

DENTAL BIOMATERIALS IN NON-OPERATIVE MANAGEMENT OF DENTAL CARIES

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Abstract

Dental caries is a disease that results in destruction of tooth structure called as carious lesions. The formation of carious lesion over a period of time is a sequel of alternating sequence of demineralization and remineralization of the hydroxyapatite crystals in the tooth structure. The yesteryears' management was focused on the lesions alone, in the surgical model of 'drill and fill'. Currently the disease prevention is receiving its due attention, a paradigm shift which is a result of a better and deeper understanding of the etiopathogenesis of carious disease. The formation of new lesions as well as remineralization of initial lesions are prevented by targeting various causative factors using biomaterials. These preventive materials and their current modifications are used in the non-operative treatment of caries, focusing on the preservation of the healthy tooth structure. This article highlights the latest advances in biomaterials used for the non-operative treatment of dental caries.

Key words: *Dental caries, remineralization, demineralization, carious lesions, non-operative treatment, operative treatment, dental biomaterials*

Introduction

Dental Caries is a disease that results in tooth destruction called as carious lesion. It is defined as a disease that is characterised by the localized destruction of susceptible dental hard tissue by acidic by-products from bacterial fermentation of dietary carbohydrates.^[1] As evident by the definition, it is a multifactorial disease where multiple causes interact in a complex and dynamic manner. The biological factors that act in concert are the susceptible tooth structures, salivary factors, dietary sucrose and the cariogenic biofilm with predominance of Mutans streptococci.

Mutans streptococci in the dental biofilm, metabolize the dietary sucrose, which is an easily fermentable sugar, to release acidic by-products. This reduces the pH of the dental biofilm. In the acidic ambience minerals are dissolved from the tooth hydroxy apatite crystallites. Such a loss of calcified material from the tooth structure is called as demineralization. Continuous demineralization that

occurs over time, on and within the tooth structure can result in changes ranging from initial microscopic demineralization to macroscopic cavitation. These detectable changes that occur on the tooth are called as carious lesions.

But the demineralization process may not be continuous always. The unfavourable ambience and factors causing demineralization can be altered by beneficial salivary factors or by specific intervention by the operator, resulting in re-deposition of minerals to the tooth structure. This net gain of calcified material within the tooth structure, replacing that which was previously lost by demineralization is called as remineralization.^[1]

The management of dental caries in the yester years focused only on the removal of carious lesions and restoration of the defect with a dental biomaterial. This was called as the surgical model, where drill and fill was the norm. Though the structure and function

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