

Case Report

Oncological treatment and upper lip reconstruction in basal Cell carcinoma: case report and review of reconstructive options

Carla M. Cruz Rocha^{*1}, Jose D. Tellez Gonzalez¹, Danna Gonzalez Delgado¹,
Liliana A. Cuevas Mejia¹, Besser I. Irias Vasquez¹, Daniela I. Sanchez Lozano¹,
Carlos A. Bautista Lopez², Maria del C. Torres Gonzalez²

¹Department of General Surgery, Civil Hospital of Guadalajara, Guadalajara, Jalisco, Mexico

²University Center for Health Sciences, University of Guadalajara, Guadalajara, Jalisco, Mexico

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*Correspondence:

Dr. Carla M. Cruz Rocha,

E-mail: carlitacruzrocha4@gmail.com

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ABSTRACT

Basal cell carcinoma (BCC) is the most common cutaneous malignancy and frequently affects sun-exposed facial regions. Lesions of the upper lip are considered high risk due to their tendency for local invasion, recurrence, and involvement of critical functional and aesthetic subunits. Optimal management requires complete oncologic excision followed by anatomically precise reconstruction. We report the case of a 66-year-old woman with a recurrent nodular BCC of the upper lip after prior incomplete excision. Margin-controlled surgical resection was performed with intraoperative frozen-section analysis. Persistent deep margin involvement required extension of the excision to include the upper lip, anterior nasal vestibule floor, and premaxillary periosteum, resulting in a defect involving approximately 40% of the upper lip. Immediate reconstruction was carried out using a layered anatomical approach, including separate repair of the mucosa and orbicularis oris muscle, bilateral perialar advancement flaps, and an additional local cutaneous flap to reconstruct the central tubercle. This case highlights the importance of achieving complete tumor clearance in recurrent BCC, particularly in high-risk anatomical regions such as the upper lip. Reconstructive planning must balance oncologic safety with restoration of oral competence, symmetry, and aesthetic subunits. Local advancement flaps, especially perialar techniques, represent reliable options for moderate defects (30–50%), providing good functional and cosmetic outcomes when combined with meticulous layered repair. The presence of recurrence and periosteal involvement underscores the need for multidisciplinary evaluation, including consideration of adjuvant therapies. Recurrent upper-lip BCC requires an integrated approach combining aggressive oncologic resection with tailored reconstruction. Layered repair and local advancement flaps allow effective restoration of both function and aesthetics in moderate-sized defects, supporting their role as first-line reconstructive options in appropriately selected cases.

Keywords: Basal cell carcinoma, Mohs surgery, Upper lip, Local flaps, Facial reconstruction

INTRODUCTION

Basal cell carcinoma (BCC) is the most common malignant tumor of the skin, originating from basal keratinocytes of the epidermis or the follicular unit. Among its histologic variants, the nodular subtype accounts for approximately 50–54% of cases and

typically presents as a pearly, translucent, firm papule with well-defined borders, often progressing to ulceration in long-standing lesions.¹⁻³ Although BCC predominantly affects older adults, its incidence in younger populations has risen in recent decades, largely attributable to increased ultraviolet (UV) exposure and indoor tanning practices.⁴⁻⁷ Despite its very low metastatic potential,

BCC may demonstrate locally aggressive behavior, particularly in anatomically and functionally critical regions such as the upper lip, nose, and medial canthus. These high-risk facial zones are associated with increased recurrence rates, especially following incomplete excision, which have been reported to range from 10% to 17%.^{8,9} In this context, both European and National Comprehensive Cancer Network (NCCN) guidelines recommend Mohs micrographic surgery as the treatment of choice for high-risk or recurrent BCC, as it allows complete circumferential and deep margin assessment while preserving uninvolved tissue.¹⁰⁻¹³ The upper lip represents a uniquely complex reconstructive unit due to its tridimensional anatomy and its essential role in oral competence, speech articulation, facial expression, and aesthetic harmony. Successful reconstruction must preserve vermilion continuity, philtral definition, tubercle projection, and dynamic symmetry of the smile.¹⁵⁻¹⁷ Immediate reconstruction using local flaps is therefore

critical to restore function, sensation, mobility, and facial aesthetics while minimizing morbidity.

CASE REPORT

This case report forms part of a broader review on oncologic management and reconstructive strategies for upper-lip basal cell carcinoma (BCC). A 66-year-old woman with well-controlled hypertension presented with a one-year history of an ulcerated lesion located on the right philtrum. She had previously undergone a limited excision in the same region, and histopathological analysis at that time demonstrated an ulcerated nodular BCC, a subtype associated with a higher risk of recurrence and infiltrative behavior in high-risk facial areas. A new surgical excision with 3-mm clinical margins was performed in accordance with guideline-based recommendations for recurrent or incompletely excised BBC.

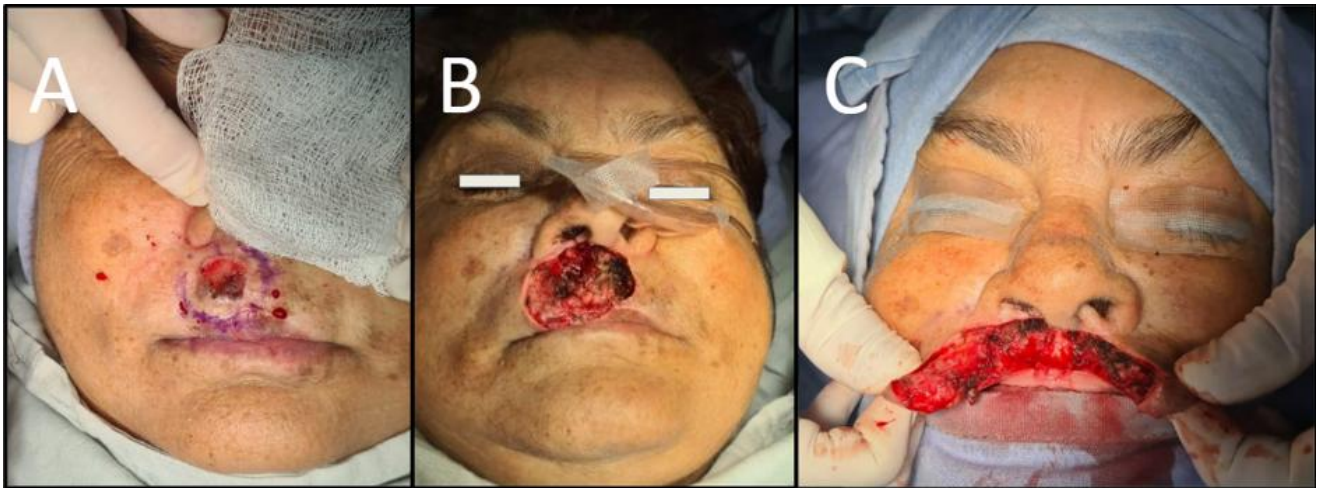


Figure 1: (A) Pre-surgical marking 3 mm from microscopic margins; (B) incision with persistent positive microscopic margins and (C) enlarged incision with negative microscopic margins.

Intraoperative frozen section analysis revealed involvement of the deep margin extending to the periosteum, prompting an extension of the resection to include the upper lip, the anterior floor of the nasal vestibule, and the premaxillary periosteum. This approach was consistent with current oncologic principles emphasizing complete tumor clearance prior to reconstruction. The resulting defect involved approximately 40% of the upper lip. Reconstruction was performed following a layered anatomical approach in accordance with established reconstructive algorithms for moderate-sized upper-lip defects. The mucosa, orbicularis oris muscle, and skin were dissected and repaired separately. The mucosal layer was closed with continuous absorbable sutures, while the orbicularis oris muscle was reapproximated using interrupted 3-0 polyglactin sutures to restore sphincteric function. Bilateral perialar advancement flaps were designed to

achieve lateromedial closure while preserving the natural contour of the nasal ala. Additionally, a supplementary cutaneous flap from the left upper lip was used to reconstruct the tubercle subunit. Skin closure was completed using 4-0 polyglactin and 4-0 polypropylene sutures. Postoperative management included oxygen supplementation and activity restriction to protect the muscular repair. Follow-up evaluation focused on flap viability, symmetry, oral competence, maximal mouth opening, and overall functional and aesthetic outcomes.

The reconstructive strategy resulted in successful layered anatomical restoration and stable functional recovery. The bilateral perialar advancement flaps demonstrated excellent viability and integration, preserving the natural alar curvature without distortion. The patient maintained oral competence, achieved adequate central projection through tubercle reconstruction, and presented only mild



Figure 2: (A) Reconstruction of buccal mucosa and upper lip skin of orbicularis oris muscle; (B) reconstruction of orbicularis oris muscle; (C) immediate postoperative period.



Figure 3: (A) Late post-surgical results and (B) Late post-surgery forced oral opening.

asymmetry of the right commissure. Maximal mouth opening reached 5 cm, consistent with expected functional outcomes. Color and texture match of the flaps were satisfactory, contributing to favorable aesthetic results.

No postoperative complications such as wound dehiscence, infection, flap congestion, or microstomia were observed. From an oncologic perspective, the case highlighted the importance of achieving clear surgical margins, particularly in recurrent bcc with periosteal involvement - factors associated with an increased risk of recurrence. Given these features, the patient was referred to medical oncology for evaluation of adjuvant radiotherapy as part of a multidisciplinary treatment approach.

DISCUSSION

Upper-lip BCC is considered a high-risk lesion because of its propensity for recurrence, progressive local invasion, and involvement of functionally and aesthetically critical structures. Recurrence after previous incomplete excision considerably increases operative complexity, as scar tissue and altered anatomical planes may hinder margin assessment and create larger defects. In this setting, Mohs micrographic surgery remains the gold standard for perioral tumors, achieving cure rates of 98% for primary and 94% for recurrent BCC.^{6,7} Its ability to evaluate all margins in real time is especially valuable in the lip, where even small tissue losses may result in noticeable functional and cosmetic sequelae. Reconstruction of the upper lip must restore three key

elements: the integrity of the orbicularis oris muscle, essential for oral continence, phonation, and facial expression; the mucocutaneous continuity that ensures sensation and competence; and the aesthetic symmetry that defines the philtral columns, tubercle, and vermilion.^{9,10}

Reconstruction by anatomical layers

Successful lip reconstruction requires restoring its tridimensional architecture - mucosa, orbicularis muscle, and skin. Repairing the orbicularis is particularly critical since this sphincteric muscle is indispensable for articulation, feeding, and emotional expression. Inadequate muscular reconstruction may lead to oral incompetence, saliva leakage, microstomia, or smile distortion, as emphasized in classic reconstructive guidelines by Park and others.¹⁷⁻²⁰

Reconstructive techniques according to defect size and location

For defects involving approximately 30–50% of the upper lip, as in the present case, reconstruction with local flaps is generally sufficient to restore both contour and mobility, provided that the oral commissure remains intact and adequate tissue laxity is present.²¹⁻²³ Local flaps offer several advantages, including superior color and texture match, preservation of sensibility, maintenance of muscular continuity, and avoidance of donor-site morbidity associated with regional or free flaps.²¹⁻²⁴ Perialar advancement flaps - designed as V-Y, island, or crescentic variants - are particularly well suited for paracentral and paramedian upper-lip defects. These flaps recruit tissue from the lateral upper lip and nasolabial region, allowing lateromedial advancement while preserving the alar base, nasolabial fold, and philtral contour.²³⁻²⁵ Because the flap advances along relaxed skin tension lines, it minimizes scar visibility and reduces the risk of nasal distortion. Liapakis et al reported excellent functional and aesthetic outcomes using perialar advancement flaps for moderate upper-lip defects, with high rates of oral competence and minimal asymmetry.²¹⁻²³ Similar results have been corroborated in reconstructive series emphasizing the reliability of these flaps for defects not exceeding half of the lip width.^{21,22} Lateral advancement flaps represent another effective option for central or paramedian upper-lip defects within this size range. By mobilizing tissue from the lateral lip and cheek, these flaps maintain the natural curvature of the vermilion border and preserve the nasolabial groove, thereby minimizing distortion of adjacent facial subunits.²²⁻²⁴ When carefully designed, lateral advancement flaps allow for precise alignment of the white roll and vermilion–cutaneous junction, which is critical for aesthetic outcomes in the upper lip. Thornton and colleagues emphasize that respecting lip subunits and maintaining muscular continuity during advancement are key determinants of long-term functional success.²²

In cases where mucosal volume or continuity is insufficient, additional mucosal advancement flaps may be employed to restore the internal lining. This maneuver is particularly important to prevent postoperative oral incompetence, contracture, or vermilion deficiency, especially when defects extend close to the wet–dry junction.²¹⁻²⁴ Adequate mucosal reconstruction also contributes to improved sensation and patient comfort during speech and mastication. In the present case, bilateral perialar advancement flaps provided symmetrical lateromedial closure, while an additional local cutaneous flap was used to recreate the central tubercle subunit. This combined approach respected facial subunit principles and allowed restoration of lip projection, symmetry, and oral competence, consistent with reconstructive algorithms described for moderate upper-lip defects.²¹⁻²⁶

For defects of 50–70% of the upper lip

Defects involving 50–70% of the upper lip represent a reconstructive challenge that exceeds the capacity of simple advancement techniques and requires either increased tissue mobility or tissue transfer from adjacent lip subunits. In these cases, preservation of oral competence, vermilion continuity, and dynamic symmetry must be balanced against the risk of microstomia and distortion of the philtral architecture.^{21,22} The Abbé flap (cross-lip flap) remains the gold standard for central upper-lip defects involving the philtrum and tubercle. This staged flap transfers full-thickness tissue from the lower lip based on the labial artery, providing tissue of identical color, texture, thickness, and muscular composition. Because the orbicularis oris muscle is included, the Abbé flap allows restoration of sphincteric function and dynamic movement, which is essential for speech and oral continence. Despite its excellent functional and aesthetic outcomes, the technique requires a two-stage procedure and temporary oral tethering, which may limit patient acceptance in selected cases.²²⁻²⁵ The Estlander flap is particularly indicated when defects extend to or involve the oral commissure. This flap transfers lateral lip tissue while maintaining continuity of the vermilion and preserving oral competence.²²⁻²⁶ However, it may alter the natural curvature of Cupid's bow and produce some degree of commissural asymmetry. Lam and Ducic report favorable functional outcomes with Estlander flaps for defects involving up to two-thirds of the lip, with acceptable speech and oral continence when meticulous muscular reconstruction is performed.²⁶ Careful patient selection and precise flap design are critical to minimizing aesthetic compromise. Composite V-Y advancement flaps provide an alternative strategy for moderate-to-large defects by mobilizing full-thickness lip tissue as a single anatomical unit. These flaps allow advancement of mucosa, muscle, and skin simultaneously, preserving tissue thickness and reducing the risk of vermilion mismatch.^{23,24} When properly executed, composite V-Y flaps can restore lip projection and continuity while limiting microstomia, particularly in

patients with adequate tissue laxity. Several authors advocate their use as a single-stage option for select defects approaching 60% of the upper lip, especially when commissures remain uninvolved.²¹⁻²⁴

For massive defects (>70%) or composite loss

Although not encountered in the present case, recurrent, neglected, or deeply invasive basal cell carcinoma may result in extensive upper-lip defects exceeding 70% of lip width or involving composite loss of skin, muscle, mucosa, and adjacent structures. In such scenarios, local tissue recruitment is often insufficient, and regional or free tissue transfer becomes necessary to restore function and facial harmony.^{21,22} Regional flaps, particularly the nasolabial flap, represent a reliable reconstructive option for large upper-lip defects. As described by Baker and others, the nasolabial flap offers excellent color and texture match, robust vascularity, and minimal donor-site morbidity. It is especially useful for reconstructing the cutaneous component of the upper lip and nasal vestibule. However, because it lacks vermilion and mucosal lining, reconstruction of the red lip typically requires adjunctive mucosal advancement or secondary vermilion grafting to restore oral competence and aesthetic balance.²²⁻²⁶ When defects are massive or associated with significant functional compromise, free tissue transfer becomes the reconstructive modality of choice. Radial forearm free flaps and anterolateral thigh (ALT) flaps provide ample tissue volume, reliable vascular pedicles, and versatility in shaping complex three-dimensional defects.²¹⁻²⁶ These flaps allow simultaneous reconstruction of external skin, muscular bulk, and internal lining, particularly in cases involving total lip loss or adjacent maxillary invasion. Nevertheless, free flaps often lack the native characteristics of lip tissue, and secondary refinements - such as debulking, vermilion reconstruction, or commissuroplasty - are frequently required to optimize symmetry, mobility, and aesthetic outcomes.²¹⁻²⁴ Overall, reconstruction of massive upper-lip defects mandates a staged, multidisciplinary approach, prioritizing oncologic safety while progressively restoring oral competence, speech, and facial expression.

Philtral and tubercle symmetry

The philtrum and central tubercle constitute key aesthetic subunits of the upper lip and play a fundamental role in facial identity, symmetry, and dynamic expression. Precise reconstruction of these structures requires meticulous geometric planning and strict adherence to the facial subunit principle, as originally described by Burget et al and further refined by Zoumalan et al.²⁴⁻²⁶ Failure to respect these subunits may result in asymmetry, flattening of the Cupid's bow, or distortion of the smile. Reestablishing the medial insertions of the orbicularis oris muscle is essential to restore central projection and prevent postoperative tubercle retraction. Proper muscular realignment ensures balanced sphincteric function, contributes to natural philtral definition, and

maintains vermilion eversion - outcomes consistently emphasized in reconstructive series focused on functional lip restoration.^{23,24} Inadequate muscular reconstruction has been associated with long-term complications such as oral incompetence, speech alteration, and compromised aesthetic outcomes.

Oncologic considerations and adjuvant therapy

In recurrent basal cell carcinoma, tumors exhibiting deep invasion, previously positive surgical margins, perineural involvement, or infiltrative histologic subtypes are associated with a significantly increased risk of further local recurrence. In these high-risk scenarios, both European guidelines and the National Comprehensive Cancer Network (NCCN) recommend consideration of adjuvant radiotherapy as part of a multidisciplinary treatment strategy.¹¹ Although distant metastasis in basal cell carcinoma remains exceedingly rare, aggressive local behavior in anatomically critical regions - such as the upper lip - may lead to substantial functional and aesthetic morbidity if not adequately controlled. Multidisciplinary evaluation involving dermatology, surgical oncology, plastic surgery, and radiation oncology is therefore essential to optimize oncologic safety while preserving quality of life.¹⁸⁻²⁰

CONCLUSION

The management of recurrent basal cell carcinoma of the upper lip requires meticulous oncologic excision and highly personalized reconstruction. Mohs micrographic surgery ensures negative margins while maximizing tissue preservation, and local flaps provide reliable restoration of lip function, oral competence, and facial aesthetics. This case highlights how appropriate integration of oncologic and reconstructive techniques minimizes recurrence, optimizes functional recovery, and reduces psychological impact. Adjuvant therapy should be considered in recurrent or high-risk lesions as part of comprehensive patient care.

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