

# Clinical Evidence

**Colgate® 360°®**  
High-Performance Manual Toothbrush



**Colgate®** **360°**  
WHOLE MOUTH  
CLEAN

# Clinical comparison of the reduction in total cultivable and hydrogen sulfide-forming salivary bacteria in the mouth with Colgate® 360°® versus a regular flat trim toothbrush<sup>1</sup>

Vazquez J, Williams MI

## Aim

A randomized crossover clinical study was conducted to compare the ability of Colgate® 360°® toothbrush and a regular flat trim toothbrush (Oral-B® Indicator®) to reduce total cultivable and hydrogen sulfide-forming salivary bacteria in the mouth.

## Study design

Following a 7-day pre-treatment washout period using a regular toothbrush (Colgate® Plus®) and a regular fluoride dentifrice, subjects (n=29) reported to the test site having refrained from performing oral hygiene, eating or drinking that morning. Subjects provided baseline salivary samples for bacterial analysis by rinsing with 10ml of sterile saline for 10 seconds. Each subject then brushed under supervision with a regular fluoride dentifrice and one of the test toothbrushes (either Colgate® 360°® toothbrush or Oral-B® Indicator® toothbrush) for 1 minute. For subjects using the Colgate® 360°® toothbrush, the 1 minute of brushing was followed by 10 seconds of cleaning the tongue with the back of the brush.

At 30 minutes post-brushing, during which time subjects were instructed to refrain from performing oral hygiene, eating or drinking, post-use rinse samples were obtained. The collected rinse samples were serially diluted in sterile phosphate buffered saline and duplicate plated onto TSA w/15% Sheep's Blood Media for total cultivable salivary bacterial counts and Lead Acetate Media for hydrogen sulfide-forming salivary bacterial counts. The number of colony forming units (CFU) was determined after a minimum 72-hour incubation period. This regimen was repeated for the second test toothbrush after a washout period of at least 2 days.

## Conclusion

This study documents the ability of the Colgate® 360°® toothbrush to reduce salivary bacteria levels. When compared with the regular flat trim toothbrush, the Colgate® 360°® toothbrush provided a 136% and a 154% greater reduction in total cultivable and hydrogen sulfide-forming salivary bacteria, respectively.

## Results

Both Colgate® 360°® and the regular flat trim toothbrush provided a statistically significant ( $p<0.05$ ) reduction from baseline in total cultivable salivary bacteria levels of 1.03 and 0.45 log CFU/ml, respectively. The reduction observed with the Colgate® 360°® toothbrush was statistically significantly ( $p<0.05$ ) greater than that of the regular flat trim toothbrush. Similarly, baseline hydrogen sulfide-forming salivary bacterial levels were statistically significantly ( $p<0.05$ ) reduced by 0.88 log CFU/ml for the Colgate® 360°® toothbrush and 0.33 log CFU/ml for the regular flat trim toothbrush. Again, the reduction observed with Colgate® 360°® toothbrush was statistically significantly ( $p<0.05$ ) greater than that observed for the regular flat trim toothbrush.

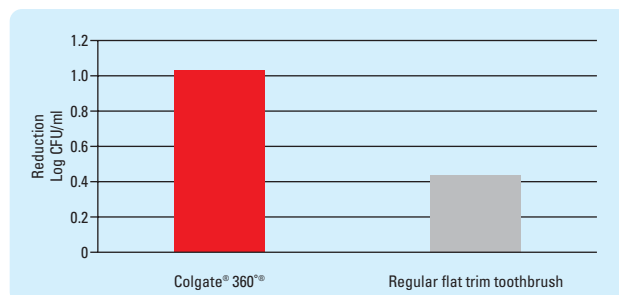


Figure 1. Reduction in total salivary bacteria in the mouth from baseline after a single brushing.

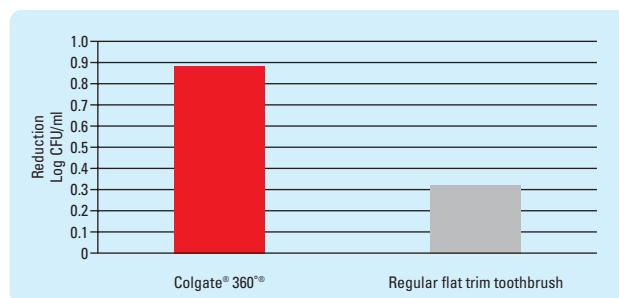


Figure 2. Reduction in hydrogen sulfide-forming bacteria in the mouth from baseline after a single brushing.

1. Data on file. Colgate-Palmolive.

# Clinical efficacy of Colgate® 360°® and three commercially available toothbrushes on the removal of desquamated epithelial cells<sup>1</sup>

Williams MI, Vazquez J, Cummins D

## Aim

A clinical study was performed to evaluate the performance of four toothbrushes on the removal of desquamated epithelial cells after brushing according to the manufacturers' instructions for use. This randomized, crossover-design clinical study compared Colgate® 360°® with two commercially available manual toothbrushes (Oral-B® CrossAction® and Oral-B® Indicator®) and a commercially available battery-powered toothbrush (Crest® SpinBrush® PRO).

## Study design

Adult men and women subjects (n=20) reported to the clinical facility after a 1-week washout period of brushing with a regular fluoride dentifrice and a soft-bristled toothbrush. Participants reported having refrained from oral hygiene procedures, eating, and drinking that morning. After providing a baseline rinse sample, subjects brushed their teeth for 1 minute with their assigned toothbrush and a commercially available fluoride toothpaste, then returned 30 minutes later to provide post-use rinse samples. Subjects refrained from dental hygiene, eating, and drinking during the 30-minute evaluation period. To provide the samples, subjects rinsed with 10ml of sterile phosphate-buffered saline solution for 10 seconds. Each collected sample was centrifuged, resuspended, and run in a colorimetric assay to determine the level of desquamated epithelial cells found in the rinse as measured by the absorbance at 570nm. After a 1-week washout period of brushing with a regular fluoride dentifrice and a soft-bristled toothbrush, the treatment regimen was repeated with subjects using the other toothbrushes.

## Conclusion

The results of this randomized, crossover clinical study indicate that the Colgate® 360°® manual toothbrush, with a tongue-cleaning implement on the back of the brush head, was statistically significantly more effective than the Oral-B® Indicator®, Crest® SpinBrush® PRO, and Oral-B® CrossAction® toothbrushes in removing desquamated epithelial cells.

## Results

At baseline, the mean levels of desquamated epithelial cells for the four treatments were  $0.70 \pm 0.27$ ,  $0.63 \pm 0.20$ ,  $0.69 \pm 0.30$ , and  $0.62 \pm 0.31$  for the Colgate® 360°®, Oral-B® Indicator®, Crest® SpinBrush® PRO, and Oral-B® CrossAction®, respectively. Post-treatment, the mean levels of epithelial cells were  $0.19 \pm 0.12$ ,  $0.38 \pm 0.19$ ,  $0.42 \pm 0.27$ , and  $0.34 \pm 0.17$ , respectively. All of the treatments provided a statistically significant reduction compared with their respective baseline. However, the Colgate® 360°® toothbrush was statistically significantly better than the other three toothbrushes in reducing desquamated epithelial cells.

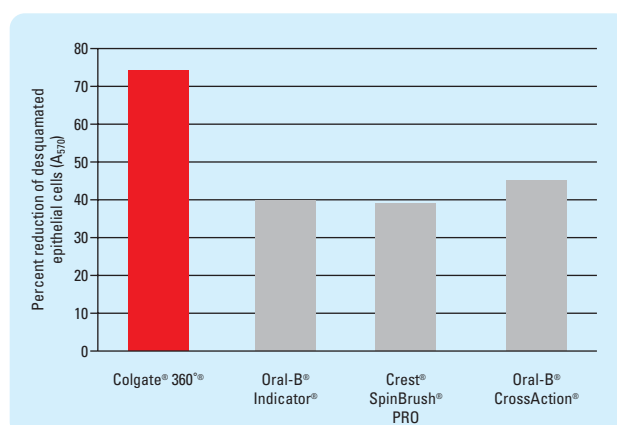


Figure 3. The percent reduction of the levels of desquamated epithelial cells after brushing with the four toothbrushes.

1. Williams MI et al. Compend Contin Educ Dent 2004; 25(10 Suppl 2): 12–16.

# Clinical comparison of a new manual toothbrush on the level of hydrogen sulfide-forming bacteria on the tongue<sup>1</sup>

Williams MI, Vazquez J, Cummins D

## Aim

The objective of this randomized, crossover study was to compare the effectiveness of Colgate® 360° with two commercially available manual toothbrushes (Oral-B® Indicator® and Oral-B® CrossAction®) and a commercially available battery-powered toothbrush (Crest® SpinBrush® PRO) for their ability to reduce hydrogen sulfide-forming bacteria on the tongue.

## Study design

After a 7-day pre-treatment washout period in which subjects (n=31) used a Colgate® Plus toothbrush and a regular fluoride toothpaste, subjects arrived at the clinical site for baseline tongue bacteria sampling without performing oral hygiene, eating, or drinking. Subjects sampled the left side of their tongue with a cotton swab then brushed their teeth for 1 minute with the assigned test toothbrush and regular fluoride toothpaste. Those using the Colgate® 360° toothbrush were instructed to clean their tongue with the implement on the back of the brush head for 10 seconds. After 2 hours, the subjects returned to the clinical site having refrained from dental hygiene, eating, and drinking for post-treatment sampling, this time sampling the right side of their tongue. After a minimum 2-day washout period, subjects repeated the same regimen using the other toothbrushes. Collected tongue samples were dispersed in sterile water, serially diluted in sterile phosphate-buffered saline, and plated in duplicate onto lead acetate agar. After 72 hours of incubation, the hydrogen sulfide-forming bacteria colonies were counted, expressed as log colony-forming units/ml, and reduction from baseline was calculated.

## Conclusion

Statistical analysis indicated that the Colgate® 360° toothbrush was statistically significantly better ( $p < 0.05$ ) than the three commercial toothbrushes in reducing the levels of hydrogen sulfide-forming bacteria on the tongue.

## Results

There was no significant difference between baseline hydrogen sulfide-forming bacteria levels. Post-treatment, the reduction of bacteria was 0.80, 0.41, 0.33, and 0.44 log CFU/ml for the Colgate® 360°, Oral-B® Indicator®, Crest® SpinBrush® PRO, and Oral-B® CrossAction®, respectively.

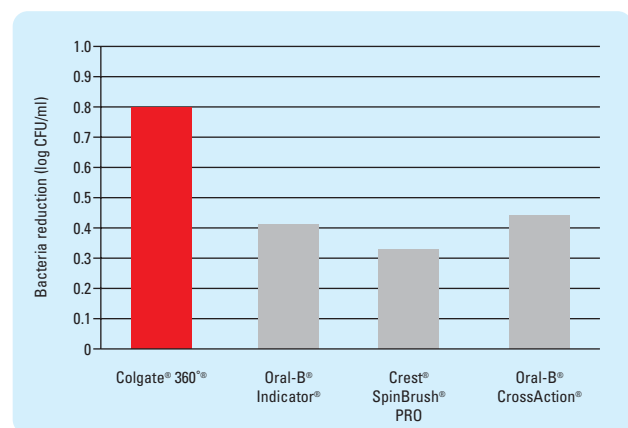


Figure 4. Reduction in tongue bacteria for the post-use time point. CFU=colony-forming units.

1. Williams MI et al. *Compend Contin Educ Dent* 2004; 25(10 Suppl 2): 17–21.

# Clinical comparison of a new manual toothbrush on the removal of plaque and the reduction of gingivitis<sup>1</sup>

Hu D, Zhang YP, Chaknis P

## Aim

The objective of this 4-week clinical study was to evaluate the efficacy of the Colgate® 360° manual toothbrush relative to a commercially available manual toothbrush (Oral-B® Exceed®) and a commercially available flat-trimmed manual toothbrush (Colgate® Twister) for the removal of plaque and the reduction of gingivitis.

## Study design

Adult male and female subjects reported to the study facility for a baseline plaque and gingivitis examination after having refrained from all oral hygiene procedures for 12 hours and from eating, drinking, or smoking for 4 hours. Following the baseline examinations, qualifying subjects were randomized into three groups and assigned to one of the three study toothbrushes. Subjects were instructed to brush their teeth for 1 minute under supervision with their assigned toothbrush and a commercially-available fluoride toothpaste, after which they were evaluated for supragingival plaque. They were then instructed to brush their teeth twice daily for 1 minute with their assigned toothbrush and the dentifrice provided. After 4 weeks, subjects returned to the study facility for a final gingivitis and plaque examination. Plaque removal was assessed using the Rustogi Modification of the Modified Navy Plaque Index. Gingivitis was scored according to the Löe-Silness Gingival Index and the Gingivitis Severity Index.

## Conclusion

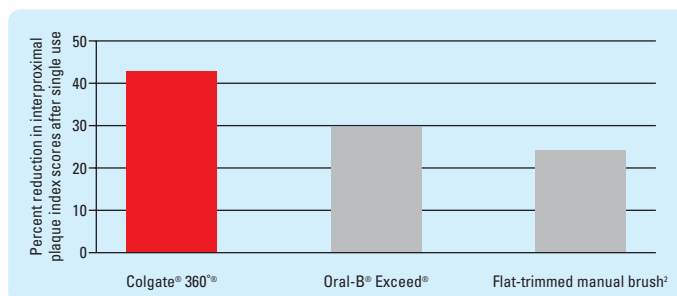
The results from this 4-week clinical study indicate that the Colgate® 360° toothbrush removed statistically significantly more plaque after a single brushing and after 4 weeks of twice-daily brushing compared with Oral-B® Exceed® and Colgate® Twister. Colgate® 360° toothbrush also statistically significantly reduced gingival bleeding after 4 weeks' use compared with the Colgate® Twister toothbrush.

## Results

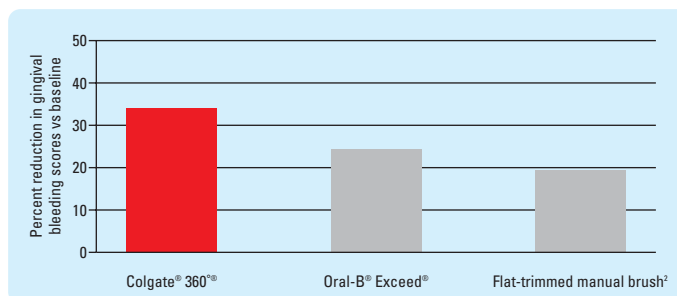
All three toothbrushes were statistically significantly efficacious in removing plaque after a one-time brushing and after 4 weeks of twice-daily brushing, as well as in reducing gingivitis after 4 weeks of use.

Colgate® 360° toothbrush removed 42.9% interproximal plaque after a one-time brushing, which was statistically significantly more than the Oral-B® Exceed® and Colgate® Twister toothbrushes ( $p \leq 0.05$ ). After 4 weeks of brushing, the Colgate® 360° toothbrush was statistically significantly more effective in removing plaque compared with the other two toothbrushes ( $p \leq 0.05$ ), removing 49.0% of interproximal plaque.

Colgate® 360° toothbrush reduced gingival bleeding scores by 34.1% after 4 weeks of brushing, statistically significantly more effective than the Colgate® Twister toothbrush ( $p \leq 0.05$ ).



**Figure 5.** Reduction between the interproximal prebrushing and postbrushing plaque index scores, expressed as a percentage of the prebrushing score, after a single toothbrushing.



**Figure 6.** Reduction between the mean gingival bleeding scores at baseline and after 4 weeks' use, expressed as a percentage of the baseline mean.

1. Hu D et al. Data on file, Colgate-Palmolive. 2. Colgate® Twister.

# *Removes over 96% more oral bacteria than an ordinary toothbrush'*



## *80% of oral bacteria are not found on the teeth<sup>2</sup>*

Colgate® 360® was designed with a soft-textured **tongue and cheek cleaner**, to go beyond teeth to the whole mouth.

It is clinically proven to:

- Remove over 96% more oral bacteria than an ordinary manual toothbrush<sup>1</sup>
- Reduce 45% more interproximal plaque<sup>3</sup>
- Reduce gingival bleeding by 34%<sup>4</sup>

**Colgate®** **360°**  
WHOLE MOUTH CLEAN

*Recommend Colgate® 360° for a healthier whole mouth clean*

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1. Versus brushing teeth alone with an ordinary manual toothbrush. Data on file, Colgate-Palmolive. 2. Data on file, Colgate-Palmolive. 3. Versus Oral-B® Exceed®. Data on file, Colgate-Palmolive. 4. Versus baseline. Data on file, Colgate-Palmolive.

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