

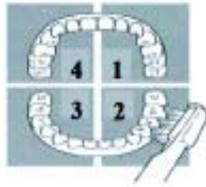
A Method Using Interproximal Sampling with Floss to Quantify the Delivery of Dentifrice Components to Areas That Toothbrush Bristles Cannot Reach

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ABSTRACT

Using woven floss as a sampling tool, it is possible to quantify the amount of individual dentifrice constituents which have been delivered into the interproximal spaces. **Objective:** To determine the relative active delivery of a simulated continuous (redose) delivery versus that of a single (bolus) delivery of dentifrice. **Methods:** Subjects have their interproximal areas flossed before and after brushing with a dentifrice. Brushing uses a single delivery (quadrant 1) or a single and redose delivery (quadrants 1 and 3). Floss samples were analysed for a target species by mass spectrometry (LC-MS/MS). Identification & quantification of individual dentifrice components (in this case SDS - Sodium dodecyl sulphate) allowed an assessment to be made of the relative performance of dosing regimes to deliver dentifrice actives to the areas which a brush would not normally reach. This is particularly relevant for electric brushes, some of which make claims on between teeth cleaning and specifically for the Philips/Crest IntelliClean system. **Results:** Data showed consistently different levels of SDS delivered in-between the teeth for bolus versus redose dosing regime. Comparative data will be shown. Clinical implications: this performance measure can be used to improve brush designs, thereby increasing the delivery of actives to proven to have a gum health benefit into the areas of the mouth where they are most needed – the areas the brush cannot reach. **Conclusion: It is possible to measure the relative performance of different brushes and dosing regimes at delivering dentifrice actives to areas where a toothbrush cannot reach.**



INTRODUCTION

Cleaning in hard to reach, interproximal areas is a significant challenge for all toothbrushes/dentifrice¹. Different product combinations are likely to have significantly different abilities to deliver dentifrice constituents into the interproximal areas.

PURPOSE

This study was designed to determine the difference in total amounts of active (Sodium dodecyl sulphate or SDS) delivered and the uniformity of delivery due to two different dosing regimes in the interproximal space in the mouth.

PURPOSE (Cont.)

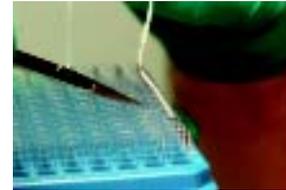
Why SDS? (Note: SDS is also known as Sodium Lauryl Sulphate or SLS)

- Present in **most oral care products** – a good ‘marker’ molecule.
- Easily ionisable and has a **distinct product ion** transition – enabling us to use MS and MS/MS for detection/quantification.
- Gives a **linear response** and 100% recoveries over required range.
- Known to provide cleaning efficacy via surfactant action and microbial cell disruption.

MATERIALS AND METHODS

Test design:

- 15 subjects with healthy gingiva were selected. Each subject had the **interproximal space** between the maxillary premolar/molar (both quadrants) **sampled using a woven floss** (Oral B Ultrafloss). All sampling was performed by a dental hygienist.



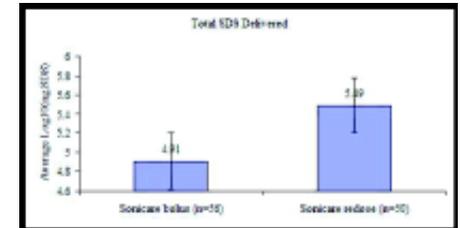
Test Products:

- Sonicare Elite– bolus delivery.
- IntelliClean System from Sonicare and Crest – redose delivery.
- Subjects **brushed with the assigned product** (double cross-over, single blind design). Dentifrice was weighed onto the brush, and **total delivery of SDS (mg) was identical for both products.**
- After 5 minutes had elapsed, the subject had the **same interproximal site resampled.**
- The length of the floss used for sampling (about 3cm) was removed and placed in a sample tube awaiting analysis.
- Total SDS was extracted from the floss, and resulting solution analyzed using LC-MS/MS.

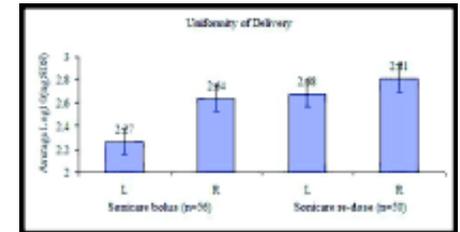


RESULTS & DATA

1. Total delivery of SDS to the interproximal gap was shown to be higher at a statistically significant level using the redose delivery method.



2. The delivery of SDS across the mouth was more uniform using redose delivery method.



Where n is the number of observations made.

Data were screened for outliers and erroneous readings due to non-compliance. ANalysis Of VAriance (ANOVA) methods were applied taking subjects, the sequence products were seen, week, day and treatment effects into account as well as any statistically significant interactions.

CONCLUSION

- ❖ Methodology developed and validated to perform extraction and quantification of low level active recovered from interproximal space.
- ❖ Method of redose delivers an overall higher level and a more uniform delivery of active to the interproximal gap.

1. Bellamy, et al J Clin Dent 15(3):59-65, 2004.

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