

New In-Vivo Sampling Method To Determine Efficiency of Interproximal Cleaning

P. Bellamy*, J.Crowther, K. Wright, A. Barlow, K.Venable, and A.Mussett

P&G, Rusham Park, Egham, UK



3526

ABSTRACT

Objective: A new in-vivo sampling method has been developed allowing quantification of bio-material in the interdental spaces. The aim of this research was to employ the technique in a randomized, parallel-group clinical trial evaluating interproximal cleaning effects with and without daily whole mouth flossing. **Methods:** A total of 80 healthy adults were randomized equally between two treatment groups. Both treatment groups used a standard manual toothbrush /toothpaste with one group also following a daily flossing regimen for 21 days. Subjects had pre molar (bicuspid)/molar interproximal boundaries sampled in each quadrant with a woven floss. Sites were sampled at baseline and 21 days, providing a change from baseline measure. Cleaning efficiency was measured by protein quantification (Bio-Rad™ Protein Assay) and statistical comparisons made between the two treatment groups using ANCOVA. **Results:** Significantly less interproximal material was measured in subjects who had followed a daily flossing regimen compared to subjects who had used a manual toothbrush alone (p value<0.001).

Treatment	Adj Mean In (Pre) In (Post)	P-Value change from Baseline	Treatment Comp. P-value
Manual	0.11	< .001	< .001
Manual + Floss	0.25	< .001	

Conclusion: Clinical application using this novel technique demonstrated a significant reduction in the amount of interproximal bio-material for daily flossing vs. use of a manual brush alone.

INTRODUCTION

Cleaning of relatively inaccessible in hard to reach interproximal areas is a significant challenge for all toothbrushes/dentifrice. Partly to address this, daily whole mouth flossing is currently recommended by dental professionals. This paper proposes a new method to measure the interproximal cleaning efficacy of different oral hygiene regimens.

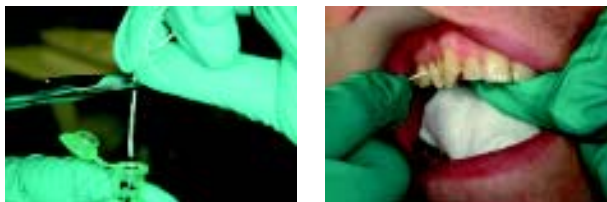
PURPOSE

This preliminary study was designed to determine the relative interproximal cleaning benefit achieved by including daily flossing in a subject's daily oral hygiene routine.

MATERIALS AND METHODS

Test design:

- ◆ 80 subjects, who were not regular tooth flossers, were selected. Each subject had one pre-molar (bicuspid)/molar interproximal space sampled in each quadrant using a woven floss (Oral B Ultrafloss). This was the baseline sample. All sampling was carried out by a dental hygienist.



- ◆ Subjects were assigned to one of two parallel treatment groups and followed the specified regimen (below) for 21 days. At this point, the same sites as at baseline were re-sampled.
- ◆ **Sampling preparation:** The section of the floss used for sampling (about 20mm) was cut from the length and placed in a sample tube containing 1ml of 0.85% saline. This was vortexed before refrigeration and analysed within 3 hours.
- ◆ **Analysis method:** An aliquot of the sample was mixed with a protein dye (Bio-Rad™ Protein Assay), and analysed for absorbance at 620nm using a Tecan Spectroflash spectrophotometer.
- ◆ In this early work, data is reported in absorbance units. As the level of protein increases in the sample, the absorbance at 620nm increases.



Treatment regimens:

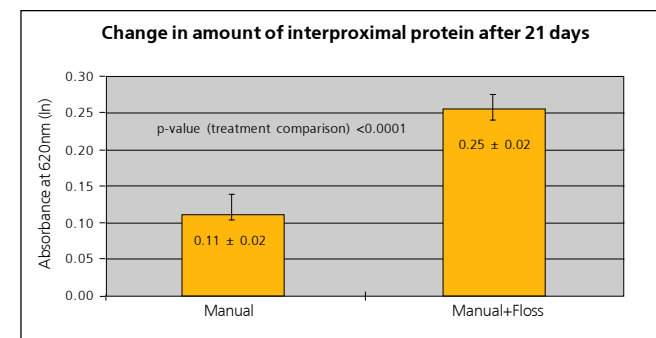
1. Manual toothbrush and Anti Cavity (fluoride) tooth paste, used twice daily.
2. Manual toothbrush and Anti Cavity (fluoride) tooth paste, used twice daily. In addition, **daily flossing** with Oral B waxed floss.

RESULTS

1. Both legs showed a significant reduction in protein from baseline over 21 days.
2. The regiment with daily flossing showed a **significantly larger reduction than the control** leg (twice daily brushing only).

DATA

Analysis of COVariance (ANCOVA) with treatment as class variable was used to make comparisons of the mean change from baseline, where change was calculated as baseline minus final. Baseline was included as a continuous covariate. Plot shows mean absorbance and standard error.



CONCLUSION

This new method is able to demonstrate the known cleaning benefit of daily flossing. Further work is required to determine it's suitability for evaluating other treatment regimens that may offer interproximal cleaning.

Acknowledgement: Mrs V. Flora (hygienist),
R. George (analyst) Oral Care P&G UK