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Lip reconstruction using superficial flaps: functional and aesthetic integration

Reconstrução labial com retalhos superficiais: integrando funcionalidade e estética

Case report

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ABSTRACT
Mohs micrographic surgery is the preferred technique for the treatment of skin cancers involving the lip region. Reconstruction of surgical defects in this area is particularly complex, requiring preservation of anatomical structures, respect for cosmetic subunits, and maintenance of function whenever possible. This study describes 4 cases of lip surgical defects managed with different reconstructive techniques: mucosal rotation flaps, double V-Y advancement flaps, and O-Z rotation flaps. The choice of technique was individualized according to the location and size of the defect, aiming to achieve symmetry, preserve oral sphincter function, and obtain satisfactory aesthetic outcomes.
Keywords: Surgical Flaps; Mohs Surgery; Lip

RESUMO
A cirurgia micrográfica de Mohs é a técnica mais adequada para o tratamento dos cânceres de pele na região dos lábios. A reconstrução dos defeitos cirúrgicos nessa área é bastante complexa, sendo necessário preservar as estruturas anatômicas, respeitar as subunidades cosméticas e manter a funcionalidade, sempre que possível. Este trabalho descreve quatro casos de defeitos cirúrgicos labiais tratados com diferentes técnicas reconstrutivas: retalho de rotação de mucosa, V-Y com duplo avanço e rotação em O-Z. A escolha da abordagem foi individualizada, conforme localização e tamanho do defeito, visando simetria, manutenção da função esfincteriana do lábio e resultado estético satisfatório.
Palavras-chave: *Retalhos Cirúrgicos; Cirurgia de Mohs; Lábio*

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INTRODUCTION

The lips are a common site for skin cancer. Basal cell carcinoma (BCC) is the most frequent subtype affecting the upper lip, whereas squamous cell carcinoma (SCC) predominates in the lower lip.[1,2] Surgical treatment is typically indicated, with Mohs micrographic surgery (MMS) providing superior margin control, greater tissue preservation, and lower recurrence rates.[3,4]

Nevertheless, reconstruction of surgical defects in the lip region remains challenging. The lips have limited tissue availability for primary closure, and their boundaries encompass multiple cosmetic subunits, increasing the risk of substantial distortion, facial asymmetry, and functional impairment.[3,4]

In this study, we describe 4 cases involving defects of the upper or lower lip that achieved favorable aesthetic and functional outcomes after reconstruction using mucosal rotation flaps, double V-Y advancement flaps, and double O-Z rotation flaps.

METHODS AND RESULTS CASE 1

A 70-year-old woman was diagnosed with superficial BCC on the left upper lip and underwent MMS. The procedure resulted in a surgical defect measuring 16 x 11 mm in diameter after tumor-free margins were confirmed at the second stage. Reconstruction was performed using a rotation flap. This technique involved an incision along the medial aspect of the surgical defect, extending toward the inner labial mucosa. Submucosal undermining of the adjacent upper lip tissue was then performed to facilitate tissue mobilization and rotation. A Burow's triangle was excised, with its lateral limit at the labial commissure. The wound edges were approximated using 5-0 Vicryl sutures, selected for their flexibility and ability to promote optimal edge coaptation (Figure 1).

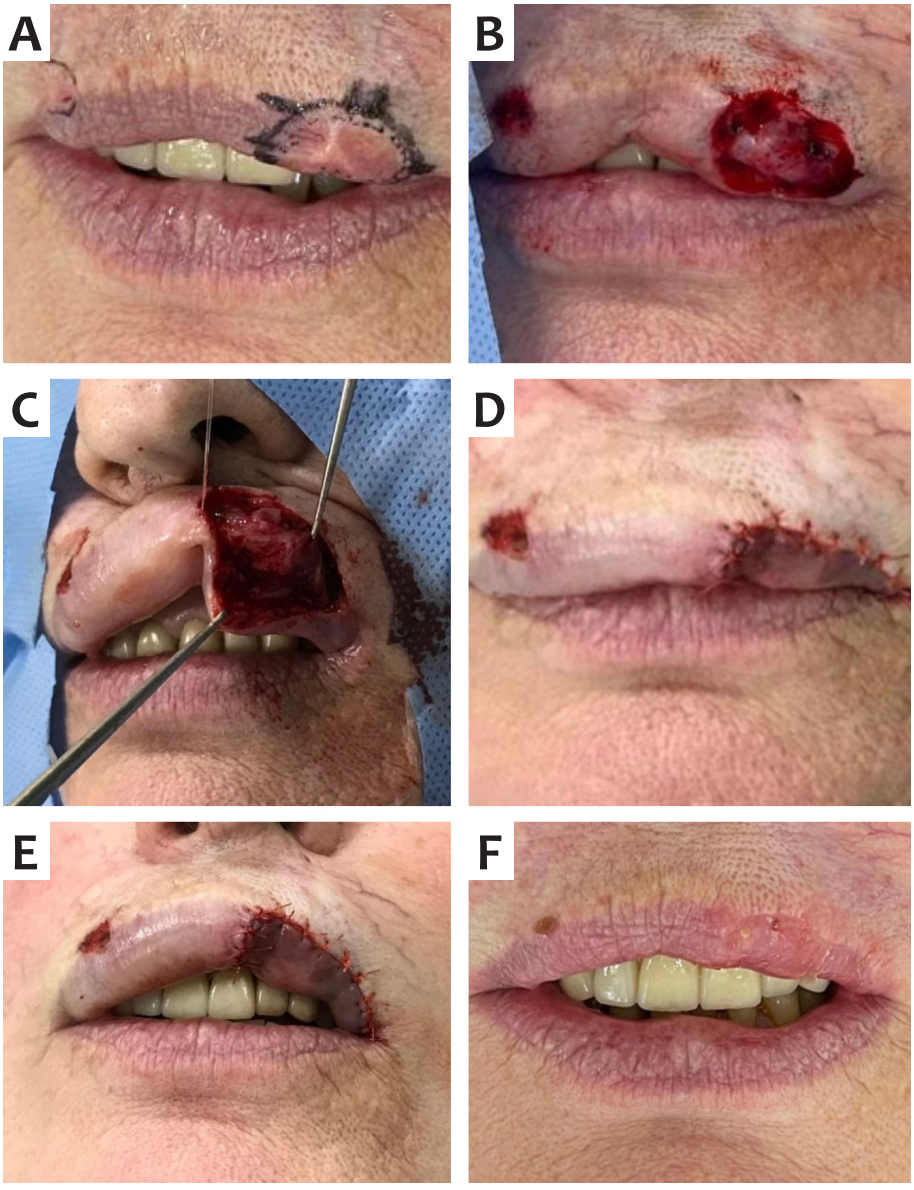

FIGURE 1: A - Lesion marked on the upper lip.
B - Surgical defect after Mohs micrographic surgery.
C - Exposure of submucosal undermining of the upper lip after incision along the medial aspect of the wound.
D and **E -** Immediate postoperative result after rotation flap reconstruction.
F - Postoperative result at 30 days.

CASE 2

A 59-year-old man presented with nodular BCC located centrally along the vermilion border of the upper lip, measuring 9 x 10 mm in diameter. MMS was performed, achieving tumor-free margins at the first stage. Reconstruction was performed using a double V-Y advancement flap. A V-shaped incision was made adjacent and lateral to the defect, allowing mobilization with compatible tissue. Unlike the conventional approach, this procedure was performed bilaterally, followed by horizontal advancement of the incised areas toward the center of the initial defect while preserving subcutaneous pedicles to maintain adequate perfusion. Both advanced flaps were then sutured at their medial edges, and the margins of the donor sites were closed with linear edge-to-edge sutures, resulting in a bilateral Y-shaped scar (Figures 2 and 3).

CASE 3

A 54-year-old man underwent MMS for invasive SCC located centrally on the vermilion border of the lower lip. After confirmation of tumor-free margins at the first stage, reconstruction was performed using a double O-Z rotation flap. An initial incision was made in the submucosal plane extending from the anterior border of the defect to the left labial commissure. A second incision was made on the contralateral side of the mucosa, extending from the posterior border of the defect to the right labial commissure. The 2 triangular flaps were then rotated over the defect and sutured in a Z configuration using 4-0 Vicryl (Figures 4 and 5).

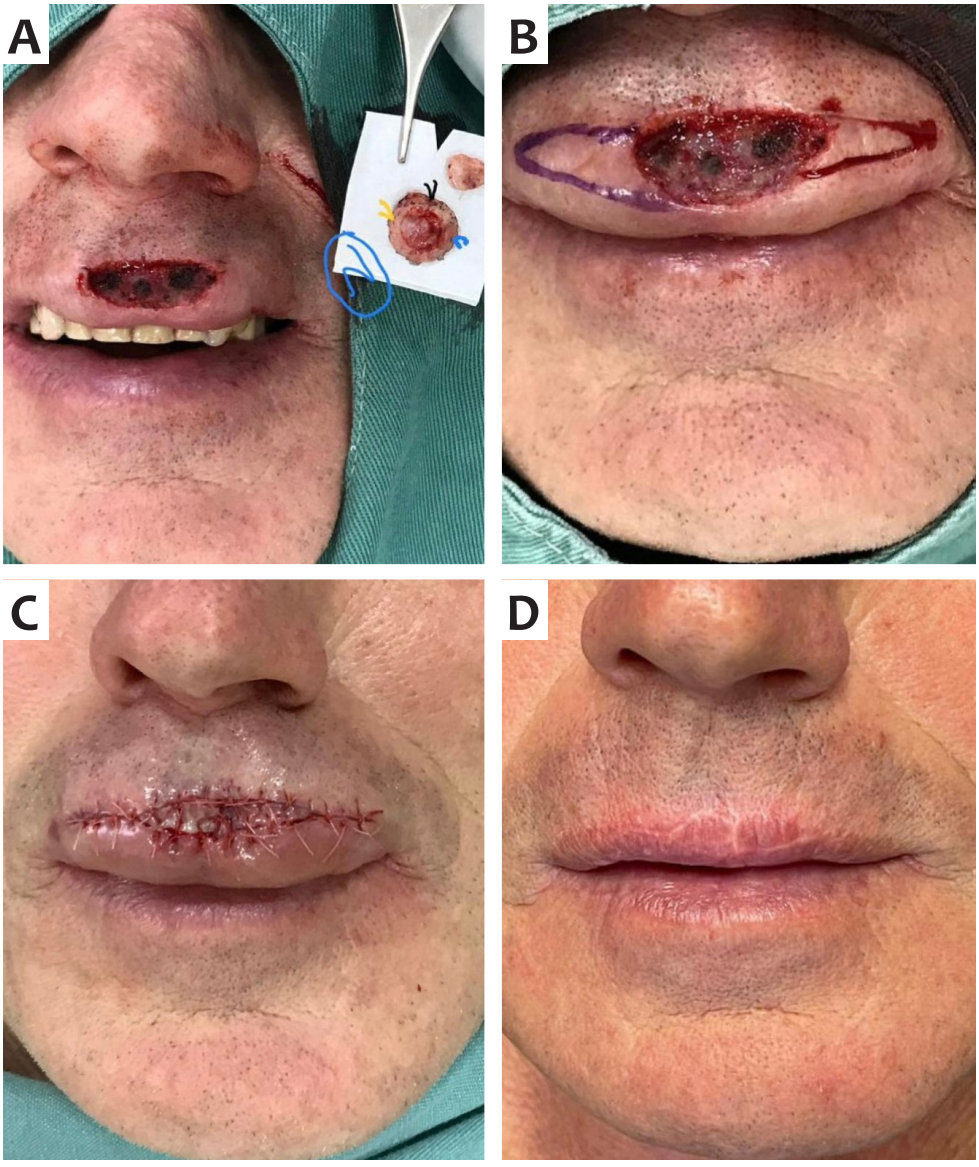

Figure 2: A - Surgical defect of the upper lip skin at the midline after basal cell carcinoma excision using Mohs micrographic surgery.
B - Bilateral V-Y advancement flap incisions.
C - Immediate postoperative result after closure.
D - Postoperative result at 30 days.

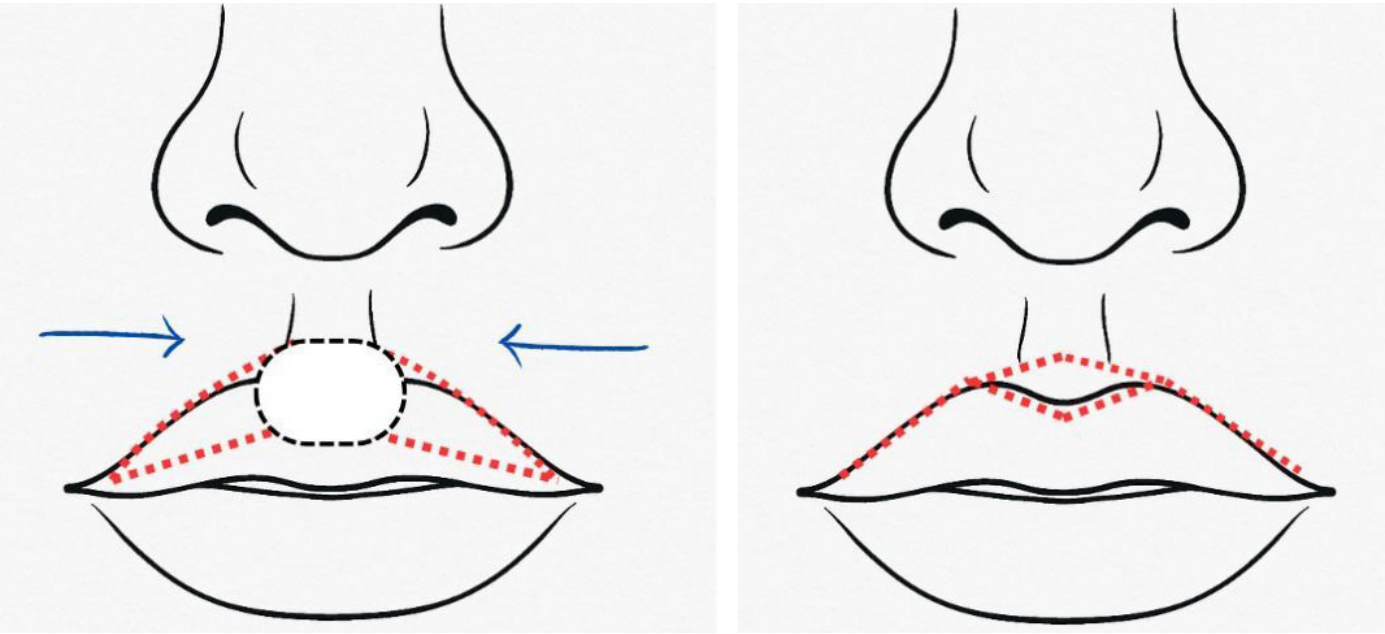

Figure 3: V-shaped incision created lateral to the defect, allowing tissue mobilization. Bilateral advancement of the incised areas toward the center of the lesion, preserving the subcutaneous pedicles. Suturing of the medial edges of the advanced flaps, resulting in a Y-shaped scar.

CASE 4

A 68-year-old man presented with moderately differentiated SCC located in the vermilion border of the left lower lip. Tumor excision was performed using a conventional surgical approach. Reconstruction was performed using a mucosal rotation flap. An incision was made along the medial aspect of the surgical defect on the lower lip, extending toward the inner mucosa. Submucosal undermining of the perilesional tissue was performed to allow adequate coverage of the defect. To compensate for tissue rotation and prevent redundancy, a lateral triangular excision was performed up to the labial commissure. The mobilized tissue was then rotated anteriorly and sutured using 5-0 Vicryl (Figure 6).

DISCUSSION

MMS with complete margin control not only achieves significant cure rates but also allows for maximal tissue preservation for reconstruction. Reconstruction of surgical defects from skin cancer involving the lip region remains technically challenging due to the limited tissue availability and the high risk of functional impairment. Microstomia and sensory innervation may occur, leading to changes in aesthetic perception, mastication, and speech articulation.[3]

Some reconstructive options have been described for this anatomical site, including healing by secondary intention, primary closure, or wedge excision. Although these approaches are less complex and may yield satisfactory outcomes in selected cases, they carry an increased risk of unpredictable results, such as scar contracture and eclabium.[1]

Mucosal advancement flaps are most commonly reserved for superficial reconstructions of the vermilion border.[5] However, this technique has inherent limitations, including varying degrees of contracture and cosmetic distortion due to differences in color and texture between the labial mucosa and vermilion border.[6] Additionally, increased dryness and occasional lip sensory loss have been reported.[7]

The mucosal rotation technique, as described in cases 1 and 4, tends to mitigate these drawbacks. In this approach, only the medial portion of the defect is rotated and advanced anteriorly, preserving the lateral mucosal tissue, from which only a Burow's triangle is excised to facilitate proper edge alignment.

Another technique, less commonly described in the literature — typically used for scalp reconstruction but effective in various anatomical regions — is the double O-Z rotation flap, as detailed in case 3. This method involves incisions that create 2 triangular flaps, which are repositioned and sutured in a Z configuration. This design minimizes traction on mucosal tissue while preserving lip volume.

Bilateral advancement flaps are indicated for larger defects of the upper lip, particularly those extending beyond the boundaries of the philtrum and compromising the mucocutaneous junction, or in cases where the natural curvature of the philtrum has been lost due to age-related lip atrophy.[8] Unilateral

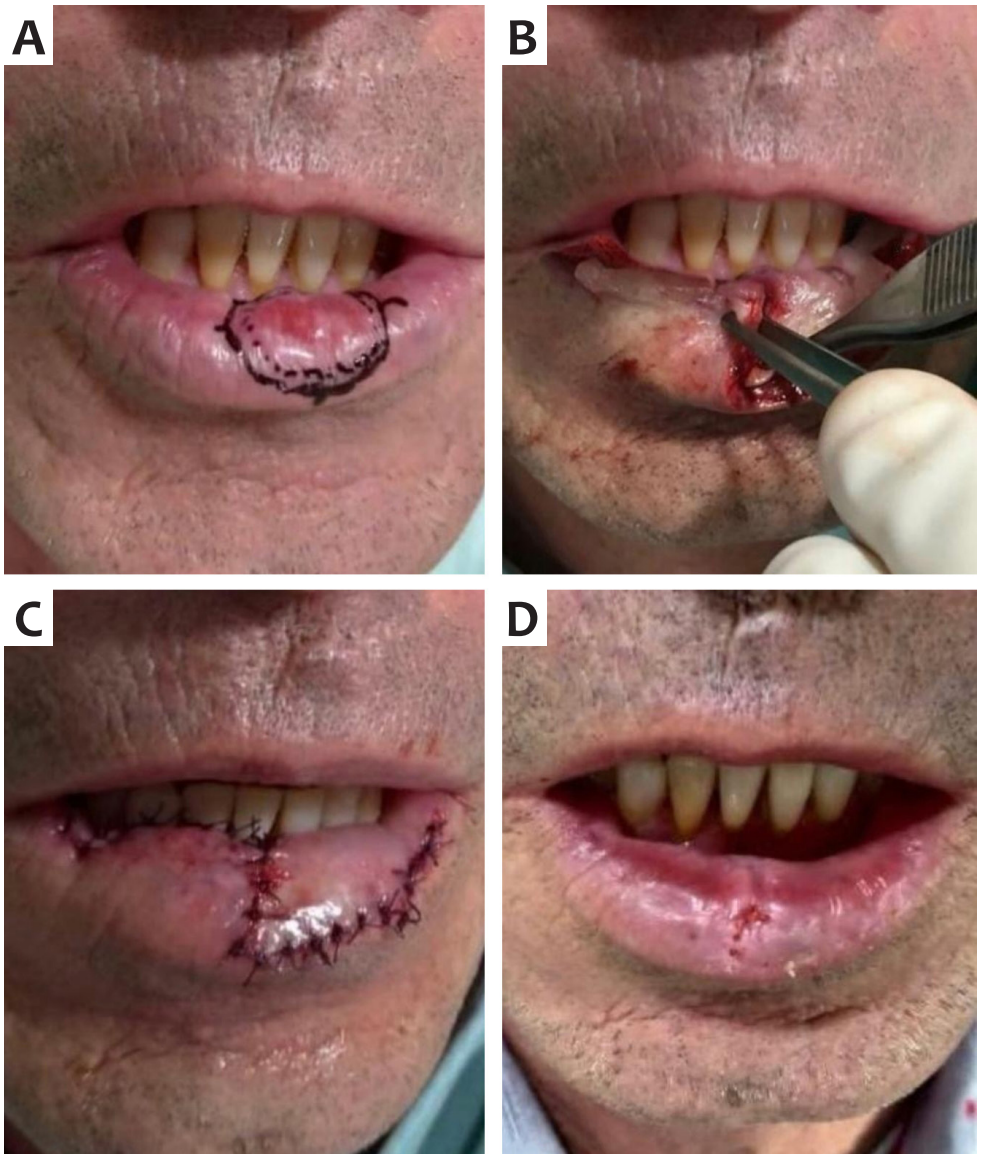

FIGURE 4: A - Surgical defect of the lower lip.
B - O-Z flap rotation.
C - Immediate postoperative result after closure.
D - Postoperative result at 30 days.

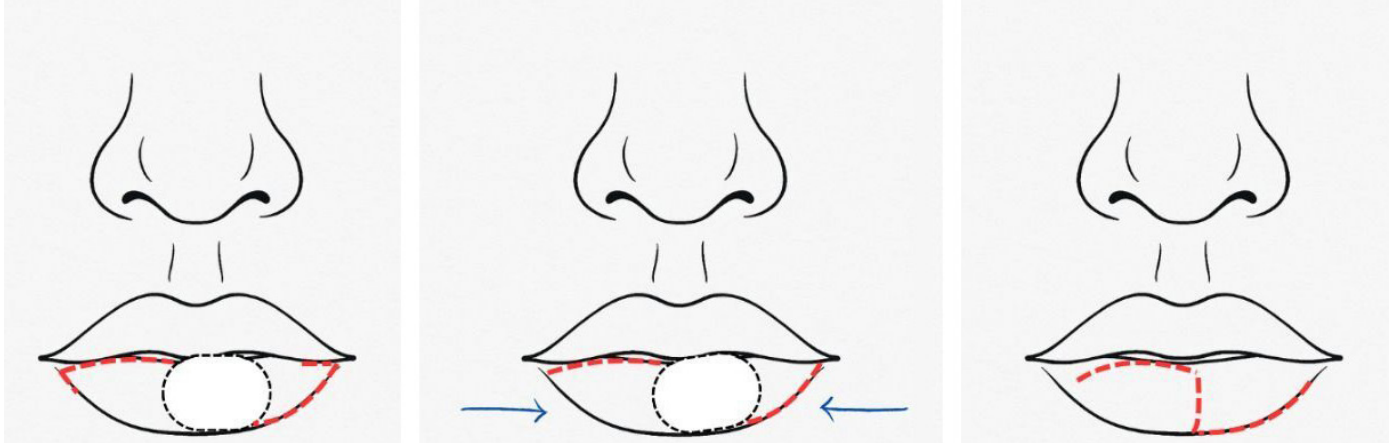

FIGURE 5: Submucosal incision extending from the anterior border of the defect to the left labial commissure. Contralateral mucosal incision extending from the posterior border of the defect to the right labial commissure. Rotation of the triangular flaps over the defect in preparation for closure. Z-shaped suturing using absorbable material.

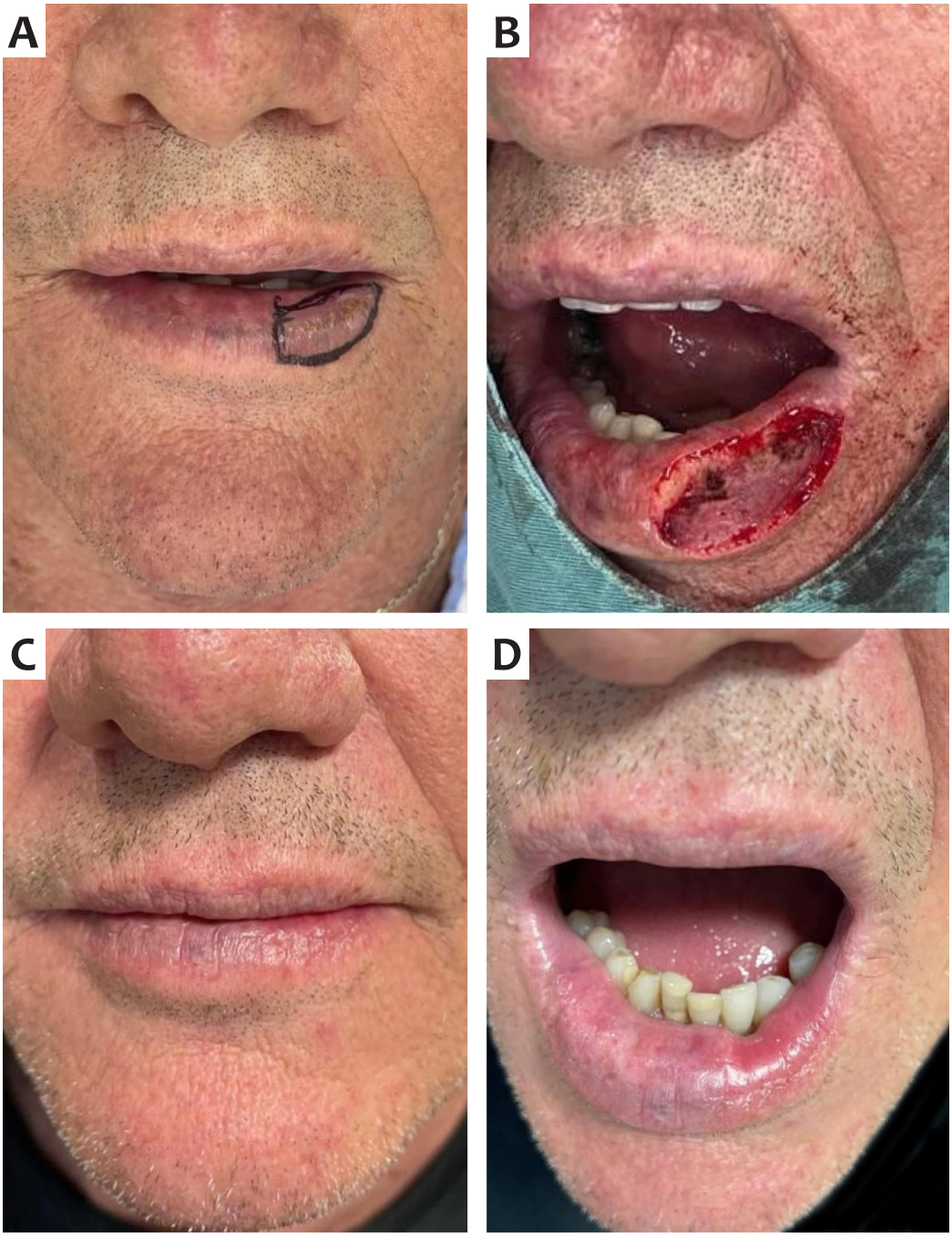

Figure 6: A - Lesion marked with 1-mm margins.
B - Surgical defect of the lower lip.
C and **D -** Postoperative result at 30 days, with preserved functional mobility.

V-Y advancement flaps, based on a subcutaneous pedicle, are suitable for lateral upper lip defects larger than 1 cm, whereas bilateral V-Y advancement flaps are recommended for central lip defects.[1] In case 2, a double V-Y advancement flap was selected to allow mobilization of adjacent tissue with optimal compatibility in color, texture, and thickness. The technique provided adequate defect coverage, restoring anatomical symmetry and function while preserving the oral sphincter without the need for muscle transposition, which would be difficult to achieve with other reconstructive techniques.

CONCLUSION

Multiple techniques have been described for lip reconstruction after MMS. The choice of technique depends on the

size and depth of the defect, as well as the aggressiveness and histologic subtype of the tumor, with the overarching goal of preserving anatomical boundaries and aesthetic subunits.

Primary closure should be reserved for smaller defects in selected cases. Mucosal rotation and double O-Z rotation flaps appear more favorable than mucosal advancement techniques due to superior preservation of lip tissue, resulting in reduced aesthetic and functional impairment. In contrast, double V-Y advancement flaps contribute to maintaining lip symmetry and preserving neural and sphincter function.

Therefore, selecting the most appropriate reconstructive technique requires comprehensive anatomical knowledge, surgical expertise, and continuous updating based on techniques described in the literature. ●

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