

New Method For Measuring Interproximal Cleaning

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ABSTRACT

Objectives: The purpose of this research was to evaluate a novel method for assessing interproximal cleaning using Periopaper® for interproximal gingival crevicular fluid (GCF) sampling. The composition of interproximal gingival crevicular fluid (GCF) samples can be quantified for viable microbial concentrations with this new method. **Methods:** Seven healthy subjects were recruited with 3 mm or shallower gingival pocket depths. GCF samples were collected from predetermined maxillary, posterior dentition sample sites in this randomized three treatment, three period cross-over study of microbial viability. Subjects were instructed to brush with a currently marketed rechargeable battery powered toothbrush with either the negative or positive control treatment for 30 seconds / quadrant: upper right, lower right, lower left, upper left followed by a water rinse. Treatment A was the negative control. Treatment B was the positive control consisting of a bolus dose of 1% cetylpyridinium chloride (CPC) gel in the first 30 seconds of brushing. Treatment C was a ½ dose of the positive control gel in the first 30 seconds of brushing with an additional ½ dose in the last 30 seconds of brushing. **Results:** Significantly better cleaning was seen for both of the positive control treatments ($p < 0.09$), i.e. overall, fewer viable microbes were found, relative to the negative control. A significant advantage in cleaning for Treatment B versus A & C ($p < 0.05$) was seen in the first 30 seconds of brushing. Treatment C showed significantly better cleaning than Treatment A ($p < 0.02$), during the last 30 seconds of brushing. **Conclusions:** **The viable bacterial measure from Periopaper® collected interproximal GCF is capable of discerning significant differences between treatments and within mouth treatment effects. This measure of viable bacteria represents a simple and effective way to assess interproximal cleaning.**

INTRODUCTION

Assessing the efficacy of oral health care products requires methods that are timely, cost effective, and predictive of health benefits. *In vivo* measurement methods are essential to this process and the interproximal GCF sampling method has been proposed as a means of establishing quantitative data on the pharmacodynamics of an active ingredient. This method involves using Periopaper® to sample the interproximal area by placing the Periopaper® adjacent to the entrance of the gingival pocket and extracting a GCF sample followed by bacterial enumeration.

PURPOSE

This study was designed to evaluate the sensitivity of a GCF sampling method to assess interproximal bacterial viability before and after brushing with a CPC gel compared to a matched placebo gel.

MATERIALS AND METHODS

Method:

Interproximal sampling: Performed by placing Periopaper® at the entrance to the gingival pockets for 30 sec. to absorb the fluid present.



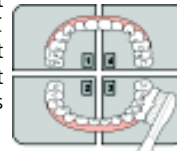
Sample analysis: The GCF sample volume was measured using a calibrated Periotron 8000® and then placed in reduced transport fluid. The sample was then cultured on gram negative selective media (ETSA-NV) using anaerobic techniques. Results were expressed as Colony Forming Units (CFU) per ml of gram negative anaerobes (GNAs) quantified.

Experimental Design:

General: Seven healthy subjects with no greater than 3 mm gingival pocket depth were selected for participation in a three-treatment, three-period cross-over study with one week washout between treatments.

Baseline sampling: Subjects did not brush prior to visiting the clinic on the morning of the study. Two mesial sites chosen from 2 or 3 and 13 or 14 were identified for each subject for sampling throughout the study. One microbiological sample was taken from each of the two identified sites.

Treatments: Subjects brushed for 2 minutes with a marketed rechargeable battery powered toothbrush. Treatment A (negative control) was 0.5 g of placebo gel (HPMC thickened aqueous gel) applied in the first quadrant of brushing. Treatment B (positive control) was 0.5 g of 1% CPC gel (HPMC thickened aqueous gel) applied in the first quadrant of brushing. Treatment C was 1% CPC gel as treatment B, applied in the first quadrant (0.25 g) and the last quadrant (0.25 g). Brushing was performed for 30 s per quadrant as shown.



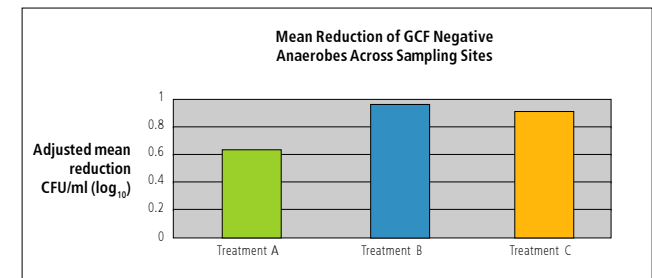
Post-Brushing sampling: Two hours after brushing interproximal GCF samples were collected from the two identified sites.

Statistics:

Analysis of covariance for repeated measures was used to model the mean change from baseline in CFU/ml. Baseline CFU/ml was included as a continuous covariate.

RESULTS

In Treatment C the adjusted mean reduction in baseline CFU/ml in the second sampling site was significantly greater than in the first sampling site ($p = 0.04$)



DISCUSSION

Using the placebo gel in conjunction with brushing led to a significant reduction in interproximal GCF GNAs. Both 1% CPC gel treatments delivered significantly greater reductions in interproximal GCF GNAs than the placebo gel. This reduction is expected for a treatment containing a high level of soluble CPC with only cationic compatible ingredients.

CONCLUSION

The viable bacterial measure from Periopaper® collected interproximal GCF is capable of discerning clinically significant differences between treatments. This measure represents an effective way to assess interproximal cleaning.