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Special Topic:

Cleft Palate Repair

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From cosmetic viewpoint cleft palate repair may not be as important as cleft lip repair but later in life speech problems due to faulty speech habits, immobile-scarred palate or VPI due to other reasons may become a major problem in rehabilitation. Not only this, the cosmetic problems due hypoplasic maxilla and dental problems that appears later in life following a bad palate repair may be more distressing and difficult to treat than secondary cleft lip repair. At present the important goals of palate repair are:

1. To avoid unnecessary scarring (dental problems) and maxillary growth problem (correct timing of repair and less traumatic technique)
2. To avoid speech problems (correct timing of repair, lengthening of palate, post-operative speech therapy)
3. To reduce complications like hemorrhage and fistula formation

Various methods commonly used methods for palate repair are:

- Two-flap palatoplasty without palatal lengthening (Von Langenbeck, Two single pedicle flap)
- Two-flap palatoplasty with palatal lengthening (Push back palatoplasty or combined with double opposing Z - plasty of the soft palate)
- Single flap palatoplasty (Dorrance type of repair)

After closely observing more than 1,000 cleft palate repairs (including adult cleft palate cases), I can safely say that distant tissue to repair cleft is very rarely required (none of the our cases required distant flaps out side the oral cavity).

Von Lagenbech's procedure utilizes two bipedicled mucoperiosteal flaps to close oral layer. One may have difficulty in moving the flap near the pedicles and during the dissection near hard and soft palate junction, dissection of the greater palatine pedicle, and dissection and detachment of soft palate muscle due to limited exposure because of two attachments of the flaps. This may increase the chances of complications. Though my experience with this procedure is limited since there is no distal edge of the flap, I expect reduced chances of post-operative hemorrhage.

The disadvantages of the Von Langenbech's procedure is effectively tackled by raising two greater palatine vessels based flaps. Suturing the anterior edge of the flap near its original position will reduce chances of anterior fistula formation but prevents any lengthening of the soft palate. For convenience of description 'two-flap technique' will be used for this single pedicle procedure that does not lengthen the palate.

Veau-Wardill-Kilner push back palatoplasty effectively utilizes the advantages of two-flap technique. Two additional advantages (aiming at speech improvement) over two-flap technique without push back are intravelar veloplasty and lengthening of the palate by "V-Y" plasty at the anterior edge of the flap.

Nasal lining lengthening may be achieved on operation table by making a transverse cut over it and leaving the defect to heal by fibrosis. Doubts have been expressed about its effectiveness after healing by fibrosis. Mukherjee Cheek flaps have achieved lengthening of the oral and nasal linings.

Furlow's double opposing Z - plasty over soft palate may be combined with two-flap technique to achieve effective palatal lengthening and proper muscle alignment. The difficulty faced in executing this procedure is the excessive tension at the tips of Z - flaps and sometimes (wide gap) failure to close the defect laterally.

Dorrance procedure, which has been advised for sub mucous cleft palate starts with raising single posteriorly based mucoperiosteal flap after making horseshoe shaped incision over hard palate. There is no clear-cut advantage over two-flap technique. The dissection may be difficult in midline.

Often it is possible to close soft palate at the time of the initial lip repair (3 to 4 months of age). The points in favor of this as given by its proponents are less chances of airway problem in immediate post-operative period due to staged palatal surgery, marked marrowing of hard palate cleft and hence easy repair of hard palate cleft at a later date (usually 6-7 years of age), and better long term result due to less chances of growth disturbance. During waiting period after soft palate closure, a dental obturator is used to temporarily obliterate the hard palate cleft. The main draw back is in managing the obturator and increased chances of speech problems. In our steup, we hardly encounter any cleft palate which we fail to repair and over all fistula rate is within acceptable limits. Without raising the muooperiosteal flap from hard palate, proper dissection of soft palate muscles may not be possible. Maxillary growth problem after palate repair at 1½ yrs is less troubling than speech problem due faulty habits after delayed hard palate closure. Hence, at present we do not recommend delayed hard palate closure, though there is renewed interest in delayed hard palate closure protocol.

Based on my experience I would advise following procedure for cleft palate repair in different situations:

1. *Sub mucous cleft palate and incomplete soft palate cleft:* Furlow's double opposing Z plasty technique (advantage being no raw area by the side of dental arch and minimum bone growth problem)
2. *Cleft palate up to incisive foramen:* Veau-Wardill-Kilner pushback palatoplasty (Only disadvantage is scarring along the dental arch; this may be avoided by preventing infection in post-operative period / closure of the side defect by compromising contact between oral and nasal layers, however, later on due to tissue expansion by the tongue pressure both layers come in close contact with each other.)
3. *Cleft palate up to alveolus:* Two flap technique (first stage) and lengthening of soft palate by double opposing Z plasty after 6 months (minimum) if required (Second stage).
4. *Alveolar clefts:* Local mucosal (turnover, transposition) flaps
5. *Palatal fistulae:* Anterior fistulae – local turn over flaps even if the local tissue is scarred, tongue flap in case of repeated failures. Posterior fistulae – Local turn over flaps, island mucoperiosteal flap described by Millard or redoing the palate repair. Cheek flaps may prove to be good alternative flap in larger defects with extensive surrounding scarring

Hemorrhage is usually managed conservatively by local vasoconstrictor drops (adrenaline solution or xylonate zolibe) for both nasal and oral surfaces. Troublesome hemorrhage is usually from the continuation or branches of the greater palatine artery at the distal edge of the mucoperiosteal flaps. This is easily controlled by bipolar coagulation under short general anesthesia.

The problem of palatal fistula at the junction of hard and soft palate is reduced by proper mobilization of the oral mucoperiosteal flaps. Usually releasing the greater palatine vessel maximum up to the middle of the oral mucoperiosteal flaps facilitates this. The author has found a constant ligament extending from the posterior edge of the hard palate to the oral mucoperiosteum (Fig 1 & 2) that severely restricts the movement of the oral flaps. The width of the ligament is from posterior point of the upper alveolar arch to the middle of the posterior edge of the same side hard palate. The medial most attachment of the ligament to the mucosa is often represented by tiny mucosal tags and by the depression when one applies gentle tension on the flap to move it towards the cleft. If this ligament is detached from the hard palate or divided by sharp dissection chances of fistula formation at the hard and soft palate junction is reduced considerably (due to reduced tension). Till date none of the author's operated cases have developed fistula at the junction of hard and soft palate even though the nasal layer was damaged in many of his cases.

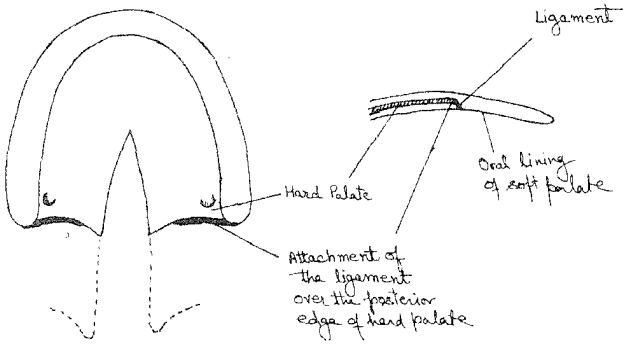

Fig 1. Line diagram showing ligament attachment from posterior edge of hard plate to the oral mueous membrane. Thus ligament found by the author severely restricts the movement of oral mucoperiosteal flap towards the cleft and if not devided increases tension and thus chances of fistula formation at the of soft palate & hard palate.

Chances of anterior fistula may be drastically reduced by two flaps technique without palatal lengthening. Palate may be lengthened at a later date by double opposing Z plasty of the soft palate[1].

Closure of side defects in two flaps technique has definite advantage by reducing the scarring by the side of the dental arch and incidence of hemorrhage in post-operative period. But at the same time direct closure increases the tension on the central suture line along with collection of blood and serum between oral (oral layer becomes more flat due to tension) and nasal layer.

Adult cleft palate: Few important observations, which were made by the author in his adult cleft palate cases, are–

1. The upward inclination of palatal shelves (palatal arches) is perceptibly higher than those in cases presenting at an early age. (Probably due to constant pressure of tongue in attempts to lick nasal secretions).
2. Adult patients with wide-open cleft lip and

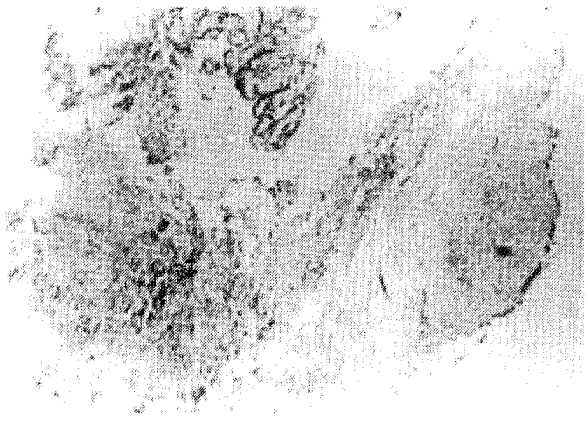

Fig 2a. Showing thickband of fibro collagenous tissue trapping lobules of submucous glands (5 x10 magnification)

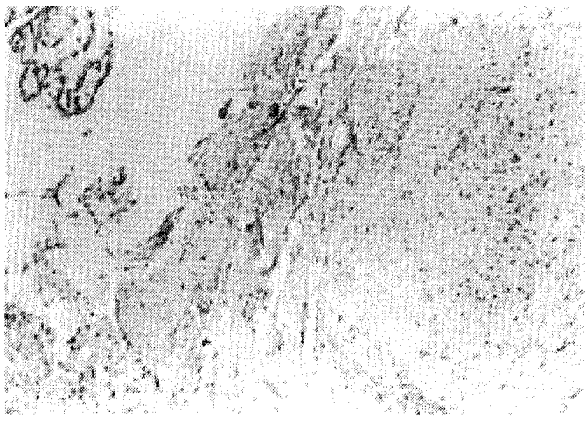

Fig 2b. Showing thickband of fibro collagenous tissue trapping lobules of submucous glands (10 x 10 magnification)

palate may develop ulceration over posterior pharyngeal wall due current of dry air directly hitting the posterior pharyngeal wall. So far author has seen marked ulceration in two patients,

3. The width of the palate appears to be deficient (probably due to increased inclination) and inadequate for closure but repair is usually not difficult because the oral mucoperiosteal flaps cover the defect easily in horizontal position. Soft palate can be easily closed with mild to moderate tension. Author planned posterior pharyngeal flap (PFF) several times for primary closure of the adult cleft palate but always succeeded to close without PFF. Water- tight closure of nasal layers may not be possible at the junction of hard and soft palate but it does not lead to fistula formation (though it may lead to increased scarring).

4. Elevation of the oral mucoperiosteal flaps is relatively difficult due to the presence of spicules arising from the bone of the hard palate.

5. Though the bleeding during dissection in adult patient is more, blood transfusion is rarely required due to the fact that the adults can tolerate relatively larger volume loss.

6. Though the improvement in speech is not as much as in cases of repair at early age, patients are usually happy with the result.

7. Sequence of repair, if two stage repair is planned in adult patients with cleft lip and palate, is reversed i.e. first palate is repaired followed by lip repair. This is because that these patients tend to disappear if cosmetic result is good after lip repair. Those who ignore lip and palate repair till adulthood (whatever the reason may be) may ignore palate repair for another many years if lip repair is satisfactory.

Few more observations which might add to the existing knowledge about cleft palate repair are :

i) Throat swab culture which was thought to be mandary few years ago, does not seem to influence the outcome of palate repair. For about last 3 years we have stopped doing routine throat swab culture. Broad spectrum antibiotic is used on operative day and continued for 7 days post-operatively. Pre-operative antibiotics (broad spectrum or as per culture and sensitivity report) are given in only those cases that show clinical signs of infection.

ii) Anterior palatal fistula is usually detected during first follow up one month after discharge. This is probably due to mechanical reasons. 1) The repair anteriorly is single layered, 2) Few of the children are in habit of licking nasal secretion and in post-operative period when the pain is reduced, they try to lick the nasal secretion from the tip of the tongue producing anterior fistula and 3) finally hard food or other hard objects like pencil etc might be carelessly put in the mouth by the child producing fistula.

iii) Those children who are in habit of sucking thumb are more prone to develop fistula and pose difficult problem in post- operative period. In these children it is advisable to start using fist bondage one week prior to the surgery.

iv) Incidence of suppurative otitis media in cleft palate (isolated or with cleft lip) is 7.1% (3/42) (unpublished report) which appeals to be comparable with incidence of suppurative otitis media in normal population. But in 28 isolated cleft lip patients during the same study period, none of them developed suppurative otitis media. None of the patient (total 70 cleft patients) under went routine check up to detect serous otitis media or gromet apart for antibiotic administration prescribed by local medical practitioner as and when necessary.

Reference

1. Personal Communication with Philip KT Chen (2001). Chang Gung Memorial Hospital, Taiwan