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Novel Agents for Prevention of Caries: A Review

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Now a day’s treatment modalities regarding dental caries have been changed with aim at maximum conservation of tooth structure and it’s an ethical duty of a dentist to provide their patients with minimally invasive treatment. Remineralization therapy is preferred in cases, where there is a chance of gaining success by preventive methods. Many novel caries preventive materials are now available in the market which contains components that have the ability to initiate remineralization.

KEYWORDS: Dental Caries, Prevention, Treatment, Remineralization, Demineralization, Agents

INTRODUCTION

Dental caries and periodontal diseases are the one of common oral diseases and dental cares remains the most prevalent chronic childhood disease worldwide. “Dental caries is an irreversible microbial disease of the calcified tissues of the teeth, characterized by demineralization of the inorganic portion and destruction of the organic substance of the tooth, which often leads to cavitations.¹

Dental caries is a peculiarly local disease which involves destruction of the hard tissues of the teeth by metabolites produced by oral microorganisms and management was based upon this concept only in the past time unless there was surgical/restorative intervention.² In order to overcome many of the management related problems, modern treatment modalities should involve early detection of non-cavitated lesions with individual’s risk for caries progression. Even the detailed understanding of the caries process along with “active surveillance” is required to apply preventive measures for caries.^{2,3,4}

Caries management protocols further refine the decisions concerning individualized treatment and its thresholds based on a specific patient’s risk levels, age, and compliance with preventive strategies. Such protocols should yield greater probability of success and better cost effectiveness of treatment than less standardized treatment. Even the caries management protocols standardize the decision making and treatment strategies with stability in treatments and further eliminate various kinds of uncertainties in treatment procedures, and guarantee the more correct strategies.^{5,6}

Currently management strategies are more focus on non-destructive and conservative approaches rather than restorative treatment alone along with many changes in understanding of the multifaceted nature of caries process and its management. We can describe the caries process as a dynamic balance between re- and demineralization, and if more minerals are lost than gained from the hard tissues over time, a lesion occurs as a sign of the disease. Among many of the persons demineralization and remineralization happen simultaneously in the oral cavity and carious lesions progression depends upon it.^{7,8} Therefore, any factor that can push this balance toward the proceeding of remineralization can be utilized as a weapon in the battle against dental caries. Hence an attempt has been made through this review where several novel therapeutic developments for the prevention of dental caries has been discussed which can be carried out by the individual dentist and are bound to change as treatment modalities evolve in future.⁹

Silver Diamine Fluoride: As its been said and proved that dental caries is process result from bacterial process and Silver Diamine Fluoride is the one of the successful agent which kills cariogenic bacteria by arresting of caries through precipitation on dentinal carious lesion. Not only this it can be also be used to promote remineralisation of hydroxyapatite which is a tooth mineral under constant acidic environment in the oral cavity. Even it is also in applicable in young children in case of management of dental caries, for further arrest of root caries, to prevent pit and fissure caries, to

prevent secondary caries, to desensitize sensitive teeth, to treat infected root canals and to prevent the fracture of endodontically treated teeth.^{10,11}

Sodium Bicarbonate Chewing Gum: Various kind of researches has explained that regular use of sodium bicarbonate through toothpastes is very effective in reducing volatile sulphur compounds (VSCs) and thus altering the halitosis /oral malodour. Chewing gum would also be suspected of providing benefits in controlling oral malodour through its claimed ability to mechanically aid in the removal of dental plaque which will reduce the chances of occurrences of dental caries.¹²

Klauer et al.¹¹ in 2001 did a human clinical study was to determine whether a commercial chewing gum containing 5% sodium bicarbonate (The Baking Soda Gum [AHDC]) was effective in removing dental plaque when used as a supplement to regular tooth brushing by children. The bicarbonate gum demonstrated significant plaque reduction in all other areas of the mouth, even on tooth surfaces not directly contacted during chewing. Compliance with the chewing gum regimen was excellent, and oral health exams did not indicate any adverse events among children using either the chewing gum or mint tablets

Enamelon technology: The Enamelon technology is based on unstabilized amorphous calcium phosphate (ACP). Through this technology calcium salt like calcium sulphate and a phosphate salt such as ammonium phosphate are delivered separately to the patients intraorally with the help of dual chamber device.¹³ The salts mix with saliva & dissolve releasing calcium and phosphate ions and results in immediate precipitation of ACP or (in the presence of fluoride ions) amorphous calcium fluoride phosphate (ACFP).¹⁴

NovaMin commercial product: There are various kinds of commercial products such as calcium sodium phosphosilicate and NovaMin which are readily available in the market are X-PUR toothpaste where sodium ions help to increase oral pH and decrease acidity in the oral cavity. Calcium sodium phosphosilicate forms a layer on the tooth surface that is structurally similar to natural enamel. X-PUR is recommended as a toothpaste application, but can

also be used in medication carriers for longer exposure because it does not contain fluoride.^{15,16}

The other products containing NovaMin include a homecare toothpaste from Natural Health Organics (Oravive® Revitalizing Paste-5 wt%, which does not contain fluoride), prescription pastes for hypersensitivity marketed by 3M/Omni (SootheRx) and (Densshield® - both with 7.5 wt%), and a prophypaste promoted by Sunstar/Butler (NuCare® - 100 wt% and water). Newer products include a tooth root desensitizer (Vitalmin -100 wt% NovaMin and water), a fluoride varnish (Durashield - 10 wt% NovaMin and 5% NaF), and a dentifrice (Renew 5000 ppm fluoride and 5 wt% NovaMin).^{14,15}

CONCLUSION

Though many of the treatment strategies are available for dental caries but still preservation of tooth structure is not possible among many of the people. So there should be individualized consideration of the underlying disease process is recommended for every patient and minimal intervention program can be considered for high-risk patients. Hence this novel approach is based on research, clinical expertise, and the patient's preferences and individual needs, implementation of this new protocol will provide ultraconservative tooth preservation that gives good patient care.

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