0567. Laboratory Interproximal Access Efficacy of a New Toothbrush

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Introduction

- The laboratory interproximal access efficacy (IAE) procedure has been shown to be predictive of clinical plaque removal.

Objective

- The purpose of this study was to evaluate a new prototype (NP) vibrating toothbrush, with the brush head longitudinally split into three parts, and a commercially available (CA) toothbrush using the IAE assay.

Methods

- Two toothbrushes were evaluated in this assay: an NP toothbrush (GlaxoSmithKline) and a CA toothbrush, the Oral-B 40 Indicator (Oral-B Laboratories). Both toothbrushes were labeled as medium texture.
- Six products from each toothbrush group were tested four times for a total of 24 tests.
- All products were stored at 67–70°F, for a minimum of 48 hours before testing.
- The laboratory equipment used was fabricated to the design of Nygaard-Ostby *et al*[1].
- The toothbrushing technique involved independent evaluations of each toothbrush in a horizontal or vertical brushing motion, tooth shapes simulating posterior and anterior teeth, and a brushing weight of 250 g.
- The brushing apparatus was set to brush for 15 seconds, at two strokes per second with a 50-mm stroke.
- The maximum width (IAE) of the brushing stroke was recorded (in cm) using vernier calipers on pressure-sensitive paper placed around the simulated anterior or posterior teeth (**Figure 1**). The same examiner performed all evaluations.
- Analysis of variance was performed on the mean scores comparing the two toothbrush products. Significant differences between the toothbrushes were identified using the *post hoc* Tukey test.

Results

- The mean IAE value, with horizontal brushing, was statistically significantly ($p < 0.001$) higher for the NP toothbrush compared with the CA toothbrush mean for both anterior and posterior tooth shapes (**Table 1**).
- The mean IAE value on anterior and posterior tooth shapes, with vertical brushing, was statistically significantly ($p < 0.001$) higher for the NP toothbrush compared with the CA toothbrush (**Table 2**).
- The overall mean IAE value was statistically significantly ($p < 0.001$) higher for the NP toothbrush compared with that for the CA toothbrush (**Figure 2**).

Table 1. Interproximal Access Efficacy on Anterior- or Posterior-Shaped Teeth with Horizontal Brushing

Tooth Shape	NP	CA
	Mean (SD), in cm	
Anterior	0.98 (0.05)	0.71 (0.07)
Posterior	0.68 (0.05)	0.50 (0.06)

CA, commercially available; NP, new prototype; SD, standard deviation.

Table 2. Interproximal Access Efficacy on Anterior- or Posterior-Shaped Teeth with Vertical Brushing

Tooth Shape	NP	CA
	Mean (SD), in cm	
Anterior	1.09 (0.03)	0.75 (0.05)
Posterior	1.32 (0.02)	1.02 (0.02)

CA, commercially available; NP, new prototype; SD, standard deviation.

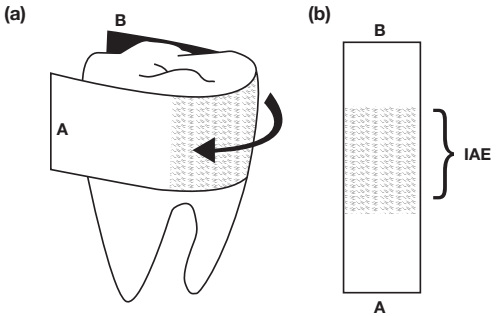

Figure 1. Measurement of brushing stroke width. (a) Pressure-sensitive paper (A-B) wrapped around model tooth prior to brushing. (b) After brushing, paper is removed and maximum width of markings is measured to give interproximal access efficacy (IAE) value.

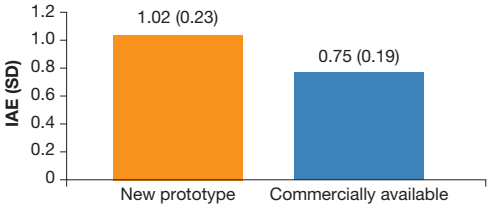

Figure 2. Overall interproximal access efficacy (SD).

Conclusion

- The mean IAE values, using horizontal or vertical brushing, on anterior or posterior teeth, as well as the overall mean, were significantly higher ($p < 0.001$) for the NP product than the CA toothbrush.

Reference

1. Nygaard-Ostby P, Edvardsen S, Spydevold B, 1979. Access to interproximal tooth surfaces by different bristle designs and stiffness of toothbrushes. *Scand J Dent Res* 7:424–30.