

RESEARCH ARTICLE

LIP CANCER: DEFECT RECONSTRUCTION CHALLENGE (A REVIEW OF 6 CASE).

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Abstract

..... Lip cancer is a frequent tumor of the head and neck region. Surgery is the treatment of choice for most of these cancers. Although there are several strategies to reconstruct lip tumors after tumor ablation this reconstruction is a challenge for the plastic surgeon. A retrospective review of the patients treated for lip cancer in the plastic reconstructive and esthetic Surgery Department of CHU TTA (Tangier-Tetouan-Al Hoceima), from march 2021 to June 2022. Only patients with histological confirmation of lip cancer were included. All the cases were evaluated for demographic features, tumor characteristics, and lip reconstructive surgery used. There were 4 male and 2 female patients. (4:2 ratio). with an average age of 57 years. the lower lip was the most frequently affected (83%), Most tumors were squamous cell carcinomas in 4 cases (83 %) a basal cell carcinoma (BCC) in 1 case (17%), and were located in the lower lip in 4 cases (83%). Neck dissection was performed in 3 cases (50. Different surgical techniques were used for lip reconstruction after tumor ablation: a V-shaped wedge excision and direct repair was performed in 1 case (17 %); Wshaped wedge excision in 1 case (17%); V-shaped wedge in the upper lip associated with w shaped wedge in the lower lip in one 1 patient (17%); and karapandzic flap is performed for 3 patients (50 %). The most significant aspect of lip cancer surgery is tumor ablation, and that is not affected by the subsequent reconstructive strategy. Careful preoperative assessment and planning will allow the surgeon to reach an acceptable balance between form and function with the reconstruction.

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Introduction:-

The lips play crucial roles in speech, mastication, swallowing, maintenance of dental arch integrity, and aesthetics. Therefore, cancers of the lip can lead to various functional and aesthetic problems. Due to their location, lip cancers are easily detected and diagnosed at relatively early stages. It's occupy up to 30 % of all malignant tumours of the oral cavity [1, 2]. The vast majority of malignancies of the lips are squamous cell carcinoma (SCC), followed by melanoma and minor salivary gland carcinomas [3]. Lip reconstruction poses a particular challenge to the plastic

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surgeon in that the lips are the dynamic centre of the lower third of the face. The goals of lip reconstruction are both functional and aesthetic, and the surgical techniques employed are often overlapping.

Methodology and Procedures:-

We conducted a retrospective review of the patient treated for lip cancer the plastic reconstructive and aesthetic Surgery Department of CHU TTA (Tangier-Tetouan-Al Hoceima), from march 2021 to June 2022. Only patients with histological confirmation of lip cancer were included. We obtained a sample of 5 patients. For each case, the following features were recorded: age, sex, size and location of the tumour, tumour, node, metastasis (TNM) status at presentation, histological diagnosis and microscopical characteristics of the tumour, width of excision margin, type of reconstruction performed, and postoperative treatment, Analysis of the data was performed using Microsoft excel

Results:-

A total of 6 patients with lip cancer were included in the study. There were 4 male (67%) and 2 female (33%) patients. The male-to-female ratio was 4:2. Patient age ranged from 40 years to 70 years with an average value of 57 years. all patients have significant sun exposure antecedent 2 patients were diabetic 4 patients are chronic smokers and only one patient is followed for high blood pressure Regarding location of the tumour, the lower lip was the most frequently affected (5; 83 %), followed by the lower lip and upper lip and commissure (1; 17 %). When the patients first came in consultation, the largest diameter of the tumour was on average 3,4 cm, varying from 2 cm to 5 cm. The distribution of postsurgical TNM shows that the most tumours were either stage II (33%) or stage III (50%), stage I is being represented in only 17 % of the patients. Histologically, the tumour was a squamous cell carcinoma (SCC) in 83% of cases (4), a basal cell carcinoma (BCC) in 17% (1). SCC was exclusively found in the lower lip in All patients. Basal cell carcinoma case is found in the patient with the lower, upper lip and commissure (1case).



Figure 1:- Distribution of patients according to the age.



Figure 2:- Distribution of patients according to the sexe.



Figure 3:- Distribution of patients according to the type of lip cancer.



Figure 4:- Distribution of patients according to the location of the lip cancer.

The SCCs were considered well differentiated in 2 cases (33%) and moderately differentiated.in 3 cases (50%). Three patients were subjected to neck dissection at the time of surgical excision (50%). Neck dissection was performed because patients either showed preoperative evidence of node involvement (two patients), they underwent bilateral modified radical neck dissection

Different surgical techniques were used for lip reconstruction after tumor ablation: a V-shaped wedge excision and direct repair was performed in 1 (17%) patient, (Figure 5); W-shaped wedge excision in 1 patient (17%) (Figure 6); and V-shaped wedge in the upper lip associated with w shaped wedge in the lower lip in one 1 patient (17%)(Figure 8). The Karapandzic flap was performed in 3 cases (60%) (Figure 7)



Figure 5:-V shaped wedge excision of a SCC of the lower lip and direct repair (plastic reconstructive and esthetic surgery department CHU TTA).



Figure 6:- W shaped wedge excision of a SCC of the lower lip and direct repair (plastic reconstructive and esthetic surgery department CHU TTA).



Figure 7:- Excision of a lower lip cancer and reconstruction with the karapindzicflip(plastic reconstructive and esthetic surgery department CHU TTA).



Figure 8:- V sharped wedge excision of the upper lip associated with W shaped wedge excision of a SBC of the lower lip and direct repair (plastic reconstructive and esthetic surgery department CHU TTA).

Discussion:-

Anatomy [1]

Lip reconstruction requires familiarity with the surface anatomy, under lying muscular anatomy, and neurovascular anatomy of the lower face.

The upper lip is composed of the philtrum and tubercle centrally, the paired philtral columns laterally, and the white roll of the vermilio-cutaneous junction. The orbicularis oris muscle maintains oral competence by acting as a

circumoral sphincter. Its horizontal fibers link the modiolus and philtral columns producing a tightening of the upper lip. (Figure 9)

Oblique fibres between the commissure and nasal floor act to evert the upper lip. The orbicularis is acted upon by the surrounding elevating and depressing mimetic musculature. The levator labii superioris, levatorangulioris, and the zygomaticus major and minor elevate the upper lip, and the mentalis, depressor labii inferioris, and the depressor angulioris draw the lip inferiorly (Figure 10).

The blood supply to the lips is derived from the facial artery with the inferior labial artery supplying the lower lip and the superior labial artery and branches from the angular artery supplying the upper lip (Figure 11). Motor innervation arises from the buccal and marginal mandibular branches of the facial nerve; sensory innervation of the upper lip is from the infraorbital nerve V2 and the mental nerve V3 supplies the lower lip.

The lip vermilion separates the skin of the external lip and the mucosa of the inner lip. It is composed of keratinizing glabrous epithelium with numerous sebaceous glands. The transitional area between the keratinizing epithelium of the vermilion and the nonkeratinizing epithelium of the labial mucosa is densely innervated with mucocutaneous end organs.



Figure 9:- Anatomic landmarks of the lip (Lip Reconstruction Oral Maxillofacial Surgery p 337)[2]



Figure 10:- Perioral musculature (Lip Reconstruction Oral Maxillofacial Surgery 338)[2]



Figure 11:- Schematic presentation of blood supply to the lips (Anatomic Considerations of the lips LIP CANCER p 8) [3]

Epidemiology

Cancers of the lip make up to 30 % of all malignant tumours of the oral cavity. They also predominantly occur in the lower lip. The lower lip is affected in 85–95 % of cases, compared to the much lower incidences found in the upper lip (2–7 %) and lip commissure (1–4 %) [4]. This is presumed to be due to the higher risk of sun exposure in the lower lip associated with its anatomical location and orientation.

In our study we observe that the lip cancer is predominantly occur the lower lip

The incidence of lip cancer varies considerably depending on the population. In the USA, the average incidence is approximately 1.8 per 100,000; however, significantly higher rates are seen in certain parts of the country (12 per 100,000 in Utah) [5, 6]. Greater variations in incidence are seen among different regions and countries. For example, the incidence in Southern Australia is reported to be 13 per 100,000 and that of a population of fishermen in Newfoundland over 50 per 100,000 [5]. On the other hand, the overall prevalence of lip cancer is low in Asia. Age-adjusted incidences in Osaka, Japan, and Mumbai, India, have been reported to be 0.1 and 0.3 per 100,000, respectively [6]. It isimportant to note that direct comparison is difficult to interpret because of differences in data collection, as well as cultural and behavioural factors. Despite this, the overall annual incidence of lip cancer has shown a downward trend in many parts of the world, including the USA, and most notably Great Britain [5, 6] . Interestingly, the prevalence of lip cancer appears to be inversely related to that of other oral cancers in many parts of the world. For example, India, which as a high incidence of oral cancer, by comparison has a much lower incidence of lip cancer [6]. On the other hand, parts of Canada and Utah have an especially high prevalence of lip cancer of lip cancer of lip cancer [6].

Clinical Presentation [7]

The majority of early-stage lip cancers will be obvious to most health-care practitioners; however, very early-stage lesions may be quite challenging to the naked eye. the majority of lip cancers are diagnosed at stage I. The characteristic lip cancer presents as an ulcerative or endophytic lesion of the vermilion border, most commonly of the lower lip.

Extension of the oral mucosa, skin, and deep functional muscle may be present is larger lesion. Well-differentiated lesions typically occur in a region of clinical hyperkeratosis, which may actually represent cancer.

Lip cancer is a common malignancy with several unique qualities that continue to force practitioners to re-examine its etiopathogenesis and prevention. Sun exposure remains the main culprit; however, epidemiologic data reveal several cofactors implicated in carcinogenesis.

Reconstructions

Three-layered closure, reconstruction of orbicularis oris, and restoration of the continuity of the lips sphincter and labial vestibules are essential to restore ideal function. Microstomia is acommon complication in lip reconstruction thatcould affect function. In order to avoid microstomia, bringing new tissue to the lip might benecessary [8, 9]. Topographic boundaries and aesthetic subunitsmust be recognized and respected. [10]. It is best to avoid crossing

theseboundaries. When a defect involves a substantial portion of an aesthetic subunit, better cosmetic results are achieved by reconstructing areas ascomplete units [11].

General Considerations:

Management of lip defects with reconstructivesurgery requires restoration of labial/oral functionand restoration of aesthetics. There are several options for defect reconstruction [12, 13] and will varyper patient according to:

Patient factor Age:

Prognosis;General medical condition;Patientcompliance;Comorbidities;Cost and convenience of treatment

Defect/tumour factor Size of tumour;Histology of tumour;Extent of lip resection/defect ;Anticipation of aesthetic and functionaloutcome; Availability of local tissue; History of prior treatment (e.g., radiationand surgery)

Functional and aestheticconsiderations.

Functional goal: Maintenance of oral competence; Sufficient oral access; Preservation of sensation; Mobility Phonation

Aesthetic Goal:

Restore or preservation of the anatomic land marks; Reconstruction of facial subunits; Adequate tissue match in terms of colour and texture; Lip symmetry and anatomic proportion; Maintenance of lips relation

Reconstructive strategies of upper and lower lips

Lip defects are classified based on anatomic location (skin or vermilion), thickness, and size of the defect [14]

The main reconstructive options include secondary intention healing, skin grafts, primary closure, local flaps, and free flaps. When considering reconstruction of lip defect, the reconstruction ladder starts with the simplest procedures, moving up to the most complex. [15]in our series all of the patients have a full thickness defect after lip cancer resection and we will discuss the reconstruction option of the full thickness lip defect

Full-thickness defect reconstruction of the lips requires replacement of skin, muscle, mucosa, or a reasonable substitute and multilayer repair. [8] These defects have traditionally been classified according to the size and location of the defect. [14]

Small full-thickness defects: primary closure

Full-thickness defects that involve less than 30% of the stretched lower lip width or25% of the upper lip width, not including most of the philtral subunit, can be removed by wedge excision or its variants and repaired by primary layered closure [11, 12, 16] without causing significant microstomia. [15] The size rules are especially applicable to elderly patients with greater tissue laxity. [14]

The anterior vermilion line is the principal landmark of the lip, and its location at the edge of the wound needs to be identified and marked before incision to avoid distortion during injection and dissection. Meticulous closure of the vermilion is critical, both anteriorly and posteriorly, to prevent asymmetry. [17]

Early approximation of the vermilion border is recommended as a guide for closure of the other layers and maximizes the cosmetic outcome. [8, 17]

Precise anastomosis of the orbicularis oris muscle ends is important to reconstitute the oral sphincter and prevent notched or retracted vermilion. [8, 15]Aesthetic wound closure can be achieved by undermining the skin and mucosal edge of the wound and closure of epithelium with slight skin eversion. [8, 15]

A V-shape (wedge) excision is the most common and simplest method to repair small lip defects and malignancies. [8] The wedge resection is designed with the incisions perpendicular to the red lip, tapered as they enter the white lip. [18]

The apex of the wedge should not exceed 30 and not cross the mental crease to avoid a conspicuous cutaneous deformity and scar

In our study this method of reconstruction is performed for 2 patients

A W-shaped excision is a modification of a wedge excision that allows greater resection and preserves the integrity of the aesthetic subunit [12] without extending the incisions beyond the mental or Melo labial creases. [8, 17]

The excision is planned, with the apices of the W oriented away than 30°

In laterally located defects, the angle formed by the lateral subunit should be larger and more obliquely oriented to properly align the closure and achieve a more natural-appearing scar. [8, 17]

W-plasty can be used for moderate-sized defects up to one-third of the lower lip width.

Aesthetic results in the upper lip are often less satisfactory, in part, because of the specific aesthetic subunits and that the upper lip is able to withstand less tissue loss.

In our study this method of reconstruction is performed for 2 patients

Medium full-thickness defects of lip

Medium-sized defects (30%–60% of lip length) represent the most complex challenges in surgical planning. [9] Although primary closure of this defects of this size is feasible, it is not recommended because of secondary wound tension and microstomia. [19]

These defects require some form of local flap to borrow tissue from the opposing lip or adjacent tissue. [10, 9] Depending on the site of the defect, 2 major techniques are available to reconstruct these defects:

- 1. Lip switch/cross lip flap (3 most common are the Abbe, Estlander, and Stein)
- 2. Circumoral advancement or rotational flap

Abbe flapCross-lip transfer of full-thickness tissue was described by Abbe in 1898. [20, 21] It is designed as a rotational or lip switch flap from the opposite lip, based on the labial artery, which is preserved on one side to serve as a pedicle of the interpolated flap. There is no associated vein, and venous drainage is provided by small veins that parallel the course of the artery. [8, 17, 22] Although this flap was initially designed to correct midline defects of the upper lip, it has been used for reconstruction of full-thickness defects affecting 30% to 60% of the width of either lip medial to the commissure (Figure 12). [8, 23]The donor site is traditionally designed similar to the V-shaped full-thickness excision; but it can also be designed to accommodate different variations, such as W shape or rectangle, depending on the defect situation.



Figure 12:- abbe flap (Lip Reconstruction Oral Maxillofacial Surgery p 347) [2]

This flap is designed conventionally as the same height and half of the width of the defect [8, 21] to achieve a proportional reduction in size of both lips.

The flap is created by a full-thickness incision with preservation of the labial artery on the medial or lateral pedicle within the vermilion. Approximately 5 mm of vermilion mucosa should be preserved for adequate blood supply. The pedicle should be place at the defect midpoint. The flap is rotated 180 as it is inserted into the opposing lip defect and closed in multiple layers. The donor site is repaired primarily. Patients are placed on a liquid or soft diet for the period of vascular ingrowth. In approximately 3 weeks, the pedicle on the vermilion is divided and the flap inset [8].

A cross-lip flap can be combined with unilateral or bilateral advancement flaps to reconstruct major tissue loss. Bilateral Abbe flaps are advised for large central defects of the lower lip to avoid upper lip asymmetry. In this technique, the defect is repaired with similar tissue; the orbicularis oris muscle is reconstructed; the continuity of the circumoral sphincter is re-established; and the commissure is not violated. Adequate sensory and voluntary motor function is regained. [24, 25]

The major disadvantages are damage to the artery on elevation of the flap, relative microstomia, 2-stage surgery, risk of injuring the flap by opening the mouth, prolonged phase of denervation, and thickened appearance caused by scar and trapdoor deformity.

Estlander flap

This design was described by Estlander in 1872. [25] It is a cross-lip flap. It is similar to the Abbe flap but has its point of rotation at the commissure (Figure 13). It is designed for repairing a defect involving the oral commissure of either lip and transfers a full-thickness lip flap around the oral commissure on a small medially vascular pedicle containing the labial artery. In contrast to the Abbe flap, it is a single-stage reconstruction. [26]



Figure 13:- Estlander flap (Lip Reconstruction Oral Maxillofacial Surgery p 384) [2]

The flap design is similar to the Abbe flap; its dimension is equivalent in height and half the width of the defect. It is usually designed as a triangle but can be modified to lie within the melolabial crease to reduce scarring [8, 10].

Stein flap in 1848, Stein described a method of reconstructing the lower lip with 2 flaps from the center of the upper lip hinged on the labial vessels. [27] The Stein flap is essentially a double Abbe flap. It has 2 smaller symmetric flaps that form the central portion of the upper lip to reconstruct the lower lip. This flap is a complicated and less-favored flap.

Bilateral lip advancement

Full-thickness defects, measuring up to one-half of the lower lip [9, 26], may be reconstructed with unilateral or bilateral lip advancement. [8, 17] In this technique, the wide, rectangular wedge of the tissue is excised. Unilateral or bilateral full thickness advancement flaps are created by an inferior arc shape releasing the incision along the labiomental crease. The resultant flaps are advanced medially around the mental prominence to close the defect. Incisional release at the commissure or removal of crescents around the mental prominence incision may be necessary to mobilize the flap.

Gillies fan flap

This flap is a rotation advancement flap that was initially described by Gillies and Millard in 1957. [28] It is a modification of the technique described by von Bruns and is designed to transfer the remaining lip segment from one side of a defect together with the lateral portion of the opposing lip around the commissure in the same fashion as Estlander. It is based on the superior labial artery [17] and has a narrow pedicle.

This composite flap is created by full-thickness lip incisions from the inferior aspect of the defect, which extends laterally around the commissure and superiorly into the melolabial fold, essentially paralleling the orbicularis-oris. A secondary incision is made toward the superior vermilion without compromising the superior labial artery. Then the flap is rotated and advanced to close the defect, and the layer closure is performed (Figure 14).



Figure 14:- Gillies fan flap. 1 and 2, Z-plasty is incorporated to the facilitated movement of the flap (Lip Reconstruction Oral Maxillofacial Surgery p 350) [2]

The advantages of this technique are more available tissue from the nasolabial region, one stage reconstruction surgery, and maintained orbicularis-oris continuity. The primary limitations of this approach are microstomia, blunted commissure, and vermilion deficiency [29]. Because the orbicularis is not fully dissected, full function and sensation may not return and oral incompetence may also result; however, partial reinnervation seems to occur in 12 to 18 months.

The Gillies flap can be used bilaterally or in combination with other flaps to restore large full thickness lip defects of up to 80% of the lip. Z-plasty may be incorporated to the facilitated movement of the flap [23].

McGregor flap:

McGregor has modified the Gillies technique to reconstruct upper lip defects. [8] It is a rectangular composite flap, based on the labial artery, created by a full-thickness lip incision and transfers the tissue from the melolabial region to the defect of the upper lip. It is indicated for reconstruction of lateral upper lip defect when there is not sufficient tissue without recruitment of cheek tissue. This technique fails to reconstruct the muscle of the sphincter and the vermilion. It needs to be combined by other techniques such as mucosal advancement to reconstruct the vermilion. It can be used bilaterally for large upper lip full- thickness defects.

Karapandzic flap

The circumoral advancement-rotation flap initially described by von Bruns in 1857 (Figure 15) [12]. He used a full thickness flap to rotate the upper lip and perioral tissue down and around to reconstruct the lower lip defect, which resulted in denervation of the orbicularis oris muscle. In 1974, Karapandzic modified von Bruns' technique. In his modification, the incisional design was identical to the original technique; but a full-thickness flap was not created, and the neurovascular supply of the lip was preserved via meticulous dissection, so optimal oral competence, sensory, and function were preserved. The flap is created by circumoral incisions extended bilaterally from the base of the defect to the upper lips by placing incisions in the mental and nasolabial crease. The thickness of the flaps should be maintained relatively constant throughout their length. Neurovascular bundles are identified, bluntly dissected, and preserved. The dissection of peripheral muscle fibers allows advancement without dissection of the mucosa. The mucosa is incised only if needed. The flap is advanced, and the layer closure is performed. This type of flap used two time in our study



Figure 15:- Karapandzicflap (Lip reconstruction Facial Plastic Surgery p 451)[30]

This method is usually used to reconstruct defects involving up to two-thirds of the lower lip and, to a lesser degree, the upper lip. Some investigators state it can be designed bilaterally to reconstruct defects of up to 80% of the total lip length. [12, 31]It is useful in cases whereby radiation had been previously used and blood supply is compromised. The technique has predictable results, with superior function, sensation, and cosmetic outcome. [10, 12] It causes blunting of the commissure and some degree of microstomia [10, 12]; however, secondary correction of the mouth opening is seldom needed. [14]

Conclusion:-

The principles of management of lip cancer require resection with negative margins and reconstruction of the defect to restore form and function. the unique anatomy and the location of the lips bring specific challenges to the reconstructive surgeon. Repairing these defects requires a clear understanding of anatomy, pathology, patients' factors, and surgical techniques. Size, location, and thickness of the lesion are the most important determining factors to choose the proper surgical approach. Smaller defects can be repaired by primary reconstruction, followed by a local flap from the remaining labial or adjacent tissue. Larger defects may need a distant tissue flap or free flap. The ultimate goal in lip reconstruction is to reach a high level of aesthetics while attempting to maintain normal function

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