A comparative study of oscillating/rotating electric toothbrushes and Sonicare for plaque-removing efficacy in relation to toothbrushing duration.

Van der Weijden, G. A., et al., Academic Centre for Dentistry, Amsterdam, The Netherlands
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Objectives
The primary objective of this study was to investigate plaque removal with the Braun Oral-B Plaque Remover (D7), the Braun Oral-B Ultra Plaque Remover (D9), and the Sonicare toothbrush, in relation to duration of toothbrushing.

Design
Randomized, two-part study in which the first part was parallel-group and the second part was a 3-way crossover design.

Materials and Methods
In the first part of the study, 24 volunteers abstained from oral hygiene procedures for 48 hours prior to each assessment. The amount of dental plaque at six tooth sites was then assessed by the Silness and Löe plaque index. The subjects’ teeth were professionally brushed by a second examiner using either the Braun Oral-B Plaque Remover (D7), the Braun Oral-B Ultra Plaque Remover (D9), or the Sonicare electric toothbrush. Each brush was randomly assigned to a quadrant for the duration of this part of the study and the order in which the quadrants were brushed was randomized. After brushing, the amount of plaque was re-assessed. Toothbrushing was carried out for four time periods, 15, 30, 40 and 60 seconds per quadrant; i.e. between 1 and 4 minutes for the whole mouth. No toothpaste was used in this phase of the study.

In the second part of the study, 54 volunteers were randomly assigned to receive one of the three brushes after a single oral prophylaxis. Subjects were given brief instructions according to the manufacturer’s instructions and asked to use the brush at home for at least 2 minutes every day with Zendium toothpaste over a 2-week period. They abstained from brushing for 48 hours before coming for assessment. At the assessment, a randomly chosen quadrant was brushed by the subject for a time corresponding to a whole-mouth brushing time of 1, 2, 3 and 4 minutes. Plaque was assessed pre- and post-brushing at the six mouth sites. Subjects were then assigned to their next brush and the procedure repeated.

Results

![Graph showing professional and subject brushing plaque results with statistical significance notes.]

* Statistically significant difference versus Sonicare (p<0.05).
Increasing the duration of brushing was found to increase the amount of plaque removed by all the brushes. With professional brushing, the D7 and D9 removed more plaque than the Sonicare at all four time periods. For the D9 these differences were all statistically significant (p<0.05, Wilcoxon test) and for the D7 they were significant at all time periods except 4 minutes.

When subjects brushed their own teeth, the D7, the D9 and the Sonicare toothbrush were generally equivalent with respect to plaque removal, except at 2 minutes when the D7 and D9 were found to be more effective (p<0.05). This difference was largely due to significantly greater plaque removal from approximal surfaces.

Clinical Comment
This two-part, post-brushing study demonstrated that when brushing was carried out professionally, the Braun Oral-B Plaque Remover (D7) and the Braun Oral-B Ultra Plaque Remover (D9) were significantly more effective in removing plaque than the Sonicare toothbrush, irrespective of brushing time.

This difference in favour of the D7 and D9 was less apparent when subjects brushed their own teeth, with a statistically significant difference only being apparent at two minutes.

For all three toothbrushes, it can be seen that most plaque is removed within the first two minutes.