A Comparative Clinical Study: Plaque Removal Efficacy of an Oscillating/Rotating Power Toothbrush versus an Ultrasonic Toothbrush

Tao He, AR Biesbrock, PA Walters, RD Bartizek

KEY CLINICAL RESULTS

• Oral-B® Triumph® provided statistically significantly greater whole mouth plaque reduction versus Ultreo® based on the Turesky Modified Quigley-Hein Plaque Index (p=0.0001) and the Rustogi Modified Navy Plaque Index (p<0.001).
• Triumph showed 23.9% greater plaque reduction based on TMQHPI and 16.3% greater plaque reduction using RMNPI.

OBJECTIVE
To evaluate the safety and efficacy of two power toothbrushes in the removal of dental plaque following a single brushing.

MATERIALS AND METHODS

• Two-treatment, examiner-blind, randomized, 4-period crossover design evaluating two power brushes:
  1. Oral-B Professional Care 9000 Triumph, an oscillating/rotating/pulsating power toothbrush
  2. Ultreo sonic toothbrush with ultrasound waveguide
• Subjects used each brush twice during the study. Subjects were asked to refrain from all oral hygiene procedures for 23-25 hours prior to their appointment and to refrain from eating, drinking or smoking for 4 hours prior to their appointment.
• At Visit 1, 25 subjects who were enrolled in the study received both toothbrushes along with written acclimation phase instructions. Subjects were provided with a standard fluoride gel toothpaste (Crest® Cavity Protection) to use at home. During the 6-day acclimation phase, subjects used one brush for 3 days then the alternate brush for 3 days.
• At Visit 2, subjects who met continuance criteria swished with red disclosing solution to disclose plaque, then received a baseline plaque exam by two experienced examiners, one using the Turesky Modification of Quigley-Hein Plaque Index (TMQHPI) and the other using the Rustogi Modification of Navy Plaque Index (RMNPI). Subjects were instructed to brush for 2 minutes with their randomly assigned brush and the marketed gel toothpaste unaided by access to a mirror. The site supervisor dispensed the gel and also monitored brushing.
• After brushing, subjects again swished with red disclosing solution to disclose plaque. Post-brushing plaque examinations were performed by both examiners.
• The same procedure was followed for Visits 3, 4 and 5 with an approximate 2-day washout period between visits. Subjects used their own toothbrush during the washout.
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MATERIALS AND METHODS (continued)

- A mixed model analysis of covariance (ANCOVA) for a crossover design was applied to the baseline minus two-minute post-brushing differences in average TMQHPI whole-mouth plaque scores to assess treatment effects. Secondary analyses of average whole-mouth RMNPI scores, average gingival margin RMNPI scores and average interproximal RMNPI scores were performed using the ANCOVA method described above. All comparisons were two-sided at the 0.05 level of significance.

RESULTS

- 24 subjects were included in the statistical analysis; 20 females and 4 males. Mean age was 44.0 years. Baseline plaque scores were balanced using TMQHPI and RMNPI.

- **TMQHPI**
  Adjusted mean whole mouth plaque removal (baseline minus post-brushing) scores were 0.604 for Triumph and 0.488 for Ultreo. This difference (p=0.0001) represents a 23.9% greater adjusted mean reduction for Triumph versus Ultreo.

- **RMNPI**
  Triumph also showed statistically significantly (p<0.0001) more plaque reduction using RMNPI: 16.3% greater for all surfaces; 14.2% greater along the gingival margin; and 25.1% greater at interproximal sites.

- Both brushes were well-tolerated; no adverse events were reported.

### Plaque Removal

<table>
<thead>
<tr>
<th>Plaque Index</th>
<th>TMQHPI</th>
<th>RMNPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline - postbrushing difference (adjusted mean)</td>
<td>0.604</td>
<td>0.488</td>
</tr>
<tr>
<td>Triumph</td>
<td>0.232</td>
<td>16.3%</td>
</tr>
<tr>
<td>Ultreo</td>
<td>0.02</td>
<td>0.2</td>
</tr>
</tbody>
</table>

**Triumph**

**Ultreo**