

The Case for the Inferiorly Based Posterior Pharyngeal Flap

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The superiorly based and inferiorly based posterior pharyngeal flaps are compared. Reasons for choosing one or the other in specific cases are given. The complications with each are enumerated. The results obtained in speech comparing the two flaps in two retrospective series and one prospective series of cases failed to show a significant difference between them. Therefore, with little difference in the results and some good reasons for preferring one or the other under certain conditions, it would seem logical to select the one best suited for the particular problem.

Introduction

In the Western Hemisphere, the superiorly based posterior pharyngeal flap (PPF) appears to be the operation preferred by most surgeons for velopharyngeal incompetence and also for the occasion when a "primary" posterior pharyngeal flap is used at the time of the initial soft palate repair (Grabb 1971, Stark 1960). There are good reasons for this preference, and indeed, the authors prefer the superiorly based PPF for most of their cases. We also feel that there are advantages to be considered for the inferiorly based posterior pharyngeal flap, and hence, some cases where the inferiorly based flap would be preferred. Rather than discard its use altogether, it is suggested that these two flaps can be used selectively—each with its individual indications.

In addition, it is noted that, in three series of cases that have been published comparing these two flaps, there has been a negligible difference between them. Two of these series were retrospective and one was prospective.

This paper attempts to discuss only the

advantages and disadvantages of these two types of posterior pharyngeal flaps. Obviously, additional procedures such as lengthening operations and levator reconstruction operations can be important in improving palatal function (though little data exist to show this). However, unless each individual operation can be isolated and studied without other procedures having been done, it is impossible to compare the results.

History

It is interesting to reflect that Professor Schoenborn described the use of a 2 × 5 cm. inferiorly based posterior pharyngeal flap in a 17-year-old girl for velopharyngeal incompetence and published his results more than 100 years ago (Schoenborn 1876). He noted that Passavant had tried four different operations for this problem which he further described in detail.

The operation was sparsely done until about 1924 when Rosenthal popularized the procedure. In 1934 Sanvanero-Roselli in Milan, Italy, described and advocated the superiorly based flap. However, it was the inferiorly based flap which was done in this country by Padgett in 1930. By 1936, he had operated on 68 patients reporting a marked improvement in 10, fair in 27, some in 18, and none in four (Padgett 1936, Rees 1964). More recently, the theoretical advantages of the superiorly based flap have been noted and

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supported by many so that the inferiorly based flap has been virtually discarded (Curtin 1973, Georgiade 1974, Owsley 1970, Yules 1970, 1971). Even though good comparative studies have not borne out the prediction of the superiority of the superiorly based flap, it is used far more widely at the present time.

Advantages of the Superiorly Based Flap

One advantage of the superiorly based flap is that, with a higher base, contraction of the flap tends to be in the direction of the inferior edge of the adenoid pad at a point higher than that achieved with the inferiorly based flap and closer to the usual point of contact between the palate and the posterior pharynx. A longer flap can be obtained if a flap is based superiorly than if based inferiorly, making it more useful when the distance between palate and pharynx is great. This is because the length of the inferiorly based flap is limited by the inferior edge of the adenoid pad. The superiorly based flap, on the other hand, can be extended literally as far as one can reach. Insertion of the flap can be achieved at a higher point closer to the posterior edge of the hard palate when it is based superiorly, thus augmenting the bulk of the levator eminence.

Disadvantages of the Superiorly Based Flap

It is very difficult to achieve a high insertion of the flap and to raise a mucosal flap from the nasal side of the soft palate without incising the palate longitudinally through the entire thickness of mucosa and muscle. We are aware that unlined flaps have been useful in some instances but prefer to provide mucosal lining for both the superiorly and inferiorly based flap to reduce the tendency of shrinkage, to promote healing, and to minimize the problem of secondary bleeding. Any such incision through the soft palate carries with it the potential of scar contraction and further diminution of the excursion and flexibility of a structure which is already inadequate for its intended function.

Advantages of the Inferiorly Based Flap

We find the operation of the inferiorly based flap to be easier and exposure for the inferiorly based flap to be more satisfactory. These factors are of importance in patients with jaw deformities such as those with

Treacher-Collins syndrome, or with the Pierre Robin anomaly, as well as those with limited temporomandibular joint excursion. They apply also to patients who are poor operative risks such as those with cyanotic congenital heart disease and those who are not doing well under anesthesia. In addition it includes those patients often seen in developing countries who are poorly nourished. Under these conditions, it would be safer to choose an easier and shorter operation than to do a more difficult and prolonged one.

Most important—as noted above—we are reluctant to add another longitudinal incision through the muscles of the soft palate if it is not needed. This applies particularly to those palates which are moving well, though inadequately. On the other hand, if the palate has very poor motion so that most of the velopharyngeal valving is achieved by overactivity of the superior pharyngeal constrictor muscles, we would be less reluctant to incise through the palate.

In addition, some posterior pharyngeal flaps after healing need to be revised either because the lateral ports are too small and are producing hyponasality and nasorespiratory obstruction or because they are too large making the flap inadequate to correct the velopharyngeal incompetence. In either case, it is far easier to revise the lateral ports of the inferiorly based flap than those of the superiorly based flap because the latter are up behind the palate and much more difficult to reach.

There is also some feeling that the inferiorly based flap will direct the air stream into the mouth more efficiently and act as a “sounding board” which would be more effective in reducing hypernasality. In addition, Skolnick has noted a wide variety between both normal subjects and children with clefts as to the site of maximum lateral wall excursion (Skolnick 1973). Because the medial movement of the lateral pharyngeal wall seems to achieve significant valving in many of these cases, the maximum excursion might well be at the site of the inferiorly based flap rather than the superiorly based one.

Disadvantages of the Inferiorly Based Flap

The inferiorly based flap of necessity is shorter, so it cannot be used when a wide gap needs to be bridged. Additionally, the infe-

riorly based flap sometimes assumes a downward and posterior direction and seems to tether the natural upward and posterior excursion of the soft palate. However, many authors have noted that both the superiorly and inferiorly based flaps tend to approximate the same point on the posterior pharyngeal wall as they heal, so that at times it may be difficult to determine whether the flap in a given patient has been superiorly or inferiorly based.

In addition its attachment on the oral side of the soft palate or into the free edge of the soft palate is not likely to add much bulk in the region of the levator eminence such as is seen with a superiorly based flap.

Factors Influencing a Choice

In deciding which way to base a posterior pharyngeal flap, the authors consider the distance between the soft palate and the posterior pharyngeal wall, the amount of excursion of the soft palate, the amount and site of maximum lateral wall movement, the presence or absence of conditions such as jaw deformities which might limit excursion, and thus diminish surgical exposure, as well as the presence or absence of factors which might render the patient a poor operative risk.

With these factors in mind, we prefer the superiorly based flap in most cases and particularly if there is a great distance between the soft palate and the posterior pharynx. In fact, it is a necessity in these patients, since the inferiorly based flap simply cannot reach the soft palate. We prefer the superiorly based flap as a primary posterior pharyngeal flap when it is felt that it is needed as part of the initial repair to the soft palate. It is also preferred in those patients who are good operative risks with good surgical exposure and in whom an additional incision in the muscles of the soft palate will not critically interfere with whatever function they already have.

Contrarily, the inferiorly based flap is preferred in those patients in whom the exposure is poor or who are poor operative risks. It is also preferred when there is very good palatal excursion and movement, and additionally, in those patients in whom hypernasality is severe and out of proportion to problems of articulation and nasal escape. This situation is often seen in older patients. This is based

simply on the theory that the inferiorly based flap does have a better "sounding board" effect in reducing hypernasality. Under these conditions, we also tend to agree with Hogan's suggestions that the lateral ports be made extremely small, thus, in effect, overcorrecting the problem (Hogan, 1973). Interestingly, these patients are also the very ones who are likely to require a second revision to adjust the lateral ports, either larger or smaller, and if so, the inferiorly based flap is more accessible for such a maneuver.

Discussion

It is a bit confusing to see surgeons consistently stating a preference for one operation over another when there exist good data showing virtually no difference between them. In 1965, Skoog of Uppsala, Sweden, reported in a retrospective study of 82 patients in which 49 had a superiorly based flap and 33 had an inferiorly based flap, that he was unable to demonstrate any significant difference in either the short or long-term effects between these two flaps. In 1970, Hamlen of Toronto, Canada, reported another retrospective study of 91 patients of which the flaps were based superiorly in 64 cases, and inferiorly in 27 cases, and reached essentially the same conclusion.

In 1972, Whitaker, Randall, et al., in a prospective randomized series of 35 patients again reported essentially the same thing. It should further be noted that this later series did not include a minority number of patients in whom either a superiorly or inferiorly based flap was selected for one or more of the reasons already discussed in this paper.

In 1973, Graham, Hamilton, Randall, et al., report the complications in 222 patients with posterior pharyngeal flaps from the Children's Hospital in Philadelphia. One hundred and nine of these flaps were superiorly based; 98 were inferiorly based; and 15 were unknown. Dehiscence was recorded in 13 cases where the flap was based inferiorly, as opposed to only four cases superiorly based. However, it should be pointed out that it is often difficult to see the superiorly based flap postoperatively and dehiscence could well occur under these conditions without being observed. In 12 patients with severe, persistent postoperative nasal obstruction, eight had

had superiorly based flaps, and in four, the flap had been based inferiorly. In seven patients who required tracheostomy postoperatively for acute respiratory obstruction, six had had superiorly based flaps, and one had had an inferiorly based flap.

Conclusion

Though most surgeons—including the authors—presently prefer the superiorly based posterior pharyngeal flap for correction of velopharyngeal incompetence and also as a primary flap at the time of the initial cleft palate repair in some patients, we feel that there are a number of specific indications for the preference of the inferiorly based flap. Data from two retrospective and one prospective study comparing the results obtained with these two flaps have shown no significant difference. Data comparing complications with each are also noted.

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