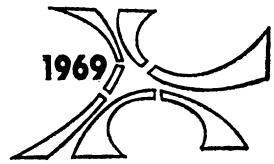
Nasality and the Obturator



CLIVE G. DENNIS, D.D.Sc.
Melbourne, Australia

The purpose of this paper is to discuss some of the parameters involved in the nasalization of speech and its reduction by means of obturators.

Nasal speech has been studied by a variety of methods, but there appear to be limitations to each technique. Nasal airflow studies have been found by Warren (*6*) to be unsuited to the assessment of velopharyngeal function in the cleft palate patient. The analog studies of House and Stevens (*2*), which led to the prediction that increased nasal coupling would cause displacement of the formant frequencies, have not been verified by Curtis (*1*). Lateral roentgenography offers only a two-dimensional picture of velopharyngeal function and Lubker and Moll (*3*) have found that the competence demonstrated by this means is inconstantly related to nasal airflow. Mazaheri and Millard (*4*) have found that the competence demonstrated by this means is inconstantly related to nasal airflow. Mazaheri and Millard (*4*) imply that listener evaluation may be inconsistent unless carried out by experienced speech pathologists, and they consider further that the independent use of instruments such as the SonaGraph is of limited value.

It is with this background that a technique for studying the nasal and oral components of speech has been developed as a clinical aid in the treatment of Australians.

One variety of Australian English has nasality as one of the significant features, being related to socio-economic factors as reported by Mitchell and Delbridge (*5*) (Figure 1).

Methods

A double microphone and baffle assembly has been developed so that the separate oral and nasal speech components are recorded on

Dr. Dennis is Senior Lecturer in Dental Prosthetics, University of Melbourne, and Honorary Consultant (Cleft Palate Prosthetics) Dental Hospital of Melbourne.

This paper was supported by the National Health and Medical Research Council, Australia.

This paper was presented at the 1969 International Congress on Cleft Palate, Houston.

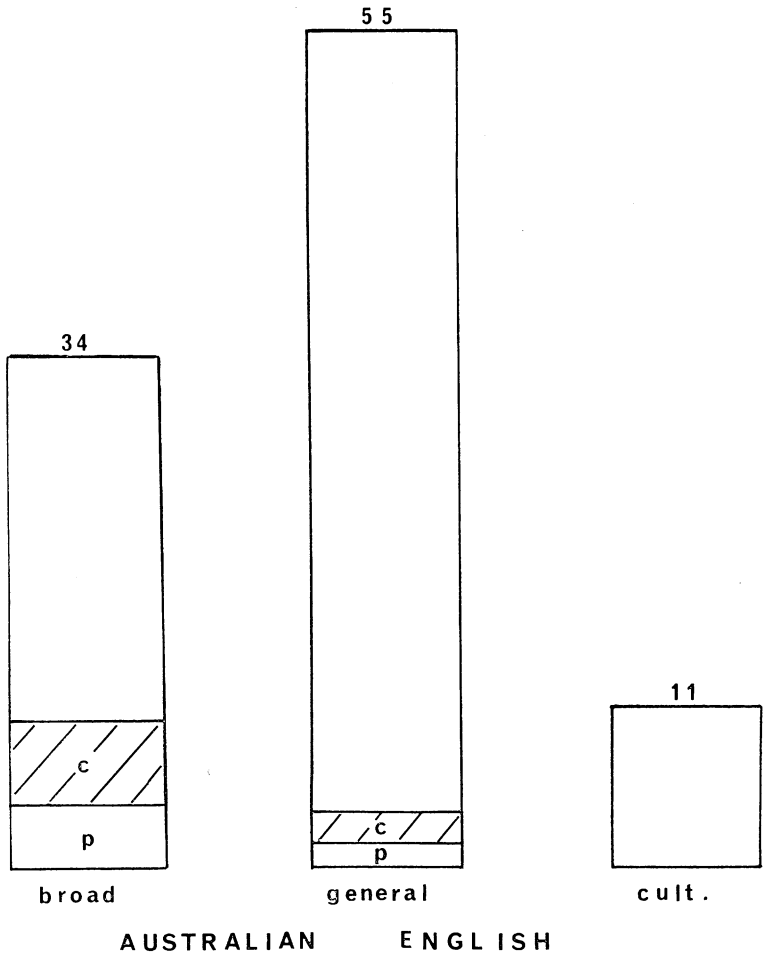


FIGURE 1. The proportions of Australian dialects (after Mitchell & Delbridge). Nasalization is represented by the symbols c- contextual, p- pervasive.

twin-track magnetic tape. A simultaneous time and frequency signal enables subsequent orientation of the records (Figures 2 and 3).

Sonagrams are prepared from selected speech extracts and direct comparison of the oral and nasal components is then made (Figure 4). Details of the socio-economic background are recorded for each patient.

This method of examination has been applied to noncleft university students, subjects undergoing exodontic and routine prosthetic treatment, and to cleft palate patients.

Modifications are made to the dimensions of the bulb during the prosthetic treatment of those cleft palate patients with short immobile vela (as a result of the surgery of yesteryear) or with unoperated clefts (Figure 5).

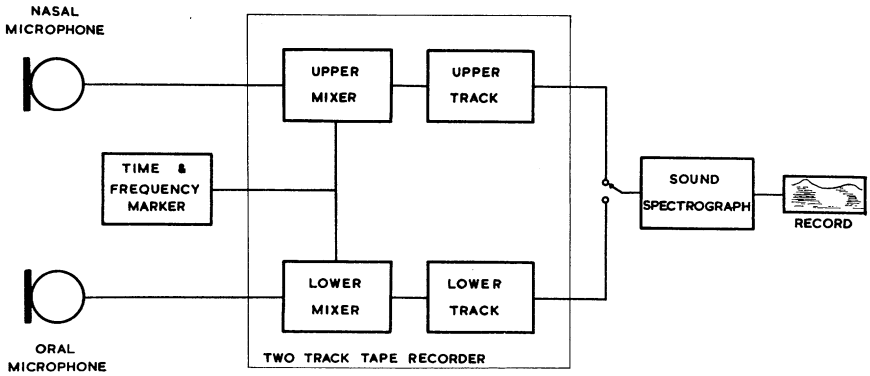


FIGURE 2. Diagram of the electronic apparatus used to portray the oral and nasal components of speech.

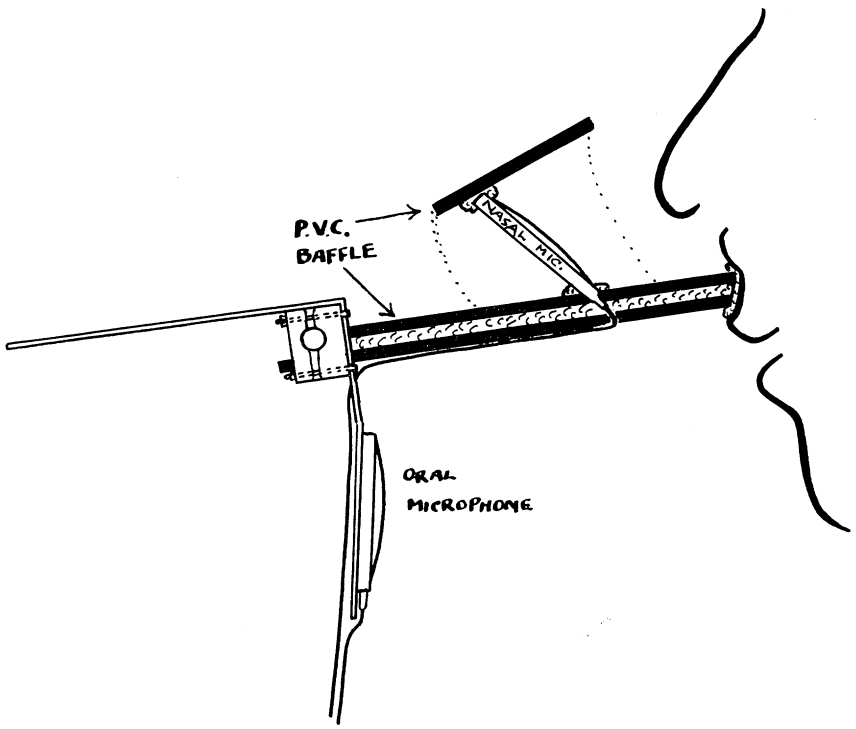


FIGURE 3. Diagram of the twin microphone and baffle assembly for separating the oral and nasal components of speech.

Attempts have been made to allow nasalization for patients with the socio-economic background conducive to the use of a Broad Australian dialect (state-school education, rural residence, unskilled or semiskilled occupation). This has been achieved by reducing the competence of the

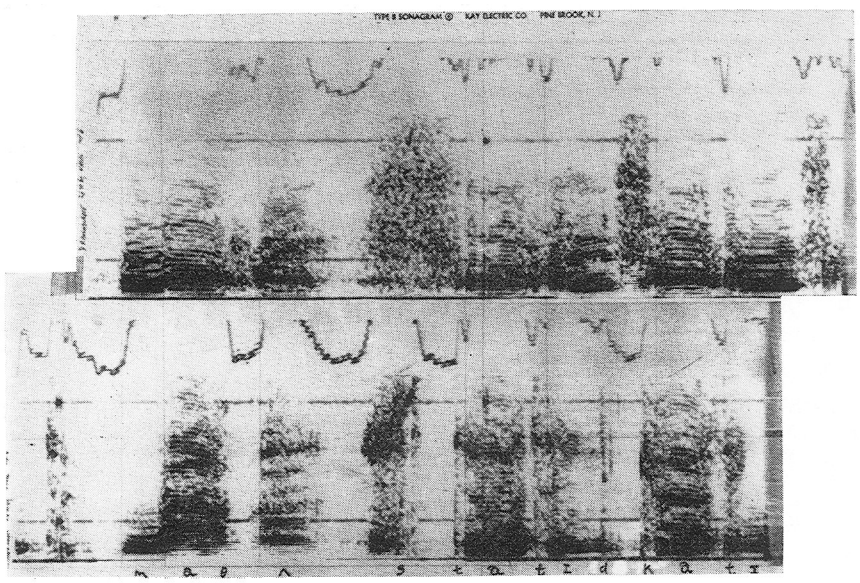


FIGURE 4. Sonagrams orientated by time/frequency markings, showing nasal (upper) and oral (lower) components.

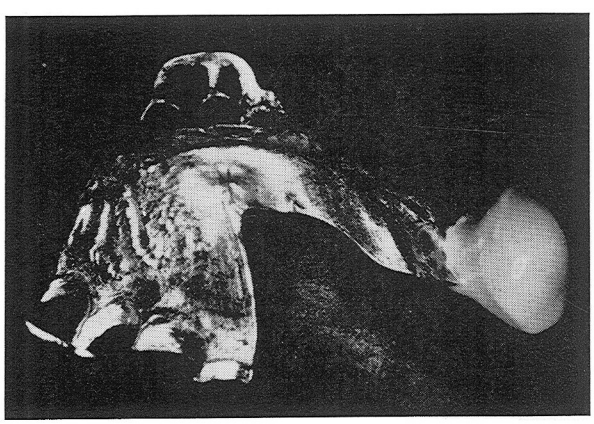


FIGURE 5. Obturator with tail-piece, showing postero-superior contours modified by deglutition.

bulb in either the posterior or the postero-lateral region, depending on the muscular activity of the area.

Unfortunately, a greater problem exists in the development of a competent bulb to match the dialect of the majority. Patients requiring obturators are first seen as adults with functional compensations for their deficiencies. Apart from the difficulty of changing speech habits, the swallowing act frequently governs the dimensions of the bulb per se.

This is in spite of the care taken with the impression, and nasalization often results.

Discussion and Summary

The present handling of the congenital cleft palate should reduce the necessity for the use of obturators in the future. An opportunity exists at the moment for the study of speech nasality which may not present itself to future generations. While the technique of adjusting the dimensions of the obturator to allow nasality has been applied to the treatment of the Australian cleft palate patient, the sonagrams provide information on the structure of the nasal components of speech. Work is continuing on this aspect.

reprints: *Dr. Clive G. Dennis*
Cleft Palate Unit
Dental School
Elizabeth Street
Melbourne, 3000
Australia

References

1. CURTIS, J. F., Acoustics of speech production and nasalization. Chapter II in *Cleft Palate and Communication*, edited by D. C. Spriestersbach and Dorothy Sherman. New York: Academic Press, 1968.
2. HOUSE, A. W., and K. N. STEVENS, Analog studies of the nasalization of vowels. *J. speech hearing Dis., 21,* 218–232, 1956.
3. LUBKER, J. F., and K. L. MOLL, Simultaneous oral-nasal air flow measurements and cinefluorographic observations during speech production. *Cleft Palate J., 2,* 257–272, 1965.
4. MAZAHERI, M., and R. T. MILLARD, Changes in nasal resonance related to differences in location and dimension of speech bulbs. *Cleft Palate J., 2,* 167–175, 1965.
5. MITCHELL, A. G., and A. DELBRIDGE, *The Speech of Australian Adolescents*, pp. 99. Sydney: Angus and Robertson, 1965.
6. WARREN, D. W., Nasal emission of air and velopharyngeal function. *Cleft Palate J., 4,* 148–156, 1967.