Detection of Pathogenic Microflora in Complete Denture Biofilms using PCR Technique

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Edentulism; the loss of natural teeth in humans, is an important global public health issue, particularly affecting the elderly. A complete denture is an oral prosthesis that replaces the missing teeth in a dental arch. A removable complete denture is often used to treat edentulism. Over time, a dense layer of microbial communities is deposited in the polymeric surface of the denture, forming a biofilm. Thus, denture biofilms serve as reservoirs for pathogenic microbes potentially progressing into systemic or localized diseases. Only a few studies have investigated the microflora that colonizes dentures and their effect on oral health. The utilization of culture-based techniques to determine the presence of oral microbes is limited due to their fastidious nature. In this study, a culture-independent molecular method, based on PCR was exploited to identify the prevalence of selected clinically significant microorganisms; *Streptococcus mutans, Porphyromonas gingivalis, Helicobacter pylori, Escherichia coli, Candida albicans* and *Staphylococcus aureus*. Complete denture biofilm samples were collected from 35 complete denture wearers without any diagnosed clinical implications, who sought treatment from the Dental Teaching Hospital, Peradeniya upon their informed consent. Relevant demographic data were recorded using a questionnaire. Microbial species were detected by PCR amplification using species-specific primers mainly based on the 16s rRNA gene. The results showed that complete denture biofilms harbored *S. mutans* (28/35), *P. gingivalis* (24/35), *H. pylori* (8/35), *E. coli* (25/35), *C. albicans* (11/35) and *S. aureus* (29/35). The findings of this study indicate that complete denture biofilm contains clinically important microorganisms. Hence, proper denture hygiene is necessary to avoid opportunistic infections by these potential pathogens among complete denture wearers. Given the accuracy of the molecular detection of opportunistic pathogens within a short period of time, the use of the PCR technique will help strengthen existing clinical diagnosis protocols.

Keywords: Edentulism, Health Care, Microbial Biofilms, Molecular Detection, Oral Microbiome