Effects of an Integrated Electric Toothbrush on Dental Plaque Accumulations

R.W. Gerlach,K. M. Kozak, R. D. Gibb, J. M. Dunavent, D. J. White*
P&G, Mason, OH, USA

2384

ABSTRACT

Objectives: This study examined the efficacy of a novel electric toothbrush integrating an *in situ* customized dentifrice delivery (Sonicare® Crest® Intelliclean System™) in comparison to brushing with a manual toothbrush and regular dentifrice. **Methods:** 17 volunteers pre-screened for participation in plaque studies signed an informed consent and were provided with commercial tubes of Crest® Regular dentifrice for use over 2 weeks time including morning and evening brushing with a standard manual toothbrush (Oral B® Indicator® Soft Regular 40). On 3 grading days in week 2 (week 1 = acclimation) subjects reported to the image clinic for fluorescein disclosure and UV imaging – at morning prior to hygiene (pre brush a.m. - A), post brushing with assigned dentifrice (a.m. post brush - B) and in mid afternoon (p.m. regrowth – C). Following two weeks, subjects were provided with Sonicare Intelliclean integrated brush system which includes an electric toothbrush with integrated specialized dentifrice for dosing *in situ*. Subjects received instructions on Intelliclean use which includes 2 minutes brushing. Intelliclean use was again 2 weeks with plaque assessments (% coverage) at timing ABC. **Results:** Intelliclean intervention produced reductions in plaque accumulation at each time point of assessment vs. a manual toothbrush including pre brush a.m. (20 % p=.028), post brushing (14 % p=0.289 nsd) and mid afternoon (21 % p=0.018). **Conclusion: Intelliclean produced significant reductions in dental plaque in the morning and midafternoon, and numerical (14 %) reductions post brushing. The Intelliclean system supplies improved therapeutic plaque control relative to manual toothbrushing.**

INTRODUCTION

Dental plaque accumulation is a primary factor in the development of gingivitis. Proper oral hygiene techniques aim to reduce plaque formation and retention to a minimum and research has shown that scrupulous hygiene invariably reduces gingivitis. Despite advances in patient education, access to professional care and modern oral products, hygiene practices of the majority of our patients is insufficient to maintain complete health. Accordingly, there is interest in the development of improved hygiene aids, including manual and electric toothbrushes to increase the efficiency of hygiene measures. The Sonicare Crest 'IntelliClean System' is an electric brush system designed to improve patient use of modern 'high cleaning' electric brush forms including a unique integration of brush and paste into a single hygiene aid. The IntelliClean system dispenses a sachet of fluoridated dentifrice to the oral cavity to provide in situ paste benefits with re-dosing effects and in use experience superior to other E-brush forms.

PURPOSE

The objective of this study was to apply Digital Plague Image Analysis Repeat Measures (DPIARM) design toward the assessment of the effectiveness of the Crest IntelliClean System in the control of dental plaque formation as compared with a well known commercial control dentifrice, Crest Regular and Onyx Base – containing regular cavity protection paste. This will include comparisons of both cleaning efficacy (plaque removal) and antimicrobial activity (plaque regrowth inhibition).

MATERIALS AND METHODS

Study Design:

N = 17 healthy subjects, informed consent, safety committee approval

Two Period Intervention Design –

Period A

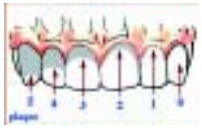
Routine Hygiene, 2 Weeks Crest Regular dentifrice & manual brush, plaque assessments during week 2

Period B

2 Weeks Sonicare Intelliclean use as directed (2 minute timed brushing redosing of integrated paste on quad. 4) electric brush & NaF dentifrice sachets

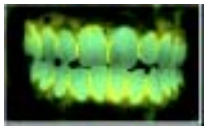
Plaque Assessment – DPIA – Digital Plaque Image Analysis

Plaque Induced Gingivitis

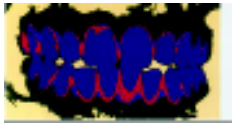


Conventional Plaque Scoring

Plaque Imaging Set-Up



Fluorescein Stained Dental Plaque Illuminated Under UV Lamp with Evaluations Carried out: Morning pre brushing, Morning post brushing, afternoon



A Computer Program Analyzes Digital Images – With Plaque and Tooth Pixels Enumerated by Mathematical Decision Rule Calibrated to Known Images

RESULTS

Treatment	Mean Plaque % Coverage a.m. Plaque Pre Brush (± SD)	Mean Plaque % Coverage a.m. Plaque Post Brush (± SD)	Mean Plaque % Coverage p.m. Plaque (± SD)
Crest Regular + Manual Brush	14.7 (6.0)	6.6 (3.5)	12.6 (5.1)
Intelliclean System	11.8 (4.6)	5.7 (2.5)	9.9 (3.8)
% Difference & Signifigance	20 p=0.028*	14 p=0.28*	21 p=0.018*

*Paired comparisons t test

CONCLUSION

- Morning tooth brushing with both manual and electric brush systems produced >50 % reductions in plaque coverage of the teeth
- The use of the Intelliclean system from Sonicare – Crest produced reductions in plaque at all three assessment times (significant at a.m. pre brush and p.m.)
- The Intelliclean system produces reductions in plaque coverage consistent with many antimicrobial therapies.