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Views and Practice

A practical approach to local flaps on the face after excision of small cancerous skin lesions

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Most cancerous skin lesions on the face come to the doctor's attention when they are still relatively small in size. Excision of these skin lesions are amenable to primary wound closure in most instances. However, there are occasions where primary wound approximation is not the most appropriate closure method. Such instances include a wound which is a bit too sizeable so that there would be undue tension or where primary closure would result in distortion of nearby anatomical margins.

The options in such cases would be to either perform a skin graft or to raise a local skin flap.

Skin graft versus local flaps

Skin grafts may provide a good outcome if the defect after tumour excision is only skin thick. Otherwise, a permanent depression could result and such a contour deformity may be very prominent leading to an undesirable cosmetic result. Skin grafts require a donor site and there will be a limit as to the size of the graft taken because the donor site scar would become prohibitively big if a split thickness graft is taken or long if a full thickness graft is harvested. Moreover, unless the graft is taken from a nearby site on the face, it will be of a different colour and texture compared to the original skin and resulting in a suboptimal appearance.[1]

Local skin flaps are almost always taken in the immediate neighbourhood of the wound and their thickness could be tailored to the desired thickness in most instances. Any additional requirement of the subcutaneous fat in addition to the skin will require the design of a flap because skin grafts will not survive when they are thicker than the full thickness of the epidermis and the dermis. When well designed, a local skin flap can give a superior result.

Blood supply to local flaps

It is useful to recall that the survival of a skin flap depends on the integrity of the circulatory supply to the flap. Local skin flaps on the face will in most instances be pedicle flaps and so no expertise in microvascular anastomosis or any specialised instruments is required. The blood supply to a local pedicled skin flap is dependent on the subpapillary and subdermal plexuses which will be in continuity with the same at the base of the pedicle and thus accounting for the viability of the supply.[2] It is

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obvious that the longer the length of a flap, the more distant these plexuses are from the base and therefore the circulation at the tip of the flap will be less secure. The safe length-to-breath ratio of a local flap is in general 1 to 1 but, due to the rich circulation of the head and neck region, this ratio can be extended to four to six times.

Such is the case with random pattern flaps. There is a special situation where an artery actually runs in the axis of the flap, i.e. along the length of its course. Examples of this variant include the facial artery in a nasolabial flap and the supra-trochlear artery in a median forehead flap. The presence of such an artery in the flap will greatly enhance the blood supply and reliability of the resultant flap, allowing a long length relative to breadth ratio and yet good survival.

How do flaps help with wound closure?

When designing a skin flap, it is helpful to first recall the two principles whereby a flap can contribute to wound closure. These are: a. to share out tension; and b. to recruit laxity in another direction, and to enable comfortable wound closure.

To illustrate the point, an advancement flap design where cuts are extended backwards from the wound is an example of the first principle of sharing out tension (Figure 1a). The increased length of the flap allows the tension in wound closure to be spread out and be borne by a longer tongue of skin so that the amount of pull for each unit length of the flap is reduced. The manoeuvre will therefore enable a wound which is otherwise too tight to be closed, to be approximated comfortably. The second principle above is best illustrated by a V-Y advancement design (Figure 1b). In this case, a V-shaped incision is made adjacent to the wound to the depth of the subcutaneous fat layer. The resulting flap is freed except for its deep attachment so that it could be advanced into the defect for closure. The gap left behind after this advancement is then closed transversely to the direction of the advancement and thus the tension in closing the wound is reduced and borrowed from the perpendicular direction when the tail of the Y is closed.

Where are the laxities on the face?

It will be obvious that it is important to look for laxity in the neighbourhood of a wound so that this could be utilised to facilitate the closure of the wound to avoid undue tension. The areas of laxity usually present on the face are found in the glabella and midline forehead, the temples, the skin along the nasolabial folds and the lateral cheek and upper neck skin.[3]

The common flap designs

A command of the most common flap designs will be helpful in selecting the most appropriate option in a particular situation. These are illustrated in Figure 2 and a brief reminder of the salient features of each is listed out in Table 1. The most often applied sites on the face for each design is also indicated in this table.

Important considerations in designing a flap

A number of considerations should always be borne in mind when we design a flap:[4]

1. ***Identify the laxity in the surrounding skin*** – recruit the laxity to enable wound closure by transposing it into the direction of tension.
2. ***Note the anatomical margin***s – such as the brows, lid margins, alae, and the lips. Tension on these would cause anatomical distortion and should be avoided.
3. ***Keep the whole design within an aesthetic unit*** – the aesthetic unit concept takes regions of the face as individual territories such as the forehead, the eyelids, the cheeks, the nose, the upper lip and the chin, etc. Any incision across

aesthetic units would violate their boundaries and give an unnatural appearance.

4. ***Respect the crease lines*** – incisions along the creases produce scars that heal better and show up less conspicuously. This is because they are less pulled against and are aligned more in harmony with the facial features.
5. ***Avoid roundish wound outlines*** – because roundish defect outlines have a tendency to result in a trapdoor effect giving a pin-cushioning appearance when the scar contracts upon healing. A round wound can easily be turned into a rectangular or triangular wound depending on the requirements of the design.
6. ***Think of the actual location of the wound on the face*** – the most often employed design(s) in relation to the site of the defect could be found in Table 1.
7. Accurate measurements of geometry and good 3-dimensional sense are keys to a perfect result.

Further tricks to make perfect results

There remain two small tricks to help with enhancing a satisfying result. The first is the concept of the Burrow's triangle (Figure 3a). Often when wound edges are pulled together there will be obvious bulging of excess skin in the immediate area next to the base of the pedicle. If this triangular shaped excess skin is excised, the final wound would become even and flat as if all the

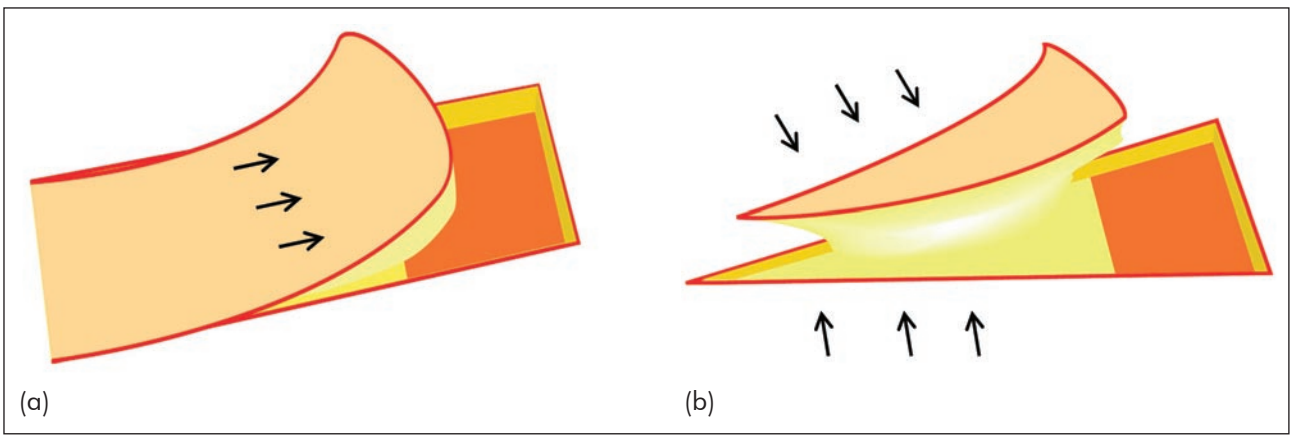

Figure 1. (a) Advancement flap showing sharing out of tension along an extended length of skin along the direction of the tension; (b) V-Y advancement flap showing the transfer of laxity in the perpendicular direction into the line of the tension (arrows show direction of tension).

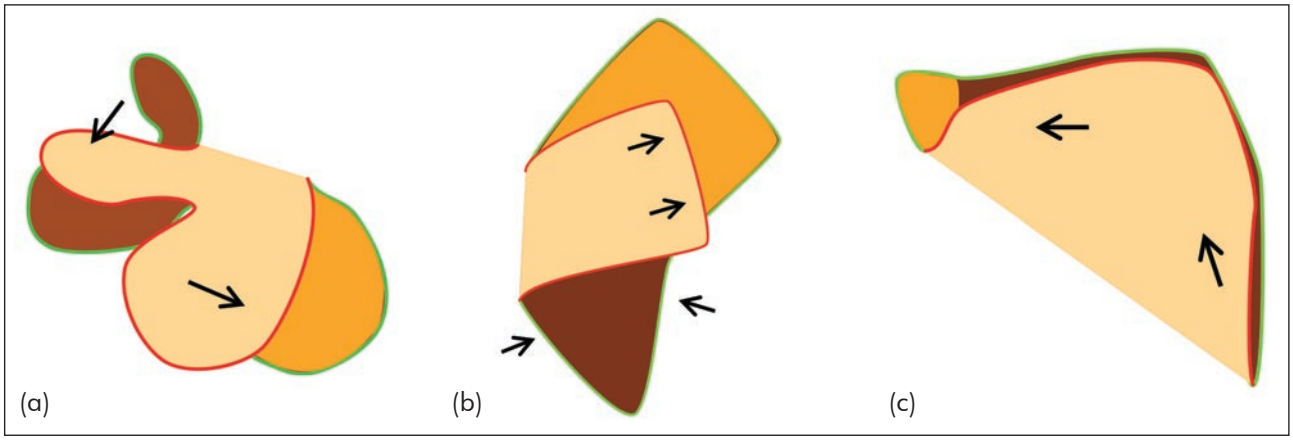

Figure 2. Common types of flap designs: (a) Bi-lobed; (b) Rhomboid; (c) Rotational.

Table 1. The most common flap designs

Flap	Wound shape	Design	Most often used
Random			
Rhomboid	Trapezoid	Rhomboid shaped flap mobilised into defect	Temples
Advancement	Rectangular	Tongue of long flap mobilised into defect, may be bilateral	Forehead, chin
V-Y pasty	Rectangular	V-shaped flap mobilised into defect and gap left closed transversely	Cheeks
Bi-lobed	Oval	Smaller flap transposed into defect with the donor defect in turn filled by a yet smaller flap transposed into it	Nose bridge
Rotational	Triangular	A long curved flap shares out the tension	Cheeks
Axial			
Nasolabial	Rectangular	Skin alongside the nose raised as superiorly or inferiorly based or be advanced medially onto the nose	Alae
Median forehead	Any shape	A long tongue of skin is turned back for nose defects, requires a second stage for division of pedicle	Alae and lobule of the nose

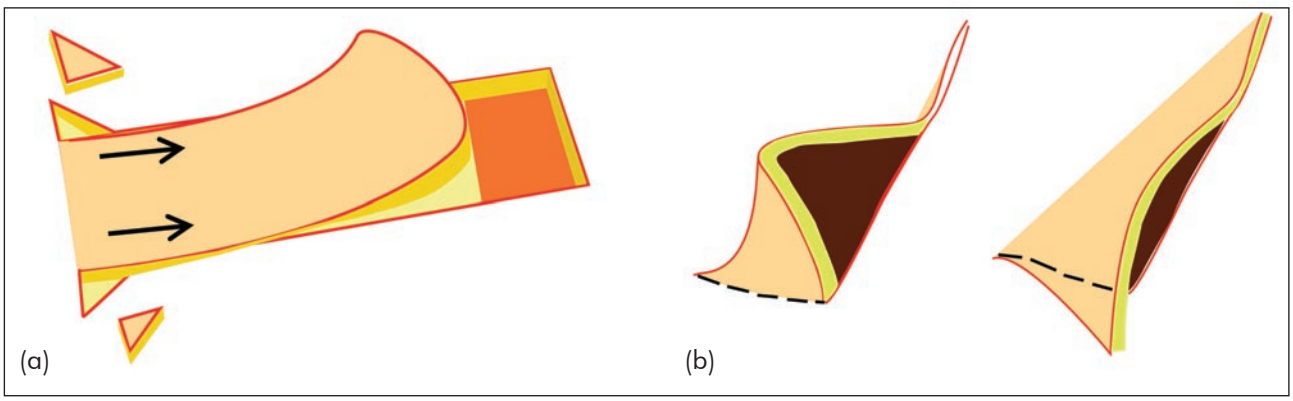

Figure 3. (a) Advancement facilitated using Burrow's triangles; (b) Dog-ear removal.

pieces spontaneously fall together into place. A Burrow's triangle is therefore a triangular piece of skin removed to facilitate advancement of flaps.

Correction of dog-ear is the other important point of note in achieving a pleasing wound. Dog-ears appear when the lengths of the wound edges are not the same. Sometimes this discrepancy can be overcome by careful suturing, taking bites that gradually even out the difference. However, in other situations, dog-ears are inevitable and will be annoying to the patient if not corrected at the time of suturing. The way to eliminate a dog-ear is to extend the end of the wound in a slightly perpendicular direction so as to allow the excess skin to overlap and thus be reduced (Figure 3b). The wound will be slightly lengthened but this is worthwhile as the scar in most cases will fade with time.

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