Braun Oral-B D17, Sonicare Plus and ADA reference brushes function.

Presented at AADR, Chicago, 7-10 March 2001

Abstract
This study was to measure simulated dentin wear and other surface characteristics occurring with toothpaste and toothbrush use when the brushed surface was clean and covered with surface debris. ADA Hard Reference Brush (A), Oral-B D-17 (B), Sonicare Plus (C) and ADA Soft Reference Brush (D). Brushes were used with 50 & 150gm for 30 sec. Electric & manual brushes were used at 16 and 60 strokes/min, resp. Each brush was used with the simulated dentin, acrylic substrate and 5gm of CaPyro reference abrasive in 1% CMC and 10% glycerin in water. After the baseline scans, the 26x50mm acrylic strips were taped to provide a reference region for each post-brushing profilometer scan. Simulated surface debris was added to half of the acrylic strips by dipping in white latex paint and dried at room temp. The non-dipped strips were brushed directly. Surface debris removal was measured with a Minolta Chroma Meter CR-100. After measuring the debris removal, the acrylic strip surface was cleaned in a sonicator. Wear and other surface characteristics were obtained with a Federal Products Co. Surfanalyzer 5000 fitted with custom software. With 50gm brush head load and debris covered surface, there were no statistical differences in the wear with B, C & D. With 50gm load, C produced more wear on uncovered surface (p<0.05), while B & D are not statistically different from each other. With 150gm load and covered surface, D produced statistically more wear than the two electric brushes & other manual brush A. With direct brushing and 150gm load, there were no significant difference between the two electric and two manual brushes. In cleaning power studies with 50gm load, B was more effective than C & D (p<0.05). At 150gm, D was most effective (p<0.05). A, B & C were comparable. Disruptive wear on simulated dentin with one 2-min brushing session with minimal with or without debris. Supported in part by Braun Oral-B.

Conclusions
These laboratory studies were designed to measure any changes after one 2-minute brushing of simulated dentin with or without plaque.
• As one would expect, surface debris minimized changes in the brushed surface, supporting the concept that the daily toothbrushing with a toothpaste can clean the teeth with little effect upon the tooth surface.
• There was no statistical difference between brushes with 150-gram brush head load and no surface debris.
• At the lighter 50-gram brush head load recommended by the manufacturer, the Sonicare Plus produced statistically more wear than the other brushes. It is unlikely that this statistical difference has little clinical significance.
• At 150-gram brush head load, Braun Oral-B 3D Excel (D-17) was more effective in cleaning than the ADA Reference manual brushes and Sonicare Plus brush.
Abstract

Calculus 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 all of 81 subjects from a general population who used in 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 Volpe 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<0.001). It is concluded that the D17 is significantly more effective in limiting the rate of calculus formation than the Sonicare toothbrush. The D17 is also as effective in this respect as a manual brush used with a tartar control toothpaste. This study was sponsored by Oral-B Laboratories, Boston, MA.

Results - Calculus

• All 3 treatments significantly inhibited calculus buildup compared to control rate of formation.
• The rate of calculus buildup was lowest for D17 (3D Excel). 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.

Results - Stain

• All 3 treatments significantly inhibited stain compared to control period.
• The rate of stain buildup 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.

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 compared to the sonicare toothbrush and a manual toothbrush plus calculus control toothpaste.

No adverse events or oral safety issues were reported over this 36 week study with any regimen.

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 Phillips Sensiflex 2000 (HX 2550).
Effect of Sonicare and Braun D17 on experimentally-induced gingivitis.

(Spec. iss): 119, Abstr. 672.
Presented at AADR, Chicago, 7-10 March 2001

Abstract
The purpose of the present study was to compare, using a split-mouth design, the ability of two power toothbrushes — a novel Braun Oral-B brush (D17) and the Sonicare (S) brush — to reduce experimental gingivitis (EG) which had been developed over a period of 3 weeks. A run-in period of 2 weeks preceded the EG period and together this was considered as the pre-trial phase of the experiment. The pre-trial phase allowed subjects to become acquainted with the 2 brushes and to receive proper oral hygiene instruction. It also allowed a reasonable level of gingivitis to develop. At day 21 of the EG period, those subjects with at least 40% of sites bleeding in each quadrant in the lower jaw, were allowed to continue with the trial. During the next 4 week treatment phase of the study, subjects were told to brush according to a split-mouth design, the right and left sides of the mouth, which were randomly allocated to one of the two toothbrushes. During this treatment phase, no additional oral hygiene products other than use of a standard toothpaste (Zendium) was allowed. After 1, 2 and 4 weeks, a plaque index (Quigley & Hein), and bleeding on probing were assessed in the lower jaw. The results show that the novel Braun Oral-B power toothbrush (D17) is more effective in removing plaque and resolving gingivitis than Sonicare.

Results
The greater efficiency observed after 10 minutes brushing with the 3D Excel was the result of plaque removal from approximal spaces. The results of brushing with a PTB was even more effective after 2 minutes. Brushing with the 3D Excel for 10 minutes removed significantly more plaque than either polishing for 10 minutes or brushing for 2 minutes.

Conclusions
- The Braun Oral-B 3D Excel (D17) was found to be significantly more efficient at reversing bleeding than Sonicare.
- Over the treatment period plaque was reduced 53% for the 3D Excel and 45% for the Sonicare.

Powered toothbrushing compared to a professional polish.

Presented at IADR, Chiba, 27-30 June 2001

Abstract
Aim: This parallel examiner-blind study was designed to compare the results of brushing with a powered toothbrush [Braun Oral-B 3D Excel (PTB)] to a professional polish session. Materials & Methods: For this study 90 non-dental students were selected. All received a single oral prophylaxis where plaque and calculus were removed and the teeth were polished so that all subjects started with equally clean teeth. Approximately 4 weeks later the subjects received a new appointment prior to which they were asked to abstain from oral hygiene procedures for at least 48 h. At baseline the examiner (MP) evaluated the amount of dental plaque (Silness & Löe) at 6 surfaces of each tooth. Subsequently, in the absence of this examiner, the subject’s teeth were brushed or polished by a dental hygienist. 3 groups were formed; the subjects in Group 1 received 12 min. of polishing with a rubber cup/point using dentifrice as abrasive paste, in Group 2 subjects were brushed for 2 min. with a PTB and dentifrice by the hygienist and in Group 3 brushing for 10 min. was performed with a PTB and dentifrice. Care was taken to call upon the examiner always > 10 minutes after her leaving the room so that she was unaware of the treatment. Powered brushing was carried out carefully following the contour of the teeth and turning the brushhead separately in the direction of the mesial and the distal aspect of each tooth in each approximal space. After finishing with the brushing/polishing the examiner re-evaluated the amount of remaining dental plaque. Results: The baseline plaque levels in Group 1 were 1.54, 1.62 and 1.55 respectively. The reduction in plaque scores in Groups 1-3 were 94.2% (±5) and 99.4% (±0.5). The results in Group 3 were significantly better than in Group 1 and 2. Explorative analysis revealed that these differences were due to a higher plaque removal from the approximal surfaces and molars.

Results
- Professional brushing with the Braun Oral-B 3D Excel power toothbrush and dentifrice for 10 minutes removed significantly more plaque than either polishing for 10 minutes or brushing for 2 minutes.
- The greater efficiency observed after 10 minutes brushing with the 3D Excel was the result of plaque removal from approximal surfaces and molars.
Approximal brushhead used on a powered toothbrush.

Danser MM, Timmerman MF, Lijzerman Y, Piscaer M, van der Velden U, van der Weijden GA.
Presented at AADR, China, 27-30 June 2001

Abstract

Aim: This study was designed to test whether the approximal efficacy of a powered toothbrush (Braun Oral-B 3D Plaque Remover [PTB]) can be improved when a specifically designed approximal brushhead (pointed shape [ABH]) is used as compared to the standard brushhead (SBH).

Material & Methods: 40 non-dental students were included. They all received the PTB with 2 different brushheads (SBH + ABH). Instructions were given to use each brushhead twice every other day with the SBH followed by 3 min with the ABH. 2 weeks later they received an appointment for the first experiment (Exp 1), prior to which they abstained from all oral hygiene procedures for 48 hours. Plaque was assessed at 4 sites per tooth. Next the dental hygienist brushed the approximal areas for another minute. In 2 randomly selected contra-lateral quadrants for 30 secs with the SBH. Plaque was scored again. Subsequently the dental hygienist brushed the approximal areas for another minute. In 2 randomly selected contra-lateral quadrants for 30 secs with the ABH and in the opposing quadrants for 30 secs with the ABH. Next approximal plaque was scored. After 2-3 weeks Exp 2 was carried out comparable to Exp 1, only this time the panelists brushed themselves. Results: Exp 1 showed approximal plaque scores at baseline of 1.70 and 1.72 and at post-brushing of 0.21 and 0.26 for the SBH + ABH and SBH resp. (p=0.05). The additional increase in approximal plaque reduction after 30 secs of brushing with ABH was 21.6% for the SBH + ABH and SBH resp. (p=0.05). Exp 2 showed an approximal plaque scores at baseline of 1.76 and 1.74 and post-brushing of 0.21 and 0.24 for the SBH + ABH and SBH resp. The additional approximal plaque reduction of 30 secs brushing with ABH was 18.6% and 17.5% with the SBH (non-significant).

Discussion/Conclusion: An additional 1 minute showed no differences (1-3%) between brushheads. Much larger was the efficacy of the 1 min extra brushing (≥10%). It seems therefore beneficial to advise the patient to brush longer. A 2nd different brushhead may stimulate to do so.

Conclusions

• When brushing was carried out by a dental hygienist, an additional 60 seconds brushing with an approximal brushhead removed significantly more plaque than did brushing with a standard brushhead.

• When brushing was carried out by the panelists, there was no statistical difference in the amount of additional approximal plaque removed with the two approximal brushheads.

• An additional 60 seconds of brushing either by the hygienist or by the panelists led to between 17.5% and 21.6% more approximal plaque removal.

• An additional brushing time will result in greater plaque removal. The availability of a second approximal brushhead might encourage longer brushing times.

Results

Percent extra plaque removal including an additional 60 seconds brushing with either a standard brushhead or an approximal brushhead

![Graph showing plaque removal](image)

Objectives

To compare the safety and efficacy of a new power toothbrush (Braun Oral-B 3D Excel – D17) with an ADA reference manual toothbrush.

Design

This was a randomized, parallel-group, clinical study.

Materials and Methods

A total of 110 healthy adult volunteers from a general population, aged from 18 to 65 years, were entered into the study, which followed ADA approved methodology. For inclusion, subjects were required to be non-smokers with at least 18 scorable teeth (excluding 3rd molars). At the baseline examination, subjects had to have a whole mouth plaque score of ≥2.1 and a gingival index of ≥3.0.

At the start of the study, subjects who met the inclusion criteria were randomly assigned to either the Braun Oral-B 3D Excel D17 group or the ADA reference manual toothbrush group. The D17 is a new power toothbrush, based on the Braun Oral-B 3D (D15), which differs from the D15 in that the angle of oscillation is reduced slightly and the frequency of pulsation is increased from 170 Hz to 340 Hz.

Evaluations for safety, plaque, gingivitis and bleeding were carried out at baseline and after 1 and 3 months of product use. Plaque was scored using the Turesky modification of the Quigley & Hein Plaque Index. Prior to all evaluations, subjects were instructed to abstain from oral hygiene for 12 to 18 hours to allow overnight plaque formation. Subjects were requested to brush for 2 minutes twice daily. At the baseline visit, a clinical assistant instructed each subject in the use of their assigned product. After 3 months of product use, subjects in the D17 group were asked to complete a questionnaire which documented their attitude to and subjective opinion of the D17.

Of the 110 subjects who were enrolled, 101 completed the study with evaluable data for all time periods. No subjects were lost from the study as a result of adverse events. The D17 was found to be safe, and there was no evidence of hard or soft tissue abrasion.

In the D17 group, mean whole mouth plaque scores were reduced by 20% after 1 month and this was maintained until the end of the study. The reduction in plaque scores was lower in the manual group reaching 10.3% after 1 month and 12.7% after 3 months. At both time periods, the differences between the two groups were statistically significant. The pattern for approximal plaque was similar, with statistically significant differences between the two groups.

After one month, whole mouth mean ginvitits scores were reduced by 23.1% in the D17 group and 19.5% in the manual group. The difference between the groups was statistically significant (p=0.05). After 3 months, the reduction in gingival index was 21.8% and 16.2%, respectively (p=0.003). As for the gingival index, the bleeding index was also reduced by a significantly greater extent in the D17 group.

The pattern for approximal plaque was similar, with statistically significant differences between the two groups. After one month, whole mouth mean ginvitits scores were reduced by 23.1% in the D17 group and 19.5% in the manual group. The difference between the groups was statistically significant (p=0.05). After 3 months, the reduction in gingival index was 21.8% and 16.2%, respectively (p=0.003). As for the gingival index, the bleeding index was also reduced by a significantly greater extent in the D17 group.

Most subjects who had used the D17 (after 3 months) and on a scale of 0 (disliked) to 9 (liked very much), 80% gave a score of 7-9. All subjects said that their teeth felt smooth and polished after using the D17, and 73% said that the D17 left their mouth feeling as it did after a visit to the dentist.

Clinical Comment

It is now well established that some power toothbrushes have the potential to increase plaque removal and improve gingival health, when compared with use of a manual toothbrush. This superiority over a manual toothbrush was confirmed at the 1998 European Workshop on Mechanical Plaque Control, where a consensus was reached that: “There is evidence from both short- and long-term controlled clinical trials that some of the more modern designs of automated toothbrushes are somewhat superior to manual brushes in plaque removal and gingival inflammation control”. The evidence from the study presented here is in agreement with this conclusion, results showing that both plaque removal and control of gingivitis were significantly greater with the new Braun Oral-B D17.

Compliance with a power brush is also an important issue, and results from the questionnaire completed by users of the D17 in this study suggest that this new power brush is well accepted. A significant subjective feeling of tooth smoothness and polish was reported, and subjects said that the D17 left their mouth feeling like they had just visited the dentist. These characteristics may enhance compliance.

Safety, efficacy and acceptability of a new power toothbrush: A 3-month comparative clinical investigation.