treatment and bone density within

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periodontal pocket, subgingival application of probiotics may be helpful in maintaining host-bacterial symbiosis.

In the era of probiotic bacteriotherapy, adjunctive use of probiotics pose a great potential of plaque modification, halitosis management, altering anaerobic bacteria colonization, pocket depth reduction, clinical attachment gain, modulating immunity, reduction in gingival bleeding. Moreover, probiotics could serve as an adjunct to periodontal treatment when scaling and root planing might be contraindicated.⁴ A recent randomized controlled trial study evaluated the efficacy of local use of probiotic in the form of subgingival delivery.⁵ They found that adjunctive use of probiotics with scaling and root planing resulted in overall pocket depth reduction and clinical attachment gain. Thus, GPR concept seems to be promising and these experiments suggest potential for a new arena of research for developing exciting new strategies for managing periodontal disease. There is a need for more in vivo studies in order to apply this concept usefully in treating periodontal disease.

Thus, it can be clearly emphasized by the means of this article that although application of probiotic strains has been widely studied in treating periodontal diseases but its role and efficacy in subgingival application still remains in shadow. Given the emergence of antibiotic resistance and the lack of natural treatment options, guided pocket recolonization approach through

local delivery of probiotic in periodontal pocket may provide a valuable addition or alternative to the armamentarium of treatment options for periodontitis. It seems the suitable time when more research work needs to be done to provide us the understanding which gives us a basis and the mechanism of action of probiotics in colonizing subgingival habitat, inducing microbial shift and human utilization of well-studied organisms.

Conflicts of interest

The authors have none to declare.

References

1. Quirynen M, Vogels R, Pauwels M, et al. Initial subgingival colonization of 'pristine' pockets. *J Dent Res*. 2005;84(4):340–344.
2. Teughels W, Newman MG, Coucke W, et al. Guiding periodontal pocket recolonization: a proof of concept. *J Dent Res*. 2007;86(11):1078–1082.
3. Nackaerts O, Jacobs R, Quirynen M, Rober M, Sun Y, Teughels W. Replacement therapy for periodontitis: pilot radiographic evaluation in a dog model. *J Clin Periodontol*. 2008;35(12):1048–1052.
4. Vivekananda MR, Vandana KL, Bhat KG. Effect of the probiotic *Lactobacilli reuteri* (Prodentis) in the management of periodontal disease: a preliminary randomized clinical trial. *J Oral Microbiol*. 2010;2.
5. Penala S, Kalakonda B, Pathakota KR, et al. Efficacy of local use of probiotics as an adjunct to scaling and root planing in chronic periodontitis and halitosis: a randomized controlled trial. *J Res Pharm Pract*. 2016;5(2):86.