



The Efficiency of Fluorescence Technique Used For Gingival Inflammation and Plaque Detection

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Abstract

Periodontal disease is one of the most important oral health issues in Thai population due to high prevalence. Therefore, the instrument required for early detection clinically is an interesting topic for further discussion in order to prevent disease progressions. The study recruited 40 human subjects. All subjects will undergo both standard examination and SOPROCARE[®] examination to detect gingival inflammation and plaque accumulation. Plaque accumulation and gingival inflammation were scored in numeric data by Sillness and Loe index in P0-P3 and G0-G3, respectively. The result of the dental plaque score and gingival inflammation revealed that the average score of fluorescence examination had an average score lower than clinical. While old and new plaque detection by SOPROCARE[®] and conventional method had the same result as 71.5% and gave the different result of 28.5%. This study found that the sensitivity of fluorescence examination for dental plaque detection was 88.68%; whereas, specificity was 33.33%. Gingival inflammation detection had a sensitivity of 83.79%; whereas, specificity was 50.00%. In other words, this method was sensitive for gingival inflammation detection. In conclusion, the conventional method was able to detect gingival inflammation and dental plaque more than fluorescence examination. ROC curve was also analyzed. SOPROCARE[®] in PERIO mode had high disease detection ability but did not suit for diagnostic assessment. However, it should be used as a tool for patient motivation for oral hygiene instruction.

Keywords: Fluorescence, conventional examination, gingival inflammation, dental plaque

1. Introduction

Oral health is an important part of the general health of one's body. According to National Oral Health Survey of Thailand Vol.8 2017, periodontal disease is one of the most crucial oral health issues in Thai population due to their high prevalence. It is also multifactorial disease, in which the risk is increasing, especially in smoking patients, patients with Diabetes Mellitus (DM) and patients with poor hygiene. With periodontal disease, the inflammatory reaction is associated with progressive loss of periodontal ligament and alveolar bone and eventually will have mobility and loss of teeth (Coventry et al, 2000). The inflammation of the periodontal tissue is the most common oral disease caused by the dental plaque presented on the teeth (Marsh, 1994).

Dental plaque becomes more pathogenic when presents on the tooth surface for a long period (matured plaque) (Kolenbrander, Palmer, Periasamy, & Jakubovics, 2010). Prevention of oral disease relies on frequent plaque removal (Axelsson & Lindhe, 1978). Therefore, plaques accumulation and gingival inflammation are necessarily recorded in order to be able to determine disease progression and treatment (Carvajal et al., 2016).

Both gingival inflammation and plaque accumulation mentioned above require early detection in order to be able to prevent disease progressions. However, the method to detect those lesions usually rely solely on visual under operating unit light which could be quite subjective, so the adjunctive screening tool could provide some benefit for early detection of those lesions. (Seshan & Shwetha, 2012)

One of the new technologies was invented to aid an early diagnosis of various substances (Morgan, 2011) in which each one emits different fluorescent color to detect lesions is called fluorescence examination. This concept has been used widely in dentistry such as in restorative dentistry, caries detection and in oral cancer investigation (Mualla, 2016). Fluorescence detects red autofluorescence, produced when illuminated with blue light at 405 nm.