ABSTRACT

Objectives: Control of dental plaque is an important aspect of oral health maintenance. Patients undergoing orthodontic treatment with fixed appliances are at higher risk for plaque accumulation and for developing caries and gingivitis. This study was to evaluate the anti-plaque properties of a rotation/oscillation power toothbrush (Oral-B® ProfessionalCare™ 7500) relative to a manual brush (ADA manual toothbrush) using Repeated Measures Digital Plaque Image Analysis (DPIARM). Methods: This study employed a 2-treatment, 2-sequence, 3-period crossover design. A total of seventeen subjects with fixed orthodontic appliances were enrolled into the study. Subjects were randomly assigned to one of two sequences. The power toothbrush was used following manufacturer’s usage instruction (2 minutes, twice daily). Subjects used the manual toothbrush as they would normally do (1 minute, twice daily). All subjects used the same regular anti-cavity toothpaste. Digital images were taken two times (pre- and post-brushing) a day on three separate days per week. ANCOVA was used to analyze the post-brushing plaque coverage with pre-brushing scores as covariate. All comparisons were two-sided at the 0.05 level of significance. Results: The average pre-brushing plaque scores were balanced (0.324 for the power toothbrush and 0.316 for the manual toothbrush) between the two groups (p=0.58). The adjusted plaque reduction means were 0.138 and 0.091 for the power toothbrush group and the manual toothbrush group, respectively. The treatment difference was statistically significant in favor of the power brush group (p=0.001). The power toothbrush demonstrated 51.6% more plaque removal when compared to the manual toothbrush group. Conclusions: The research demonstrated the superior plaque removal effects of the rotation/oscillation power toothbrush relative to the manual toothbrush in subjects with fixed orthodontic appliances. The rotation/oscillation power toothbrush represents one of the efficient oral hygiene aids to maintain proper hygiene and to minimize the side effects of orthodontic treatment.

MATERIALS AND METHODS

This study employed a 2-treatment, 3-period crossover design. A total of seventeen subjects with fixed orthodontic appliances were enrolled into the study. Subjects were randomly assigned to one of two sequences. The power toothbrush Oral-B® ProfessionalCare™ 7500 was used following manufacturer’s usage instruction (2 minutes, twice daily). Subjects used the manual toothbrush as they would normally do (1 minute, twice daily). All subjects used the same regular anti-cavity toothpaste. Digital images were taken two times (pre- and post-brushing) a day on three separate days per week. ANCOVA was used to analyze the post-brushing plaque coverage with pre-brushing scores as covariate. All comparisons were two-sided at the 0.05 level of significance.

RESULTS

A total of seventeen (17) subjects were enrolled at baseline and finished the test. The average age was 24.2 (2.8). There were 12 (70.5%) females. The average pre-brushing plaque scores were balanced (0.324 for the power toothbrush and 0.316 for the manual toothbrush) between the two groups (p=0.58). The adjusted plaque reduction means were 0.138 and 0.091 for the power toothbrush group and the manual toothbrush group, respectively. The treatment difference was statistically significant in favor of the power brush group (p=0.001). The power toothbrush demonstrated 51.6% more plaque removal when compared to the manual toothbrush group (p=0.001).

Both toothbrushes were well tolerated. No AE was reported in this test.

<table>
<thead>
<tr>
<th></th>
<th>Pre-Brush Plaque (SE)</th>
<th>P value</th>
<th>Adjusted Plaque reduction</th>
<th>P value</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral-B Professional Care™ 7500®</td>
<td>0.324 (0.03)</td>
<td>0.5839</td>
<td>0.138*</td>
<td>0.001**</td>
<td>51.60%</td>
</tr>
<tr>
<td>ADA Manual tooth brush</td>
<td>0.316 (0.03)</td>
<td>0.091*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant reduction from baseline

**significant difference between two treatments

CONCLUSION

The research demonstrated the superior plaque removal effects of the rotation/oscillation power toothbrush relative to the manual toothbrush in subjects with fixed orthodontic appliances.