

## Optical detection of dental caries

Sir,

Dental caries is one of the most prevalent chronic diseases in man, worldwide. It is a multifactorial disease that starts with microbiological shifts within the complex biofilm (dental plaque). Caries is affected by the consumption of dietary sugars, salivary flow, exposure to fluoride, and preventive behaviors.<sup>[1]</sup> Owing to the potential risk of initial lesions progressing to manifest caries lesions,<sup>[2,3]</sup> the prevalence of initial caries and its significance for further caries development ought to be a reason for finding new strategies for caries prevention. Identifying risk in individuals or populations is difficult when it comes to chronic diseases that are caused by multiple factors that develop over a long period of time. Multifactorial modeling has been shown to be superior in the field of prediction, which is natural due to the complex etiology of the disease.<sup>[4]</sup> The intention should be primary prevention, that is, to prevent even noncavitated approximal initial caries lesions.<sup>[5]</sup> Conventional examination for caries detection is based primarily on subjective interpretation of visual examination and tactile sensation, aided by radiographs. The clinician makes a dichotomous decision based on subjective interpretation of color, surface texture, and location, using rather crude instruments such as dental explorer and bitewing radiographs.<sup>[1]</sup> These conventional examinations often show low sensitivity and high specificity. It is widely recognized that these methods cannot detect caries lesions until a relatively advanced stage, involving as much as one-third or more of thickness of enamel. The recently discovered optical caries detection methods are based on observation of the interaction of the energy which is applied to tooth, or the observation of the energy which is emitted from the tooth.<sup>[6]</sup> Such energy is in the form of a wave in the electromagnetic spectrum. Hence, the caries process leads to distinct optical changes that can be measured and quantified with advance detection methods based on light that shines on and interacts with tooth. The various optical caries detection methods are Quantitative Light-Induced Fluorescence (QLF), Laser-Induced Fluorescence, and Transillumination with Near-Infrared Light (TINIR). Both

QLF and transillumination (TI) methods enable imaging detection of enamel caries that can be digitally stored and viewed later. The TINIR is promising technique for the detection and imaging of Occlusal and proximal lesions.<sup>[7]</sup> These methods are excellent in early diagnosis of the dental caries and promote initial prevention at the early stages.

**Rajiv Saini**

*Department of Periodontology and Oral Implantology, Rural Dental College- Loni, Rahata, Ahmednagar, Maharashtra, India*

**Address for correspondence:**

Dr. Rajiv Saini  
Department of Periodontology and Oral Implantology,  
Rural Dental College- Loni, Rahata, Ahmednagar,  
Maharashtra - 413 736, India.  
E-mail: drperiodontist@yahoo.co.in

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