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## Evaluation of *in vitro* biofilm removal with 2% and 10% sodium hypochlorite

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**Introduction:** Biofilms are communities of microorganisms attached to a surface and embedded in a matrix of polysaccharides and proteins forming a slimy layer. Oral bacteria have the capacity to form biofilms on distinct surfaces. Bacteria also form dense colonies on root canal walls and features like isthmuses and lateral canals. Microbial communities in biofilms are remarkably difficult to eradicate with antimicrobial agents for reasons that are yet to be adequately explained. Studies have shown that sodium hypochlorite (NaOCl) is the most effective anti-microbial irrigant used during endodontic treatment. The aim of this study is to evaluate the structure of biofilms and presence of EPS before and after the use of NaOCl 2% and 10%.

**Materials & Methods:** Dual species biofilms of *Streptococcus oralis* J22 and *Actinomyces naeslundii* T14VJ1 were grown under static conditions and in a constant depth film fermentor (CDFF). Biofilms grown in the CDFF mimic the basal layer of an oral *in vivo* biofilm better. For the static conditions, a confined space was created over saliva coated dentin discs with supply of 20 ml of modified BHI each 24 h for 4 and 10 days. For the CDFF, saliva coated hydroxyapatite discs biofilm was grown for 96 h at 37 uC under continuous supply modified BHI at a rate of 45 ml/h. The system was equipped with 15 sample holders and each sample holder contained 5 saliva coated hydroxyapatite discs, recessed to a depth of 250 mm. After growing the biofilms, NaOCl 2% and 10% were applied for 60 s and 300 s for removing the biofilm. Optical coherence tomography (OCT) was used for high-resolution, real-time imaging of a three-dimensional structure of the biofilm. Confocal laser scanning microscopy (CLSM) was used to visualize the biofilm matrix, structure and condition of bacteria (LIVE/DEAD staining).

**Results:** In the static biofilm group, OCT images showed reduction of biofilm thickness after applying the NaOCl 2% and 10% and there was a very fluffy structure observable. In the CDFF group, OCT images showed bubble formation in the biofilm after using NaOCl 10%, but the irrigant did not reduce the thickness of the biofilm or its consistency. The bubble formation was also observed in CLSM images. The CLSM showed reduction of the biofilm structure but mostly living bacteria were found in the remaining biofilm.

**Conclusion:** According to our study, we need to use more efficient irrigants for more period of time to achieve our goal of cleansing the matrix.

### Biography

Sayedah Zahra Rahmani has earned scholarship for Dental School at Tabriz University of Medical Sciences and was graduated in 2015 and also she was the only Dentistry student won the International Research Fellowship in Groningen, Netherlands in 2015. She has been working in Behbood Hospital as General Dentist in 2015 to till date. She is interested in research in medical and also basic science fields as well as dental practice.

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