In Vivo Evaluation Of Initial Enamel Erosion Using Optical Coherence Tomography (OCT)
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Aim: To assess the potential of Optical Coherence Tomography (OCT) in the monitoring of initial enamel erosion in vivo for a clinical trial.

Objectives: 1) To evaluate the effect of three-times daily exposures of a commercially available orange juice on backscattered intensity of OCT. 2) To evaluate the effect of overnight saliva after daily exposure of orange juice.

Methods: Twenty-two healthy adults, age 23-33 participated in the study, involving a 2-Phase (A and B) cross-over study of 3 days each. In Phase A, participants were asked to swish a total of 250 ml orange juice for 10 min, 3 times per day with an interval of 3 hours, with a 2-day wash-out period. In Phase B, same protocol was followed with an addition of gum chewing for 15 min after each swishing. A swept-source OCT (SS-OCT) was used to scan the labial surfaces of the right or left maxillary incisors before and after each interval, totalling of 6 scans per day (T1 – T6). The integrated reflectivity (IR) values, derived from the OCT A-scans were used for evaluation and the changes were analysed using paired t-test.

Results: Results revealed that there was a significant increase in the (IR) of the backscattered OCT signals after repeated rinsing with orange juice in comparison to orange juice plus gum chewing (p<0.05) in day 3 for Phase B. However, there were no significant different between T6 and T1 after overnight saliva either in Phase A or Phase B, (p<0.05).

Conclusions: Results showed that this method is a sensitive technique for investigation during initial stage of erosive lesions, suggesting that OCT may be able to quantify early demineralisation in vivo. Thus, this study provides support for further development of OCT to be used as a tool monitoring the progression of initial enamel erosion in a clinical trial.