

Treating the symptoms does not cure the disease

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Past decades have witnessed a new scientific understanding of dental caries and major developments in both the diagnosis and the restorative techniques for treating caries lesions. However, the effect on clinical practice has been minor.

The surgical model founded at the turn of the 1900's for treating dental caries remains the dominant approach. Excessive reliance upon this model is a result of incomplete understanding of the dental caries process. This surgical-restorative approach is based on frequent patient visits to the dental office for routine dental exams. The dentist examines the teeth attempting to discover the presence or absence of cavities. If cavities are found, the area of the caries lesion and a significant portion of the surrounding tooth structure are shaped surgically to form a box. The prepared cavity preparation is usually much larger than the damage caused by the caries lesion. It is the tradition of the surgical model that makes acceptable sacrificing large portion of healthy tooth structure to accommodate the restorative material.

An alternative model is the medical model. It is based on the understanding that the caries lesion is the symptom and not the disease. Dental caries represents a chronic infection caused by pathogens called mutans streptococci. It is mainly acquired from the mother during eruption of the dentition. In the presence of fermentable carbohydrates, mutans streptococci, lactobacilli and other microorganisms produce acid causing dissolution of the calcified component of dental hard tissues and creating the caries lesion. According to this model caries should be managed as an infectious disease.

Traditionally, caries diagnosis focused on caries lesion discovery. It was not appreciated that the caries lesion is a symptom of an underlying disease. Risk assessment could be used as a tool to assess the presence, absence, and the activity status of the disease. Risk assessment should be integrated as a layer of the diagnosis process. A treatment goal, when applying the medical model, is to control the infection and to remineralize early non-cavitated lesion. Incipient non-cavitated caries lesion progress slowly. Healing of these lesions should be promoted through remineralization. The invasive approach should be the last resort. Both body defense and repair mechanisms are enhanced by using different disease control measures. Proven methods to reduce cariogenic bacteria, such as chlorhexidine mouthwash and xylitol chewing gum, should be routinely used. Different forms and concentrations of fluoride are used to provide fluoride ions and to help increase remineralization and decrease demineralization. Diet counseling aimed at decreasing the frequency of carbohydrate intake, as there is overwhelming evidence confirming the role of diet in dental caries.

The traditional visual, tactile and radiographic methods for the diagnosis of caries lesions lack reliability, especially during the incipient stage of the lesion. Emerging quantitative methods such as electrical conductance, laser fluorescence, tuned-aperture computed tomography, and optical coherence tomography show promising sensitivity and specificity for the diagnosis of non-cavitated caries lesions.

Surgical intervention should be reserved for the frankly cavitated lesions. When prescribed, it should be minimally invasive. The dental profession should be sensitive toward the removal of sound tooth structure. It should be limited to access and the removal of damaged tooth structure. There is no evidence to support "extension for prevention". It is time for the profession to reassess preparation design. Extension for retention to create macro-mechanical retentive features is not indicated for bonded restoration. The retention should be achieved through the micro-mechanical integration of the restorative materials to the tooth surfaces through bonding. The lesion-specific approach, which describes cavity extension and location based on size and location of the damaged tissue, should be preferred to the predetermined box-form cavity preparation.

Many dental schools across the world have been slow in adopting the medical model. Evidence-based dentistry should be the foundation for curriculum revisions. Is it time to retire the traditional approach of teaching and practicing dentistry? This would be the first step toward the permanent cure for the disease dental caries.

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