

# The Complementary Use of Speech Prostheses and Pharyngeal Flaps in Palatal Insufficiency

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Traditionally, speech prostheses and pharyngeal flaps have been used in cases of palato-pharyngeal insufficiency to assist speech by improving ability to impound air.

In 1960 (1), the use of speech prostheses as temporary devices for speech training was discussed and a patient was described who, after obtaining a speech appliance, apparently developed so much pharyngeal constriction associated with speech, that the obturator was reduced in size and subsequently removed completely without appreciable detrimental effect on speech. This kind of clinical observation along with that of others (3, 5) has led to the belief that a broader approach might be taken to speech prostheses than has traditionally been used.

Rather than considering a patient with palato-pharyngeal insufficiency as a possible candidate for either a speech prosthesis or a pharyngeal flap, it might be advantageous in selected cases to consider utilizing the assets of both the obturator and the pharyngeal flap and possibly reducing the liabilities of each.

Proponents of treatment by prosthesis (4) have pointed out the modifiability of the obturator in terms of size, shape, level of placement, and the fact that it can usually be placed earlier than the pharyngeal flap. It is also suggested (6) that an obturator may stimulate greater pharyngeal constriction for speech purposes.

Those favoring the pharyngeal flap operation may show that a speech prosthesis can traumatize the teeth and interfere with orthodontic treatment. It can be defended that utilization of a patient's own tissue is a physiologically more healthy and more permanent form of treatment than is the placing of a foreign body in the oral cavity. A speech prosthesis needs cleaning, technical adjustments, change with growth, and ultimately requires that the speech be partly dependent upon sound teeth. Further, a patient may reject the speech appliance and thus refuse to wear it.

Clinical observations of patients receiving obturators compared with those receiving pharyngeal flaps suggest that obturators are generally more

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successful initially in helping patients to achieve normal or near-normal air pressure for speech, and thus may be more advantageous in helping to interrupt the habitual pattern of abnormal speech. It has been observed (1, 2) that a primary need for the best success with either procedure is adequate pharyngeal constriction during phonation. When limited pharyngeal constriction is present, obturators seem to be more successful in reducing nasal emission of air for speech than do pharyngeal flaps. This clinical experience, coupled with the observation that some obturator patients appear to develop greater pharyngeal constriction, stimulated the development of the approach to palato-pharyngeal insufficiency described below.

Selected patients with poor palato-pharyngeal valving for speech, who do not present any contra-indications for use of a speech appliance, may be supplied with an obturator which ideally allows them to develop complete, or near-complete, nasal-pharyngeal closure for production of all pressure consonants. Initially this may cause mild, or even obvious, hyponasality (interference with normal nasal resonance for the sounds /m, n, ŋ/ as in *me, no*, and *bang*), which can usually be relieved within a month or two by reducing the size of the obturator.

When the patient has achieved good articulation results with speech training and is well on the way to normal speech, he may be placed on an obturator-reduction program.

Using a nasal listening tube (30" rubber tube with a glass nasal olive at either end) as a guide, the obturator should be reduced in size until an obvious change is noted (through the tube) in nasal resonance or nasal emission. This procedure may be repeated every 30 to 90 days, and the patient may continue to compensate palato-pharyngeally in order to maintain the normal or near-normal level of articulation and voice previously achieved. Normal speech once achieved appears to be difficult to destroy.

When the obturator has been maximally reduced and the patient appears not to be able to further compensate, a pharyngeal flap may then be considered. Strong indications for substituting the pharyngeal flap for a speech prosthesis after normal speech has been achieved are: a) the need for orthodontic treatment; b) requirement of appliance adjustments and reconstruction with growth change; c) trauma to teeth; and d) personal desire of the patient.

Three patients have been treated successfully in this manner. In each case the pharyngeal flaps were hinged superiorly at the inferior border of pharyngeal constriction, thus allowing the well-developed pharyngeal muscles to close against the lateral and posterior-superior surfaces of the flap. The same surgeon performed all of the operations.

#### *Case I*

The patient had a repaired bilateral cleft palate. At age five years, five months, the soft palate was judged to be short and limited in movement.

There was a visible pharyngeal ring of constriction, but palato-pharyngeal function for speech was felt to be inadequate. The patient had received approximately nine months of speech training. Her voice was severely hypernasal, and she made errors by distortion or substitution on 19 of the 25 consonants.

A speech appliance was placed at age five years, five months, and the patient continued in speech training. Four months later it was felt that the obturator was of little assistance for speech because the pharyngeal musculature was not approximating the obturator. The obturator was, therefore, subsequently enlarged four times over a period of eight months until the patient was able to achieve complete palato-pharyngeal seal for plosive and fricative sounds. Speech training continued.

Eleven months after enlargement of the obturator (age seven years, four months) the patient's voice and articulation were judged by two speech pathologists to be within normal limits and not calling unfavorable attention to itself. The patient was then placed on an obturator-reduction program during which the obturator was reduced in size by 1 to 2 mm every 60 to 90 days for a period of eight months.

The patient had developed an orthodontic problem and the speech appliance needed replacement. For these reasons, because the parents preferred it, a pharyngeal flap was considered as a substitute for the appliance. This surgery was postponed almost a year because of the illness and death of the plastic surgeon. The flap finally was attached when the patient was eight years 11 months of age or three and a half years after obtaining the obturator.

Speech was evaluated four and a half months post surgery and judged by two speech pathologists to be 'within normal limits' in voice and articulation. The parents felt that the patient's speech was slightly better than it had been with the obturator.

The exact amount of reduction of the obturator is unknown.

## *Case II*

This patient had a repaired cleft of the hard and soft palate. When evaluated at four years, three months of age, the voice was considered severely hypernasal and the articulation was markedly defective. The soft palate was considered short and virtually immobile during phonation. Pharyngeal movement was considered to be poor. A speech appliance was placed at that time, and the child received speech training at school. Two years later the appliance was replaced because of growth changes. At age eight years, 10 months, a third speech appliance was constructed because of growth changes. At that time the palate was found to be virtually immobile with only 'perceptible' movement detected in the lateral pharyngeal walls on phonation. No posterior wall movement was observed. The new obturator caused slight hyponasality but articulation was considered to be within normal limits by a speech pathologist. One month later, the patient was started on an obturator reduction program. The obturator was reduced in size, principally on the lateral aspects, on five separate occasions extending over a two-year period. Reductions were from 2 to 4 mm in the overall width. The total reduction in size of the obturator is estimated to be 10 to 12 mm.

The speech continued to be within normal limits. Using a nasal listening tube there was slight nasal resonance on /i/ and /u/ (as in *beet* and *boot*) and a

slight nasal 'snore' on some fricatives during the production of sentences. The soft palate still appeared to be immobile, but obvious lateral pharyngeal constriction was present.

Because the patient needed orthodontic treatment and because growth again had resulted in improper fitting of the appliance, a pharyngeal flap was performed at age 11 years, two months, as a substitute for the speech appliance. The flap was hinged superiorly.

Thirty-five days post-operatively the speech was judged by two speech pathologists to be within normal limits and was considered not to call unfavorable attention to itself. Using the nasal listening tube, virtually no nasal resonance occurred on /i/ and /u/, and virtually no nasal emission was present on fricatives. The voice quality appeared to be slightly better post-surgically.

### Case III

This patient was born with a palatal insufficiency. The soft palate was short and limited in movement. Apparently because of chronic nasal congestion associated with nasal allergy, his articulation had developed fairly well by the time he was seven, although it was not normal. The voice quality was severely hypernasal.

After a trial period of speech training a speech appliance was placed at 11 years of age. The palate still showed limited movement, but pharyngeal movement was judged to be good on phonation. Articulation was essentially normal, but severe nasality persisted. Speech training was continued in his school.

Three months later the obturator was enlarged in order to reduce a persistent nasal leak of air. This enlargement caused slight hyponasality on the three nasal sounds /m/, /n/, and /ŋ/ and there was still slight nasal resonance on /i/ and /u/. Six months thereafter the term *excellent pharyngeal constriction* was noted in the patient's chart.

Fifteen months after placement of the obturator the voice quality was judged by a speech pathologist to be within normal limits and the articulation normal. Using the nasal listening tube, slight nasal resonance could be detected on /i/ and /u/. The obturator was then reduced five times extending over a seven-month period. From 1.5 to 6 mm of material was removed each time from the lateral aspects of the appliance and between .7 and 1.5 mm was taken from the posterior border. The total extent of the reduction of the obturator in the lateral dimension was 17 mm, while 3.5 mm of material was removed from the posterior aspect. At this point the speech again was judged to be within normal limits. When the nasal listening tube was used, slight nasal resonance could be heard on /i/ and /u/ and a 'just perceptible' nasal leak occurred on /s/ and /z/, as in *see* and *zoo*, produced in sentences. Palate movement had shown no apparent change, but pharyngeal constriction during phonation was judged to be extreme.

The parents and the patient were eager to replace the speech appliance with a pharyngeal flap, and so 23 months after obtaining the obturator, a pharyngeal flap procedure was performed. The patient was then 13 years old.

Three months post-operatively voice quality and articulation were judged to be normal by two speech pathologists. Using the nasal listening tube, there was no nasal emission on any plosives or fricatives produced in sentences and no

nasal resonance on /i/ and /u/. A complicating factor with regard to the voice quality was the patient's nasal allergy. On some occasions nose drops had to be used to determine whether any of the hyponasality was related to the obturator or the pharyngeal flap. Residual hyponasality was determined to be mainly related to the nasal allergy.

### Summary

A point of view is suggested that speech prostheses need not necessarily be thought of as permanent devices for patients with palatal insufficiency. It is proposed that both a speech prosthesis and a pharyngeal flap may be compatible, at different times, in the same patient and that the assets of each may be utilized. A procedure is described for considering temporary obturation during the course of an obturator-reduction program, the purpose of which would be to develop pharyngeal constriction in order that a subsequent pharyngeal flap might more successfully be used. Three patients have been successfully managed in this manner. Courses of treatment for them are described.

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