

Guest editorial

Probiotics: harbinger of a new era of biological strategies for prevention/treatment of periodontal diseases

Root scaling and planing (RSP) is the therapy of choice for most of the clinicians and largely considered as the “gold standard” for the treatment of periodontitis. However, its isolate use frequently does not result in the desired clinical outcomes in severe cases of periodontal disease (PD). In these situations, the recolonization of pathogens and the disease relapse are very common. Because of the largely knowledge on the microbiological basis of periodontitis, the use of the antimicrobial therapy is becoming conventional as an adjunctive for RSP, especially in the treatment of the severest cases of PD. Additionally, due to the fact that the host's response play an important role in the disease progression, treatments which suppress the inflammation, the so-called host response modulators, have been employed [1]. In summary, the use of adjunctive therapies in periodontal treatment aims either to treat the sites that do not respond to the conventional treatment or potentiate the results normally obtained with the mechanical instrumentation, therefore avoiding the need of additional surgical procedures to decrease the periodontal pockets. Considering RSP limitations in PD treatment, as well as the participation of several mechanisms regarding the innate and adaptive immune system of the host in the disease pathogenesis, the use of probiotics as a new adjunctive therapy for periodontitis has brought the interest of the dental scientific community, since the probiotics may modulate the immune-inflammatory response of the host and modify the bacterial environment. This subject was recently discussed in of the work groups of the 7th European Workshop in Periodontics, held in Spain, in 2011.

Probiotics have been defined as live microorganisms, mainly bacterias, safe for consumption and capable of producing beneficial effects for the host's health when ingested in sufficient amounts [3]. A recent study of “proof of concept” demonstrated that the mixing of *Streptococcus* species applied onto teeth of dogs with periodontitis, as adjunctive therapy to RSP, delayed the recolonization of periodontal pathogens and reduced the inflammation [7]. The probiotics are, generally, regulated as dietary supplements and commercialized to improve or keep health. The main microorganisms used as this purpose have been the bacterias of genus *Lactobacillus* and *Bifidobacterium*. The probiotic therapy may provide advantages that are not observed when antimicrobials and/or mouthrinses are associated with RSP, because they did not cause bacterial resistance and they can interfere naturally on the local immune-inflammatory response of the host. The oral cavity has been only recently suggested as a relevant target to the application of probiotics. Until now, the probiotics was evaluated, mainly for the control of caries, where they can reduce the levels of *Streptococcus mutans* in saliva. The mechanisms of action of the probiotics on oral cavity seemed to be similar to those described for the balance of intestinal microflora [2]. These mechanisms can be an alternative, not only for the control of dental caries, but also for PD treatment. The microorganisms used for probiotic purposes may cause direct effects on the periodontal pathogens, affecting their growth, adhesion and colonization [5]. Probiotic bacterias can produce several components acting as antimicrobial agents, such as lactic acid, hydrogen peroxide, and bacteriocins. Other mechanism suggested to explain the probiotic action on PD treatment is the modulation of the immune-inflammatory response of the host [5]. Some studies have demonstrated that some probiotic species can attenuate the expression of interleukin (IL)-8 induced by periodontal pathogens in the oral epithelial cells [10], reduce the levels of proinflammatory cytokines (IL-8, IL-1 α and tumor necrosis factor alpha) in the gingival crevicular fluid [8], affect the levels of salivary lactoferrin in periodontal highly susceptible individuals [6] and interfere on the activity of the polymorphonuclear elastase, as well as on the levels of myeloperoxidase and metalloproteinase-3 of the matrix present in the gingival crevicular fluid of individuals with gingivitis [4].

Considering that the main two strategies for periodontal disease treatment are the elimination of specific pathogens and the suppression of the destructive response of the host, the use of probiotics, undoubtedly, opens a new promising field to reach these goals, which can be of great values for the

prevention of the disease relapse in follow-up programs of the periodontal-affected patient. There are little *in vivo* studies evaluating the effects of probiotics on the PD control. Generally, these clinical studies demonstrated that the use of probiotics can promote a significant reduction of periodontal pathogens, improve the clinical periodontal thresholds in individuals with periodontitis, inhibit the development of gingivitis and potentiate the RSP effects during the non-surgical therapy [6, 4, 9]. Notwithstanding, these studies still need to be carefully considered, because their methodologies hinder to reach definitive conclusions capable of supporting safely the efficacy of probiotics for PD treatment.

The market of probiotic products is worldwide increasing at exponential rate. Their introduction in the care of periodontal health will provide a significant impact because PD is considered as a public health problem around the world due to its high incidence and prevalence. Also, it is important to emphasize the relevance of studies on this field in order to find new alternatives of PD preventions, assuming an urgent character facing the current increasing evidences of the bidirectional relationship between PD and general systemic conditions of the individual. Thus, further studies are necessary to clarify better the role of the beneficial bacterias within oral cavity, identify new species of probiotic bacterias, establish periods and new administration vehicles and determine the real clinical significance of this therapy. The results of these studies in the field of Periodontics will be surely very useful for the development of new products for the chemical control of the bacterial plaque, as well it can create solid bases for the replacement of the systemic use of antimicrobials, therefore avoiding the development of resistant bacterias.

References

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