The Effect of Two Power Toothbrushes on Calculus and Stain

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Abstract
Calcium increases the amount of dental plaque formed and therefore its control is an important part of daily oral hygiene procedures. Information on the ability of power toothbrushes to control calculus formation is rare and therefore this study investigated this aspect of efficacy, comparing the Braun Oral-B D17 and Sonicare power toothbrushes. This was a cross-over study involving a total of 81 subjects from a general population who used a randomised sequence the D17 and Sonicare toothbrushes, and a manual brush with tartar control toothpaste, which served as a positive control. Following 9 weeks of manual brush use with a non-tartar control toothpaste, each test brush was used for a period of 9 weeks, after which subjects switched to the next brush in the sequence. Calculus was scored using the Völpe/Manhold Calculus Index and stain using the Lobene Stain Index. Results demonstrated that all three brushes in the study were safe. All three products significantly reduced the levels of calculus from baseline. The rate of calculus formation was lowest in the D17 group (37% of baseline), followed by the manual brush with tartar control toothpaste (40% and Sonicare (56%). Both the D17 and the manual brush were significantly more effective than Sonicare (p<0.001). The D17 was also more effective at controlling stain formation than either Sonicare or the manual brush, the difference from Sonicare being statistically significant for all analyses (p<0.0001). It is concluded that the D17 is significantly more effective in reducing the rate of calculus formation than the Sonicare toothbrush. The D17 is as effective in this respect as a manual brush used with a tartar control toothpaste. This study was supported by Oral-B Laboratories, Boston, MA.

Results - Calculus
• All 3 treatments significantly inhibited calculus buildup compared to control period of formation.
• The rate of calculus build up was lower for 3D Excel significantly inhibited calculus buildup compared to Sonicare Plus.
• 3D Excel + non-tartar control toothpaste inhibited calculus buildup as well as a manual toothbrush with tartar control toothpaste.

Calculus Formation Compared to Control Period

Results - Stain
• All 3 treatments significantly inhibited stain compared to control period.
• The rate of stain build up was lowest for 3D Excel
• 3D Excel significantly inhibited stain formation compared to sonicare Plus + non-tartar control and manual + tartar control toothpaste along the gingival area.

Stain Formation Compared to Control Period Gingival Region

Conclusions
• The Braun Oral-B D17 significantly inhibits the rate of calculus formation more than Sonicare and as well as a manual toothbrush plus calculus control toothpaste.
• The D17 significantly inhibits extrinsic stain formation at the gingival margin than either the sonicare toothbrush or a manual toothbrush plus calculus control toothpaste.
• No adverse events or oral safety issues were reported over this 36 week study with any regimen.

Purpose
The purpose of the present study was to compare the reduction of gingivitis with a novel Braun Oral-B power toothbrush (D17) and the Philips Sensiflex 2000 (HX 2550) power toothbrush.

Materials and Methods
Subjects: 31 non-dental students participated in this study. Inclusion criteria: no oral lesions or sites with PPD ≥2 mm; at least 5 evaluable teeth per quadrant; no orthodontic bands; no partial dentures.
Brushes: The brushes under investigation:
• a novel Braun Oral-B power toothbrush (D17), with an oscillating/rotating action at a speed of 3600 rpm and a vibrating action towards the tooth surface of 340 Hz.
• The Philips Sensiflex 2000 (HX 2550) power toothbrush, with an oscillating/rotating action at a speed of 45-60 Hz, an independently moving tip, and a controlled pressure system with a force threshold of 250g.

Experimental Design
Professional prophylaxis was done on day 0. Subjects were randomly allocated to one of the toothbrushes. During this period no prophylaxis was done. The next 4 weeks of the study, subjects were instructed to brush according to a split-mouth design. The right and left sides of the mouth were run-in period during which subjects received meticulous oral hygiene instruction to become accustomed to the use of the 2 toothbrushes. In order to obtain a sufficient level of gingivitis, a 3 week period of experimental gingivitis or of the lower jaw followed. After this 3 week experimental gingivitis phase, those subjects with at least 40% of sites bleeding in each quadrant in the lower jaw continued with the trial. During the next 4 weeks of the study, subjects were instructed to brush according to a split-mouth design. The right and left sides of the mouth were randomly allocated to one of the toothbrushes. During this period no rinsing with an antiseptic mouthwash or flossing was allowed and a standard toothpaste (Crest) was used.

Clinical measurements: Plaque (Turney et al. 1970) and bleeding on marginal probing (Lee et al. 1998) were assessed in the lower jaw at 6 sites per tooth at baseline, immediately after the experimental gingivitis phase (day 21) and 1, 2 and 4 weeks later.

In conclusion
The data from this study show that the novel Braun Oral-B D17 power toothbrush is more effective in resolving gingivitis than the Philips Sensiflex 2000 (HX 2550).