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A Paradigm Shift In The Treatment Of Dental Caries And Periodontitis - A Mini Review

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Abstract
Oral cavity harbours millions of bacteria which interact to form biofilm and thereby helps to maintain homeostasis. Dysbiosis in the normal flora leads to various oral diseases such as dental caries and periodontitis. Dental caries is the most common oral disease where acids are produced by fermentation of carbohydrate molecules by various bacteria such as Streptococcus mutans, Lactobacillus sp, leading to demineralization of the tooth structure. Another disease of interest is Periodontitis where subgingival plaque is associated with the progression of gingivitis to periodontitis. After the success of Fecal Microbial transplant, researchers has been inspired to find out whether Oral Microbial transplant can be used in the treatment of oral diseases.[1]

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I. Introduction

Oral cavity houses millions of bacteria which interact to form biofilm and thereby helps to maintain homeostasis. Dysbiosis in the normal flora leads to various oral diseases such as dental caries and periodontitis. The success of Fecal Microbial Transplant has opened a view on the use of oral microbial transplant in treating dental caries and periodontitis. Oral Microbial transplant is an artificial transfer of oral microflora from a healthy donor to a diseased recipient. OMT will give an easy and cost effective approach in days to come.

II. Review Of Literatures

Fecal microbial transplant has recently been approved, showing significant results for treatment of persistent Clostridium difficles infection, chronic irritable bowel syndrome, ulcerative colitis, autism spectrum disorder. In Fecal Microbial Transplant there is transfer of stool sample from a healthy donor to a diseased recipient. The stool sample was collected from a healthy individual, mixed with saline or other solutions strained and introduced into the gastrointestinal tract of the diseased individual through enema, colonoscopy or nasogastric tube. FMT involves single administration dose but multiple administration has been proposed. Although FMT is a promising approach to alter the gut ecosystem and ameliorate gastrointestinal health, substantiation of its true effectiveness remains questionable and enterprises have been raised regarding short- and long- term safety and tolerability. It still remains as an experimental approach and its complications are yet to be assessed.

Oral Microbial Transplant

Oral microbial transplant involves artificial transfer of oral commensal flora from healthy patients to patients with oral diseases. According to the study by Nath et al, the inclusion criteria for healthy individials was:-[2]

1) systemically and orally healthy adult's ≥ 18 years of age.
2) presence of all set of teeth with the exception of impacted/missing wisdom teeth or orthodontic extraction
3) healthy periodontium and participants having probing depth (PD) of ≤ 4 mm and no loss of clinical attachment
4) presence of less than 20% of bleeding on probing (BOP)
5) score of 2 or below in the Caries Assessment Spectrum and Treatment (CAST) index.

The exclusion criteria was :-

1) Participants with systemic disorders
2) Pregnant and lactating women
3) Patients taking oral medications such as antibiotics, anti- fungals, anti virals, probiotics, immunosuppressants and corticosteroids in the past 3 months.

The hypothecated protocol by Dewhirst and Hoffmann suggested of collection of supragingival plaque from a caries free donor (ideally a relative of the recipient patient) with the help of nylon swab, store it under saline and transfer it to the recipient. The recipient should have a healthy microbiome that excludes cariogenic bacteria such as Streptococcus mutans.[3]

Pozhitkov et al. proposed to introduce health-associated oral microbiota into the oral cavity of periodontitis patients.24 Firstly, they confirmed that the microbiomes of subjects with periodontitis were distinct from those of healthy or edentulous patients. Next, they tested an in vitro antimicrobial protocol to be used on the oral cavity of the recipient patient prior to OMT. They showed that application of sodium hypochlorite (NaOCl) followed by its neutralization with sodium ascorbate buffer might be a valid option for suppressing the disease-associate microbiota to allow for a more pronounced microbial shift to a healthier microbiota. In that same study, the authors suggested an OMT procedure consisting of collecting sub- and supragingival plaque from a healthy donor (spouse or partner), performing deep cleaning, root planing and applying a broad-spectrum antimicrobial agent to the periodontitis patient and, finally, neutralizing the antimicrobial agent immediately following by rinsing with a microbial suspension harvested from the healthy donor in the periodontitis patient.[4]

III. Conclusion

Despite limited scientific and clinical evidence, oral microbiota transplant holds promise as a new therapy for managing caries and periodontitis in near future. OMT may represent a cost-effective approach and have the capability to more reach delicate to- access, high-risk populations. Still, clinical recommendations for the use of OMT cannot be handed at this point grounded on the current state of knowledge and expansive exploration is demanded

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