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Biography

Ramesh Nagarajappa, graduated from the prestigious Bapuji Dental College and Hospital, Davangere, India in 1999. I am presently working as a Vice Principal, Professor and Head, in the Department of Public Health Dentistry at the Oxford Dental College, Bangalore, India. He has post-graduation teaching experience of over 26 years and have guided both PhD and MDS students. He has also authored 140 publications in various international and national reputed journals. Been a regular reviewer too in many journals. He has experience in delivering scientific presentations and chairing scientific sessions at various conferences.

Ecological Plaque Hypothesis Revisited: Can Natural Probiotics Restore Oral Microbial Homeostasis?

Abstract:

The Ecological Plaque Hypothesis, redefined the understanding of dental caries and periodontal disease by emphasizing that disease results not from specific pathogens alone, but from a dysbiotic shift within the resident oral microbiota driven by environmental changes. Frequent sugar exposure, reduced salivary flow, and inflammatory conditions create ecological pressures that favor acidogenic and proteolytic microorganisms, leading to biofilm imbalance and tissue destruction. In recent years, naturally occurring probiotics have been investigated as biological modulators capable of restoring microbial equilibrium rather than merely eliminating pathogens. Probiotic strains such as *Lactobacillus* and *Bifidobacterium* exert their effects through competitive exclusion, bacteriocin production, pH modulation, quorum-sensing interference, and immune regulation. Evidence from in vitro and clinical studies suggests that these microorganisms may reduce levels of cariogenic species such as *Streptococcus mutans*, attenuate gingival inflammation, and enhance host defense mechanisms. Revisiting the ecological framework, probiotics align conceptually with minimally invasive and preventive dentistry by targeting the biofilm's ecological drivers rather than applying broad-spectrum antimicrobial strategies that may further disrupt microbial balance. However, challenges remain regarding strain specificity, optimal dosage, delivery vehicles, persistence of colonization, and long-term clinical outcomes. This presentation will critically evaluate current evidence supporting the role of natural probiotics in modulating oral biofilms, examine their relevance within the ecological plaque model, and discuss future directions for integrating probiotic-based strategies into contemporary preventive and therapeutic dental practice.