Laboratory Interproximal and Subgingival Access Efficacy of Nine Toothbrush Products

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Objective: Toothbrush bristle interproximal (IAE) and subgingival (SAE) publications predicted clinical plaque reduction and gingivitis improvement.[1,2] A new toothbrush, the G•U•M® Technique PRO has a unique design. The purpose of these IAE and SAE studies was to compare the efficacy of G•U•M® Technique PRO to eight commercially available toothbrushes with various bristle configurations.

Materials and Methods: Toothbrushes tested were: G•U•M® Technique PRO (G•U•M), Colgate Slim Soft (Colgate), CURAPROX 1560 (CURA), elmex inter X (elmex), Inava 20/100 (Inava), meridol (meridol), Oral-B PRO-EXPERT (Oral-B), TePe Select (TePe), and VITIS Suave Access (VITIS). Each toothbrush was reciprocated on an artificial plaque substrate at 250 g brushing pressure for 15 seconds to evaluate IAE. Both vertical and horizontal motions were used. IAE was determined as the maximum width of the removed artificial plaque around simulated anterior and posterior teeth. For SAE, horizontal motions were used on the plaque substrate at 500 g for 15 seconds. Maximum plaque distance removed under gingival margin of simulated posterior teeth was determined. This procedure was repeated 24 times for each design. Results were analyzed using ANOVA and post hoc Tukey for multiple comparisons.

Results and Discussion: Table 1, Figure 1 and Figure 2 present the means of IAE and SAE. Mean differences greater than 0.07 cm for IAE and 0.38 mm for SAE were significant (p < 0.05). The G•U•M® toothbrush removed artificial plaque deposits at a width of 1.44 cm and also under the simulated gingival pocket at a depth of 3.37 mm. The design of the G•U•M® product might contribute to better cleaning efficacy in these in vitro tests.

Conclusions: In the studies conducted, the G•U•M® Technique PRO toothbrush was statistically superior to each of the other toothbrushes tested (p< 0.05). Clinical studies are warranted.

Table 1
Efficacy Results

Toothbrush	IAE	SAE
	Mean (SD)	
G•U•M	1.44 (0.17)	3.37 (0.60)
Colgate	1.32 (0.22)	1.93 (0.21)
CURA	0.82 (0.15)	0.13 (0.23)
elmex	1.07 (0.14)	2.07 (0.42)
Inava	0.84 (0.14)	0.65 (0.31)
meridol	1.24 (0.24)	2.24 (0.51)
Oral-B	1.08 (0.10)	2.35 (0.42)
TePe	0.99 (0.12)	1.37 (0.45)
VITIS	1.06 (0.15)	0.85 (0.49)

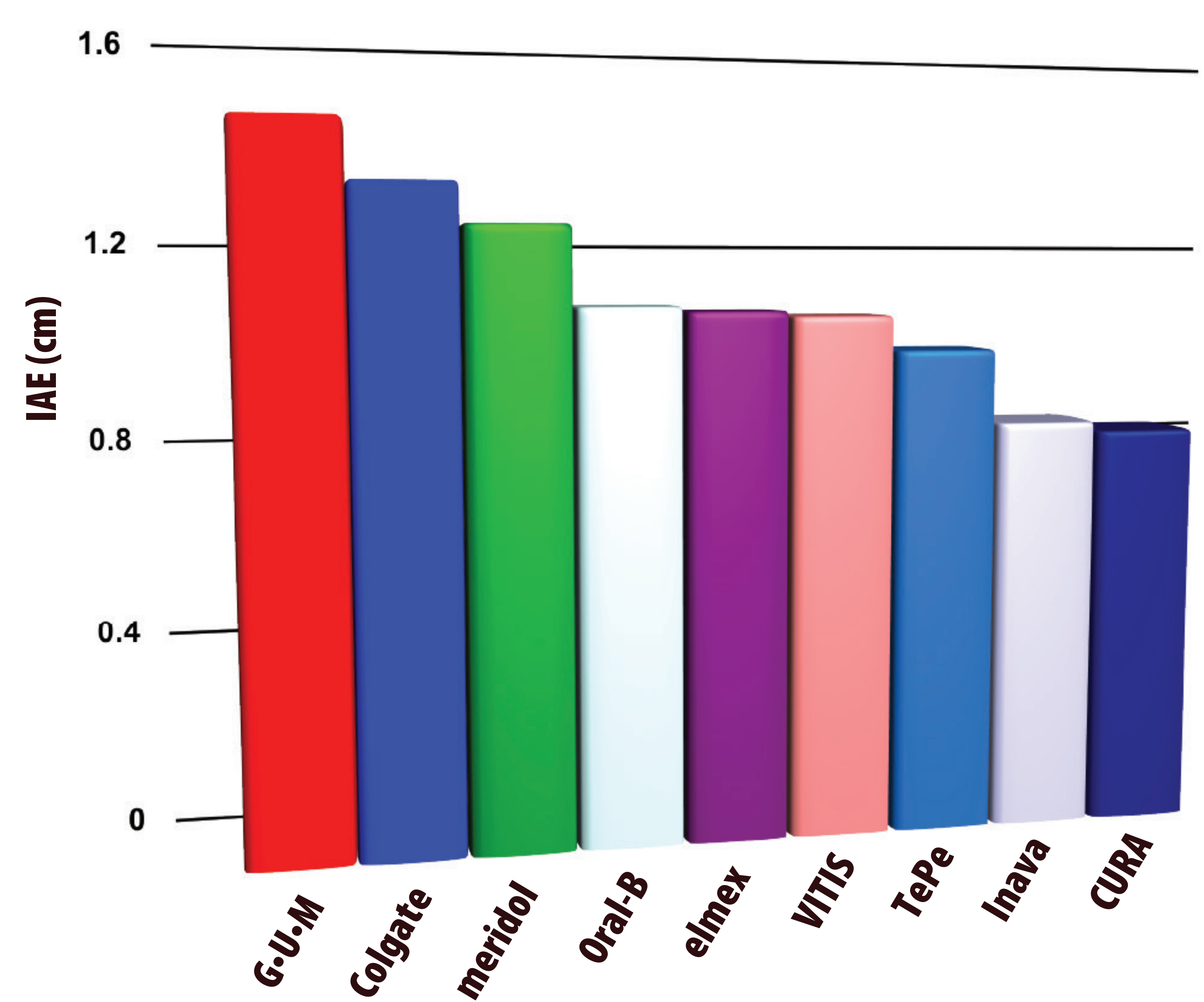**Figure 1**
IAE of tested toothbrushes.

Figure 2
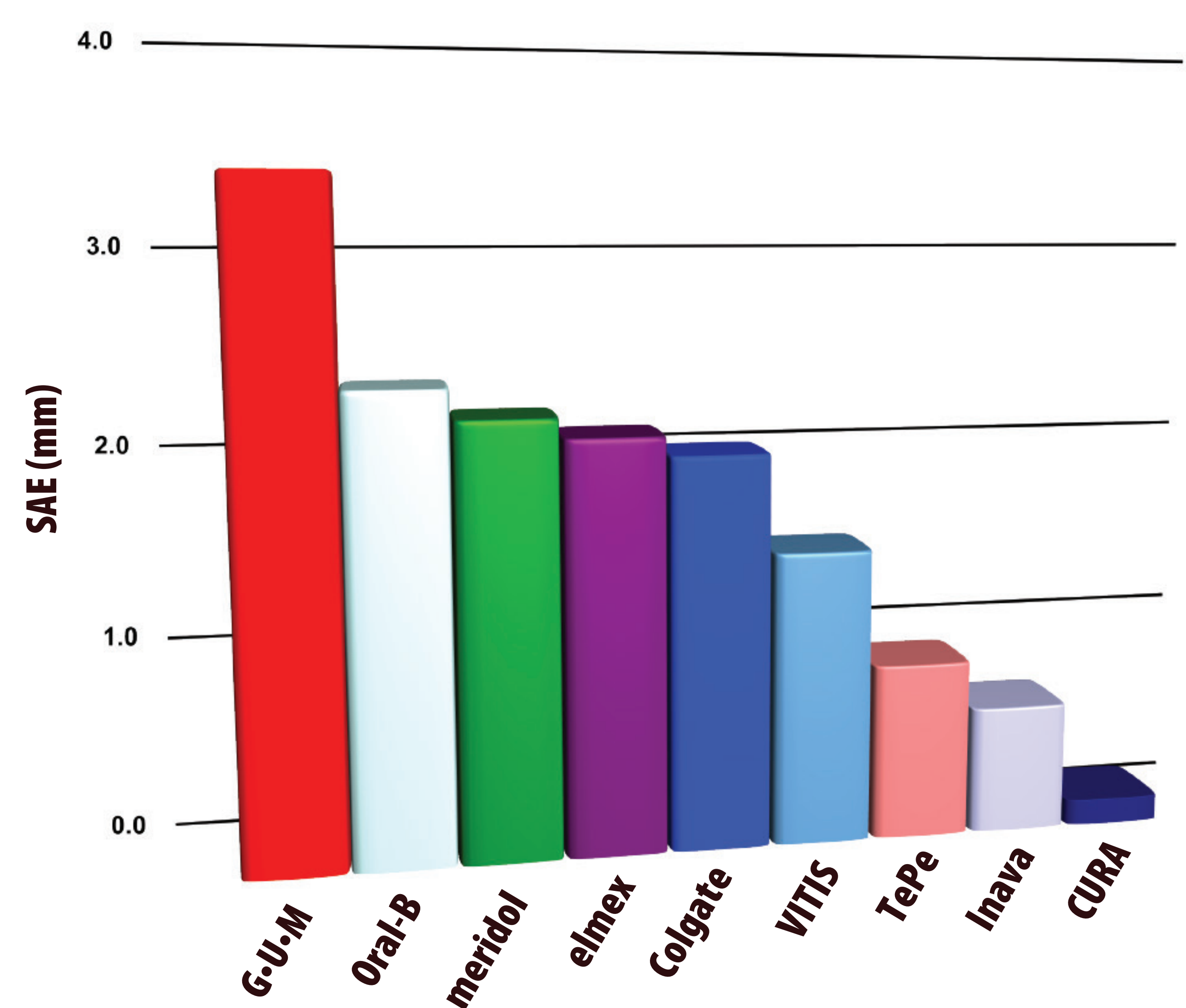*SAE of tested toothbrushes.*

Figure 3
Toothbrushes tested. Lateral view of the toothbrush head.
From left to right: Inava, Colgate, CURA, elmex , G•U•M, meridol, Oral-B, TePe, VITIS.

References:
1. Yankell SL, Nygaard-Ostby P: Evaluating cleaning efficiency of different toothbrush designs and textures. *J Soc Cosmet Chem* 34:151-157, 1983.
2. Yankell SL, Green PA, Greco PM, Stoller NH, Miller MF: Test procedures and scoring criteria to evaluate toothbrush effectiveness. *Clin Prev Dent* 6: 3-8, 1984.