

# Interproximal Cleaning Using an Integrated Oral Hygiene System

K. Wright<sup>1\*</sup>, P. Bellamy<sup>1</sup>, A. Noronha<sup>1</sup>, and X. Zhou<sup>2</sup>

<sup>1</sup> P&G, Rusham Park, Egham, UK, <sup>2</sup> P&G, Mason, OH, USA



0946

## ABSTRACT

**Objective:** To investigate the interproximal cleaning effects of an integrated oral hygiene approach, the Sonicare/Crest IntelliClean system, versus the gold standard positive control for oral hygiene, the combination of manual brushing + daily flossing, and a negative control of manual brushing alone.

**Methods:** A 21 day home use study was implemented using 196 subjects split across the three treatment groups. Interproximal samples were taken at baseline and 21 days from multiple sites in the mouth using Oral B Ultrafloss to remove accumulated debris. The debris was then analysed using a protein quantification technique, with the sample values standardised against Bovine Serum Albumin (BSA). The sampling and protein estimation approaches have been reported previously<sup>1</sup>.

### Results:

- All three treatment groups showed significant reductions in the amount of material recovered from the site after 21 days ( $p < 0.0001$ ).
- Reductions in interproximal material after 21 days were:
  - Manual brushing + flossing: 44.7% reduction**
  - Sonicare/Crest Intelliclean system: 39.3% reduction**
  - Manual tooth brush: 33.5% reduction**
- Both the manual brushing + flossing and the Sonicare/Crest Intelliclean System showed significantly higher reductions in interproximal material over 21 days, relative to manual tooth brushing.

## INTRODUCTION

The oral health benefits of combined regular brushing and flossing are well documented and is a primary oral hygiene method recommended by dental professionals. Flossing targets 'hard to reach' areas within the dentition & interdental space which are not typically accessible via normal brushing, removing the plaque and mineralized deposits which can result in disease. However, poor technique and compliance with flossing regimens often minimize the benefits achieved.

## PURPOSE

In vitro experiments have demonstrated that the Sonicare/Crest IntelliClean System is capable of cleaning effects beyond areas where actual physical contact of the bristle occurs<sup>2</sup>. In order to further investigate these properties and allow comparisons to flossing under *in vivo* conditions, a novel technique has been developed that measures accumulated biomass (bacteria + proteins) by quantifying protein within the inter-dental space<sup>1</sup>.

## MATERIALS AND METHODS

**Study Design:** The randomized, single-blind parallel study design contained 3 legs, with 85 healthy adult subjects each in the negative control (brushing alone) and Sonicare/Crest IntelliClean System legs, and 30 healthy adult subjects in the positive control leg (brushing + flossing). Clinical evaluations were conducted at the screening, baseline and final visits. Each subject used their assigned test product, twice a day, at home, for a period of 21 days.

Selected interproximal locations were sampled with a woven floss (Oral B Ultrafloss).

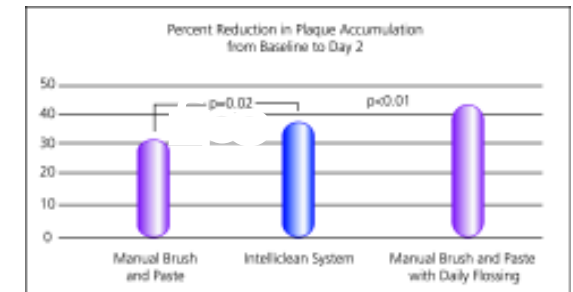


A 2 cm section of the floss excised and vortexed in sterile saline and each sample analyzed using a validated protein quantification technique<sup>1</sup> and standardized against a Bovine Serum Albumin (BSA) protein control.

**Statistical Method:** A base-10 logarithm function was applied to the concentration of the proteinaceous material in the interproximal flossing sample. Analysis of covariance methods was used for treatment comparisons, with baseline concentration as a covariate. The adjusted means were transformed back to the original scale for the reporting purpose.

## RESULTS

- One hundred ninety-six subjects were enrolled and randomized to one of the three treatment groups. Of those, 192 completed all visits and were evaluable. Subjects ranged from 18 to 67 years of age and were predominantly female (67.3%).
- At baseline, subjects in the three treatment groups had similar level of proteinaceous material in their sampled interproximal areas ( $p$ -value 0.6558).



At the end of the 21 day treatment period:

- All three groups had statistically significant ( $p < 0.0001$ ) reduction in material between the teeth relative to the baseline samples.
- Reductions in interproximal material over the 21 days were:
  - Manual brushing + flossing: 44.7% reduction**
  - Sonicare/Crest Intelliclean System: 39.3% reduction**
  - Manual tooth brush: 33.5% reduction**
- Both the Manual brushing + floss and Sonicare/Crest IntelliClean legs broke significantly when compared with the Manual tooth brush leg.

## CONCLUSION

The interproximal cleaning effects of three oral hygiene regimens, manual brushing + flossing, Sonicare/Crest Intelliclean system and manual tooth brushing were assessed using this new *in vivo* sampling technique, with interdental material being shown to be a viable measure for the cleaning efficacy of these regimens.

1. P. Bellamy, A. Barlow, G. Puri, K. I. T. Wright, A. Mussett, X. Zhou: A New *In Vivo* Interdental Sampling Method Comparing a Daily Flossing Regime Versus a Manual Brush Control. *J Clin Dent* 15:59-65, 2004.
2. IADR Poster no. 1031: *In-vitro* Assessment of Cleaning Efficacy of Integrated Electric toothbrush. V. Rane, D. Brittin, M. Leigh, and G.C. Peterson