Laboratory Evaluation of the Interproximal Access Efficacy of a Specially Engineered Sonic Electric Toothbrush with Unique Sensing and Control Technologies

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Study Objective
The objective of this laboratory study was to compare a specially engineered sonic electric toothbrush with unique sensing and control technologies with either the Triple Clean or Sensitive refill brush head to a commercially available manual flat-trim toothbrush for their ability to access interproximal sites using a laboratory assay, the Interproximal Access Efficacy (IAE).

Trial Conditions and Methods

Products Under Investigation

Test Toothbrush 1: Colgate® ProClinical® A1500 Electric Toothbrush with Triple Clean Brush Head (Colgate-Palmolive Company, New York, NY)
Test Toothbrush 2: Colgate® ProClinical® A1500 Electric Toothbrush with Sensitive Brush Head (Colgate-Palmolive Company, New York, NY)
Manual flat-trim toothbrush: Oral B® Indicator® Toothbrush (Procter & Gamble Company, Cincinnati, OH)

Methods
A laboratory method was used to assess the ability of toothbrush bristles to penetrate between simulated teeth and remove artificial plaque, i.e. interproximal access efficacy (IAE), during the tooth brushing procedure. The brushing technique involved independent evaluations of each toothbrush in both vertical and horizontal brushing motion with tooth shapes simulating anterior and posterior teeth. The brushing apparatus was set to brush for 15 seconds at two strokes per second with a 50-mm stroke. The maximum width of artificial plaque removed from the plaque substrate placed around the teeth was recorded in centimeters. Six brushes from each test product group were evaluated four times for a total of 24 tests. Before and after completion of the test, the brush heads were visually examined for bristle integrity. The same examiner performed both efficacy and toothbrush integrity evaluations. Results for all brushing comparisons were statistically analyzed using an analysis of variance (ANOVA). A Tukey test for pairwise comparisons with a minimum significance level of 0.05 was used to identify significant mean differences between the test toothbrushes.
Results
Overall results combining IAE data using vertical and horizontal brushing motions and anterior and posterior tooth shapes are shown below. The overall mean IAE for the sonic electric toothbrush with the Triple Clean and Sensitive brush head was statistically significantly (p < 0.001) higher than the overall mean IAE for the manual flat-trim toothbrush. The sonic electric toothbrush with the Sensitive brush head demonstrated statistically significantly (p < 0.001) higher mean IAE compared to the sonic electric toothbrush with the Triple Clean brush head.

![Overall Mean Interproximal Access Efficacy](chart.png)

Conclusion
Relative to a manual flat-trim toothbrush, the specially engineered sonic electric toothbrush with unique sensing and control technologies equipped with either the Triple Clean or Sensitive brush heads provided statistically significant higher mean Interproximal Access Efficiency. In addition, the specially engineered sonic electric toothbrush equipped with the Sensitive brush head demonstrated higher interproximal access efficacy compared to the sonic electric toothbrush with the Triple Clean brush head.