Success of an Obturator Reduction Program

CURTIS E. WEISS, Ph.D
Portland, Oregon 97201

Temporary speech prosthesis is being employed in the initial management of children with palatopharyngeal inadequacy either with or without clefts (*1, 2, 3, 4, 5*). At least four reasons account for the existence of such a program: (1) adequate palatopharyngeal closure at an early age, (2) minimal risk, (3) no alteration to existing structures, and (4) better results for subsequent pharyngoplasty. Although obturators are traditionally employed to bridge the gap between primary surgery and secondary surgery, they sometimes serve more permanent functions.

Sixteen years ago it was discovered, quite by accident, that the initial size of the pharyngeal segment of the obturator could be reduced in some patients. More importantly, it was observed that sufficient compensation of palatopharyngeal musculature occasionally occurs so that the obturator can be removed permanently without adversely affecting articulation and vocal quality. Our program of systematically reducing obturator size as often and as much as the speech of the patients could tolerate began nine years ago. The goal of this program, to establish adequate palatopharyngeal closure for normal speech and vocal quality while stimulating pharyngeal musculature, became threefold: (1) to reduce the pharyngeal segments of the obturator and subsequently remove them; (2) to reduce the pharyngeal segments as much as possible before considering pharyngoplasty; and (3) to consider the feasibility of permanent obturators. Criteria for the selection of patients and for the reduction of pharyngeal segments have been described previously (*3*).

Because little is known about the prevalence and characteristics of patients who have been able to discontinue wearing their obturators, this study was undertaken. It attempted to delineate common success variables, the permanence of success, and the kinds of patients that are successful.

Procedures

Twenty post-obturator patients with varying kinds of palatopharyngeal inadequacies were studied. These patients had discontinued wearing their

This paper was presented at annual meeting, American Cleft Palate Association, Pittsburgh, Pa. April 22–24, 1971.

Dr. Weiss is Assistant Professor of Speech Pathology, Crippled Children's Division, University of Oregon Medical School, Portland, Oregon.

obturators after several reductions without altering vocal quality. Hereafter, they shall be referred to as successful patients. Even though most of our obturator patients have been successful in achieving the potential for normal articulation and vocal quality and in most instances the pharyngeal segments have been reduced somewhat, the majority of them eventually require pharyngoplasty.

The following parameters were analyzed: type of orofacial anomaly, sex, age, specific speech and dental management procedures, and kind of compensatory palatopharyngeal behavior. Medical and dental charts were reviewed, tape recordings were made, and anatomical, physiological, and obturator assessments were carried out. Information on speech and dental management procedures was obtained directly from the patient, the parents, and the speech pathologist who saw the patients. Tape recordings were made of each patient reading a standard passage and during conversation. In these recordings both articulation and vocal quality were assessed by a speech pathologist. On the basis of the perceived acoustic information, articulation and vocal quality were judged to be either normal or disordered during conversation. The nasal flutter test and the nasal listening tube test were used to determine the presence, if any, of hypernasality and nasal emission. Manometric ratios were obtained with the nostrils occluded and unoccluded, and during sustained blowing. The bleed valve of the manometer was open for all three blowing activities. Dentition, swallowing, oral sensation and perception, and palatopharyngeal physiology were appraised. Lateral and posterior pharyngeal wall movements were subjectively dichotomized as moving significantly or moving very little on the basis of intraoral observations. Finally, the transverse pharyngeal dimension of each patient's initial obturator was measured with a dial caliper.

Results

At the time this study began, twenty out of a total of 125 obturator patients had successfully discontinued wearing their obturators (Figure 1). Since then, three additional obturator patients have been terminated successfully. The average length of time that these patients wore their obturators was three years seven months, ranging from six months to six years, six months. Figure 2 illustrates the distribution of males and females among the successful patients. Since the sex ratio of all the obturator patients was one to one, the sex difference among the twenty successful obturator patients was significant at the .05 level of confidence.

To ascertain if certain kinds of patients were more amenable to obturator reduction than were other patients, the third analysis was made. Figure 3 categorizes the four general groups according to anomalies. Except for Cleft of Soft Palate, where only females were able to discontinue wearing their obturators, males and females were distributed among all categories. Generally, the younger the patient the better the results. Size

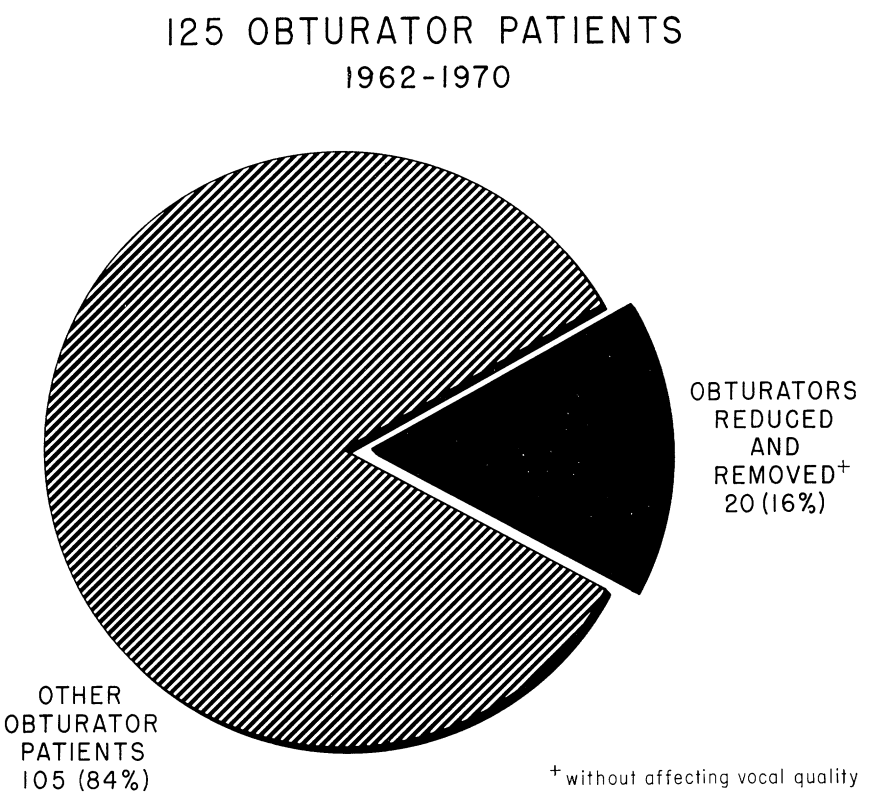

FIGURE 1. Number of all patients in whom obturators were reduced and permanently removed without requiring pharyngoplasty.

of the initial pharyngeal segments of the obturators among the successful patients was specified in millimeters (Figure 4). The magnitude of these pharyngeal segments exemplify the initial degree of palatopharyngeal inadequacy and the amount of compensatory behavior that eventually took place.

On re-evaluation, four of the patients had mildly disordered vocal quality, but none of them required secondary palatopharyngeal surgery. Three of the four marginally successful patients had considerably more difficulty attaining normal vocal quality during production of vowels than during production of consonants. All four achieved manometric readings below the group mean of 15 ounces.

Common variables present among the twenty successful patients were: (1) excellent cooperation of patient and parent, (2) early enrollment in the obturator reduction program, (3) good palatopharyngeal compensatory ability, (4) remedial speech simultaneously with prosthetic therapy, (5) consistency of wearing obturator, and (6) careful case selection.

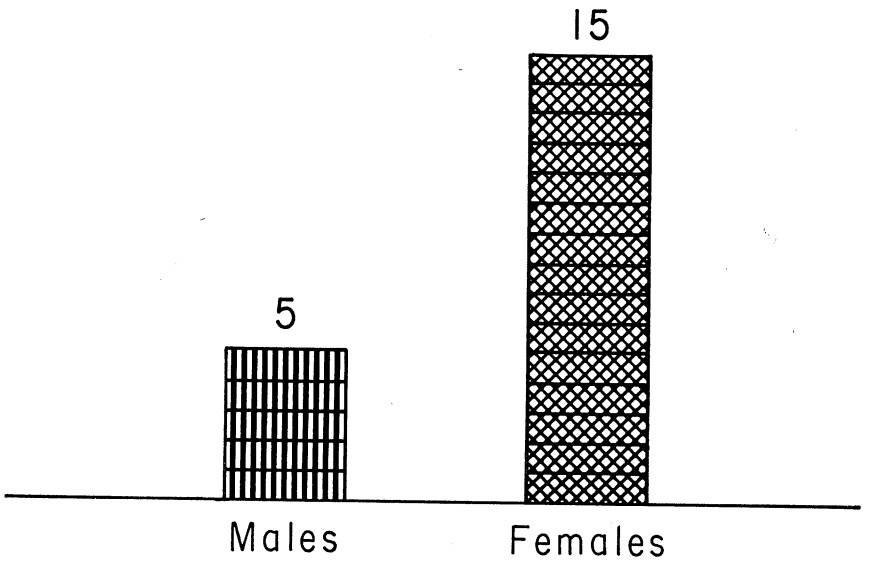

FIGURE 2. Distribution of sex of the successful obturator patients.

Discussion

In our systematic obturator reduction program, sixteen per cent of the patients were able to discontinue wearing their obturators without detriment to their articulation or vocal quality. Nearly all of the 125 obturator patients were able to tolerate some pharyngeal segment reductions, and a steady increment of patients who no longer need to wear obturators continues as the program develops.

No particular kind of patient was significantly more successful than any other patient. Although three times more females than males were successful, females received obturators at an earlier age than did males. Generally the younger the patient when fitted with an obturator, the shorter the duration of wearing the obturator. Most of the successful patients wore their obturators between eighteen months and three years.

The required magnitude of the initial transverse pharyngeal segment of an obturator should not bias a systematic obturator reduction program; neither should it preclude selection of certain patients. Most of our successful patients required beginning pharyngeal segments of one inch or greater in width. It would appear to be injudicious to anticipate or to predict the amount or the rate of palatopharyngeal compensations that may occur in a particular patient, or the extent of compensations needed for normal voice. We are continually surprised at the amount of palatopharyngeal compensation occurring in some of our obturator patients; some achieved a great amount and some very little. Several of the successful patients did not appear to have achieved closure; nevertheless, their voices were acoustically within the range of normal.

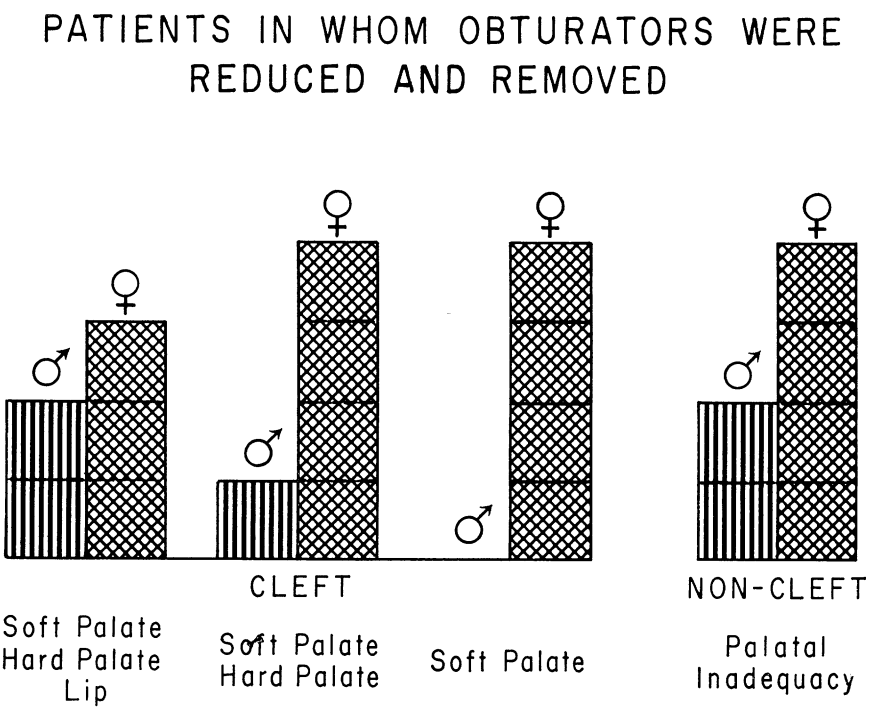

FIGURE 3. Distribution of successful obturator patients in terms of palatopharyngeal anomaly.

A patient's ability to discontinue wearing an obturator and still maintain normal vocal quality and the potential for normal articulation seems to be dependent on several factors. Perhaps the most important requisite is cooperation of the patient and parents. If the patient does not wear his obturator consistently, treat it properly, and keep his appointments regularly, the chances for ultimate success are greatly reduced. If the parents reject the obturator or fail to encourage their child to wear it, then the end result is likewise unfavorable. Patients whose speech can sustain periodic obturator reductions are more likely to discontinue wearing them than are patients whose speech can tolerate obturator reductions only sporadically, or than patients who occasionally need to have their obturators enlarged. To be able to get along without an obturator, a patient either has to develop some lateral pharyngeal wall movement, or he has to be able to achieve normal vocal quality without complete palatopharyngeal closure. The prognosis of ultimately discontinuing wearing an obturator seems to be related to the patient's receiving remedial speech simultaneously with remedial prosthesis. But more importantly, the patient should be fitted with an obturator as early in life as possible.

Another critical factor in the success of an obturator reduction program is selection of the patients for obturators based on radiographic and

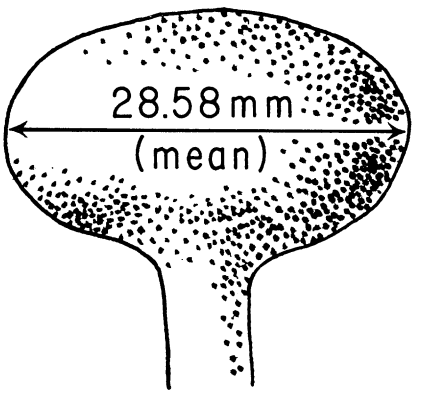

FIGURE 4. Initial size of pharyngeal obturator segments among successful patients.

acoustic information. If the patient shows signs of not being able to wear an obturator or of not being able to tolerate periodic reductions of the pharyngeal segment, then he should obviously not be included in the obturator program. Also, the philosophies of temporary prosthesis and permanent prosthesis in particular patients should be clearly determined and related to the cooperating specialists. Systematic obturator reduction is the other variable important to eventual removal of obturators. The word "systematic" should not be misconstrued to mean reduction of pharyngeal segments at rigidly determined intervals, but rather reductions when the specific patients can tolerate them; that is, when the lateral dimensions of the pharyngeal segment can be reduced without altering vocal quality as perceived by a speech pathologist.

Summary

Success, defined as normal vocal quality and the potential for normal articulation after the obturator has been permanently removed, was analyzed among twenty post-obturator patients seen during the past nine years. Type of orofacial anomaly, sex, age, and specific speech and dental management procedures were studied, and articulation and vocal quality were re-assessed several years after termination of temporary speech prosthesis. The variables that appear to be related to the success of our obturator reduction program were delineated.

Acknowledgements: The author is grateful to Dr. Robert W. Blakeley, Coordinator of the Oregon Cleft Lip and Palate Program, and to Dr. Herold S. Lillywhite, Chairman of Speech Pathology and Audiology, University of Oregon Medical School, for their invaluable assistance in this project.

References

1. BLAKELEY, R. W., Temporary speech prosthesis as an aid in speech training, *Cleft Palate Bulletin, 10,* 63–65, 1960.
2. BLAKELEY, R. W., The complementary use of speech prostheses and pharyngeal flaps in palatal insufficiency, *Cleft Palate Journal, 1,* 194–198, 1964.
3. BLAKELEY, R. W., The rationale for a temporary speech prosthesis, *British Journal of Disorders of Communication, 4,* 1969.
4. FLETCHER, S. G., HASKINS, R. C., and BOSMA, J. F., A movable bulb appliance to assist in palatopharyngeal closure, *Journal of Speech and Hearing Disorders, 25,* 249–258, 1960.
5. SHELTON, R. L., LINDQUIST, A. F., CHISUM, L., ARNDT, W. B., YOUNGSTROM, K. A., and STICK, S. L., Effect of prosthetic speech bulb reduction on articulation, *Cleft Palate Journal, 5,* 195–204, 1968.