Comparison between Visual and QLF Examinations of Incipient Caries in Deciduous Dentition

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\textbf{Abstract:} The purpose of this clinical study was to investigate the correlation between visual examination as a subjective method and examination using a quantitative light-induced fluorescence (QLF) image as an objective method for evaluating the oral health condition of the deciduous dentition. The subjects of this study were 119 nursery school children (4 or 5 years of age) in Osaka, Japan. The occlusal and buccal surfaces of the 2nd deciduous molar and buccal surface of the deciduous incisor were examined visually and tactilely with a dental mirror and CPI probe. The tooth surfaces were classified into: sound, filled (including a sealant), decayed caries, or early caries lesion. Examination using a QLF image was performed for the same tooth surfaces with the same criteria as for visual examination. Thirty-five tooth surfaces with early caries lesions were detected by visual inspection, whereas 332 surfaces were detected by QLF. There was nearly a 10-fold difference between visual and QLF examinations in the detection of early caries lesions. Moreover, 134 filled surfaces were observed by QLF examination. On visual inspection of these 134 surfaces, 63 surfaces were identified as filled surfaces, and 61 as sound surfaces. These results suggest the importance of introducing a new examination system which consists of subjective and objective methods into dental management in the future.

\textbf{Key words:} Early caries detection, Visual examination, QLF, Deciduous dentition

Objective

The prevalence of dental caries has clearly been decreasing on a global scale\textsuperscript{1).} The DMFT index value of 12-year-old Japanese children is believed to have been less than 1.0 in 2010, as in other developed countries. Conventionally, total dental caries is presented as the caries experience, which indicates the number of decayed, missing, and filled teeth. The unit of caries prevalence has also been expressed in terms of the individual, tooth, or tooth surface depending on the purpose of the research. In situations where most of the tooth surfaces are sound, it is important that the difference between sound teeth and those with dental caries is objectively examined for the prevention of caries and promotion of health\textsuperscript{2).}

An early caries lesion, which is reversible and located between sound teeth and caries, has been described as “sound” according to the WHO caries criteria\textsuperscript{3).} Objective methods for detecting and quantifying early caries lesions have been developed using optical tools\textsuperscript{4–6),} and the quantitative light-induced fluorescence (QLF) method is one of the most useful for detecting and quantifying initial caries lesions. The QLF method can also evaluate tooth surfaces nondestructively. Many reports have used this method for detecting and monitoring early caries lesions\textsuperscript{7–9).}

The purpose of this study was to compare the results of oral examination with visual examination as a subjective method and QLF as an objective method.

Subjects and Methods

The subjects of this study were 119 nursery school children between 4 and 5 years of age. Written in-