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Lip Reconstruction in Lip Cancers Experience of the Plastic, Reconstructive and Aesthetic Surgery Department of Rabat about 40 Cases

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Abstract: **Case Report**

***Introduction*:** Lip cancers are a distinct entity in cervicofacial oncology affecting an essential organ due to its functions. Their treatment is primarily surgical. ***Objective*:** To specify the methods of reconstruction following tumor excision, as well as postoperative complications, and to evaluate outcomes in terms of function and aesthetics. ***Methods*:** We conducted a retrospective study including 40 patients operated on for lip tumors over a 3-year period. ***Results*:** Simple sutures, skin grafts, local flaps, regional flaps, free flaps, and perforator flaps (n = 20, 1, 9, 7, 2, and 1 respectively) were the reconstruction techniques used. Postoperative courses included suture dehiscence, transient flap congestion, partial flap necrosis, and postoperative infection (n = 2, 1, 1, and 4 respectively). Functional sequelae observed were mainly food leaks (n = 2), lower gingival exposure (n = 2), and residual microstomia (n = 4). Aesthetic outcomes were judged good in 80% and average in 20% of our patients. ***Conclusion*:** Surgery for lip cancer is relatively well codified. However, in the presence of a large tissue defect, choosing the reconstruction technique is challenging, given the potentially disabling functional and aesthetic sequelae for the patient.

Keywords: Lip Tumor, Plastic Surgery, Squamous Cell Carcinoma, Functional outcomes, Aesthetic results.

I. INTRODUCTION

The lips represent a key facial element for expressiveness, but also play a major functional role in oral cavity closure, contributing to all oro-facial functions: phonation, respiration, deglutition, and expression.

They have a very special role as centers of facial expression and as the stoma's gateway. Regarding language, they contribute to the pronunciation of certain phonemes, such as [b], [m], and [p], by subtle modifications of airflow. Without lips, these phonemes could not be pronounced with such precision.

The lips also allow more elaborate movements, due to the development of the frontal cortices. These include expressive gestures, such as kissing, smiling, or conveying joy, fear, or sadness.

They also have a crucial aesthetic component. Like the eyes, the lips are an important element in facial proportions and harmony, responding to facial aesthetic criteria.

Etiologies of lip tissue loss are dominated by animal bites, road accidents, ballistic trauma, but mainly malignant cutaneous tumors (carcinomas, melanomas).

Reconstruction of such tissue loss depends on several parameters: type, location,

size, thickness of defect, alveodental architecture, and neighboring tissues.

Reconstruction is very complex and warrants precise analysis with logical proposals for stagestrategies and techniques.

This surgery follows basic rules to ensure an optimal result. Reconstruction may be done via simple suture, but most often local flaps are used. Success is evaluated by two essential criteria: lip function (restoration of continence allowing alimentation) and the aesthetic quality of reconstruction.

Few studies have compared outcomes of different reconstruction methods. Our study aims to examine reconstruction methods after tumor excision, postoperative complications, and assess functional and aesthetic outcomes.

II. Patients and Method

We performed a descriptive retrospective study analyzing the records of 40 adult patients operated on for lip tumors in our department over a period of 3 years (January 2021–December 2024). Inclusion criteria were adults with histologically confirmed malignant lip-origin tumors. Data were collected from archives. All patients underwent surgical treatment involving tumor excision with safety margins depending on tumor type, specimens sent for histopathologic margin assessment, followed by lip reconstruction: direct excision + suture, skin graft, local flap, regional flap, free or perforator flap.

Postoperatively, all patients received broad-spectrum parenteral antibiotics. Local care was performed daily on both skin and mucosal aspects, using multiple daily mouth rinses. Oral intake was ensured via a nasogastric tube placed intraoperatively. Tube duration depended on healing quality, averaging 3weeks.

We assessed complications such as dehiscence, flap necrosis or congestion, surgical site infection, as well as functional sequelae specific to lip reconstruction: microstomia, salivary/food leaks, and lower gingival exposure. Functional outcome was evaluated based on salivary continence, mouth opening (microstomia), and gingival exposure. Aesthetic result classification was subjective: poor if the patient reported aesthetic discomfort; average if the patient had an acceptable scar; good if no aesthetic discomfort.

Statistical correlation between chosen surgical method and specific complication was performed using SPSS for Windows (version 20).

III. RESULTS

Our study included 24 men (60%) and 16 women (40%), with a male predominance (sex ratio 1.5). Mean age was 60 years (range: 40–75). Among risk factors, tobacco consumption accounted for 73%. Tumors were primarily squamous cell carcinoma. Regional and distant extension workup found no distant metastases.

Lower lip involvement was most frequent (n = 24, 60%), followed by upper lip (n = 12, 30%) and commissural involvement (n = 4, 10%). Tumor extension was mostly toward the labial mucosa (18 cases; 90%) and across the midline (4 cases; 20%).

Tumor size ranged from 1 to 5 cm (median 3 cm; mean 3.06 cm; SD 1.62 cm). Most lip cancers were diagnosed at T1 (60%), T2 (20%), and T3 (20%). No clinically or sonographically palpable cervical lymphadenopathy was found.

Final histopathology revealed squamous cell and basal cell carcinomas. All surgeries were under general anesthesia. Tumorectomy specimens were oriented for margin assessment. Margins ranged from 8–10 mm for squamous cell carcinomas and 5–10 mm for basal cell carcinomas. Definitive histology showed clear margins in 38 patients; 2 patients had involved margins and received adjuvant radiotherapy.

Reconstruction methods for lip tissue defects were distributed as follows: direct excision + local flap in 20 patients, full-thickness skin graft in 1, local flaps in 9, locoregional flaps in 7, free flaps in 2, and perforator flap in 1.

Direct excision + flap types: W-plasty in 7, Z-plasty in 4, V-plasty in 9. Local flaps were used in 9 patients; heterolateral lip flaps were most common. These were used for defects 3–5 cm (mean: 3.42 cm), with tumor sites on the lower lip with commissure in 1 case, lower lip in 5, upper lip in 3.

The Estlander flap is a heterolateral full-thickness lip flap based on the coronary labial artery, turned 180°. It is indicated for lateral defects exceeding 1/3 of upper or lower lip. Five patients in our study received this flap.

Karapandzic flap was indicated in 5 patients, all with lower lip tumors (12.5% of our total; 26% of those treated with flaps). These patients had 5–8 cm defects and underwent bilateral Karapandzic flaps. Tumor sizes ranged from 2 to 5 cm (mean 3.5 cm). All had midline and internal mucosal extension. This technique is simple and quick, based on a superiorly based cheek advancement flap that preserves orbicularis muscle.

Two patients underwent radial forearm free flap ("Chinese flap") based on radial artery. Defects ranged from 5–9 cm (mean 6.5 cm), involving complete lower lip where other methods were not feasible. After flap harvest, vascular anastomosis was performed to the external carotid artery and external jugular vein; donor site was resurfaced by split-thickness skin graft in a second session. Some patients had secondary commissuroplasty (Préaux technique) after 6 months to correct rounded commissure deformity.

Functional results post-reconstruction were satisfactory in 70%. Postoperative complications occurred in 20%: suture dehiscence, flap congestion, partial flap necrosis, and infection. Dehiscence occurred in 2 patients with local anesthesia for edge freshening and resuturing. One free flap patient had transient cutaneous congestion on Postoperative Day 2, which resolved spontaneously. Partial flap edge necrosis was treated with debridement and secondary suture. Surgical site infection occurred in 4 flap patients, resolved with targeted parenteral antibiotics. Functional sequelae included microstomia, food/salivary leaks, and lower gingival exposure.

Table 1: Patient reconstruction techniques

Techniques	Number	Percentage
Skin Graft	1	2,5%
W Plasty	7	17,5%
V Plasty	9	22,5%
Z Plasty	4	10%
Estlander flap	5	12,5%
Abbé flap	4	10%
Karapandzic flap	5	12 ,5%
Webster flap	2	5%
Chinois free flap	2	5%
Submental Perforator flap	1	2,5%
Total	40	100%

Local flap reconstructions were used in 72.5% of cases (50% direct sutures, 22.5% heterolateral flaps), reflecting early presentation and small lesion size.

Residual microstomia was the most frequent functional sequela (n = 4), mostly among heterolateral flap patients; 2 of these underwent Préaux commissuroplasty. Food leaks occurred in 2 free flap patients; none in simple suture cases. Use of flap coverage was significantly associated with food leaks ($p = 0.048$).

Lower gingival exposure was observed in 2 patients. Subgroup analysis showed that Chinese free flap technique carried the highest risk for gingival exposure and food/salivary leaks if not properly thinned.

Aesthetic outcome was judged good in 32 patients (80% overall): 12 with flaps (63% of flap group) and 17 with sutures (85% of sutures group). Aesthetic outcomes were judged average in 8 patients (20%), significantly more frequent after flap techniques (37%) versus sutures (15%).

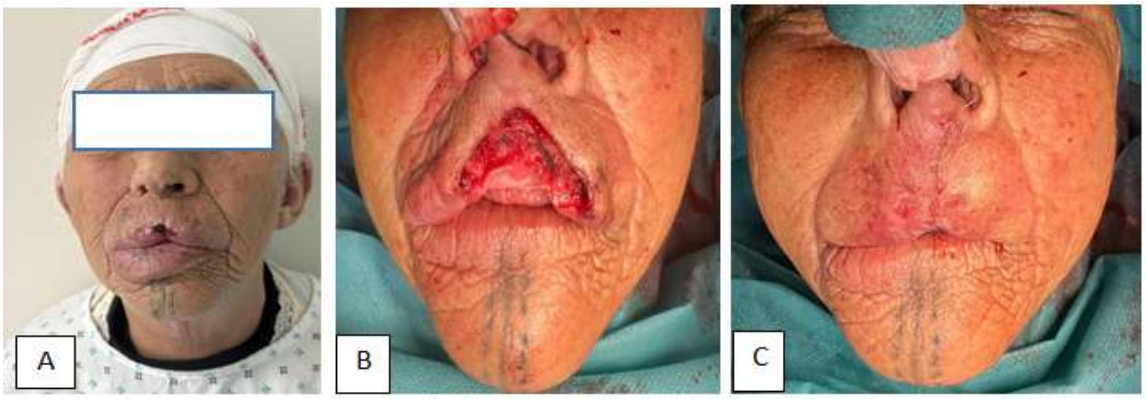

Fig 1: A) Aspect of tumor (CE) en preoperative; B) Aspect affter resection transfixing of tumor in V with margin of 0,5cm; C) Aspect after suture in 3 plans (mucous, et skin)

Fig 2: A) Aspect in préopératoire of tumor (CE); B) Aspect in trace W of peroperative with margin 1 cm; C) Aspect after exérèse of tumor (CE); D) Aspect after suture des 3 plans (muscle, mucous, skin); E) Aspect after healing

Fig 3: A) Aspect en preopérative of tumeur (CE); B) Résection of tumeur in V with margin 1 cm; C) Aspect after suture of Webster flap; D) Aspect after flap healing

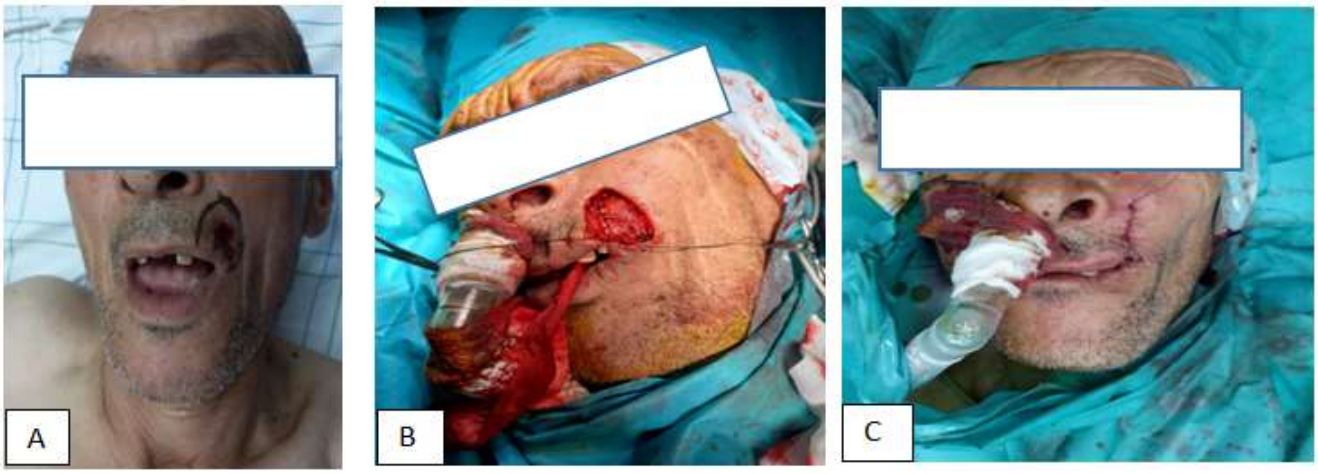

Fig 4: A) Aspect in preoperative of tumor (CE) superior lip with trace in V and margin of 1 cm; B) Aspect after exérèse transfoxing V in peroperative; C) Aspect suture of 3 plans (muscle, mucous and skin)

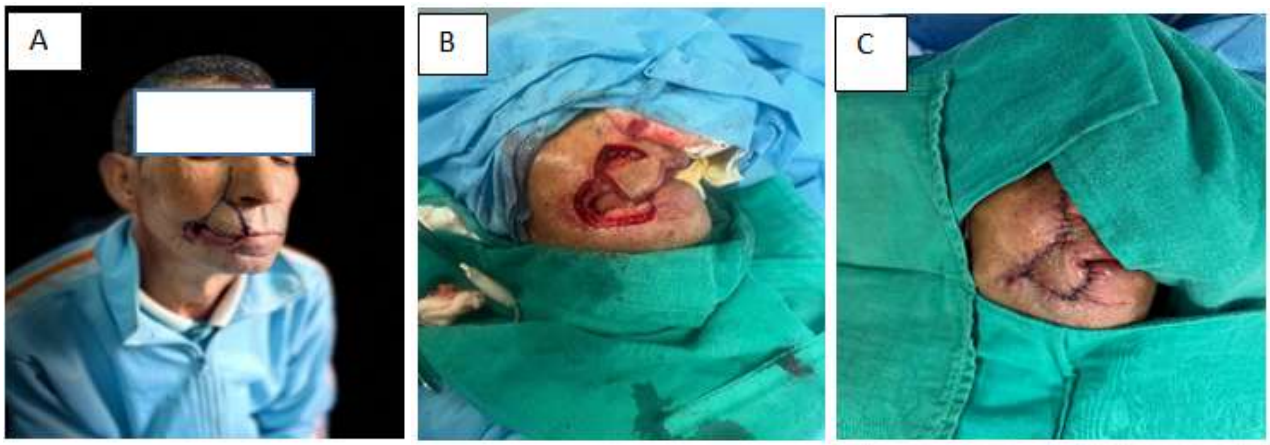

Fig 5: A) Aspect preoperative with of tracé d'Estlander flap after exérèse in CE lip corner right extent lips; B) Aspect in peroperative after raised et rotation à 180°; C) Aspect after wager in position and suture of flap

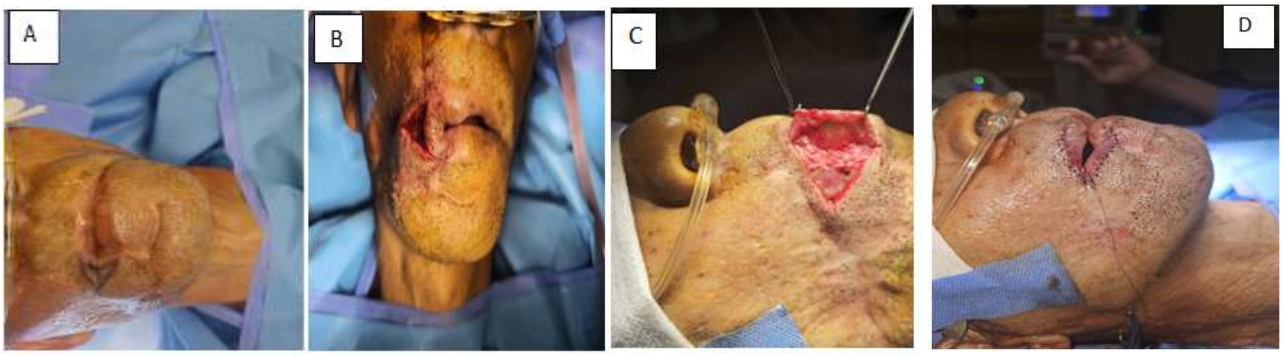

Fig 6: A) Aspect in peroperative trace en triangle of corner technique of Préaux; B) Aspect in peropératoire after exérèse of triangle flap; C) Aspect after dissection flap mucous; D) Aspect wager in place and suture of mucous flap

Fig 7: A) Aspect in preoperative of tumor (CE) inferior lip; B) Aspect after Healing duplicate Karapamdzic flap

IV. DISCUSSION

The aims of lip reconstructive surgery are to maintain lip continence, preserve maximal mouth opening, lip mobility and sensitivity, and achieve the best aesthetic result [6–8].

Technique indication must precisely consider defect location, superficial or transfixiant nature (especially orbicularis involvement), total lip volume disrupted. Commissure and modiolus involvement must be evaluated for primary or delayed commissuroplasty [8].

Reconstruction follows an escalation from simple to complex procedures [6]. Simple sutures are for small defects; next step is local flaps [8], which match tissue color, are relatively easy and maintain muscle innervation—but require extra facial incisions [9]. Free flaps and grafts are last resort after tumor resection [10].

Transfixiant full-thickness defects require three-layer reconstruction (muscle, mucosa, skin) [9]. Reconstruction depends on lip volume: the rule of thirds applies, especially for the lower lip. Upper lip reconstruction aims to restore the philtral region, regardless of thirds [8].

Defects under one-third in depth are suited to wedge excision suture (V/W-plasty), typically up to 2–2.5 cm [9]. For defects over one-third, simple W-plasty is no longer indicated due to microstomia risk; local or locoregional flaps are preferred [9, 12], although Soliman *et al*., [11] suggest direct sutures may be used for defects up to 50% of lower lip and 40% of upper lip.

For defects over 80%, complex reconstruction is required [13]; combined flaps may be proposed—for subtotal upper lip defects, two bilateral Webster cheek advancement flaps and an Abbé flap [14]. The Abbé flap is a heterolateral full-thickness lip flap, 180° rotation.

Karapandzic flap may be used for subtotal or total lip defects if dissected circumferentially [15]. At lower lip level, combined flaps are also possible (Brinca, Rajaonarivelo) [16, 17]—two lateral Abbé flaps preserving philtrum reconstruct lower lip, with two Webster flaps for donor upper lip [17].

Fasciocutaneous free flaps (radial forearm, anterolateral thigh) are reliable for total lower lip reconstruction [18]. When mandible is involved, vascularized fibula free flap is indicated [19].

For defects extending beyond the lip, combined locoregional flaps [20] (delto-pectoral or pectoralis major musculocutaneous with costal rib) or free flaps are needed [9, 10]. For total or extensive lower lip defects, radial forearm ("Chinese") or parascapular free flaps are a good choice due to reliability, thickness, simplicity [9, 10].

Postoperative complication rates remain relatively low and depend mainly on defect size [14]. Dehiscence may result from intrinsic factors (malnutrition, preop radiotherapy, active smoking) or flap design flaws with excessive tension [21, 22].

In our series, two dehiscences occurred with favorable outcomes. Flap necrosis is often multifactorial: surgical technique, flap choice, tension, hematoma, infection, vascular conditions [23]. Rotation flaps (Abbé/Estlander) depend on coronary labial pedicle preservation [12]; overstretching or torsion may compromise vascular supply [9, 22, 24, 25]. Early pedicle division at 2–3 weeks can cause partial or total flap loss [26]. We noted one partial necrosis after Chinese flap.

Postoperative infections in secondary reconstruction of lip tumors are relatively rare (0–17.9%) [25]; infection promotes dehiscence and cicatricial retraction, worsening aesthetics [22]. Given proximity to oral cavity microbiota, perioperative antibiotics (e.g. amoxicillin–clavulanic acid) and mouth rinses are justified [9]. We had 4 postoperative infections with favorable outcomes.

Functional goals include creating a liquid-tight barrier, enabling denture insertion, preserving lip sensitivity, symmetry at rest, mimicry, and voluntary dynamic functions such as smiling [10, 28].

In our series, microstomia resulted from commissure retraction, or from flaps; depending on severity and functional impact, commissuroplasty or distant tissue flaps may be used [29, 30]. Two patients had microstomia, one underwent commissuroplasty (Préaux).

Labial incontinence is more frequent with lower lip involvement causing salivary leaks and possible speech impairment [9]. It occurs when lip is insensitive, lax, or muscle reconstruction insufficient [23]. Food leaks may impair liquid or semi-liquid feeding [10]. In our series, two Chinese free flap patients reported leaks, resolved by thinning, repositioning, and flap fixation.

Lower gingival exposure is a functional sequela observed in large lower lip tumors. We found a significant statistical correlation between this sequela and Chinese free flap use.

Aesthetically, the mouth is the focal point of the lower face [31]; cosmetic objectives and patient expectations must be assessed before finalizing any reconstruction plan [10].

The literature lacks studies on aesthetic outcomes after post-tumoral lip reconstruction except Di Fede [32], who introduced the Functional Lip Glasgow Scale (FLiGS): a questionnaire scoring speech, mastication, swallowing, salivary leaks, and physical appearance before and after surgery. This is quick, simple, valid, reproducible, and clinically relevant, aiding postoperative monitoring [32].

In our study, in absence of a gold standard for aesthetic evaluation, outcomes were subjectively judged: good in 32 patients (80%), average in 8 (20%).

CONCLUSION

Lip reconstruction poses a dual challenge—functional and aesthetic. Continence is the principal function, allowing normal alimentation, and preventing salivary or food leaks, while maintaining speech. It's essential to involve the patient in decision-making, as labial reconstructions can be complex and aesthetic outcomes may fall short of expectations

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