

291 July-August 1988
Journal Of Dentistry For Children

The curved-bristle toothbrush: an aid for the handicapped population

Nancy Johnson Williams, RDH, MS
Norman J. Schuman, DDS, MPH

Limited data exist to substantiate the claim that the curved-bristle toothbrush is an effective plaque control device, especially for that segment of the population incapable of or requiring assistance to accomplish tooth-brushing (Figure). According to Nowak, dental health care is the greatest unmet need of the institutionalized population.¹ A continuing challenge for the dental professional to encourage adequate plaque control measures, in an effort to prevent periodontal disease, the most serious dental problem affecting the institutionalized population. The etiology of this disease stems from bacterial activity and local irritants present in plaque and calculus.²

The purpose of this study was to compare the effectiveness of the curved-bristle toothbrush to that of a conventional toothbrush in plaque reduction among institutionalized, profoundly retarded individuals who are dependent on others for oral hygiene care.

REVIEW OF THE CURRENT LITERATURE

A review of the literature revealed numerous publications on the subject of mechanical plaque removal. Fewer articles existed on the subject of mechanical plaque removal in a handicapped population, however, and a very limited number were available on the use of the curved-bristle toothbrush, regardless of type of population investigated.

According to Avery, a statistically significant difference ($p < .001$) in plaque removal with the curved-bristle toothbrush was demonstrated in a group of normal third graders in a West Virginia school system.³

Meckstroth and Weller evaluated the curved-bristle toothbrush according to its effectiveness in the removal of plaque and according to the user's attitudes toward the curved-bristle toothbrush with both assisted brushing and completely dependent patients.⁴ Results revealed a reduction in plaque, especially in the posterior lingual areas. Acceptance of this type of toothbrush by long-term geriatric patients and facility personnel upon evaluation was favorable.

In a 1987 study by Allen and Evans of eighty-seven four-year-old subjects, brushing with either curved-bristle or conventional toothbrushes, a significant difference in the removal of plaque from the posterior lingual areas favored the curved-bristle toothbrush.⁵

A 1986 study by the Collis Curve® Research team at a Texas Boys' Home, (n16), evaluated the effectiveness of the curved bristle toothbrush, using the simultaneous random scrub technique, and the conventional toothbrush. using the Modified Stillman Method. It was reported that after one week, the curved-bristle toothbrush produced a significantly greater reduction in plaque as compared to the conventional toothbrush.⁶

An abstract by Maita reported use of the air driven vibratory toothbrush with curved-bristle tips for plaque control in the hospitalized handicapped population. Results revealed a decrease in plaque, but the report failed to show whether the scores were statistically significant.⁷

Findings of a 1987 study by Williams suggested that the curved-bristle toothbrush was as effective as the conventional toothbrush in reducing the amount of plaque present on the teeth of institutionalized, profoundly retarded individuals, when brushed by trained personnel (n24).*

MATERIALS AND METHODS

From an institutionalized population of a state facility for the mentally retarded, individuals were selected according to the following criteria:

- Incapable of brushing one's own teeth.
- Profoundly mentally retarded.
- Poor oral hygiene as measured by the DI-S of the OHI-S

They were then equally divided into control and experimental groups (n24) (Table 1). Baseline data were collected through utilization of the DI-S of the OH I-S by the facility's dentist.⁹ The purpose of this index was to quantitate oral cleanliness by estimating the tooth surface area covered by debris. All six preselected teeth (numbers 3,8,14,19,24, and 30) were examined in this study. Once daily during the next three months students in dental assisting provided treatments for the control and experimental groups with the conventional and curved-bristle toothbrushes, respectively. The tooth brushing method utilized for the control group was the Modified Stillman Method. The traditional Collis Curve® Scrub Method was utilized for the experimental group. For follow-up data were collected by the same examiner.

FINDINGS

At the end of the three-month study evaluation and analysis of the data were accomplished by use of an independent I-test on the difference between the base-line and follow-up scores. No statistically significant difference was found in the amount of plaque reduction between the two toothbrushes ($t=.31, p<.76$). The curved-bristle toothbrush was found to be as effective as the conventional toothbrush in achieving similar results for plaque removal (table 2).

DISCUSSION

When working with individuals who are dependent on others for their care, it is most important for the health care provider to take the initiative to create or investigate other devices that would allow these patients optimum oral care that is practical both for the patient and for the person who provides this service. The curved-bristle toothbrush, by its design, brushes the buccal, lingual, and occlusal surfaces simultaneously. It has been shown, by this study, to achieve similar reductions in plaque with half the time required with conventional toothbrushes. Mentally or physically handicapped patients, or any patient with a weak or limited grasp who requires varying degrees of assistance in toothbrushing, may benefit from the design of this toothbrush, as the literature suggests. Because the caretaker can brush as effectively with this brush in the same amount of time as with the conventional toothbrush suggests a possibility of both manpower and financial savings to the institution. The decrease in time required to brush the residents' teeth may also encourage better oral hygiene for the patient who received little or no assistance from the facility's personnel, since they were previously neither inclined nor encouraged to do so, due to other time restraints required for other self-help skills in the institutionalized setting. Findings of this study should prove beneficial to the advancement of the dental profession, through the discovery and application of new knowledge

in the delivery of care to the handicapped population in alternative practice settings.

CONCLUSION

Adequate plaque control for the institutionalized populations presents a continuous challenge to dental professionals. The findings of this study indicate that an effective, time-efficient method for plaque control exists in the curved-bristle toothbrush. Institutions may consider adoption of this toothbrush for patients incapable of self-brushing.

References

1. Nowak. A.J. Dentistry for the handicapped patient. St. louis: C.V. Mosby Co. - 1976. p 3.
2. O'Donnell. J.P and Cohen. M.M.: Dental care for the institutionalized retarded individual. J Pedodont. 9:3. 1984.
3. Avery. K. D. Give your teeth a hug: A simplified brushing technique for children. J Dent Child. 51:371-373. September/October. 1984.
4. Meckstruth. R.L. and Weller. M.A.: Comparison of the plaque removal characteristics and user attitudes toward the curved and straight bristle toothbrush. Submitted to Special Care, in Dentistry.
5. Allen. K.B. and Evans. M. Comparison of the plaque removing ability of a toothbrush with curved bristles and straight bristle toothbrush. Presentation made at the Annual Meeting of the American and Pediatric Dent. Colorado Springs. CO. May. 1986.
6. Collis Curve Research Team. Collis Curve. Inc. Newsletter. 1986. Dr. George Collis. Minneapolis. MN.
7. Maita. E. and Sasaki. S.: Automatic oral cleaning apparatus and clinical evaluation. Japanese Association of Periodontology. 22(1). March 1986.
8. Williams. N.J. and Schuman. N.J.: Collis Curve versus conventional toothbrush: An institutional study. J Dent Res. (66) Special Issue. March. 1987.
9. Wilkins. E. M.: Clinical practice of the dental hygienist (5th ed. (Philadelphia: Lea & Febiger. 1983.

ERRATUM

In the article. "The role of coping in children's adjustment to the dental visit", by Sandra L. Curry et al, the name of one of the authors was submitted as Sandra W. Fuss, PhD. The name should be shown as Sandra W Russ. PhD.

Ms. Williams is Assistant Professor. Department of Dental Hygiene College of Allied Health Sciences. The University of Tennessee 310 Madison Avenue. Memphis. TN 38163.

Dr Schuman is Associate Professor and Interim Chairman. Department of Pediatric Dentistry. The University of Tennessee. College of Dentistry. Memphis. TN 35163.