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Considerations in the Repair of Hare Lips and Cleft Palates

by

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THIS article is not intended to be an account of the various surgical procedures involved in repairing clefts in the lip and palate but to illustrate how basic anatomical concepts, to which attention has already been focussed in a preliminary communication (Paul and Navaratnam, 1967), can be employed in planning the repair.

THE REPAIR OF HARE LIPS

Had a cleft in the lip remained vertically linear as one imagines the embryonic hare lip groove to be (Fig. 1), simple apposition of the edges of the cleft would adequately restore continuity of the lip. However, whatever its extent, a cleft in the lip is not linear (Fig. 2). The medial border of a unilateral cleft is always inclined, while the lateral border is more or less vertical but far receded. Although the obliquity of the medial border is partly caused by unopposed contraction of one belly of the Orbicularis Oris muscle on the nasal columella, there has undoubtedly been a suppression in growth of the lip as well and it is important to appreciate the extent of the resulting gap.

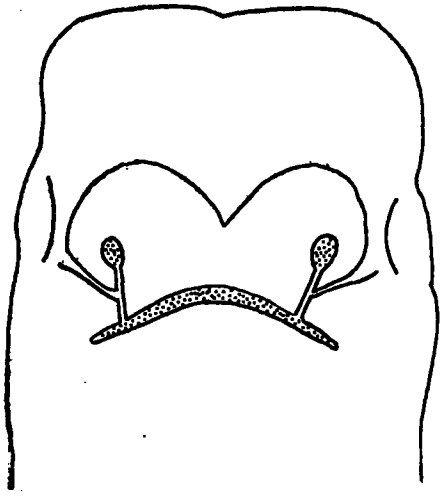

Fig. 1

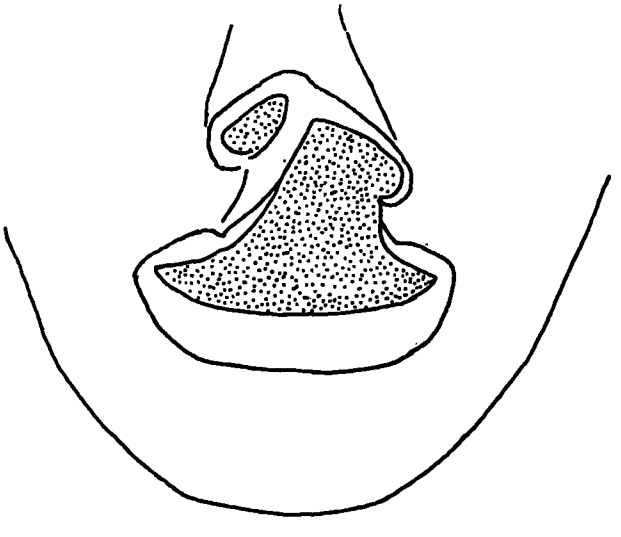

Fig. 2

FIG. 1. Reconstruction of the face of a 10 mm. C.R. human embryo showing the linear nature of the hare lip groove (h.l.g.), where clefts may occur. For further explanation see Paul and Navaratnam (1967).

FIG. 2. Line drawing of a complete hare lip showing that the cleft is, in fact, not linear. The medial margin (m) of the cleft is oblique, in line with the tilt of the nasal columella (c), while the lateral margin (l) is far receded. Note that there is a deficiency in the lip proper but none in the nostril rim.

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On the other hand where a cleft extends into nostril, as in a complete hare lip, there is no actual reduction in extent of the rigid nostril rim, even though there may be wide separation of the edges of the cleft; it is as though the nostril rim had been split at one point and unwound. Appreciation of this feature would dictate that the first step in the repair of a complete hare lip should be the approximation of the freshened edges of the cleft at the level of the nostril. In near-complete hare lips the skin-lined tag would need to be excised to bare the true edges of the cleft. Approximation of the lower end of the splayed nostril wall to the base of the columella restores the natural curve of the ali nasi and, in unilateral hare lips, straightens the tilt of the columella. Moreover this manoeuvre, by approximating the edges at the uppermost end of the cleft, defines the triangular deficiency in the lip proper and simplifies planning for the subsequent closure of the gap. All accepted methods of repair rely on the advancement flap principle to achieve the closure.

In cases of unilateral hare lip, the red margin at the inferior borders of the lip on either side of the cleft have a combined length which falls short of the length of the red margin of a normal lip of similar size. A hare lip repair must, therefore, bring down sufficient of the red margin from the edges of the cleft down to the lower margin of the lip if the latter is to be of near-normal length; the rest of the red margin at the edges can then be excised. In bilateral hare lips, the red margin bordering the median component of the upper lip is invariably too high to be used for the repair and has to be excised. The red margin of the repaired lip must be fashioned from that of the two lateral components.

Further difficulties inevitably arise when a cleft lip overlies a cleft in the jaw. Owing to the projection of the jaw medial to the cleft the problem of bringing the components of the lip into apposition calls for appreciable mobilisation. If the defects are unilateral, it is more feasible to mobilise the lateral component of the lip and to bring it forward than to push the median part back. If the defects are bilateral, however, it is often advantageous to mobilise the median component of the jaw, with the median tubercle of the lip perched on it, and to push it back part of the way so as to facilitate freer apposition of the labial components without undue strain on the suture lines.

A hare lip is best repaired within a few days of birth for, once repaired, the lip will grow under normal tensions and thus avoid further suppression of its growth. Moreover, the repaired lip will mould the bones underlying it, a point of considerable importance where the hare lip overlies displacements between the components of the jaw.

CLOSURE OF MIDLINE CLEFTS IN THE HARD PALATE

Owing to the lack of normal pull medialwards, the palatal shelves are highly arched and the gap between them often appears hopelessly wide. Forcible apposition of the two lateral components of the jaw was advocated by Brophy (1924) but, apart from the difficulty of achieving the objective, the repaired palate was narrow and highly arched. The operation replaced one defect with another.

It is preferable to close the gap between the bony palatal shelves by mobilising muco-periosteal flaps from the buccal surfaces of the shelves and then suturing the flaps in the midline. This procedure creates a partition between the nasal and buccal cavities which

proves to be sufficiently rigid to function as a palate. Even where the gap in the palate *appears* too wide to be bridged lowering the muco-periosteal flaps usually enables the surgeon to unite them in the midline. Nonetheless, care should be taken not to lower the flaps beyond the top of the alveolus for a palate so repaired will interfere with speech.

CLOSURE OF CLEFTS IN THE SOFT PALATE

Covering a gap in the soft palate, using flaps of buccal mucosa from the bony shelves, is mechanically possible (Lane, 1916) but a soft palate so repaired proves to be too rigid and immobile even though its musculature is intact. There is hardly any improvement in speech or deglutition suggesting that, while a repair must close the gap in the hard palate by a rigid partition, the repaired soft palate must remain freely movable. The tough consistency of the muco-periosteum of the hard palate precludes its use as material for soft palate repair.

Clearly, the simplest procedure is to freshen the edges of the cleft and to suture the two halves in the midline. Even though each shelf of the cleft soft palate is reduced in width it possesses the full complement of muscles of half a normal palate. If difficulty is experienced in approximating the shelves in the midline, the solution does not lie in a measure such as fracture of the pterygoid hamulus for the Tensor Palati muscle would still be restrained by the medial pterygoid plate and cannot displace medially to an appreciable degree. If, on the other hand, the entire soft palate is lowered (*vide infra*) there is little difficulty in apposing the palatal shelves.

The desirability of lowering the repaired soft palate extends beyond considerations of facilitating its suture in the midline. Examination of post-operative cases shows that, even when the cleft in the hard palate has been covered by muco-periosteal flaps and the cleft in the soft palate repaired by suture of its freshened edges, assuming that this can be accomplished without further manoeuvres, speech and deglutition are not automatically improved. The repaired soft palate is altogether too high and too short and cannot effectively contact the posterior pharyngeal wall. Theoretically, there are two ways of meeting this last difficulty; the united palatal shelves can be displaced till they contact the pharyngeal wall or the pharyngeal wall can be advanced till it contacts the soft palate.

Some operations (Wardill, 1937; Denis Browne, 1935) have attempted to reduce the gap behind the soft palate by creating an exaggerated and permanent elevation at the site of Passavant's ridge (Passavant, 1869). Passavant's ridge is a transient elevation, being most conspicuous during certain acts of phonation but invisible when the pharynx relaxed. From our dissections and from the observations of Whillis (1930), it is probable that the ridge corresponds to the contraction of the upper horizontal fibres of the Palato-pharyngeus muscle. The artificial creation of a permanent elevation at this site has proved difficult to achieve.

The more practicable approach to the problem of diminishing the gap between the soft palate and the posterior pharyngeal wall is to mobilise the soft palate and to displace it downwards and posteriorly. Gillies and Fry (1921) achieved posterior displacement of the soft palate by dividing the attachments of the shelves of the soft palate to the shelves of

the hard palate; they then united the freshened edges of the cleft in the soft palate and closed the gap in front of the soft palate by an obturator. However, as the obturator could not maintain satisfactory contact with the moving anterior edge of the soft palate, the method of Gillies and Fry has not been generally accepted. A more successful technique is to divide the nasal mucosa on the soft palate and the palatine aponeurosis where they attach to the posterior border of the hard palate (Fig. 3). The buccal mucoperiosteum of the bony palate is then mobilised and each flap, in continuity with the ipsilateral shelf of soft palate, is lowered and displaced posteriorly. The repair can now be completed by suture of the mucoperiosteal flaps and the soft palate in the midline.

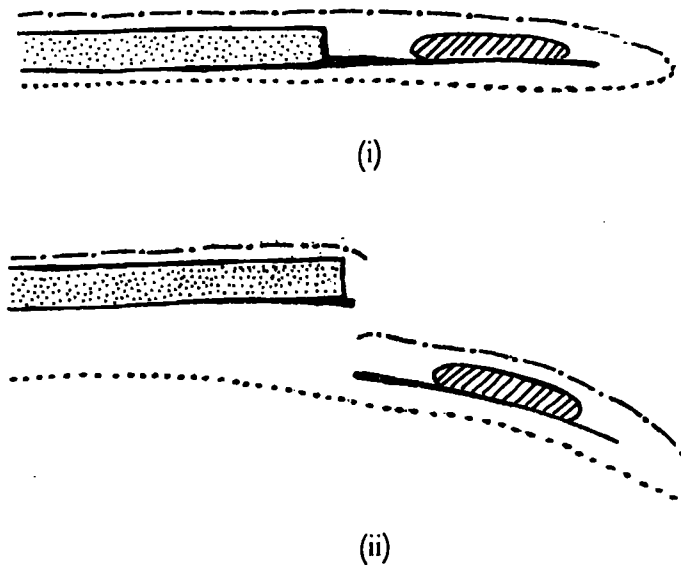

Fig. 3

FIG. 3. Steps in lowering the soft palate.

(i) Natural relationships of the hard palate shelf (h.p.), the ipsilateral shelf of soft palate, the nasal mucosa (n) and the buccal muco-periosteum, (*b*). p.a.—the palatine aponeurosis within the soft palate, which contains its complement of musculature (mu).

(ii) The palatine aponeurosis and the nasal mucosa are divided at the posterior border of the bony palate. Subsequently, when the buccal muco-periosteum is detached from the bony palate, it can be lowered together with the soft palate.

To summarise, there are three requirements for success in a cleft palate operation. The defect in the hard palate must be completely closed, the repaired soft palate must be mobile and continuous with the partition closing the hard palate and, thirdly, the soft palate must be in contact with the posterior pharyngeal wall. The first two objectives can be achieved fairly readily but the third requirement eludes the surgeon in many cases. Here is an incentive for devising further techniques for the repair of cleft palates. A repair satisfying all three requirements should give satisfactory speech in addition to satisfactory deglutition. Post-operative courses of speech therapy cannot endow intelligible speech, if the surgical operation fails in its objectives.

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