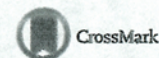


Chair-side detection of *Prevotella Intermedia* in mature dental plaque by its fluorescence



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ABSTRACT

Background: *Prevotella intermedia/nigrescens* is one of the well-known pathogens causing periodontal diseases, and the red fluorescence excited by the visible blue light caused by the protoporphyrin IX in the bacterial cells could be useful for the chair-side detection. The aim of this study was to evaluate levels of periodontal pathogen, especially *P. intermedia* in clinical samples of red fluorescent dental plaque.

Methods: Thirty two supra gingival plaque samples from six individuals were measured its fluorescence at 640 nm wavelength excited by 409 nm. Periodontopathic bacteria were counted by the Invader PLUS PCR assay. Co-relations the fluorescence intensity and bacterial counts were analyzed by Person's correlation coefficient and simple and multiple regression analysis. Positive and negative predictive values of the fluorescence intensities for with or without *P. intermedia* in supragingival plaque was calculated.

Results: When relative fluorescence unit (RFU) were logarithmic transformed, statistically significant linear relations between RFU and bacterial counts were obtained for *P. intermedia*, *Porphyromonas gingivalis* and *Tannerella forsythia*. By the multiple regression analysis, only *P. intermedia* had statistically significant co-relation with fluorescence intensities. All of the fluorescent dental plaque contained *P. intermedia* m. In contrast, 28% of non-fluorescent plaques contained *P. intermedia*.

Conclusion: To check the fluorescence dental plaque in the oral cavity could be the simple chair-side screening of the mature dental plaque before examining the periodontal pathogens especially *P. intermedia* by the PCR method.

1. Introduction

Several hundred bacterial species inhabit oral biofilm called dental plaque [1,2]. *Prevotella intermedia/nigrescens* is frequently isolated from dental plaque in patients with periodontal diseases, and is considered one of the periodontal pathogen classified as “orange complex” [3,4]. *P. intermedia/nigrescens* has also been associated with other oral infections, including pregnancy gingivitis [5,6] or acute necrotizing ulcerative gingivitis [7]. Socransky et al. examined over 13,000 subgingival plaque samples from 185 adult subjects and used cluster analysis and community ordination techniques to demonstrate the presence of specific microbial groups within dental plaque. Early colonizers of the tooth surface, such as a yellow complex, a green complex, a purple complex usually precedes to mature dental plaque classified as “orange complex”, and finally causes periodontal diseases containing dental plaque classified as “red complex” including *Porphyromonas gingivalis*, *Tannerella forsythia* and *Treponema denticola* [8]. Removal of the mature

biofilm is the most effective means of prevention and initial treatment of periodontal diseases. Therefore, to check the characteristic of dental plaque is important for dental clinical practice.

P. intermedia/nigrescens is capable of incorporating a large amount of haem from environment, as an iron protoporphyrin IX, into their cells [9–14]. The incorporated protoporphyrin show fluorescence when excited by the visible blue light with wave-length 400–495 nm [15–18]. This phenomena seem to be very advantageous for the clinical dental practice to find out the characteristic of the mature dental plaque. Clinically available fluorometric devices, such as quantitative light-induced fluorescence (QLF), were originally developed for the early dental caries detection [19] and made it easy to distinguish the periodontal pathogenic biofilm in the oral cavity.

Red fluorescence reaction excited by the visible blue light is originated from a bacterial metabolite called porphyrin. Porphyrin are produced by deriving the ferrous from haem. Among the several hundred bacterial species that inhabit oral biofilm, bacteria that

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