A Study of Deformity Following Cleft Palate Repair in Patients with Normal Lip and Alveolus

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Dentists were among the first to express reservations about pushback techniques utilized by surgeons for cleft palate closures in infancy (*1, 2*). In addition to dental abnormalities, maxillary growth deficiencies were proved by careful cephalometric studies after repair by various mucoperiosteal flap methods, leading to recommendations for delay in repair until after age five (*3*).

The senior author utilized commonly accepted pushback techniques for fifteen years in cleft palate repairs, with patients and parents and surgeons usually quite happy with the results. The observations of Pruzansky and Slaughter (*4, 5*) produced new doubts about radical palate surgery, with blunt criticism from dental colleagues on the Butterworth Hospital Oral Cleft Team in 1964 leading to a virtual abandonment of pushback procedures.* A great deal of evidence has since accumulated implicating mucoperiosteal flap palate lengthening operation as a major cause of orofacial deformity in patients with clefts of lip, jaw, and palate when such repairs are accomplished within the first two years of life (*6, 7, 8, 9, 10*). In this study we wish to show the results of such palate lengthening procedures in patients who have had clefts *of the palate only*, with no involvement of lip or alveolus.

There is overwhelming evidence that patients with oral clefts who reach adulthood without surgical violation of the palate demonstrate no hypoplasia of the middle third of the face or collapse of the maxillary dental arch (*11, 12, 13, 14, 15*). Patients over fourteen years of age with cleft palate only who have had no repair serve as controls in our study (Figure 1).

Method

From a previous study of 309 patients receiving cleft palate surgery at Butterworth Hospital over a period of eleven years, we determined that most deformity in adult operated oral cleft patients is iatrogenic and not inherent in the cleft itself (*16*). However, we concluded that a more severe test of the

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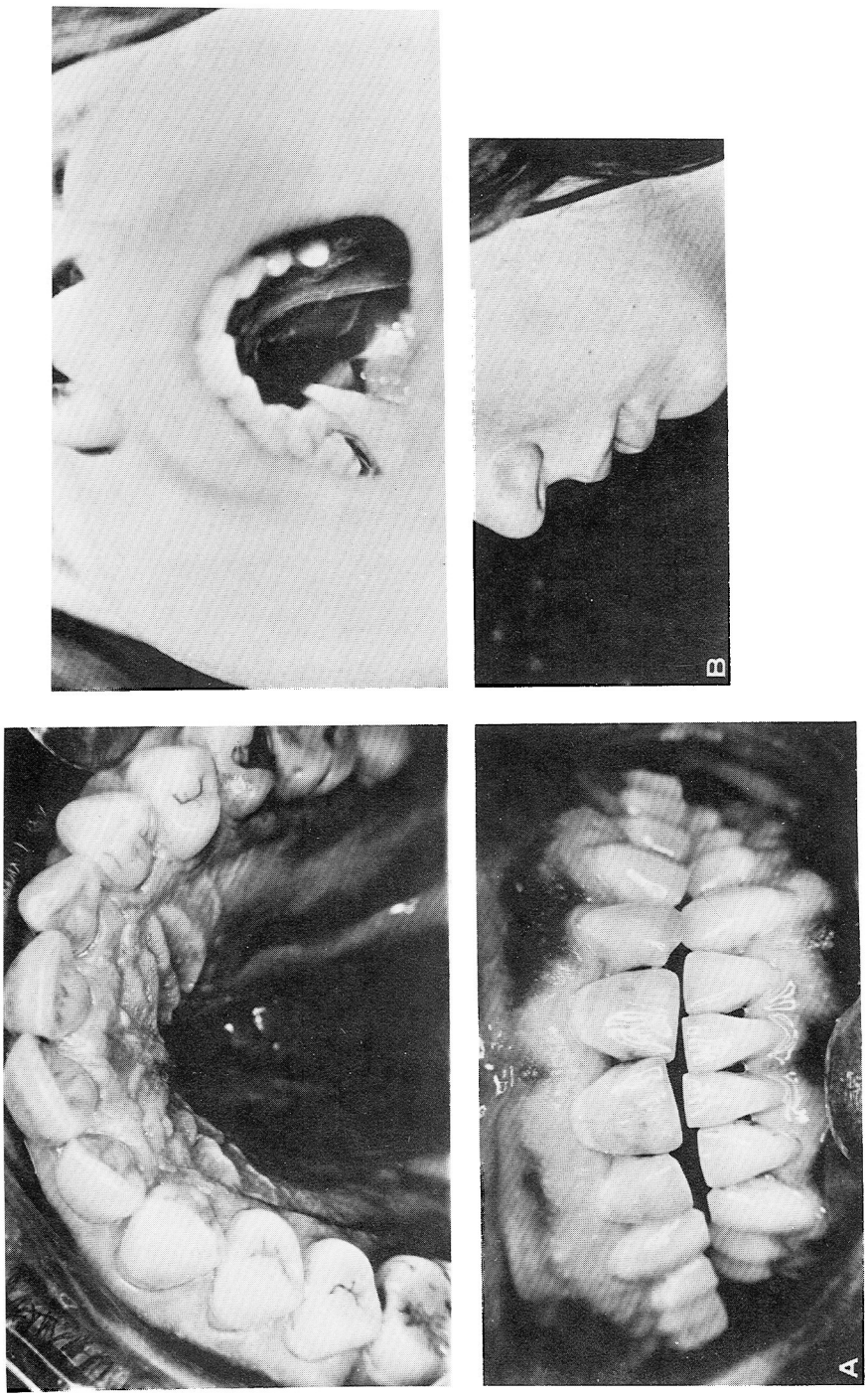

FIGURE 1A. Fifty-year-old male with unrepaired cleft of soft and hard palate having no orofacial deformity.

FIGURE 1B. Normal profile in twelve year old girl with large unrepaired cleft of hard and soft palate.

mucoperiosteal flap palate lengthening operation would be a study restricted to the clefts that did not involve the alveolar ridge or lip. In such cases, facial deformity or maxillary arch collapse would not be expected. We compared the unoperated oral cleft, the cleft palate treated by mucoperiosteal flap pushback techniques, and our very conservative "modified von Langenbeck repair." Deformities encountered could reasonably be attributed to the surgery and not to the birth defect itself. A much stronger force is required to produce deformity with the maxillary arch intact than when it is divided by a congenital cleft (*17, 18*).

The submucous cleft makes an especially ideal model for study of traditional pushback procedures since we do not expect to see hypoplasia of the middle third or collapse of the superior maxillary arch after surgical repair. We have, therefore, used this model to advantage in comparing a very conservative surgical repair without mucoperiosteal flap pushback with a commonly utilized palate lengthening procedure such as the Dorrance, Wardill, Millard-Edgerton island flap, and the von Langenbeck (which is not a pushback but involves radical elevation of mucoperiosteal flaps). In our series the most ideal model for comparison is the submucous cleft where the initial anatomical deformity is minimal.

Identical Twins

Our study was augmented by the inclusion of identical twins discovered at Johns Hopkins University with one twin afflicted at birth with a cleft soft palate described in the record as Type II and the second twin completely normal. At age twenty-two months the afflicted twin had a palatoplasty utilizing a circumareolar Wilson-type incision with elevation of the mucoperiosteum of the entire palate, mobilizing the greater palatine vessels for two-thirds of their length. A z-plasty was performed in the nasal mucosa and the mucoperiosteal flap was sutured to the leading edge of the hard palate. Both pterygoid hamuli were infractured. An excellent pushback without tension was thus obtained.

This patient was followed carefully in the Facial Rehabilitation Center at the Children's Hospital. Speech described as "markedly nasal" was first treated by a prosthetic appliance which was subsequently discarded in favor of speech therapy. The patient evidenced a mild bilateral hearing loss with air bone gap at all frequencies. An anterior cross bite of the right posterior segment was in evidence by age five. At age seven she was recommended for orthodontia and a pharyngeal flap was suggested for nasal emission, but was not done. At age eleven the recommendation was made for possible extractions due to excessive dental crowding and orthodontia for cross bite. She was one year behind her sister in school, and hypoplasia of the middle third of the face with asymmetry was evident (Figure 2). It is interesting to note that a three-year-old nephew with a cleft soft palate had received no treatment due to refusal by parents to submit their child for surgery.

The Study

We reviewed all cases of cleft palate, including minimal submucous clefts, seen at Butterworth Hospital over an eleven-year period (1963–1974). A total of 102

FIGURE 2

patients with cleft palate but without a cleft of lip or jaw were found. Of these, 29 patients were rejected from the study because follow-up records were inadequate. The remaining 73 cases form the basis for this report, with 47 patients having a cleft palate and 26 separately classified as submucous clefts.

RADICAL SURGERY. Twenty-five patients with a cleft palate had been subjected to mucoperiosteal flap elevations for palate lengthening including all the operative procedures listed above and variations of them. Nineteen out of twenty-five of these patients developed orofacial deformity for a 76 per cent rate. Problems with cross bite and occlusal failures were most common, with a contracting scar limiting normal growth of the arch and lingual displacement of posterior teeth. Of these nineteen patients, two had hypoplasia of the middle third of the face and seventeen evidencing a significant collapse of the maxillary dental arch.

Nine patients with a submucous cleft had undergone mucoperiosteal flap pushback palatoplasty, with seven of the nine evidencing deformity (77%). One of these patients showed hypoplasia of the middle third of the face and the other six evidenced collapse of the maxillary dental arch (Figures 3, 4, 5).

CONSERVATIVE SURGERY. Twelve patients with a cleft palate and eleven with a submucous cleft had undergone a very conservative modified von Langenbeck palatoplasty (Figure 6). These repairs were performed at age 18–24 months with no attempt made to increase the length of the palate by either pushback or island flap. Surgical technique involved a small, curved, lazy-z incision made around the posterior alveolar ridge to give access to the hamulus, which is usually divided. The cleft is incised slightly more on the oral than on the nasal side to further simplify nasal closure. No mucosa is excised. No exposure or interruption of the posterior or palatine vessels is required. The fibers of the posterior palatine aponeurosis are exposed and accurately divided to effect a modest lengthening on the nasal side with a gentle elevation of periosteum at the ex-

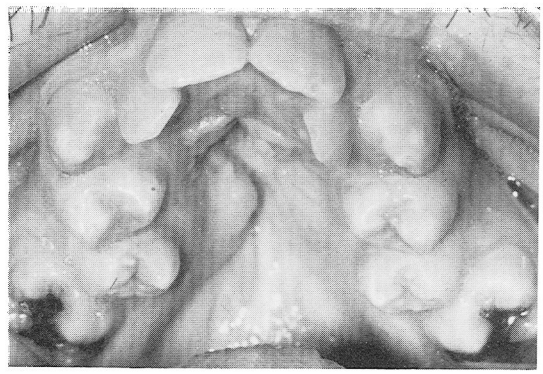

FIGURE 3. Fifteen-year-old patient born with cleft soft palate repaired at age 1½ by pushback showing characteristic dental deformity.

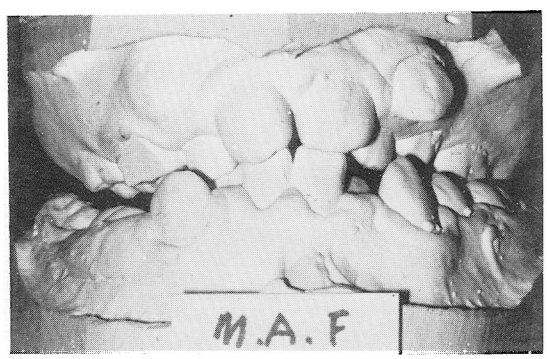

FIGURE 4. Twelve-year-old born with cleft soft palate repaired by V-Y pushback combined with pharyngeal flap age 1½ years eventuating in malocclusion with anterior crossbite.

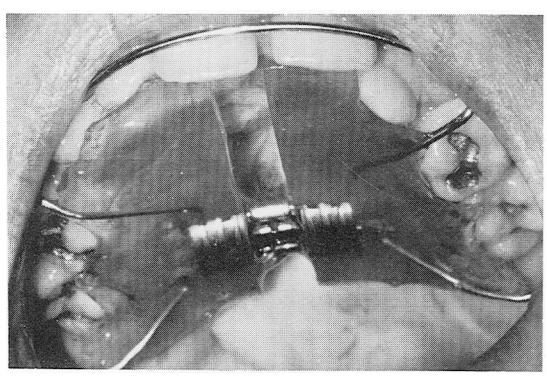

FIGURE 5. Thirteen-year-old patient with submucous cleft repair by Millard pushback age six years resulting in dental disfigurement requiring spreader device for correction.

treme posterior margin of the hard palate in some cases. Average length of stay after surgery is two days. In this group, none gave evidence of hypoplasia of the middle third or collapse of the maxillary dental arch (Figure 7).

UNKNOWN SURGERY. Nine patients with a cleft palate but intact lip and alveolar arch had received palatoplasties in infancies but it could not be determined exactly the type of palatoplasty performed. Four of these patients evidenced facial deformity (44%), each case showing some measure of collapse of the maxillary dental arch. Findings in these groups are exhibited graphically (Table 1 & 2).

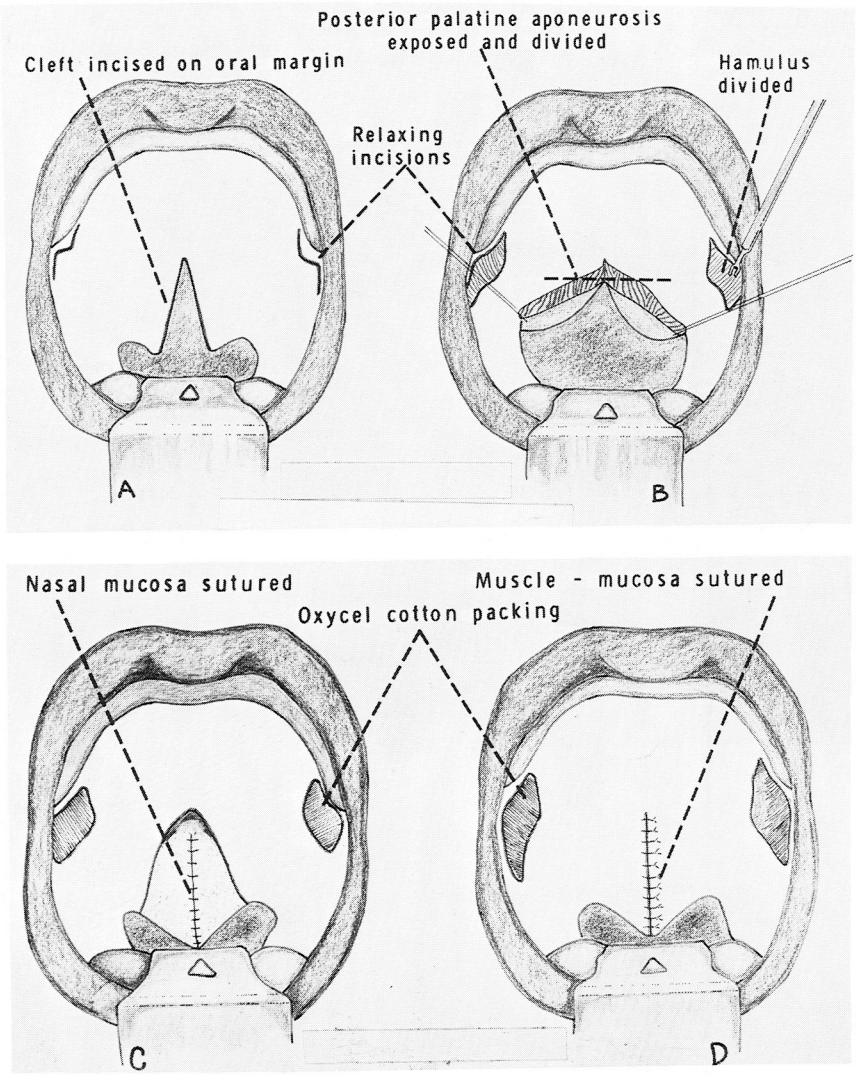

FIGURE 6. Conservative palatoplasty by "very modified von Langenbeck procedure". A. Lazy-Z incision posterior to arch. B. Incised cleft margin with posterior palatine aponeurosis divided. C. Repair of nasal mucosa. D. Repair of muscle and oral mucosa.

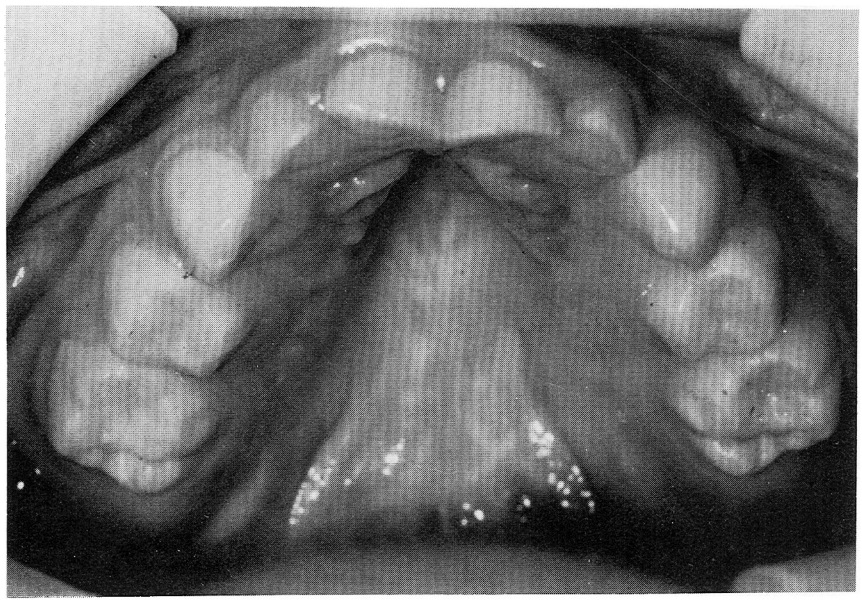

FIGURE 7. Cleft of hard and soft palate repaired at age 22 months by conservative modified von Langenbeck with normal arch at age 6.

CLEFT PALATE ONLY

Procedure	*Deformity*	*No Deformity*
Conservative	0 (0%)	12 (100%)
Radical	19 (76%)	6 (24%)
Unknown	4 (44%)	5 (55%)

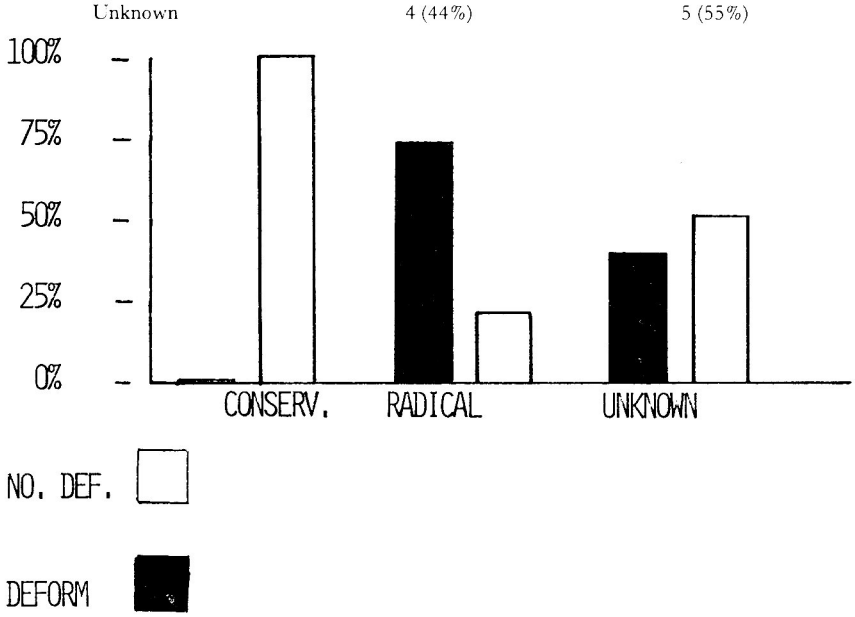

TABLE 1. Comparative summary of results of "radical" versus "conservative" palatoplasty with intact alveolar arch.

CONTROLS. Patients who were presented to us for repair of their cleft palate, aged fourteen or more, became the control group, since it is generally accepted that by this age the growth in width of the maxilla is complete and the growth in height nearly complete. The control group contained seven patients, six of them unoperated submucous cleft palates having nasal emission in speech. In none of these control patients did we find deformity in the middle third of the face or maxillary dental arch collapse (Table 3).

Conclusions and Recommendations

There is no questions at all that many patients having traditional pushback cleft palate repairs achieve excellent results both functionally and cosmetically. Some of our early patients who had received the more radical mucoperiosteal flap corrections could not be distinguished from those who had received a conservative modified von Langenbeck technique. Nevertheless, our review of patients with cleft palate having an intact lip and alveolar arch led us to the inevitable conclusion that elevation of mucoperiosteal flaps utilizing traditional techniques prior to the age of two years is the primary causative factor in orofacial deformity in adult life. In our group we have occasionally discharged patients for whom we had successfully "closed the hole" and who had achieved substantially normal speech, leaving problems of contracted alveolar arch to the

SUBMUCOUS CLEFT PALATE

Procedure	*Deformity*	*No Deformity*
Conservative	0 (0%)	11 (100%)
Radical	7 (77%)	2 (22%)

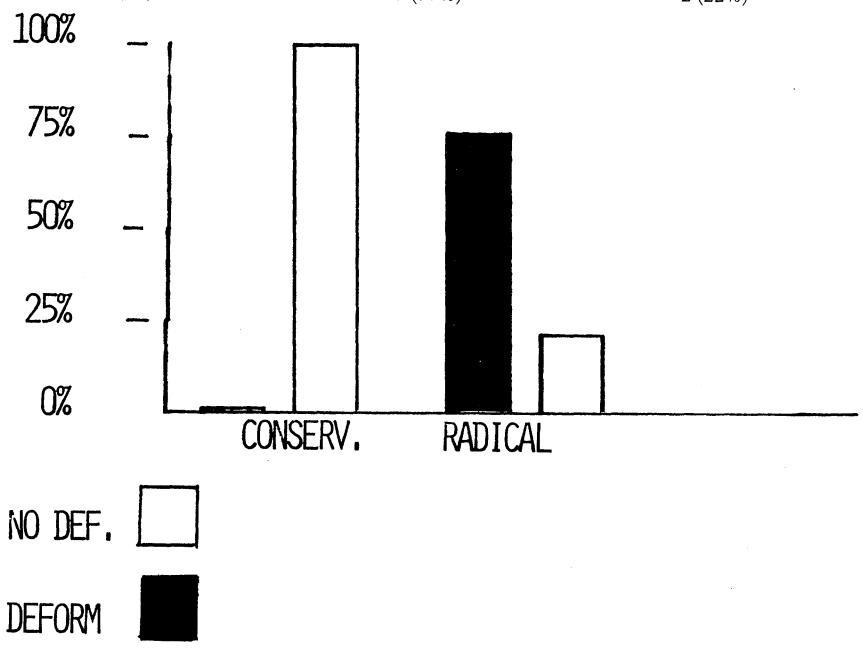

TABLE 2. Comparative summary after submucous cleft palate repairs.

TABLE 3. Control group made up of unoperated cases over 14 years of age.

	CONTROL GROUP	
Problem	*Deformity*	*No Deformity*
Cleft palate	0	1
Submucous Cleft	0	6

dentist in later life without our always understanding the extent of that deformity.

Our studies have indicated that the advantage in length of the more radical pushback procedures does not eventuate in better speech than the conservative operation where no significant palate lengthening is accomplished. In our series a measure of velopharyngeal incompetence was as common after pushback procedures as after the conservative operation (53% vs 49%). It is true that our standards of perfection have become more rigid over the years both in maxillary and dental development evaluation and speech performance. Certainly our objective should be a totally normal teenager, but we must be willing to delay any radical surgical procedures on the palate in infancy to achieve this objective. We have determined to delay all procedures on the hard palate until at least age five, and it is surprising how frequently physiologic closure of this structure has occurred by this age when the soft palate repair has been performed earlier. We have no hesitation in performing a superiorly-based pharyngeal flap where indicated after age three since the technique we have been using has shown a complication rate under 3 per cent in a recent study of 196 consecutive pharyngeal flaps. This study showed no flap detachments, no mortality, no tracheostomies, one hemorrhage after return home corrected by readmission to the hospital and return to surgery. A detailed report on this series is forthcoming.

It is our judgment that the combination of a conservative closure of the palate cleft, combined with a pharyngeal flap or teflon posterior pharyngeal implant to correct nasal emission where indicated will eventuate in the highest percentage of normal speech and freedom from orofacial deformity.

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