

“GATE FLAP” FOR THE TOTAL RECONSTRUCTION OF THE LOWER LIP

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When planning a complete reconstruction of the whole of the lip, the following major points should be taken into consideration:

1. The flaps used should be local flaps, including innervated muscle.
2. All the suture lines should be in natural facial creases or follow the junction lines of the various facial aesthetic units.
3. The flaps should be large enough to make good the tissue loss.

These “ideal” criteria may appear at first to be unattainable, especially when the excisional defect of the lower lip is large and the availability of local flaps of adequate size is limited. Only a few reports have been published on the total reconstruction of the lower lip with innervated muscle bearing flaps (Bakamjian, 1964; Bretteville-Jensen, 1973; Lentrodt and Luhr, 1971).

In 1960, Webster *et al.* described a modification (Fig. 1A, B) of the Bernard technique for the reconstruction of the lower lip which consists essentially of advancement flaps from both cheeks. Although excellent aesthetic and functional results could be obtained, the extent of mobilization required restricts the use of these flaps to the older patients with lax cheek tissues. Even in these patients the newly reconstructed lower lip is often tight, with obvious protrusion of the upper lip. Another disadvantage of this technique is the amount of skin and subcutaneous tissue that must be discarded in the nasolabial and mentolabial folds.

The use of full thickness nasolabial rotation flaps, as described by Wang *et al.* (1967) (Fig. 2A, B) is particularly valuable when the lower lip defect is large and unsuitable for the Webster pattern of repair. However, even with this method, as a result of rotation and traction on the flap, the free border of the new lower lip and the skin around both commissures becomes tight and a big dog ear is formed on either side of the mentolabial fold. Therefore, the mentolabial fold protrudes in relation to the free border of the newly constructed lower lip with the loss of the natural concave curve of the free border.

An improved technique for the total reconstruction of the lower lip loss has been devised (Fig. 3A, B) to overcome the drawbacks mentioned above, using an island flap from each nasolabial fold. The main advantages of this design are:

1. The possibility of making the island flap 3 cm greater than the nasolabial rotation flap in length.

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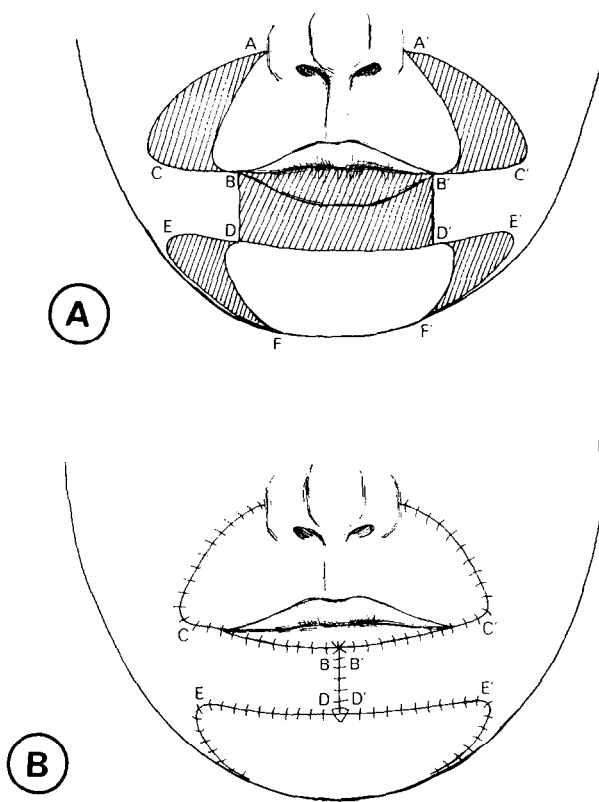


FIG. 1. A. Advancement flap. B. Compared with the "gate flap" (Fig. 3), the length (CB) of the advancement flap is shorter and the triangles ABC and DEF are discarded without being used.

2. Rotation of the island flap is possible without the formation of the dog ear.
3. The flap contains an innervated muscle.
4. The method can be carried out in one stage operation.

SURGICAL TECHNIQUE

As illustrated in Figure 3A, the whole of the affected lower lip is excised as a rectangle (B,B',D,D'). The inferior margin of resection (D,D') follows the mentolabial groove. Whenever possible, a 3 to 4 mm wide strip of labial mucous membrane is left attached near the labioalveolar sulcus. The lateral margin of resection (BD and B'D') is usually placed 0.5 to 1 cm laterally to perpendiculars dropped from the labial commissures (O and O'), but may extend 2 cm laterally in the case of old people with a wrinkled face.

The width of the flaps (BC=DE or B'C'=D'E') which are designed on both sides of the cheek can be increased to 3 cm and the suture lines (AED or A'E'D') of the donor sites of the flaps follow the natural nasolabial grooves.

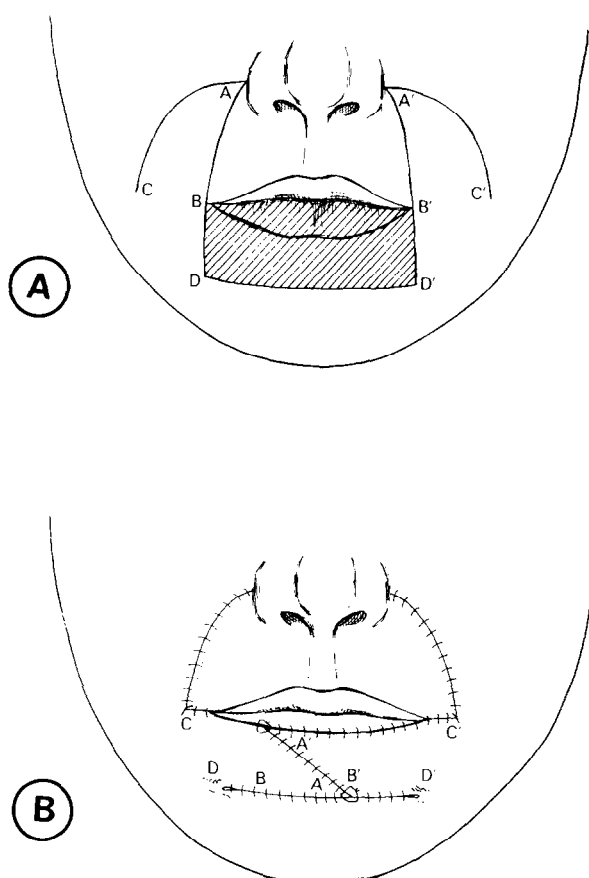


FIG. 2. A. Nasolabial rotation flap. B. The available length (AC) of the nasolabial rotation flap is shorter by about 3 cm (=CE in Fig. 3A) than the "gate flap".

The dotted lines (A1B, AmC, A'1'B' and A'm'C') represent incisions made through the mucous membrane which should be about 1 cm wider than the skin flap because the excess mucous membrane should be available for reconstruction of the new red lip.

When making the incisions (C,E,D, and C',E',D') of the flap below a line (C,C') connecting both labial commissures, the cut should be made through the skin and subcutaneous tissue only keeping the muscle layers and mucous membrane intact as the pedicle of the flap. Further undermining of the skin around the pedicle of the flap is required to allow rotation of the flap.

Since the island flap, thus prepared, contain innervated muscles (orbicularis oris, caninus, zygomaticus major or minor, risorius, triangularis and buccinator) the newly reconstructed lower lip can function satisfactorily. These flaps have a good blood supply and can be moved into the excisional defect in one stage without any "delay" procedure.

As soon as the flaps have been mobilized, the wounds should be closed

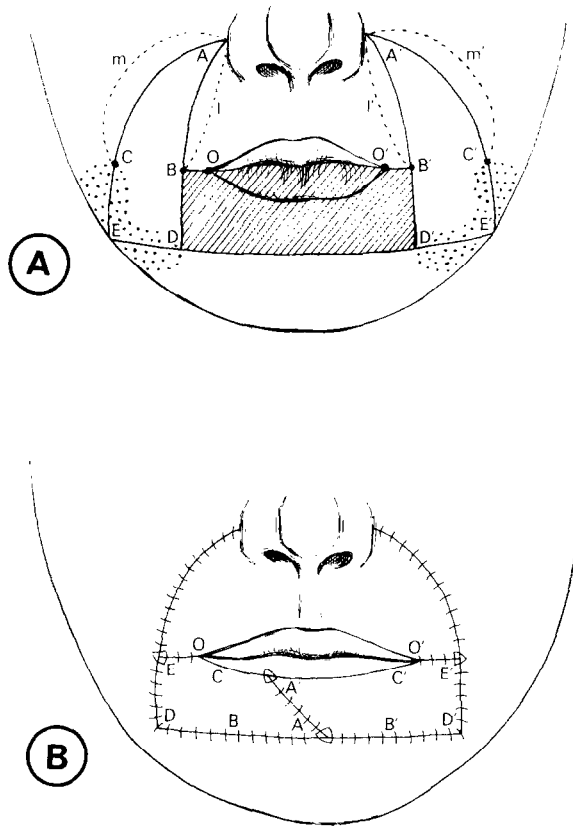


FIG. 3. Gate Flap. A. (i) $OB = O'B' = 0.5$ 1 cm in normal cases, but can be extended to 2 cm in the case of old people with wrinkled faces; (ii) $BC = B'C' = 3$ cm; (iii) Skin incision along AB and AC should be made through-and-through into the mouth; (iv) Skin incision along CE and ED should be made only through subcutaneous tissue; (v) Incision of the mucous membrane is performed along the dotted lines (A1B, A'mC, A'1'B' and A'm'C') which run laterally to the skin incision lines (AB and AC); (vi) Dotted area is undermined subcutaneously. B. Suture lines run along the nasolabial groove and mentolabial groove centrally.

meticulously in 4 layers, namely the mucous membrane, the muscle layer, the subcutaneous tissue and the skin using a monofilament nylon suture. The mucous membrane should be sutured accurately to provide a sufficiently wide vermilion border.

Even after taking such precautions the new red lip tends to be thin due to the limitation in size of the available mucous membrane.

Closure of the muscle layer and the subcutaneous tissue is accomplished by using non-absorbable buried sutures. Because of cicatricial contraction, the newly reconstructed lower lip tends to become rounded. This distortion can be prevented and corrected effectively by keeping the new lower lip immobilized and pressed adapting the sponge fixation method for about 3 months postoperatively (Fujimori and Hiramoto, 1968).

A final retouch involving Z-plasties or scar revision is often required some 3 months later when the tissues have become soft and supple.

Two typical examples of the use of this method in the treatment of a carcinoma of the lower lip, are illustrated in Figures 4 and 5.

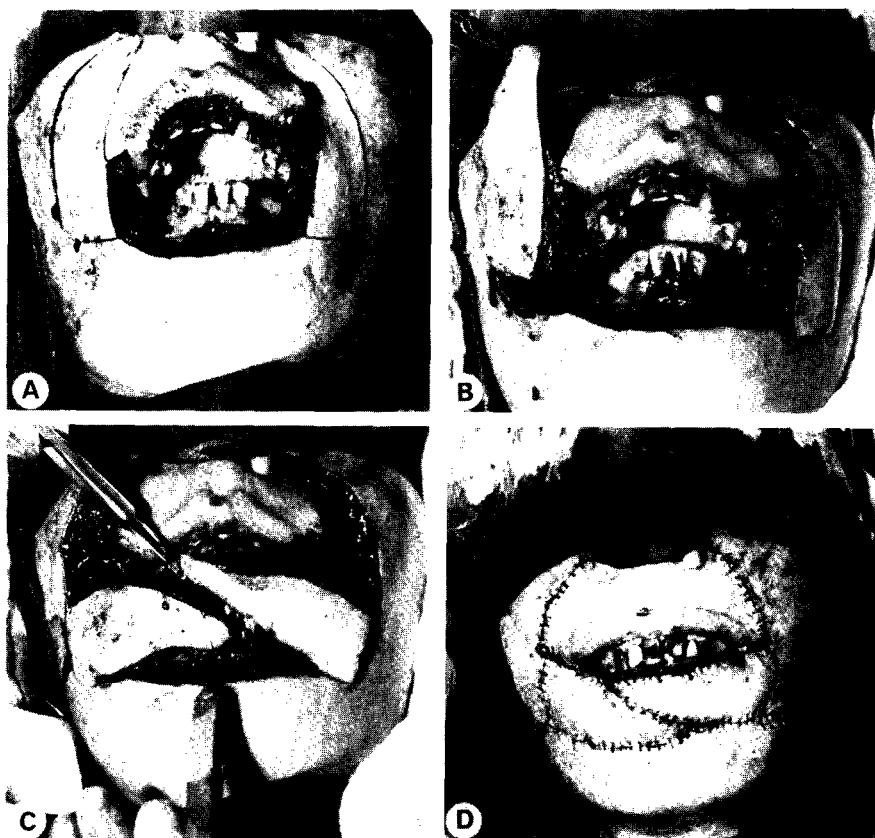


FIG 4. Gate Flap. A. The carcinoma was excised and skin incisions for the flap were made in the nasolabial grooves. B. The flap raised. C and D. The flaps rotated and sutured.

SUMMARY

A new technique using transposed nasolabial island flaps is presented for total reconstruction of the lower lip. This method enables the surgeon to close very large defects of the lower lip and since the flaps contain muscle the functional and cosmetic results are better than those achieved with traditional advancement flaps.



FIG. 5. Gate Flap. A. Squamous cell carcinoma of the lower lip. B. Appearance three weeks postoperatively. C and D. Appearance one year postoperatively. Retouch operations involved Z-plasty and defatting of the flap.

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