Oral-B

OSCILLATING-ROTATING TOOTHBRUSHES:

THE SCIENTIFIC EVIDENCE

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INTRODUCTION TO **ELECTRIC TOOTHBRUSHES AND GUM HEALTH**

Gingivitis: A common yet preventable oral disease

Gingivitis, the first stage of periodontal disease, is reported to be prevalent globally. This inflammatory disease of microbial aetiology, characterized by gingival inflammation and bleeding, is most commonly caused by sub-optimal plaque control. In the absence of treatment, gingivitis can progress to periodontitis, increasing the patient's risk for tooth loss and negatively impacting quality of life. Fortunately, gingivitis is reversible, and preventable, with thorough daily oral hygiene. The cornerstone of an effective oral care routine is mechanical plaque removal via toothbrushing.

Electric toothbrushes: Proven, superior efficacy versus manual brushes

Patients today are faced with an overwhelming selection of manual and electric toothbrush designs. Manual toothbrushes remain among the most commonly used, however the high prevalence of periodontal disease indicates they are either not used effectively, or for a sufficient amount of time. Accordingly, electric toothbrushes are growing in popularity as they provide greater disruption of plaque and certain electric brush head designs allow for greater penetration in areas that are difficult to access, such as interproximally and along the gingival margin. Systematic reviews and meta-analyses by independent groups, such as the prestigious Cochrane Collaboration, clearly demonstrate that electric toothbrushes provide superior gingivitis reduction and plaque removal compared to manual options. A recent long-term observational study in Germany supports the clinical findings, as consumers using an electric toothbrush were found to retain 20 % more teeth during the 11-year period compared to those using a manual toothbrush (p. 4/5).

Findings from an 11-year cohort study assessing the impact of electric toothbrushes on oral health

Reference: Pitchika V, et al. Long-term impact of powered toothbrush on oral health: 11-year cohort study. *J Clin Periodontol*, 2019. DOI: 10.1111/jcpe.13126.

KEY FINDINGS

During the 11-year observational period:

- Electric toothbrush users showed significantly lower progression for mean probing depth (22.0%), clinical attachment loss (21.0%), and decayed/missing/filled surfaces (17.7%) compared to manual toothbrush users (Table 1).
- Electric toothbrush users retained 19.5% more teeth compared to manual toothbrush users (Table 1).
- Usage of electric toothbrushes increased from 18% to 37%.

Table 1. Rate of change over 11 years for electric and manual toothbrush users (after adjusting for confounders).

Characteristic (mean)	Manual Brush Rate of Change	Electric Brush Rate of Change	% difference (electric vs. manual)	*p*-value*
Probing Depth	0.41	0.32	-22.0%	$p<0.05$
Clinical Attachment Loss	0.93	0.74	-21.0%	$p<0.05$
Decayed/Missing/Filled Surfaces	7.43	6.11	-17.7%	$p<0.05$
Number of teeth present	1.86	1.50	19.5%	$p<0.05$

* Mixed-effects linear regression model

Table 2. Characteristics of cohort at Baseline and Year 11.

Characteristic (mean ± SD)	Electric toothbrush users	Manual toothbrush users	*p*-value**
Baseline age (years)	46.3 ± 12.4	53.4 ± 14.5	$p<0.001$
Probing Depth (mm)			
Baseline	2.13 ± 0.57	2.34 ± 0.76	$p<0.001$
Year 11	2.38 ± 0.45	2.55 ± 0.65	$p<0.001$
Clinical Attachment Loss (mm)			
Baseline	1.62 ± 1.31	2.38 ± 1.78	$p<0.001$
Year 11	2.21 ± 1.13	2.76 ± 1.59	$p<0.001$
Decayed/Missing/Filled Surfaces			
Baseline	28.6 ± 14.3	34.1 ± 16.7	$p<0.001$
Year 11	32.6 ± 14.3	38.1 ± 16.4	$p<0.001$

** Student's t-test; Baseline = SHIP-1

OBJECTIVE

To evaluate the longitudinal effects of electric toothbrushes on periodontal health, coronal caries and tooth retention based on 11-year data from an adult cohort study in Pomerania, Germany.

METHODS

- 11-year data from adult participants in a Study of Health in Pomerania (SHIP) were evaluated. 2,819 participants were included in the model presented in this paper;

2,304 in the manual toothbrush group and 515 in the electric toothbrush group. See Table 2 for characteristics of the cohort.

- The SHIP study was initiated between 1997-2001 (SHIP-0), but information about toothbrush usage was not obtained until 5 years into the study (SHIP-1). Therefore, this evaluation included data from SHIP-1 (2002–2006), SHIP-2 (2007–2011) and SHIP-3 (2012–2016).
- The study involved dental examinations, interviews and medical examinations by trained/calibrated personnel.
- Mixed effects linear regression models were constructed to analyze the data. Data were adjusted for baseline covariates including age, gender, body mass index, education, physical activity, smoking, diabetes status/HbA1c, frequency of toothbrushing and dental visit(s) in last 12 months. Analyses were conducted using Stata/SE 14.2.

CLINICAL COMMENT

These 11-year data from an observational study provide important insights about the oral health benefits associated with electric toothbrush usage. This analysis is based on subject-level data, reflecting comparisons over time on an individual, in their real-world setting. Participants using an electric toothbrush had better periodontal health, as evidenced by slower progression of Probing Depth and Clinical Attachment Loss, and greater natural tooth retention compared to manual toothbrush users. These results are consistent with clinical data, epidemiological data from the recent 5th German Oral Health Study,[1] and systematic reviews indicating electric toothbrushes remove more plaque and provide greater gingivitis reductions than manual toothbrushes.[2] While the type of electric toothbrush technology used by participants was not assessed, the Oral-B oscillating-rotating electric toothbrush technology has been the category market leader in the region for over a decade. Clinical studies have shown oscillating-rotating electric toothbrushes provide statistically significantly greater plaque and gingivitis reductions versus manual toothbrushes and several other electric toothbrushes.[2-12] Collectively, these 11-year data in conjunction with other published findings strongly support use of electric toothbrushes for long-term maintenance of periodontal health.

References

1. Jordan RA, et al. The Fifth German Oral Health Study (Fünfte Deutsche Mundgesundheitsstudie, DMS V) – rationale, design, and methods BMC Oral Health 2014; 14:161
2. Yaacob M, et al. Powered versus manual toothbrushing for oral health. Cochrane Database of Systematic Reviews 2014, Issue 6. Art. No.: CD002281. DOI: 10.1002/14651858.CD002281.pub3
3. Ccahuana-Vasquez R, et al. An 8-week clinical comparison of an oscillating-rotating electric rechargeable toothbrush and a sonic toothbrush in the reduction of gingivitis and plaque. *J Clin Dent* 2018;29:27–32.
4. Ccahuana-Vasquez R, et al. An eight-week clinical evaluation of an oscillating-rotating power toothbrush with a brush head utilizing angled bristles compared with a sonic toothbrush in the reduction of gingivitis and plaque. *J Clin Dent* 2015;26:80-85
5. Klukowska M, et al. A randomized 12-week clinical comparison of an oscillating-rotating toothbrush to a new sonic brush in the reduction of gingivitis and plaque. *J Clin Dent* 2014;25:26-31.
6. Klukowska M, et al. Six-week clinical evaluation of the plaque and gingivitis efficacy of an oscillating-rotating power toothbrush with a novel brush had utilizing angled CrissCross® bristles versus a sonic toothbrush. *J Clin Dent* 2014;25:6-12.
7. Grender J, et al. Plaque removal efficacy of oscillating-rotating power toothbrushes: review of six comparative clinical trials. *Am J Dent* 2013; 26(2):68-74.
8. Klukowska M, et al. A randomized clinical trial evaluating gingivitis and plaque reduction of an oscillating-rotating power brush with a new brush head with angled bristles versus a marketed sonic brush with self-adjusting technology. *Am J Dent* 2014;27:179-184.
9. Klukowska M, et al. A 12-week clinical comparison of an oscillating-rotating power brush versus a marketed sonic brush with self-adjusting technology in reducing plaque and gingivitis. *J Clin Dent* 2013;24:55–61.
10. Klukowska M, et al. 12-week clinical evaluation of a rotation/oscillation power toothbrush versus a new sonic power toothbrush in reducing gingivitis and plaque. *Am J Dent* 2012;25:287-292.
11. Williams KB, et al. Comparison of rotation/oscillation and sonic power toothbrushes on plaque and gingivitis for 10 weeks. *Am J Dent* 2009;22:345-349.
12. Goyal CR, et al. A randomized 12-week study to compare the gingivitis and plaque reduction benefits of a rotation-oscillation power toothbrush and a sonic power toothbrush. *J Clin Dent* 2009;20:93-98.

OSCILLATING-ROTATING ELECTRIC TOOTHBRUSHES: **BEST-IN-CLASS TECHNOLOGY WITH STRONG SCIENTIFIC EVIDENCE**

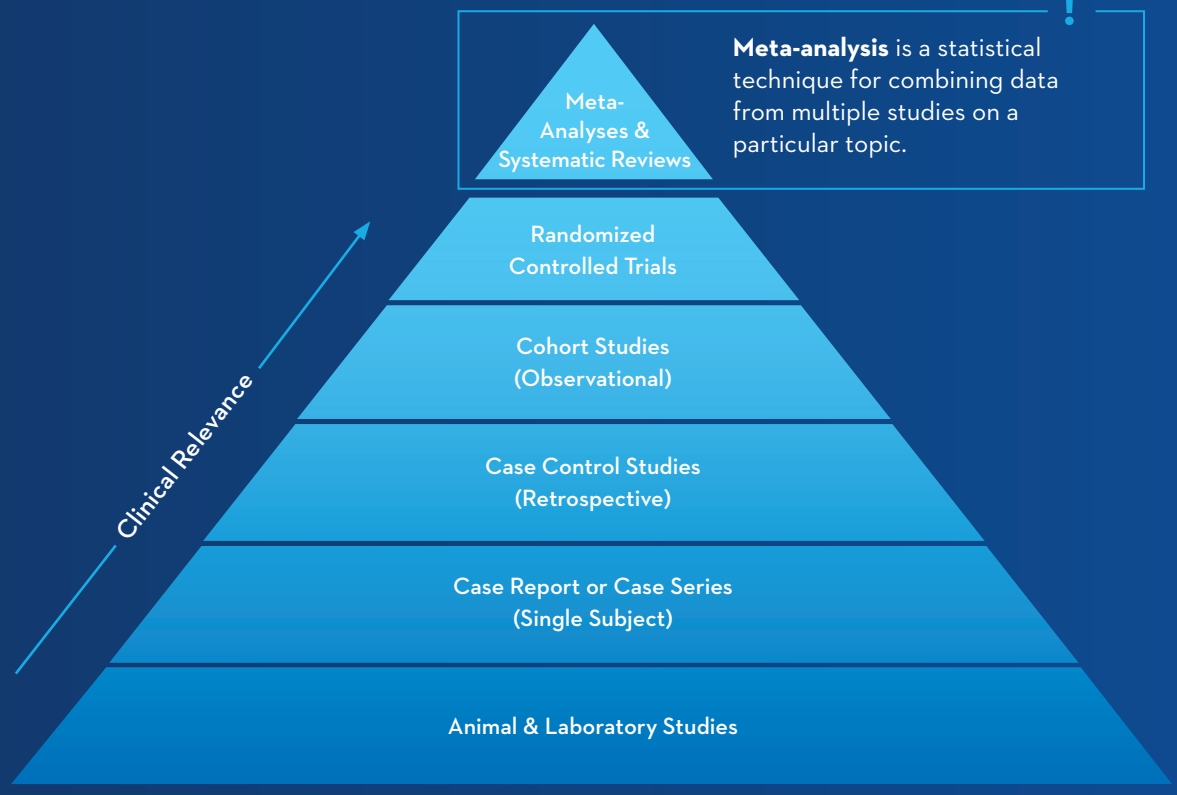
Compelling scientific evidence published in the American Journal of Dentistry demonstrates the superior efficacy of oscillating-rotating toothbrushes versus manual and sonic brushes in helping patients attain healthy gums. Among electric toothbrushes, the Oral-B oscillating-rotating technology developed in Germany provides proven gingival health benefits. Since its introduction in 1991, more studies have been published demonstrating the efficacy, gentleness, and compliance of the Oral-B oscillating-rotating technology with its iconic round brush head, inspired by dental professionals, than on any other mechanical brushing device.

Clinical evaluations have been conducted among various patient populations, including those with periodontal disease, pediatric patients, orthodontic patients, post-surgical patients and implant patients. With such a wealth of literature, a number of systematic reviews and meta-analyses comparing electric toothbrush technologies have been undertaken, including a review by the Cochrane Collaboration. The conclusions from these systematic reviews and meta-analyses, which represent the highest level of scientific evidence (see Fig), confirm the safety and superior efficacy of oscillating-rotating technology in both controlling plaque and reversing gingivitis when compared with manual toothbrushes. The addition of interactive features, such as brushing guidance, pressure sensors, and timers has been shown to improve brushing behavior, extend brushing time and increase plaque removal. In addition, a 3-year clinical trial evaluating gingival recession and dental abrasion via examination, repeat dental impressions and study models supports the safety of oscillating-rotating technology.

More than 250 studies on efficacy of the oscillating-rotating technology have been published since 1991.

Clinical studies assessing safety: 100 trials involving 5,600 subjects representing 44,743 patient-weeks of use.

HIERARCHY OF RESEARCH DESIGNS AND **LEVELS OF EVIDENCE**



A meta-analysis of Oral-B® oscillating-rotating electric toothbrushes on plaque and gingivitis: Results versus manual toothbrush controls

Reference: Grender JM, Adam R, Zou Y. Am J Dent 2020; 33(1): 3-11.

KEY GINGIVITIS FINDINGS

- Across 5 randomized clinical trials assessing gingivitis, subjects brushing with an Oral-B® oscillating-rotating (O-R) electric rechargeable toothbrush showed a 50% greater reduction in the average number of bleeding sites (~9 fewer bleeding sites) versus a manual toothbrush control. See Figure 1.
- Analysis of the change from baseline to post-treatment gingivitis status revealed that 65% of subjects with localized or generalized baseline gingivitis (≥10% bleeding sites) using an O-R electric brush transitioned to "healthy" (<10% bleeding sites) post-treatment, compared to only 20% similarly transitioning for manual toothbrush users. See Figure 2.
- Subjects with localized or generalized gingivitis had 7.4 times better odds of transitioning to "healthy" after using an O-R brush versus a manual brush.

KEY PLAQUE FINDING

- Across 8 clinical trials assessing an O-R brush versus a manual brush for plaque reduction, a difference in average standardized plaque scores of –1.51 was observed (P<0.001). This represents a 20% greater plaque reduction benefit for the O-R brush compared to the manual brush.

Figure 1. Number of bleeding sites at post-treatment evaluation (≤3 months)

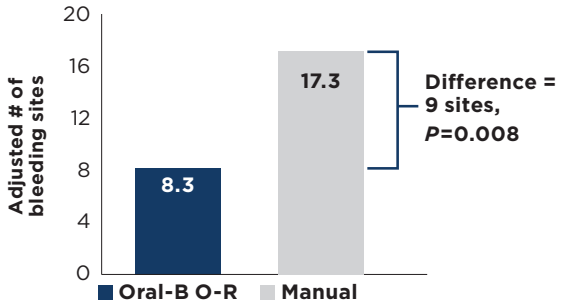
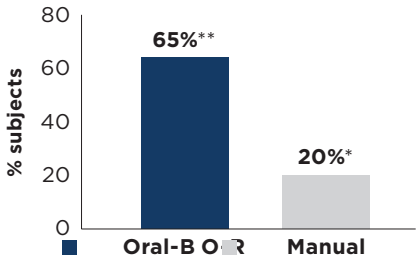


Figure 2. Subjects transitioning from "gingivitis" at baseline to "healthy"



* 32/160 subjects; ** 381/587 subjects

OBJECTIVE

A meta-analysis was conducted to compare the effects of Oral-B® O-R electric rechargeable toothbrushes versus manual toothbrush controls on plaque and gingivitis after multiple uses up to 3 months.

METHODS

- A meta-analysis of plaque and gingivitis studies from the Oral-B® (Procter & Gamble) clinical database evaluating O-R electric toothbrush effectiveness for plaque removal and gingivitis reduction compared to manual toothbrush controls was conducted in accordance with the general principles of the PRISMA statement.[1]

This meta-analysis was limited to randomized controlled trials involving O-R toothbrushes from a single manufacturer to ensure access to subject-level data.

- Studies included were parallel, randomized, examiner-blinded, controlled clinical trials with plaque and/or gingivitis evaluations taken at 3 months or less.
- Five parallel group randomized controlled trials with 586 subjects were identified assessing gingivitis via number of bleeding sites for an O-R brush versus a manual brush and 8 parallel design randomized controlled trials with 824 subjects assessed plaque reduction (TMQHI, RMNPI) of an O-R brush versus a manual brush.

CLINICAL COMMENT

O-R electric toothbrushes have been shown to provide significant plaque and gingivitis reductions relative to manual toothbrushes in meta-analyses.[2-4] However, unlike other meta-analyses in the literature, this meta-analysis was limited to evaluations from a single manufacturer (Procter & Gamble) to ensure access to subject-level data for transition analyses.

Using the new gingivitis case definition,[5] significantly more subjects using an Oral-B® O-R electric toothbrush transitioned to "healthy" (<10% bleeding sites) from "gingivitis" (≥10% bleeding sites) compared to the manual control (65% vs. 20%). O-R electric toothbrushes also demonstrated gingivitis reductions across the entire baseline disease spectrum.

These bleeding reduction results have important clinical implications. Long-term research shows that tooth sites with persistent gingival bleeding are 3 times more likely to have attachment loss compared to non-bleeding sites and 46 times more likely to be lost (extracted) compared to teeth surrounded by tissue with no bleeding.[6,7]

Collectively, these data show that brushing with an O-R electric toothbrush from Procter & Gamble provides meaningful gingival bleeding reductions compared to a manual brush, which may lead to positive long-term oral health implications for patients.

1. Moher D, et al. *PLoS Med.* 2009;6(7): e1000097.
2. Yacoob M, et al. *Cochrane Database Syst Rev.* 2014;(6):CD002281.
3. Van der Weijden FA & Slot DE. *J Clin Periodontol.* 2015; 42 Supplement 16 (S77-S91).
4. Sicilia A, et al. *J Clin Periodontol.* 2002;29(Suppl):39-54.
5. Trombelli L, et al. *J Periodontol.* 2018: 89 (Suppl 1): S46-S73.
6. Schätzle M, et al. *J Clin Periodontol.* 2003;30(10):887-901.
7. Schätzle M, et al. *J Clin Periodontol.* 2004;31:1122-1127.

A meta-analysis of Oral-B® oscillating-rotating electric toothbrushes on plaque and gingivitis: Results versus sonic toothbrush controls

Reference: Grender JM, Adam R, Zou Y. Am J Dent 2020; 33(1): 3-11.

KEY GINGIVITIS FINDINGS

- Across 11 randomized clinical trials assessing gingivitis, subjects brushing with an Oral-B® oscillating-rotating (O-R) electric rechargeable toothbrush showed a 28% greater reduction in the average number of bleeding sites (3.1 fewer bleeding sites) versus a sonic toothbrush control. See Figure 1.
- Analysis of the change from baseline to post-treatment gingivitis status revealed that 65% of subjects with localized or generalized baseline gingivitis (≥10% bleeding sites) using an O-R electric brush transitioned to "healthy" (<10% bleeding sites) post-treatment, compared to only 51% similarly transitioning for sonic toothbrush users. See Figure 2.
- Subjects with localized or generalized gingivitis had 1.8 times better odds of transitioning to "healthy" after using an O-R brush versus a sonic brush.

KEY PLAQUE FINDING

- Across 12 clinical trials assessing an O-R brush versus a sonic brush for plaque reduction, a difference in average plaque scores of -0.55 was observed (P<0.001).

Figure 1. Number of bleeding sites at post-treatment evaluation (≤3 months)

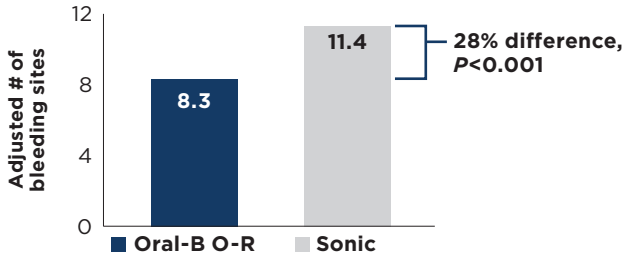
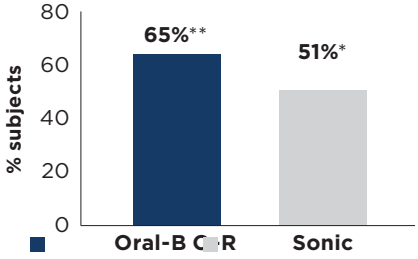


Figure 2. Subjects transitioning from "gingivitis" at baseline to "healthy"



* 221/435 subjects; ** 381/587 subjects

OBJECTIVE

A meta-analysis was conducted to compare the effects of Oral-B® O-R electric rechargeable toothbrushes compared to sonic toothbrush controls on plaque and gingivitis after multiple uses up to 3 months.

METHODS

- A meta-analysis of plaque and gingivitis studies from the Oral-B® (Procter & Gamble) clinical database evaluating O-R electric toothbrush effectiveness for plaque removal and gingivitis reduction compared to sonic toothbrush controls was conducted in accordance with the general principles of the PRISMA statement.[1] This meta-analysis was limited to randomized controlled trials involving O-R toothbrushes from a single manufacturer to ensure access to subject-level data.

- Studies included were parallel, randomized, examiner-blinded, controlled clinical trials with plaque and/or gingivitis evaluations taken at 3 months or less.
- Eleven parallel group randomized controlled trials with 1559 subjects were identified assessing gingivitis via number of bleeding sites for an O-R brush versus a sonic brush and 12 parallel design randomized controlled trials with 1727 subjects assessed plaque reduction (TMQHI, RMNPI) of an O-R brush versus a sonic brush.

CLINICAL COMMENT

O-R electric toothbrushes have been shown to provide plaque and gingivitis reduction advantages versus sonic toothbrushes in published meta-analyses.[2,3] The advantage of this meta-analysis, which was limited to research from a single manufacturer (Procter & Gamble), was the ability to access subject-level data for transition analyses.

Based on the new gingivitis case definition,[4] significantly more subjects using an O-R electric toothbrush transitioned to "healthy" (<10% bleeding sites) from "gingivitis" (≥10% bleeding sites) compared to the sonic toothbrush control (65% vs. 51%). O-R electric toothbrushes also demonstrated gingivitis reductions across the entire baseline disease spectrum.

These bleeding reduction results have important clinical implications. Long-term research shows that tooth sites with persistent gingival bleeding are 3 times more likely to have attachment loss compared to non-bleeding sites and 46 times more likely to be lost (extracted) compared to teeth surrounded by tissue with no bleeding.[5,6]

Collectively, these data show that brushing with an Oral-B® O-R electric toothbrush (Procter & Gamble) provides meaningful gingival bleeding reductions, beyond those provided by a sonic toothbrush, which may lead to positive long-term oral health implications for patients.

1. Moher D, et al. PLoS Med. 2009;6(7): e1000097.
2. Deacon SA, et al. Cochrane Database Syst Rev. 2010;(12):CD004971.
3. Van der Weijden FA & Slot DE. J Clin Periodontol. 2015; 42 Supplement 16 (S77-S91).
4. Trombelli L, et al. J Periodontol. 2018;89 (Suppl 1): S46-S73.
5. Schätzle M, et al. J Clin Periodontol. 2003;30(10):887-901.
6. Schätzle M, et al. J Clin Periodontol. 2004;31:1122-1127.

3-Year Randomized Study of Manual and Power Toothbrush Effects on Pre-existing Gingival Recession

Reference: Dörfer CE, Staehle H-J, Wolff D. J Clin Periodontol 2016; 43: 512–519

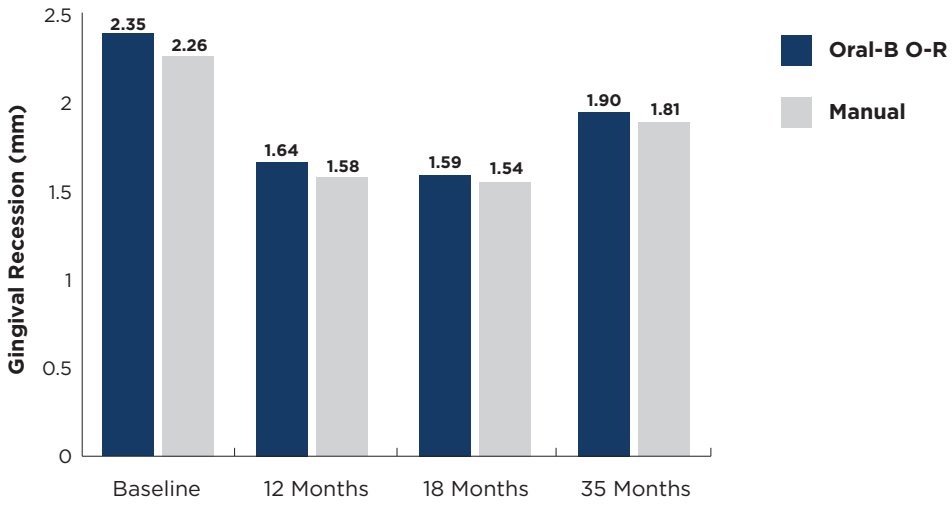
CONCLUSION

Subjects with pre-existing gingival recession showed no adverse effects on recession after three years of brushing with either an oscillating-rotating power or manual toothbrush.

KEY CLINICAL RESULTS

- Mean gingival recession for sites with initial recession did not worsen in either group or differ significantly between the power and manual toothbrush groups after approximately 3 years. See Figure.
- Examination of the oral cavity at each assessment visit revealed no adverse effects on hard or soft tissues in either group.

Figure. Mean gingival recession per group over time



* There were no statistically significant differences (P>0.05) between groups for comparisons of changes in recession between study time points.

OBJECTIVE

This was a controlled, parallel group, randomized clinical trial to compare the effects of brushing with an oscillating-rotating power toothbrush or an ADA reference manual toothbrush on pre-existing gingival recession over approximately a 3-year period.

STUDY DESIGN

- Healthy subjects with pre-existing recession (≥2 mm) were randomized into one of two groups:
  - An oscillating-rotating power toothbrush (D17U, Oral-B ProfessionalCare®, Procter & Gamble, Cincinnati, OH, USA, n=55) or
  - An ADA reference manual toothbrush (Chicago, IL, USA, n=54).
- Subjects brushed their teeth twice daily, for 2 minutes per brushing, with their assigned toothbrush and a standard sodium fluoride toothpaste.
- At baseline, Month 12, Month 18 and Month 35, the same examiner assessed subjects for clinical attachment loss and probing pocket depths at six sites per tooth. Gingival recession was calculated at pre-existing sites as the difference between clinical attachment loss and probing pocket depths. Safety was assessed by hard and soft oral tissue examinations.

CLINICAL COMMENT

There have been some hypotheses that the use of power toothbrushes is associated with gingival recession.[1] A 2011 systematic review of 35 studies found that oscillating-rotating toothbrushes are safe compared to manual toothbrushes, and they pose no clinically relevant concern to hard or soft and hard tissues.[2] This 3-year randomized clinical trial corroborates and reinforces those findings, showing that daily brushing with either a power or a manual toothbrush does not adversely affect gingival recession. Thus, based on the results of this trial and other published reviews, oral health professionals can recommend oscillating-rotating toothbrushes with the assurance that their patients will enjoy a highly effective, safe, and gentle clean.

1. Rajapakse PS, McCracken GI, Gwynnett E, Steen ND, Guentsch A, Heasman PA. Does tooth brushing influence the development and progression of non-inflammatory gingival recession? A systematic review. J Clin Periodontol. 2007; 34: 1046–1061.
2. Van der Weijden FA, Campbell SL, Dörfer CE, González-Cabezas C, Slot DE. Safety of oscillating-rotating powered brushes compared to manual toothbrushes: a systematic review. J Periodontol. 2011 Jan;82(1):5-24.


Oral-B
iO

ORAL-B iO: THE NEXT GENERATION OF OSCILLATING-ROTATING ELECTRIC TOOTHBRUSHES

Continuing its leadership in delivering cutting-edge innovation, Oral-B has introduced the next generation oscillating-rotating electric toothbrush, the Oral-B iO. This novel electric toothbrush provides the clinically proven oscillating-rotating technology, but with a complete internal and external redesign, reflecting nearly 250 granted patents and pending patent applications globally. Key features of the Oral-B iO include:

- **A Linear Magnetic Drive**
that concentrates energy where it is needed the most, at the bristle tips, producing oscillation-rotations combined with micro-vibrations and delivering a pleasant glide path and Oral-B's most impressive clinical results to date. The linear magnetic drive also results in optimized acoustics and an appealingly smooth brushing experience.

- **A Breakthrough Smart Pressure Sensor**
that helps to brush with the optimal pressure: provides positive feedback via a green light when users are brushing with optimal pressure (0.8 to 2.5 Newtons) while a red light signals the user that too much force is being applied.

- **A Smart Display**
provides personalized coaching and motivation during toothbrushing, encouraging patients to brush longer. Patients can choose among up to five modes, depending on the model, to best meet their individual needs.

- **Artificial Intelligence Technology**
via the Oral-B iO App provides real-time individual coaching to promote thorough brushing across all regions and surfaces.

- **A Redesigned Brush Head Range**
that maintains the signature Oral-B round shape and incorporates new features, such as 'tuft-in-tuft' bristle trim for hard to reach areas in the Ultimate Clean brush head, and Oral-B's smallest diameter filaments in the Gentle Care brush head.

Toothbrushing can no longer be considered a tedious or boring routine. The Oral-B oscillating-rotating family of toothbrushes, including the novel Oral-B iO, provides your patients with a highly effective, safe and enjoyable brushing experience along with some of Oral-B's most impressive scientific evidence to date.

Compared to manual toothbrush users, **3x more** gingivitis patients moved to a state of healthy gums in 8 weeks due to Oral-B iO.

Reduces **59%** more bleeding sites than Sonicare DiamondClean in 8 weeks.

Oral-B iO Electric Toothbrush versus a Manual Toothbrush for Reduction of Gingivitis and Plaque: An 8-Week Randomized Controlled Trial

Reference: Grender J, et al. Int Dent J 2020; 70 (Suppl 1): S7-S15.

KEY GINGIVITIS RESULTS

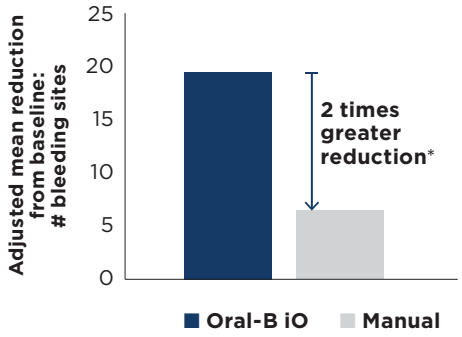
Subjects using the novel Oral-B® iO oscillating-rotating electric toothbrush showed greater improvements in gingivitis compared to those using a manual toothbrush as early as 1 week and throughout the 8-week study. At week 8, Oral-B® iO demonstrated:

- More than 2 times greater reduction for number of bleeding sites (Figure 1)
- 3 times greater reduction in gingival bleeding (GBI)
- 2 times greater gingivitis reduction (MGI)

All between-treatment differences at Weeks 1 and 8 were statistically significant (P<0.001).

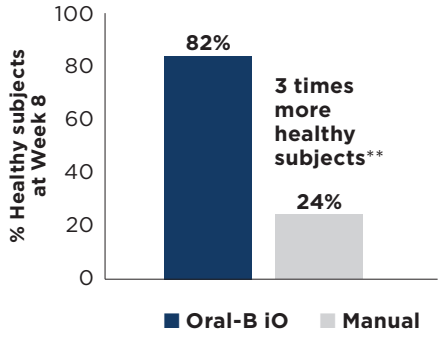
82% of subjects (45/55) using the Oral-B® iO toothbrush were categorized as Healthy (<10% bleeding sites) at Week 8 compared to 24% of subjects (13/55) using the manual brush. The difference was statistically significant (P<0.001). See Figure 2.

Figure 1. Reduction in bleeding sites from Baseline to Week 8.



* *P*<0.001; overall baseline number of bleeding sites = 32.11.

Figure 2. % of subjects classified as "healthy"(<10% bleeding sites) at Week 8.



** *P*<0.001

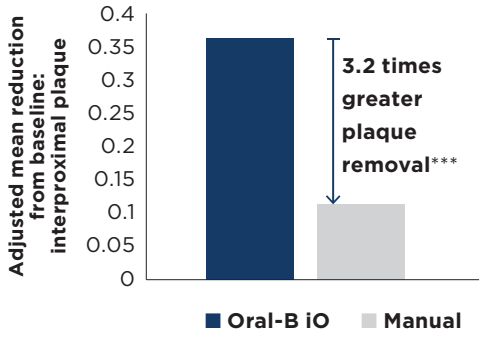
KEY PLAQUE RESULTS

Subjects using the novel Oral-B® iO oscillating-rotating electric toothbrush showed greater reductions in plaque compared to those using a manual toothbrush as early as the first brushing, at Week 1 and throughout the 8-week study. At Week 8, the Oral-B® iO brush removed:

- 2 times more whole mouth plaque
- 3 times more interproximal plaque (Figure 3)
- 6 times more plaque along the gingival margin

All between-treatment differences at Weeks 1 and 8 were statistically significant (P<0.001).

Figure 3. Reduction in interproximal plaque



*** P<0.001; overall baseline whole mouth plaque score = 0.62.

OBJECTIVE

To evaluate the efficacy of the Oral-B® iO oscillating-rotating electric rechargeable toothbrush with micro-vibrations to a standard manual toothbrush for reduction of gingivitis and plaque.

STUDY DESIGN

- This was an 8-week, single-center, examiner-blind, 2-treatment, parallel group, randomized controlled trial conducted at All Sum Research Center in Ontario, Canada. The clinical trial is registered in the clinicaltrials.gov database (NCT03624647).
- 110 subjects with evidence of gingivitis and plaque were enrolled and randomized to one of two treatments, balancing for baseline gingivitis and plaque scores, number of bleeding sites and tobacco use:
  - Oral-B® iO oscillating-rotating electric rechargeable toothbrush with micro-vibrations and Ultimate Clean brush head (M7/OC15, Procter & Gamble)
  - Manual control toothbrush (American Dental Association reference control)
- Subjects brushed with their assigned toothbrush and a standard sodium fluoride dentifrice (Crest® Cavity Protection) twice daily for the 8-week study. Subjects in the manual toothbrush group brushed according to their customary manner while those in the electric toothbrush group brushed according to manufacturer's instructions.
- Gingivitis was assessed at baseline, week 1 and week 8 using the Modified Gingival Index and Gingival Bleeding Index. Plaque was assessed at baseline, week 1 and week 8 using the Rustogi modification of the Navy Plaque Index. Oral Soft Tissue examinations were also conducted at baseline and week 8.
- All 110 subjects finished the study. Subjects had a mean age of 47.2 years; 77 were females.

CLINICAL COMMENT

The Oral-B® iO electric rechargeable toothbrush combines the clinically proven oscillating-rotating technology with gentle micro-vibrations to represent the next generation in oscillating-rotating toothbrushes. Consistent with published meta-analyses showing oscillating-rotating toothbrushes provide significantly greater gingival health benefits versus a manual toothbrush,[1-3] this 8-week randomized controlled clinical trial demonstrated that Oral-B® iO provides statistically significantly greater gingivitis and plaque reductions than a standard manual toothbrush. In addition, at the end of the 8-week study period, there were 3 times as many "healthy" subjects (<10% bleeding sites) in the Oral-B® iO group compared to the manual brush according to the new periodontal disease classification.[4]

1. Grender JM, et al. *Am J Dent* 2013;26:68-74.
2. Yaacob M, et al. *Cochrane Database of Systematic Reviews* 2014, Issue 6. Art. No.: CD002281.
3. Klukowska M, et al. *Compend Cont Educ Dent* 2014;25 (9):702-706
4. Trombelli L, et al. *J Periodontol* 2018; 89(Suppl 1), S46-S73.

Clinical Evaluation of Oral-B iO Electric Toothbrush versus a Sonic Toothbrush for the Reduction of Gingivitis and Plaque

Reference: Adam R, et al. Int Dent J 2020; 70 (Suppl 1): S16-S21.

KEY GINGIVITIS RESULTS

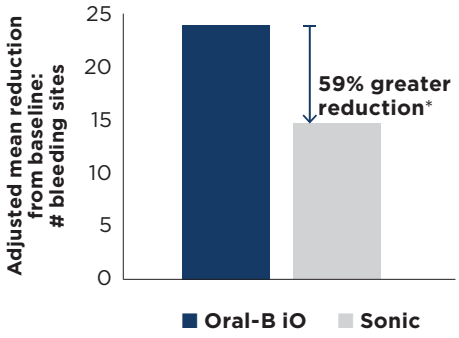
Twice daily use of the novel Oral-B® iO oscillating-rotating electric toothbrush for 8 weeks resulted in greater gingival health improvements versus Sonicare DiamondClean, including:

- 59% greater reduction in bleeding sites (See Figure 1)
- 51% greater reduction in gingival bleeding (GBI)
- 62% greater gingivitis reduction (MGI)

All differences were statistically significant (P<0.001).

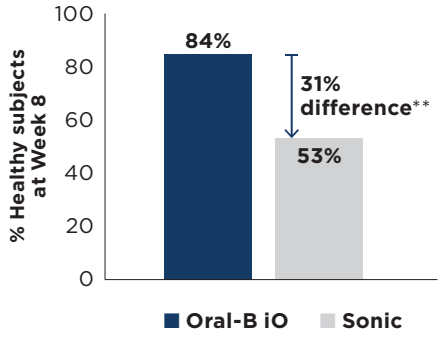
84% of subjects (38/45) using the Oral-B® iO toothbrush were categorized as Healthy (<10% bleeding sites) at Week 8 compared to 53% of subjects (24/45) using the sonic brush. The difference was statistically significant (P=0.003). See Figure 2.

Figure 1. Reduction in bleeding sites from Baseline to Week 8.



* *P*<0.001; overall baseline number of bleeding sites = 32.8.

Figure 2. % of subjects classified as "healthy"(<10% bleeding sites) at Week 8.



** *P*=0.003

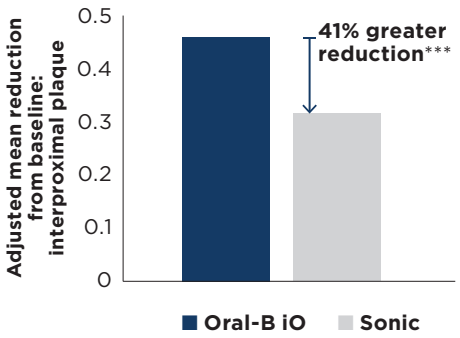
KEY PLAQUE RESULTS

Oral-B® iO also provided statistically significantly greater plaque reductions than Sonicare DiamondClean over 8 weeks, removing

- 29% more whole mouth plaque
- 41% more interproximal plaque (See Figure 3)
- 49% more plaque along the gumline

All differences were statistically significant (P≤0.011).

Figure 3. Reduction in interproximal plaque from Baseline to Week 8.



*** *P*<0.001; overall baseline interproximal plaque score = 0.98.

OBJECTIVE

To evaluate the efficacy of the Oral-B® iO oscillating-rotating electric rechargeable toothbrush with micro-vibrations to the Sonicare Diamond Clean sonic toothbrush for reduction of gingivitis and plaque over 8 weeks.

STUDY DESIGN

- This was an 8-week, single-center, examiner-blind, 2-treatment, parallel group, randomized controlled trial conducted at All Sum Research Center in Ontario, Canada.
- 90 subjects with evidence of gingivitis and plaque were enrolled and randomized to one of two treatments, balancing for baseline gingivitis and plaque scores, number of bleeding sites and tobacco use:
  - Oral-B® iO oscillating-rotating electric rechargeable toothbrush with micro-vibrations and Ultimate Clean brush head (M7/OC15, Procter & Gamble)
  - Sonicare DiamondClean sonic toothbrush with Premium Plaque Control brush head (HX9903/11, Philips)
- Subjects brushed with their assigned toothbrush, according to each manufacturer's instructions, and a standard sodium fluoride dentifrice (Crest® Cavity Protection) twice daily for the 8-week study.
- Plaque and gingivitis were assessed at baseline and week 8 using the Modified Gingival Index, Gingival Bleeding Index, and the Rustogi modification of the Navy Plaque Index. Oral Soft Tissue examinations were also conducted at baseline and week 8.
- All 90 subjects finished the study. Subjects had a mean age of 49.2 years; 68 were females.

CLINICAL COMMENT

The Oral-B® iO electric rechargeable toothbrush represents the next generation in oscillating-rotating technology, combining oscillating-rotating motion with gentle micro-vibrations. In this 8-week randomized controlled clinical trial, Oral-B® iO showed statistically significantly greater gingivitis and plaque reductions than an advanced model sonic toothbrush, consistent with numerous published studies evaluating base oscillating-rotating toothbrushes with various sonic control brushes.[1-3] Moreover, after 8 weeks of twice daily use, significantly more subjects in the Oral-B® iO group were classified as "healthy" (<10% bleeding sites) compared to the sonic brush (84% vs. 53%) according to the new periodontal disease classification.[4] This is an important outcome as gingival bleeding is often the only sign of periodontal problems noticeable to patients and it is commonly assessed by dental professionals during a gingival health assessment.

1. Grender JM, et al. *Am J Dent* 2013;26:68-74.
2. Ccahuana-Vasquez R, et al. *J Clin Dent* 2018;29:27-32.
3. Klukowska M, et al. *J Clin Dent* 2014;25:26-31.
4. Trombelli L, et al. *J Periodontol* 2018; 89(Suppl 1), S46-S73.