Give your teeth a hug: A simplified brushing technique for children

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Toothbrushing, the most commonly recommended procedure for plaque removal, is a particularly time consuming and difficult endeavor for both children and adults to perform effectively. A simple brushing technique that requires minimal time to teach and perform would prove most effective. This uncomplicated method would be easily repeated, thus reinforced, in a home environment.

The curved bristle toothbrush consists of three rows with eighteen bundles of polished nylon bristles. The two outer rows have long curved bristles that are used for cleansing the facial and lingual surfaces and mesial and distal embrasures of teeth. The third row consists of short straight bristles situated in between the two rows of longer bristles. Their purpose is to cleanse the occlusal surfaces of the teeth (Figures 1, 2). The curved bristle presents a simple alternative to the conventional straight bristle because the technique with which it is used requires very little dexterity.

Curved bristles surround the teeth and enter the sulcus easily, despite morphological variations. When bristles bend, their ends oscillate and with this motion sweep away plaque and debris. The bristles are activated by a simple horizontal scrubbing movement of the handle.[1]

This study attempts to determine the effectiveness of the curved bristle toothbrush as compared to the straight, conventional bristle toothbrush.

MATERIALS AND METHODS

A double-blind study was conducted at North Elementary school in Morgantown, WV. Fifty-two third-grade students, approximately eight to nine years of age, were randomly divided into two groups. The first, used as a control group, consisted of those students who brushed with conventional straight bristle toothbrush and were instructed to use the scrub brush method. The second, the experimental group, consisted of those students

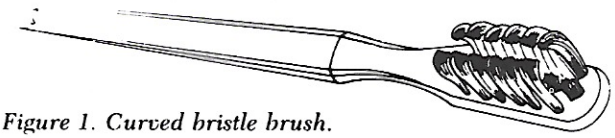

Figure 1. Curved bristle brush.

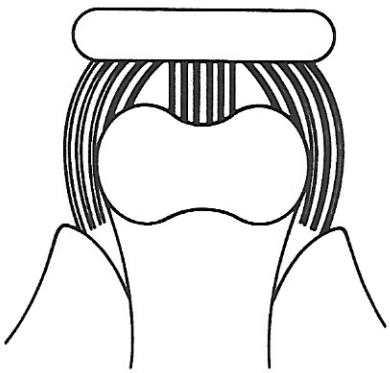

Figure 2. Cross section showing bristles being applied to all surfaces of the tooth.

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who brushed with the curved bristle toothbrush, using the method described specifically for this brush.

The children dry-brushed with their designated toothbrushes for approximately a minute. An erythrosin solution was applied with a cotton tip applicator to only those teeth which were to be checked for plaque. The children rinsed with a cup of water and proceeded to the table of examiners to be checked for plaque. Ramjford's designated teeth for the *Periodontal Disease Index* were used as a guide for the selection of teeth checked for plaque. The buccal, lingual, mesial and distal surfaces of the right maxillary permanent first molar, the left maxillary permanent central incisor, the left maxillary primary first molar, the left mandibular permanent first molar, the right mandibular permanent central incisor, and the right mandibular primary first molar were checked for absence or presence of plaque and recorded. If one of the sample teeth was missing, the tooth adjacent or distal to the sample tooth was used(Figure 3).

Four examiners were calibrated prior to the onset of the study. This was accomplished by using a sample individual to calculate the plaque index. There was a unanimous decision concerning presence or absence of plaque on the individual's sample teeth by all of the examiners. This provided a standard for student's plaque evaluation.

Once in the classroom, the examiners were separated from where the children were brushing so that they would be unaware of which group had utilized which brush.

Two examiners were assigned to each group to record plaque accumulation on the sample teeth. Both examiners recorded plaque for each student in their group.

Penlights and mouth mirrors were used to provide illumination and gluteraldehyde was used to sterilize the mouth mirrors.

This study was conducted on four nonconsecutive days within one week. T-tests were performed to measure the difference in mean plaque scores for the two groups, on each of four separate days.

RESULTS

Mean plaque scores after brushing, according to the type of toothbrush used and group are presented in the Table.

Mean plaque scores for children who brushed with the conventional toothbrushes when compared with the

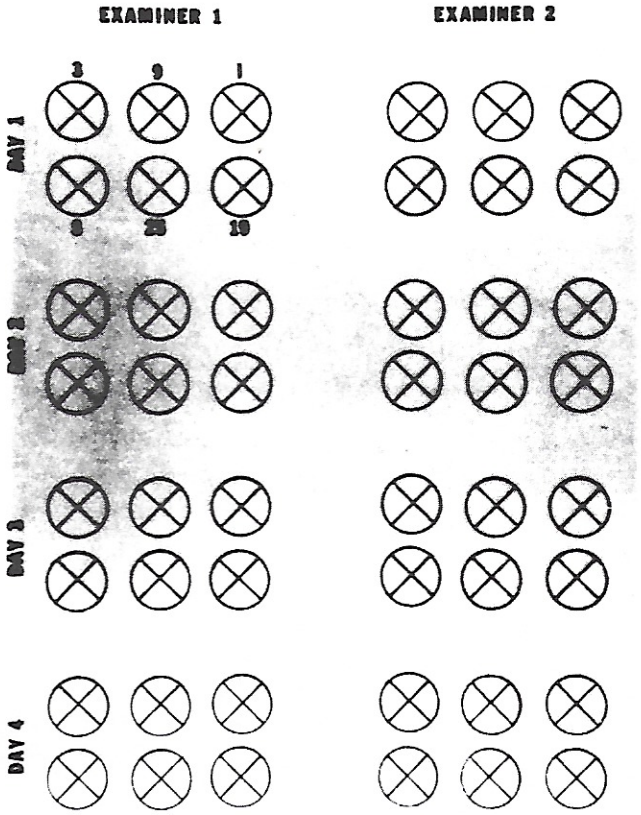

Figure 3. Plaque record used by examiners.

unconventional toothbrushes differed significantly ($p \leq .001$) in all four instances. The third grade students showed lower mean plaque scores when the curved bristle brush was used than when the conventional bristle brush was used.

DISCUSSION

A toothbrush that could be used with the scrub motion and would require a reduced number of positions in the mouth, and at the same time be as effective as conventional methods of toothbrushing would be highly desirable for children.[3]

The curved bristle toothbrush meets these qualifications. The dimensions are geared as close to the norm

Table ☐ Mean plaque scores for curved and conventional bristle brushing.

	Curved	Conventional
Day 1	3.08	3.50
Day 2	2.58	9.40
Day 3	3.27	3.68
Day 4	1.83	3.64

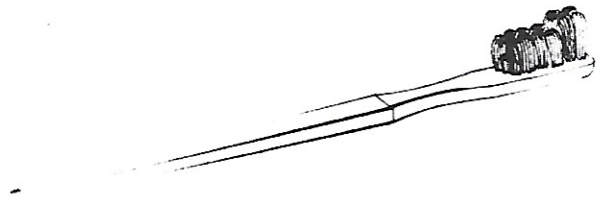

Figure 4. Mixed dentition curved bristle brush.

as possible for the greatest number of people in need of the most exacting technique at a time when it can be of the greatest benefit.

The terminal ends of the curved bristles resemble the shape of the number 17 explorer, which is used to probe the sulcus. It can be applied directly to the junctional epithelium whereas a straight explorer can easily puncture the epithelial lining. Similarly, the curved terminal ends of the curved bristles can, under slight pressure, rotate on their axes and slip into the sulcus as far as the junctional epithelium without lacerating it. While rapidly moving the handle back and forth, the shanks of the bristles twist and sweep plaque out of the undercuts in the gingival area. Injury to the softer moveable alveolar mucosa is minimal due to the fact that there are no stray excessive tufts any farther away than the gingival margin. The cleaning action is a scaling one and the ends of the bristles play no role.[1] Effective cleansing with curved bristles requires only one-eigth the time of that needed when a conventional toothbrush is used.[1] Simulateous movement of the three rows of bristles cleanse the entire tooth surface.

There are four sizes of the curved bristle brush:

- ☐ The adult: facial and lingual tufts are 7/16 inches long, occlusal tufts are 1/8 inch long.[1]
- ☐ For the primary dentition: shorter bristles than in the adult size.
- ☐ The periodontal brush: all curved bristles are longer than in the adult size in order to reach exposed root surfaces or to cover long cinical crowns completely.
- ☐ For the mixed dentition: the curved bristles on the end opposite the handle are longer, to accommodate the permanent molars (Used in this study)(Figure 4).

The mixed dentition type was used to accommodate most efficiently the population studied. The majority of students were approximately eight years of age and were in transition from the primary dentition to the permanent dentition. The children were very responsive and anxious to perform their brushing techniques. This factor may have added to the greater cleansing action of the curved bristle brush.

The area that retained the most plaque in both groups was the labial surface of the left maxillary permanent central incisor. The second most common areas missed when brushing were the lingual surface of the left mandibular permanent first molar for the conventional toothbrush and the lingual surface of the right mandibular permanent central incisor for the curved bristle toothbrush.

CONCLUSION

From the results of this study, it may be concluded that the curved bristle toothbrush is more effective in plaque removal than the conventional toothbrush. As with any scientific research, replication of this study would be desirable prior to establishing the curved bristle toothbrush as a recommended oral physiotherapy aid.

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