

The abstracts are available free online at
www.karger.com/doi/10.1159/000328514

58th Annual ORCA Congress

July 6–9, 2011, Kaunas, Lithuania

Abstracts

Contents

- Session 1
175 Fluoride
- Session 2
183 Clinical Studies
- Session 3
191 De- and Remineralization
- Session 4
200 Epidemiology
- Session 5
209 Erosion
- Session 6
217 Diagnostics
- Session 7
225 Microbiology
- Session 8
232 Caries Risk Assessment, Dental Plaque
- 240 Author Index**

KARGER

Basel · Freiburg · Paris · London · New York · New Delhi · Bangkok ·
Beijing · Tokyo · Kuala Lumpur · Singapore · Sydney

protective effect of saliva and pellicle. The aim of this study was to investigate the sensitivity of OCT in detecting early erosion in situ and validating it against surface microhardness. 20 volunteers wore a mandibular appliance with two embedded human enamel samples, one with a natural surface (Ns) and the other with a polished surface (Ps) for 5 days. Each day the participants wore the appliances from 09.00 to 16.00 and swished a total of 250 ml orange juice around their mouth for 10 min at three separate intervals. 3D OCT images and microindents with a Knoop microindenter were made at baseline and at the end of each day. Percentage of surface microhardness change (%SMC) and decay of backscattered light (At) of OCT were analysed. Multiple regression analysis of erosion interval with %SMC and At showed that both surface microhardness and OCT detected significant erosion-interval related changes on both natural and polished surfaces with the following R² value (%SMC R²_{Ns} = 0.19, p < 0.001; R²_{Ps} = 0.60, p < 0.001 and At R²_{Ns} = 0.08, p = 0.01; R²_{Ps} = 0.24, p < 0.001). There was also significant correlation between %SMC and At for both Ns and Ps (p < 0.001) with Pearson correlation coefficient of 0.351 and 0.572 respectively. Paired t tests showed significant differences from baseline (p < 0.05) at 30 minutes of erosion onwards for both methods and surfaces. At 30-minute erosion, %SMC_{Nc} = 22 ± 8 (mean ± SE) (p = 0.009) and %SMC_{Ps} = 54 ± 3 (p < 0.001) and At_{Nc} = 0.05 ± 0.02 (p = 0.005) and At_{Ps} = 0.13 ± 0.03 (p = 0.001). It can be concluded that OCT can detect early erosion on both polished and natural enamel surfaces in situ.

This research was supported by Colgate Palmolive.

101

The Abrasive Effect of a Pig's Tongue on Tooth Tissue Loss under Erosive Conditions

J. Wheeler*, E.L. Macdonald, S.B. Jones, N.X. West

s.b.jones@bristol.ac.uk

School of Oral and Dental Sciences, University of Bristol, Bristol, UK

The tongue is a powerful muscle within the oral cavity and is frequently in contact with the tooth surface and therefore has the ability to damage previously softened enamel. Most models that are used to determine the erosive effects of acid on enamel in vitro do not take the abrasive effect of the tongue into consideration. The aim of this study was to use a pig's tongue to identify the tongue's abrasive influence on tooth tissue surface loss in an erosive environment. Human enamel specimens obtained from an ethically approved tissue bank were sectioned and polished flat. Specimens were pre-soaked in either 0.3% citric acid at pH 3.2 or artificial saliva for 2 min or no pre-treatment prior to being rubbed with a pig's tongue in the presence of citric acid or artificial saliva for 15 cycles. Each cycle consisted of pre-treatment soak followed by 50 strokes with the tongue. The amount of surface tissue loss was determined using non-contact profilometry. The greatest amount of tooth tissue loss was observed for specimens that had been soaked in acid and rubbed in an acidic environment

(1.53 µm), followed by specimens that were soaked in acid and rubbed in artificial saliva (1.22 µm). Following pre-soaking in acid, specimens that were rubbed with or without acid were not significantly different (p < 0.05) to each other. Specimens that were soaked in acid without rubbing (0.31 µm) or specimens that were rubbed in artificial saliva with no prior acid exposure (0.45 µm) were significantly lower. These results show that the tongue can have a significant effect on the amount of tissue loss if the enamel has previously been exposed to acid and should therefore be considered for in vitro erosion models.

This project was funded by the Clinical Trials Unit at the Bristol School of Oral and Dental Sciences, UK.

102

Applying Profilometry to Quantitatively Detect Initial Erosion of Polished and Natural Surface Enamel in situ

S.B. Jones^{a,*}, H.P. Chew^b, C.M. Zakian^b, R.P. Ellwood^b, M. Davies^a, N.X. West^a

s.b.jones@bristol.ac.uk

^aSchool of Oral and Dental Sciences, University of Bristol, Bristol, and ^bSchool of Dentistry, The University of Manchester, Manchester, UK

The process of enamel erosion commences as soon as hydroxyapatite is exposed to acid. When designing in situ clinical studies it is advantageous to be able to determine erosion at the earliest time point possible. The aim of this study was to determine how early changes to the enamel surface caused by erosion could be significantly quantified in terms of increase to surface roughness (Ra) using both polished and natural surface enamel. Following ethical approval, 20 healthy individuals participated in this study. Each individual wore lower buccal appliances containing one flat, polished specimen and one curved, natural surface specimen. Lower human incisors were used due to the constraints of the measuring instrument necessitating a curved surface to be within 300 µm height variation over a 2 × 1 mm scanning area. Individuals wore the appliances from 9.00 to 16.00 and swished a total of 250 ml orange juice around their mouth over a 10 min period at separate intervals, three times a day for a total of five days. The surface of each specimen was scanned using a non-contact profilometer (Proscan2000, Scantron, UK) following each day and mean Ra determined. Both natural and polished surfaces showed a gradual increase in surface roughness over time ranging from 0.184–0.283 µm (R = 0.231, p < 0.001) for the natural surface and 0.086–0.168 µm (R = 0.524, p < 0.001) for the polished surface. Significant differences (p < 0.05) were observed following four days (2 h) of acid exposure for the curved specimens and one day (30 min) of acid exposure for the polished specimens. This study confirms that it is possible to use profilometry to measure surface changes caused by erosion of natural and polished specimens but a less erosive challenge was required to elicit significant change with the polished samples.

This project was funded by Colgate Palmolive.