

# Should the Pharyngeal Flap be Used Primarily with Palatoplasty?

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## Introduction

It is my contention that the pharyngeal flap should be used as a primary procedure with palatoplasty in certain given situations. This idea was first advanced by Dr. Richard Stark because he felt that the primary pharyngeal flap functioned in several ways (10). The first function that he suggested was a tethering of the velum posteriorward, increasing the length of the soft palate with growth, in a manner akin to the rapid growth of the prolabium in the bilateral cleft lip. The second function was a compensating coaptation of the velum by the pharyngeal flap to the posterior pharyngeal wall as demonstrated by cineradiography. The third function related to the superior constrictor hemi-sphincter, which squeezed against the pharyngeal flap in a side to side motion.

Millard in a rather extensive review of flap surgery decried the "shot-gun" therapy of palate clefts with a load of posterior pharyngeal flap without selection. He suggested, however, that in wide palate clefts pharyngeal flaps may be indicated primarily (4).

Certainly it would seem that in selected cases where the palate cleft is wide or there is a short soft palate, the initial closure could be improved with augmentation from a wide pharyngeal flap. Bzock pointed out the dilemma of selecting the width of the pharyngeal flap for it tends to diminish in size with the passage of time but if it is too wide initially then hyponasality and breathing problems occur (1).

Unfortunately, it is usually two or three years after the initial repair before speech testing may reveal inadequate palatal function. Valuable time has been lost and many speech errors have to be overcome by intensive speech therapy or a dental prosthesis or both. If a primary pharyngeal flap has not been carried out with the initial palate closure, then a secondary flap may even be required to solve the problem.

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**Material and Findings**

We have undertaken a study of some fifty patients with cleft palates. Thirty of these had clefts involving the secondary palate only. Over two-thirds of these patients had their clefts repaired with a V-Y palatoplasty, and the remaining number were closed with a combination V-Y palatoplasty and primary pharyngeal flap. Twenty patients had a more extensive cleft, with involvement of both the primary and secondary palate. In this group of cleft children, the majority, or sixty percent, were repaired with a combination V-Y palatoplasty and pharyngeal flap.

It is interesting that a larger number of postoperative complications were associated with the group requiring only a V-Y palatoplasty. There were ten patients in this group with six complications relating to wound healing of the repair. Breakdown or dehiscence and fistulae were directly attributable to infection in four cases and possibly to excessive tension in the other two repairs. Postoperative persistent fever occurred in two patients that was possibly virus related. Another patient had prolonged laryngeal edema that did not require a tracheostomy. The last of the ten patients with a complication in this group had postoperative bleeding that required a re-exploration to control.

A smaller number of postoperative complications occurred in the combined palatoplasty with pharyngeal flap. There were only two complications, but the two problems were life threatening. One patient bled, then developed fever and pneumonia. Two days postoperatively the patient required a temporary tracheostomy. The other patient developed an infection associated with staphylococcus aureus pneumonia. Six months after the initial repair, the patient underwent a tracheostomy and revision of the pharyngeal flap because of airway problems relating to pneumonitis.

Late complications again were higher for the V-Y palatoplasty operation. Seven of these patients had two or more bouts of otitis media and three of them developed small palato-nasal fistulae. Four patients with a palatoplasty and primary pharyngeal flap had a residual anterior palato-nasal cleft, while only one patient was diagnosed as having purulent recurrent otitis media.

**Speech and Hearing Results**

A longitudinal speech analysis was carried out on only twenty clefts for many of the patients in the total series were too young or had not been followed long enough. Ten (10) of these patients were closed with a primary pharyngeal flap, while the other ten had no pharyngeal flap with their initial V-Y push-back palatoplasty. Both groups were similar in age ranging from five to eleven years and had had their initial operation when they were from twelve to eighteen months after birth. The two groups also had a similar distribution of the various types of cleft deformities. They had been followed by the same members of the cleft palate team at the

University of Missouri Medical Center over a period of nine years, from 1962 to 1971. All of the patients were evaluated by the multidiscipline team during the regularly scheduled clinic sessions; the team concept as described by Wells (12). The speech evaluation was carried out by three or more speech pathologists in the clinic and by a separate and unique method in the home of most of the patients.

Our clinic study showed that articulatory errors occurred in both groups of patients with about the same frequency, but hypernasality was less common in the primary pharyngeal flap group.

Nasality is shown in bar-graph form in Figures 1, 2 and 3, with each bar representing a single patient. Figure 1 shows the relationship of age to nasality and the larger number of non-flap clefts that were recommended for speech therapy. Figure 2 shows the relationship of the type of cleft to nasality and again demonstrates that the non-flap group was recommended for speech therapy more often. The home environment study suggested that cooperation of the parents in following out the recommendations made by the "team" was the most significant factor in the resulting speech.

Other evaluations were carried out, including videofluorography which was reviewed by the multidiscipline team before each child was formally presented. Videofluorographic findings tended to confirm the functional superiority of the primary pharyngeal flap group. Hot-wire flowmeter or nasal anometer recordings indicated there were individual patients in both groups that demonstrated normal speaker ratios, but cleft palate speaker

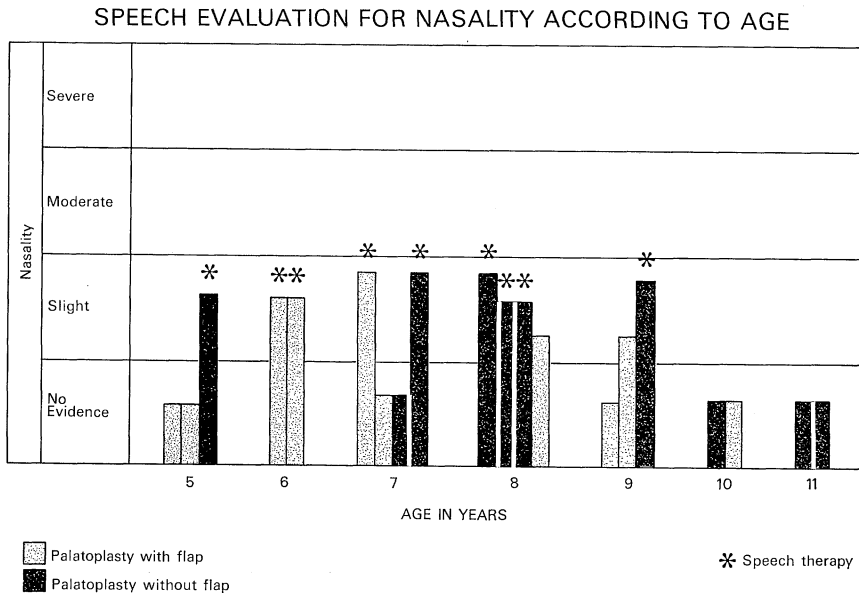


FIGURE 1

# SPEECH EVALUATION FOR NASALITY ACCORDING TO TYPE OF CLEFT

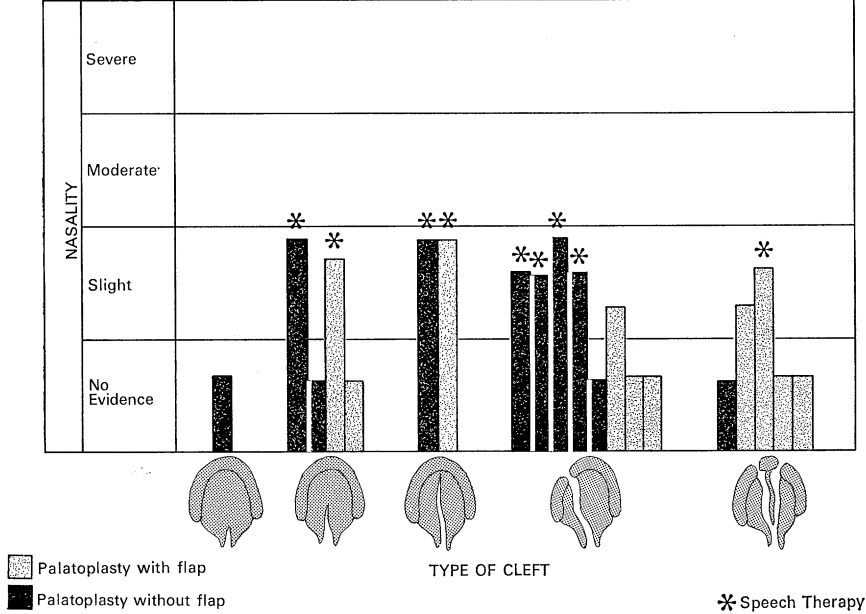


FIGURE 2

# HEARING LOSS

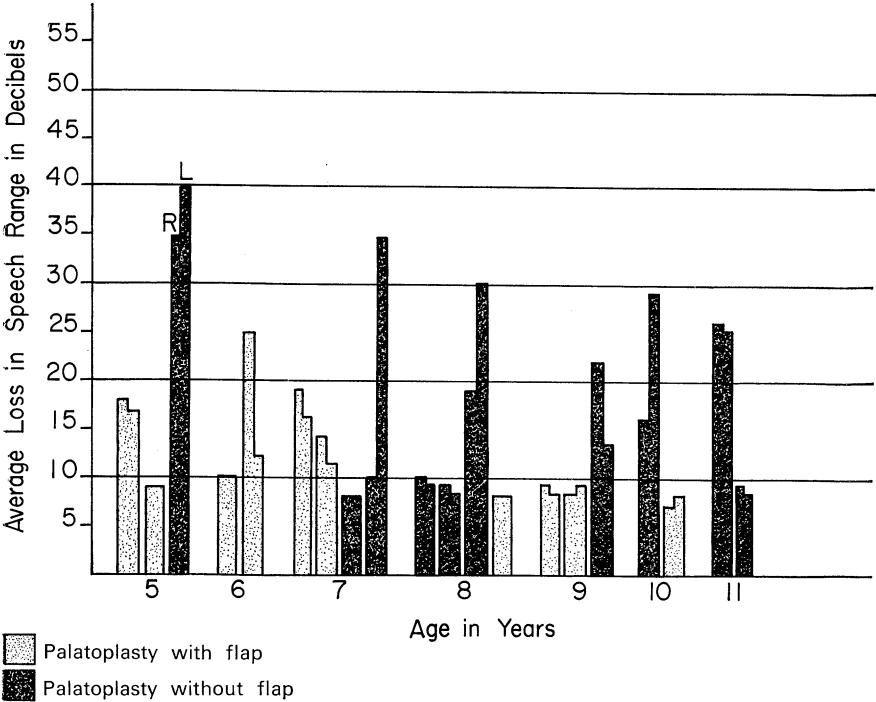


FIGURE 3

ratios predominated in both groups on vowel sounds. The consonant "n" sound was similar to the normal speaker ratio in both groups, but the consonant "s" sound demonstrated cleft palate speaker ratios in about half of each group.

Another method by which we attempted to evaluate the two groups was the multidiscipline clinics recommendations for further speech therapy. Six of the non-flap group and three of the primary pharyngeal flap were recommended for further speech therapy. Three of the non-flap group required the use of speech bulb prosthesis, but one of these had no significant change in his speech with the bulb removed. Four of the primary flap group and two of the non-flap group wore orthodontic appliances.

Probably the most surprising finding was the audiometric and otologic evaluation. All of the primary pharyngeal flap group were considered to have essentially normal hearing; whereas, five or fifty percent of the non-flap group had measurable hearing loss of a mild degree in the speech range. Refer to Figure 3.

Cephalometry was carried out in these patients to discern growth deviations but enough data has not been obtained in this longitudinal study to draw any conclusions.

## Discussion

Should the pharyngeal flap be used primarily with palatoplasty? Stark formulated three premises to justify the primary use of the pharyngeal flap. First, he felt there was a paucity of mesoderm and muscular tissue that logically required the addition of tissue. Second, he felt that the pharyngoplasty narrowed the pharyngeal aperture which reduced the nasal escape of the air column. Third and last, he stated that the open cleft of the palate presented the plastic surgeon with the best opportunity to develop and elevate the pharyngeal flap (9).

Cleveland and Falk suggested that there were certain types of cleft that necessitated the use of pharyngeal flaps if acceptable speech was to be obtained; i.e., the post-alveolar cleft, the congenitally short palate and the submucous cleft (2).

In a series of thirty-seven patients with primary flaps, Cox and Silverstein failed to detect any degree of palate breakdown or fistulae formation (3). Although breakdown and fistulae was more common in our series of patients that were closed with just the V-Y palatoplasty, there was a residual cleft anteriorly where no attempt had been made for closure with palatoplasty and primary flap. Their speech evaluation on sixteen (16) patients with primary flap showed good results for consonants and vowels.

Morris and Spriestersbach felt that successful speech results were probably related more to the mesial movement of the lateral pharyngeal wall than the actual movement of the palatal flap (5). We found mesial movement difficult to visualize with the methods of evaluating speech that

were used in our series but with videofluoroscopic multiple views as described by Skolnick and McCall (7), apparently this can be accomplished.

There was agreement, however, with Joanne Subtelny that pharyngeal flap valving during speech did seem to control breath stream and thereby reduce the nasal resonance (11). Nasal resonance was less common in our primary flap group.

Sherman concluded that there was a moderate tendency for degree of nasality to be related to degree of articulation defectiveness (6) and this phenomenon was consistently found in our series. We did not allow ourselves or other surgeons to evaluate nasality and articulation but followed the recommendation of Yules and Chase (13) who suggested that qualified speech pathologists perform this function.

Lastly, Skoog found the hearing to be improved in five to ten year olds that underwent pharyngeal flap operations (8). Our patients were operated much earlier around twelve to eighteen months and those patients with primary flaps had essentially normal hearing. The same could not be said of the non-flap palatoplasty group, for their hearing loss was measurable to a mild degree in fifty percent of the cases.

### Summary

In certain selected cleft problems, palatoplasty with a primary pharyngeal flap seems indicated. The selection is made at the time of the operation and relates to the amount of tension on the closure as well as palatal length.

Primary pharyngeal flap was elected twenty-two times out of fifty cases and was more commonly used in the complete unilateral and bilateral cleft problems. The incidence of operative and late complications associated with its use was quite low. There was no mortality in the series.

The comparison of twenty V-Y palatoplasties, ten with and ten without primary pharyngeal flaps, utilizing three speech pathologists, videofluorography, hot wire anemeter studies and audiograms showed a significant difference in hearing loss, this being less in the pharyngeal flap group. Hypernasality was also less in the pharyngeal flap group.

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