Radical neck dissection:

Considerations in flap design

By ROGER MCNEILL (Jamaica)

SINCE the first description of the Radical Neck Dissection by Crile (1906), a wide variety of skin incisions for this procedure have been advocated. Although these incisions have been selected largely on the basis of individual preferences, the purpose of this paper is to present a concise and rational approach to the choice of skin flap design with particular reference to specific problems.

The main considerations in skin flap design are as follows:

1. Flap viability.
2. Carotid artery protection.
3. Planned pharyngostome.
4. Planned tracheostome.
5. Resurfacing.
6. Cosmesis.
7. Surgical exposure.

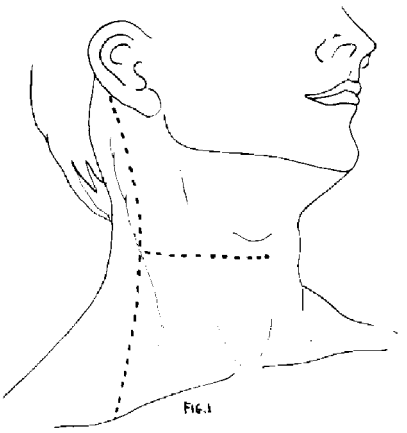
1. *Flap viability*

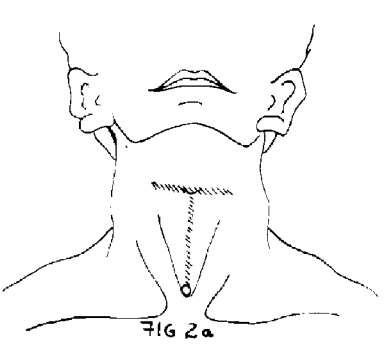
Based on the work of Kambic and Sirca (1967), and of Freeland and Rogers (1975), it has been shown that the blood supply to the skin of the neck runs from above and below in a vertical direction. It would seem therefore that the horizontal T incision (Fig. 1) with its superiorly and inferiorly based flaps of equal length would provide the best opportunity for flap viability. There are situations, however, in which the viability of the neck skin may be severely compromised as a result of systemic or local factors. Of particular relevance in the latter instance is the presence of previous incisions in the neck or prior exposure to ionizing radiation. It is in these instances that the design of flaps takes on even greater importance. Where prior neck scars exist (Fig. 2a) these may have to be incorporated in the incisions (Fig. 2b) as the blood supply crossing these areas is not sufficient to contribute significantly to flap nutrition. In this situation, J-shaped (Fig. 3a) or McFee (1960) (Fig. 3b) incisions will almost certainly result in ischaemic necrosis of the central neck skin.

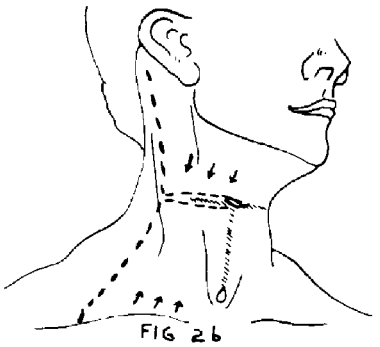
2. *Carotid artery protection*

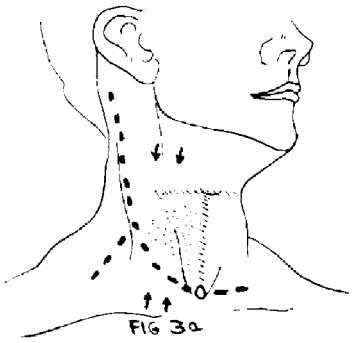
The most serious complication of skin necrosis in the neck is carotid artery exposure. The principles involved in avoiding this disaster, therefore, are largely related to the assurance of maximum skin viability. Even

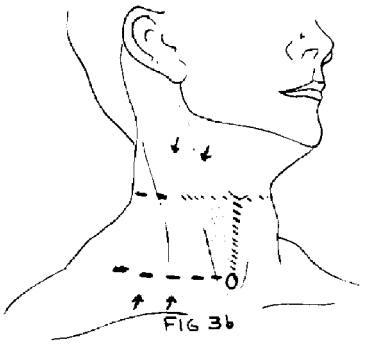
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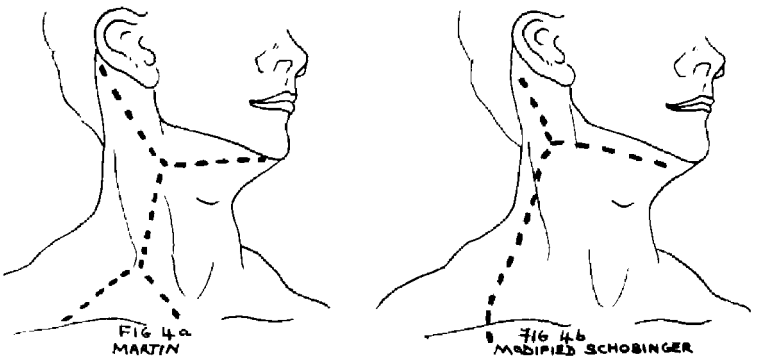






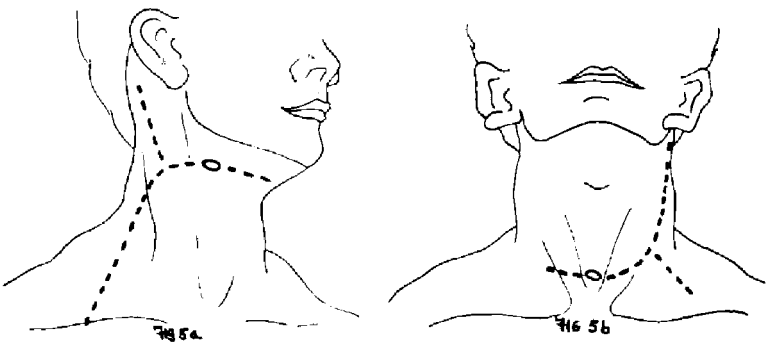
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under apparently optimum circumstances skin flaps run the risk of undergoing tip necrosis. This should always be borne in mind when designing neck flaps in such a way that areas of likely necrosis are placed at sites away from the carotid artery. It is for this reason that the original Hayes-Martin incisions (Fig. 4a) have largely been abandoned. The placement of trifurcations directly over the carotid bulb is distinctly hazardous and hence the preference for the Modified Schoebinger incision (Fig. 4b).



3. *Planned stomae*

In situations where a pharyngostome or tracheostome is planned, it is preferable to include these in the skin incisions. This obviates the need for perforating the skin flap, a manoeuvre which may threaten its viability. For example, a lateral pharyngostome may be located within a horizontal superior incision (Fig. 5a) or a tracheostome may be placed at the lower end of the J-shaped incision (Grandon and Brintnall, 1960) (Fig. 5b).

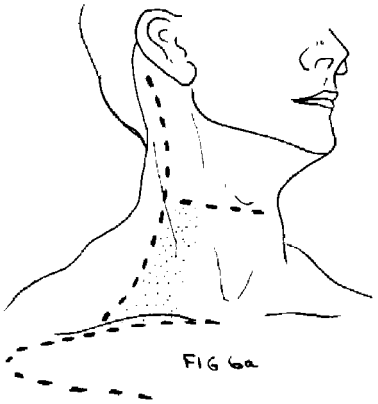


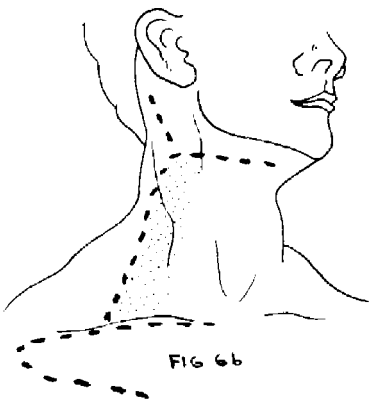
4. *Resurfacing*

Not infrequently, rotation or transposition flaps of adjacent skin may have to be utilized in the reconstructive procedure. Incisions, therefore, have to be carefully planned so as to assure maximum viability of all flaps. For example, where use of the anterior chest flap is anticipated, incisions

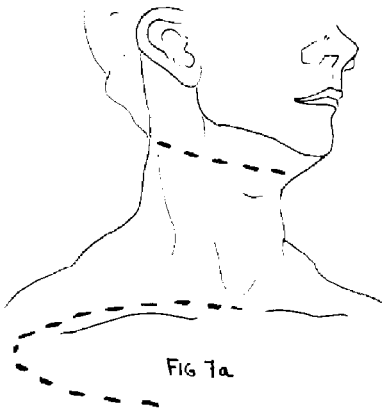
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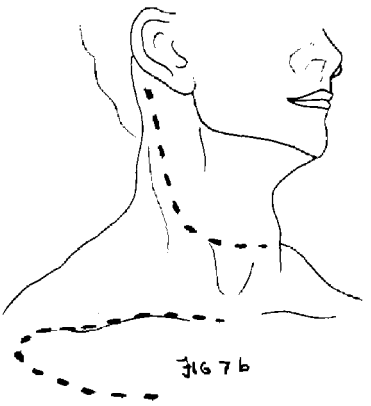
which will deprive the blood supply of the lower neck skin have to be avoided (Fig. 6a, 6b).





Incisions such as the McFee (horizontal parallel) and the J-shaped may be used in this situation with reasonable safety. In the former instance, the superior incision of the chest flap is incorporated with the lower horizontal neck incision (Fig. 7a, 7b).





5. *Cosmesis*

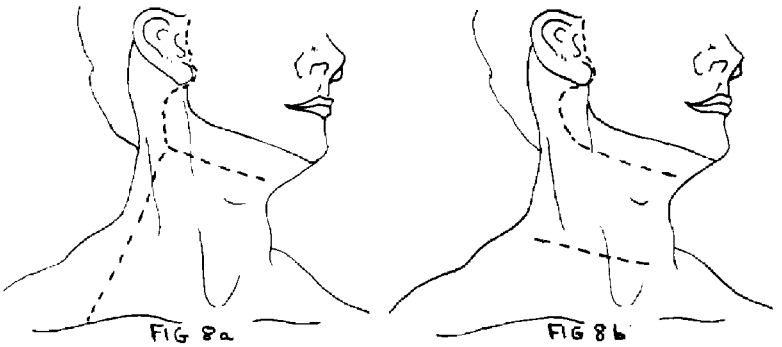
The horizontal parallel (McFee, 1960) incisions are, no doubt, the most desirable aesthetically as they lie within the skin creases of the neck and are therefore least discernible. Vertically running incisions are apt to be more noticable and are, not uncommonly, complicated by impairment of function due to secondary contracture. Objection to the use of McFee incisions is largely that of inadequate exposure, particularly in situations where the neck dissection is done in conjunction with other ablative procedures, e.g. intra-oral resections, laryngectomy, etc. Cosmesis, however,

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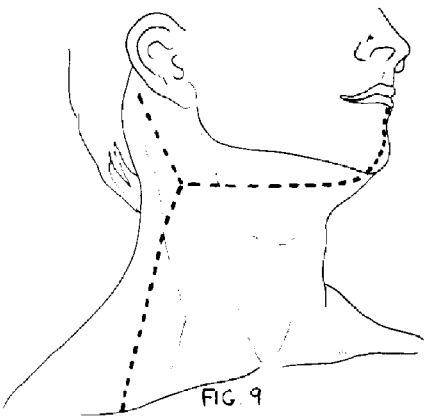
is usually of minor significance in most instances and is apt to be overlooked in favour of some of the more important considerations mentioned.

6. *Surgical exposure*

This, of course, is of major importance in situations where radical neck dissection is being performed in conjunction with resections of the primary lesion. Incisions in the neck must therefore be designed to provide satisfactory access to the primary tumour, or located optimally to allow for extension outside the neck where they may be combined with other incisions, e.g. parotidectomy and neck dissection (Fig. 8a, 8b).



Intra-oral lesions may be most easily approached through a horizontal incision below the mandible. This incision may be extended into a lip-splitting incision and continued down the neck to provide a long anterior flap (Schoebinger, 1957; Babcock and Conley, 1966), (Fig. 9).



Alternatively, a 'U' or apron flap may be utilized and is most suitable, especially when simultaneous bilateral neck dissections are to be performed (Fig. 10).

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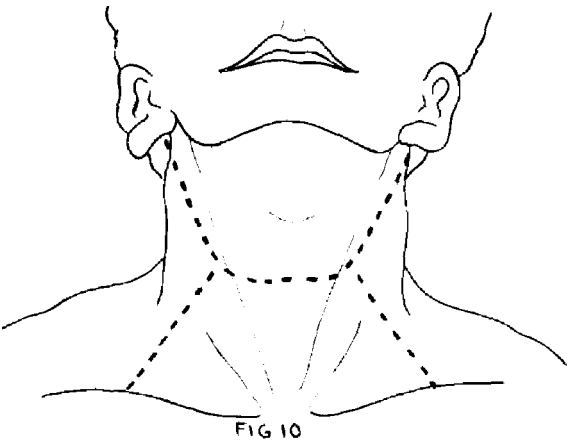


FIG 10

Summary

A wide choice of skin incisions and skin flaps is available to the surgeon contemplating radical neck dissection. The choice of incisions, however, may often be influenced by a number of existing or pre-existing conditions. Each situation has to be treated on its own merit depending on the prevailing circumstances if all objectives are to be achieved.

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