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Combination of advancement flap and interpolation flap as a treatment for a large basal cell carcinoma defect affecting multiple cosmetic subunits

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Consent for publication: the patient gave her written consent to use her personal data for the publication of this case report and any accompanying images.

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Abstract

Basal cell carcinoma (BCC) treatment aims to completely remove the tumor, maintain skin function, and restore appearance. Tumor removal can result in various patterns of abnormalities, depending on the size and location. The integration of advancement and interpolation flaps ensures adequate coverage without tension or distortion for substantial defects involving multiple cosmetic subunits. A 43-year-old female patient with basal cell carcinoma presented with a large periorbital tumor affecting multiple cosmetic subunits. Reconstruction was optimally achieved through a combination of advancement and interpolation flaps, successfully restoring both aesthetic appearance and skin function.

Introduction

Basal cell carcinoma (BCC) is a common form of skin cancer worldwide. The incidence rates increase after the age of 40. Due to increased sun and artificial UV exposure, younger individuals, particularly women, are experiencing a rising incidence.¹

Repairing defects with minimal tension will optimize aesthetic appearance and skin function restoration. However, large incisions may cause excessive tension, affecting the final results. Cases with such challenges may require skin flaps or grafts. Local skin flaps cover surgical wounds with nearby skin and tissue. This technique uses arteries to supply donor blood to the transplanted tissue by directing the tissue into the advancement flap defect, where the flap margins are incised tangentially to release the tissue.² The combination procedure of advancement flap and interpolation flap yields optimal results in aesthetic appearance and skin function restoration.³

We report periorbital basal cell carcinoma affecting multiple cosmetic subunits. For optimum aesthetic and functional outcomes, the wound was closed using a combination of advancement flap and interpolation flap.

Case Report

We report a 43-year-old woman with BCC in the periorbital region, affecting the inferior eyelid, medial canthus, and lateral nasal wall. The treatment involved a two-step approach. First, a surgical excision followed by a histological examination. Second, advancement and interpolation flap procedures were used to close the defect after confirming that the excision margins were tumor-free. The area to be removed and a 5 mm margin were identified in the first phase. A glabellar line was created to insert the interpolation flap, and a nasolabial pedicle was created to extend the defect. Finally, a line from the infraorbital region to the temporal was drawn for the advancement flap (Figure 1 A,B). The tumor was surgically removed with a 5 mm margin under local anesthesia, resulting in a

5 cm defect. The upper defect was extended along the glabellar and infraorbital region after the initial excision. The pedicle in the melolabial flaps was removed to close the defect. An additional excision was performed to prevent flap movement and reduce the defect size (Figure 1 C,D).

A comprehensive incision of the upper subcutaneous fat was performed to move the flap. Before closing the flap with 5.0 monofilament sutures, any hemorrhaging vessels were ligated or treated with electrocoagulation. To optimize the surgical outcome, the flap section closest to the attachment was surgically incised two weeks postoperatively (Figure 1 C,D). A follow-up examination conducted four weeks after the procedure revealed complete wound closure, with no signs of tissue necrosis or abnormalities (Figure 1E). The case demonstrated satisfactory functional and aesthetic outcomes over four years (Figure 1F).

Discussion

The BCC treatment aimed to completely remove the tumor, preserve function, and restore appearance. Skin cancer frequently occurs on the face, presenting unique challenges in reconstruction. Effective facial reconstruction aligns the color and texture of the surrounding tissue. A combination of flaps can be an effective option to address these reconstruction challenges.⁴ After tumor removal, especially with Mohs surgery, the skin defect may require the surgeon to extend the depth to a consistent anatomical level. Removing tissue between the surgical defect and the cosmetic subunit junction can be advantageous but is not always necessary. Scars can blend into folds and shaded areas by selectively incising along the margins of cosmetic components.⁵

A transposition flap, with various morphological forms, is relocated into the surgical defect through rotation and/or advancement. The nasal branch of the angular artery supplies adequate blood flow to the external nasal flap, while branches of the artery supply the lateral nasal wall. Necrosis is anticipated.⁶ The interpolated flap does not originate from the recipient defect area. Normal tissue is bridged by a pedicle. Generally, the flap requires a pedicle separation procedure. This flap type is utilized when the mobility of tissue or skin is insufficient to cover the tissue defect with primary closure or wound flaps. The flap is elevated over healthy skin to treat the area, such as in a transposition flap. The base of the transposition flap is adjacent to the defect, while the base of the interpolation flap is located externally. This flap forms a pedicle from the base of the flap to the surgical defect. The pedicle is elevated following the vascularization of the flap wound.⁷

In our case, a combination of advancement and interpolation flaps was used to restore the defect, as a single flap was insufficient. Repairing facial skin abnormalities with a local advancement flap proved effective. This technique utilized skin flexibility and redundant tissue to cover the defect. Regional, interpolated, and free flaps are also viable options. A local advancement flap can be adapted

as needed. Serial excision combined with advancement is beneficial for scar revision and the removal of large benign skin lesions. This staged approach allows the native skin to expand and relax between procedures, facilitating easier excision.

New defects can be addressed using the same method. The advancement flap covers part of the defect, while skin grafts are progressively removed through serial excisions to address the remaining area.⁸ Creating a flap requires multiple incisions beyond the immediate defect, which may increase the risk of nerve injury and bleeding. However, this combined technique offers sufficient coverage while minimizing tension and avoiding significant tissue distortion.⁹

Conclusions

In conclusion, facial defects caused by skin tumors will necessitate various reconstruction methods, depending on the size and location of the deformity. The results obtained with a combination of flap techniques are improved by employing this new modification for periorbital abnormalities that require restoration of multiple cosmetic subunits. Our technique is simple and does not change the contour of the canthus.

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Figure 1. The BCC treatment using a combination of advancement and interpolation flaps procedures. (A) Anterior view and (B) lateral view of the area designated for excision; (C) tumor was surgically removed with a 5 mm margin; (D) the flap section closest to the attachment was surgically incised two weeks postoperatively; (E) results after four weeks showing complete wound closure with no necrosis or abnormalities; and (F) optimum restoration of functional and aesthetic appearance over four years.

