Short Communication

Trapezoid advancement flap to reconstruct small to medium sized tissue defects–A series of clinical applications

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ABSTRACT

The choice between skin graft and local flap reconstruction depends upon the surgeon’s experience and the facilities available. For skin cancers, our main objective is clear, oncologic clearance with preservation of function. For some patients, aesthetic outcome is often equally important. In our experience, majority of our trainees will often choose skin graft reconstruction as their primary choice of reconstruction due to the fact that there is a perceived idea that this is easier to perform than a local flap. However, for lower limb or head and neck reconstructions, skin graft may result in a significant contour defect which can potentially be avoided.

We present a series of cases of an alternative flap, the trapezoid advancement, a very simple design that can be utilised in several areas of the body and technically very easily replicated. This technique allows for the advancement of tissue with a minimal tension closure as compared to other local flaps. Our results showed no flap loss and excellent cosmetic outcome.

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Introduction

The choice between skin graft and local flap reconstruction for small to medium defects measuring 1-5 cm depends upon the surgeon's experience and the surgical facilities available. Over the last two years, due to significant pressures created by Covid pandemic, this has become an additional influencing factor. For skin cancers, our main objective remains clear, that is oncologic clearance with preservation of function. Although important, the aesthetic outcome is a secondary concern. In our experience, majority of our trainees will often choose skin graft reconstruction as their primary choice of reconstruction due to the fact there is a perceived idea that this is easier to perform than local flap.

Skin cancer excisions are often performed in the minor operating theatre under local anaesthetic with potential time pressures. There is therefore limited flexibility and capacity in performing a new or a more complicated procedure. Well-known flaps such rhomboid or keystone are often the preferred choice. In potentially challenging locations, the next choice is usually a more complicated reconstruction. The trapezoid advancement flap has the advantages of being simple in concept, design and execution as well as flexibility in its potential clinical applications.

Surgical technique

The circle represents the lesion excised with its relevant pre-determined margins (A). Start by incising two opposing diagonal lines (B) to create a trapezoid shape (C) that is two parallel lines which are wider at the base and narrower at the top (white dashed lines). Incise the flap using the thickness of the lesion excised as your guide. Advance the flap to fill the defect (D). If more tissue advancement is required, extend the limbs of flap (E) to facilitate more mobility and achieve closure. Excise any excess tissue at ends of the flap (F) to facilitate better inset. To improve the contour of the recipient sides, excise Burrow’s triangles or dog ears at the base (G). It is important to excise the Burrow’s triangles after the defect is completely closed to ensure that the excised triangles are positioned at the base of the flap (Fig. 1).

![Fig. 1. Schematic diagram of the Trapezoid advancement flap design.](image-url)
Results

We performed 11 flaps from January 2021 to December 2021 on different areas of the body. One patient has two flaps on the same leg excised 10 months apart. The size of the defects ranges from 2.5 cm to 5 cm with a mean of 3.1 cm. Oral antibiotics were given as surgical prophylaxis if the lesion is ulcerated or with background erythema at time of surgery. There was one case of superficial infection which resolved with oral antibiotics. There were no flap loss and all patients were pleased with the cosmetic outcome even on early review.

Clinical cases

The most common area reconstructed with trapezoid advancement flap in this study is the lower leg. Fig. 2 illustrates 2 lower leg cases. For both cases, the scar is hardly visible with minimal contour defect a few months after surgery. Figs. 3 and 4 show other clinical cases.

Discussion

Reconstruction of small to medium sized defect (1–5 cm) following excision of skin lesions is a frequent occurrence in a Plastic Surgery setting. Often the default is a skin graft as this is seen as the easier option to choose in the reconstructive ladder and the donor site is always available. The patients are often informed that they have to accept the contour defect or colour mismatch which could affect patient’s overall satisfaction.\(^1\)

Reconstruction with local flap could potentially provide a shorter recovery and better patient satisfaction as compared to skin graft as shown in the study by Lee, et al.\(^1\) There are several advancement and transposition flaps that can be used to cover small to medium sized defects such as keystone flap, rhomboid flap and V-Y flap to name a few. On the lower limb, Behan’s keystone perforator flap\(^2\) is a good alternative reconstruction. However, trainees often mention perceived complexity in executing a design and the apprehension of avulsing the perforator of the flap. In some modifications of the keystone flap where the blood supply is reliant on the base of the flap, there is no flexibility for the design to allow more tissue advancement and may result in high tension closure. With this...
Fig. 3. Trapezoid flap reconstruction on the scalp and anterior chest. Using the scalp laxity posteriorly, we were able to achieve closure. Similarly on the anterior chest, the anterior axillary fold is advanced to cover the defect.

Fig. 4. Two cheek reconstructions. The skin laxity of the anterior neck was advanced to cover the defect and the Burrow's triangle is placed along the jawline.

trapezoid flap, the design is such that when the length of the flap is extended, the base of the flap becomes wider which make the blood supply more reliable. The excess tissue on the recipient sides of the trapezoid flap can be flattened by excising Burrow's triangles at the base of the flap. In contrast, for the rhomboid flap, excising the excess tissue to achieve a smooth contour may compromise the vascular supply.
We present a series of cases to provide an alternative reconstruction to the keystone flap. The trapezoid advancement flap has the advantage of very simple design that can be applied to several areas of the body and can easily be undertaken by trainees. Scotland and Morris have used the trapezoid flap to correct burn scar contractures. There are limited publications on the use of this named flap to cover defects following skin cancer excisions. The versatility and excellent aesthetic outcome makes this flap an ideal reconstructive option for small to medium size defects.

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**Declaration of Competing Interest**

None.

**Ethical Approval**

This was a retrospective review; all patients consented for the publishing of their medical photographs.

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