A comparison of electric toothbrushes in their potential to cause gingival desquamation of oral soft tissues


Objectives
The objective of this safety study was to compare the Braun Oral-B 3D Plaque Remover with the Braun Oral-B Ultra Plaque Remover (D9) with respect to the potential to cause gingival abrasion.

Design
This was a randomized, split-mouth, post-brushing study, single-blind to the examiner.

Material and Methods
A total of forty-nine healthy subjects were recruited from a population of non-dental students. All volunteers had a minimum of 6 teeth in each of the 4 quadrants, no orthodontic banding or removable partial dentures, oral lesions or periodontal problems. At the start of the study, all subjects received a professional prophylaxis by a dental hygienist. The study was performed single blind with respect to the examiner, and a split mouth regime was adopted so that the effect of two toothbrushes could be assessed at the same examination in the same subject.

The toothbrushes studied were the Braun Oral-B Ultra Plaque Remover (D9) and a new electric toothbrush, the Braun Oral-B 3D Plaque Remover, which features an additional sonic frequency pulsating action in the direction of the long axis of the brush head bristles.

Prior to their first appointment, all subjects received the Braun Oral-B Ultra Plaque Remover (D9) and a standard fluoride toothpaste (Zendium). Subjects were instructed briefly how to use the brush and were able to familiarise themselves with use of the toothbrush for 3 weeks prior to baseline examination. Subjects were requested not to brush their teeth 24 hours prior to attending this examination. At this visit both the gums and teeth were disclosed by Mira-2-Tone solution, which in addition to disclosing plaque also stains areas of gingival desquamation. Gingival desquamation presents on the soft tissues were assessed and recorded. They were scored as either small sites (≤ 5 mm) or large sites (> 5 mm). Subjects then brushed their teeth for 60 seconds with the first assigned brush (either the D9 or the 3D) in 2 randomly selected contra-lateral quadrants. This was then repeated with the second brush on the opposing 2 contra-lateral quadrants. After a second disclosing, the number of gingival abrasions was reassessed. All clinical examinations were performed by the same examiner who was unaware of the brush type used by the subjects.

Results

Brushing with both the D9 and the 3D resulted in a similar clinically insignificant increase in the number of small gingival desquamations. With respect to large sites >5 mm, no increase was seen in either group. In both groups, there were considerably fewer large sites >5 mm than small sites. Analysis of the number of small and large sites of gingival desquamation revealed no statistically significant differences between the two groups. As can be seen from the figure, the results with respect to small sites were similar to that observed for a soft manual toothbrush (Butler 411) which had been compared with the D9 in a separate phase to the study and reported elsewhere.

For both the D9 and the 3D, more small traumas were found in the upper jaw compared to the lower jaw, and the greatest number of desquamations were located at mid-gingival sites. With respect to the location of gingival desquamations, there were no apparent differences between the two toothbrushes.

Clinical comment

It is generally acknowledged that electric toothbrushes do not have a greater potential to cause gingival abrasion than manual toothbrushes, and, in fact, because there is evidence that patients use less force when brushing with an electric toothbrush it might be anticipated that the incidence of abrasion would be lower. This paper confirms that the Braun Oral-B 3D Plaque Remover’s additional pulsating action in the direction of the long axis of the bristles does not cause an increase in the incidence of gingival abrasion. Because in the same series of clinical experiments, the D9 was compared with a manual toothbrush (results published in a separate paper - J. Clin. Perio. 1998; In press), it can also, be concluded that neither the D9 nor the 3D cause more gingival abrasion than a soft manual toothbrush. These results confirm the overall safety of the D9 and the 3D which has been reported consistently in clinical studies with these two brushes.