Perioral Defects: Reconstructive Techniques

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ABSTRACT

Purpose: The aim of this study was to review and describe the techniques for reconstruction of perioral defects with emphasis on cosmetics and functional outcome.

Patients and Methods: Forty patients had perioral defects of variable sizes, sites, and etiologies were reconstructed by four selected local flaps which are Abbe-Eslander, Karapandzic flap, and Radial Forearm Flap (RFF).

Results: The reconstructed patients had acceptable function and resonable esthetics. Mild skin numbness in the mental area observed in all cases. Microstomia observed after Karapandzic flap. Roundation of the commissure observed after Eslander flap. One RFF has been lost. Local recurrence developed in only one patient.

Conclusion: The Abbe, Eslander, Karapandzic flap, and RFF provide a predictable method to reconstruct large perioral defects with final acceptable function and resonable esthetics.

INTRODUCTION

The reconstruction of perioral defects following ablation of cancer has been a challenge for oral and maxillofacial surgeons. Surgical management of oral squamous cell carcinoma typically involves resection of the oral carcinoma with a 1cm margin of normal appearing tissue. A large surgical defect is often encountered. The goals of perioral reconstruction are esthetics and function,with oral competence and good lip control [1,2].

Thirty percent of malignant tumours of the oral cavity involve the lips. The most frequently affected site is the lower lip (approximately 80% of cases), followed by the upper lip (approximately 12% of cases), and then the commissure (approximately 8% of cases). The most common tumour type is squamous cell carcinoma, basal cell carcinoma, and adenocarcinomas are observed more rarely, whereas melanoma is an exceptional occurrence [3,4].

Lip cancer is a slowely developing tumour, with lymph node metastasis reported at rates between 3 and 29%. They are initially located at level 1 nodes (submental and submandibular sites) and only later extend to lower levels. Surgery is the treatment of choice even if, for less extensive lesions, the results obtained with radiotherapy may compare favorable. The surgical techniques to approach the primary tumour are relatively standardized. Cervical lymph node dissection is regarded as therapeutic if clinically overt lymph nodes are present [5,6].

Various techniques have been proposed for reconstruction of large perioral defects by Abbe,, Estlander, Karapandzic, Bernard-Webster, Zisser,and Gilles. Abbe utilized a cross lip technique to transpose tissues to the defect site. The Estlander flap is similar to the Abbe flap in that they both use a cross lip design. However, the Estlander flap is designed for the reconstruction of lateral lip and commissure defects. A drawback of Abbe flap is the requirement of an additional surgery to release the flap from its base [7,2].

Karapandzic advocated local advancement of tissues with preservation of nerve and blood supply, bilaterally if necessary, for the reconstruction of large lip and commissural defects. Defects up to the entire lip can be reconstructed. The clear advantage of this flap is the patient's resultant function. Because the orbicularis oris muscle is maintained, patients typically have lip competence. This flap is based on the preservation of the facial artery, sensory and motor nerves to the area, giving the patient a sensate mobile flap [2,8].

Less commonly used methods using advancement flaps include those described by Bernard and Zisser. Bernard proposed an advancement sliding flap of cheek tissue to reconstruct the entire lower lip, while Zisser described a technique to reconstruct the commissure area [9].

Gilles described a rotation advancement flap (fan flap) centered on the labial commissure for closing large lateral defects of the lip. The advantage of this technique is that the continuity of the orbicularis oris is largely maintained and it can also be used bilaterally. However, this flap has several limitations, including microstomia, denervation and a rounded commissure [10].

The staircase technique have been described for closure of full-thickness defects of the lower lip. After rectangular excision of the cancer, reconstruction of the lower lip is performed with a lateral advancement flap from the lateral parts of the lip and chin in a stepwise fashion [3,5,11].

Distant flaps can be used when adjacent local tissues are unavailable for reconstruction owing to trauma or extensive disease involvement. Deltopectoral flap and Pectoralis major myocutaneous flap have been described for reconstruction of total lower lip defects. They can be used to provide bulk but have little sphincter function. On the other hand, microvascular flaps notably, composite radial forearm (RFF) palmaris longus tendon free flap, can address the issues of maintaining oral sphincter function and providing bulk simultaneously [12].

PATIENTS AND METHODS

In the period from December 1996 to October 2006, in the Maxillofacial Department (Alexandria University)-Maxillofacial Unit (Assiut University) and Plastic Surgery Unit (El-Minia University), 40 patients had perioral defects of variable sizes, sites and etiologies were reconstructed using local flaps. 28 were males, and 12 were females. Their age ranged from 9 to 67 years. Table (1) represents the etiology, total number and site of the defects.

Table (1): Etiology, total number and site of the defect.

Etiology	Number	Upper lip defects	Lower lip defects	Males	Females
Trauma	12	5	7	8	4
Tumours	24	10	14	18	6
Congenital	4	4	–	2	2
Total	40	19	21	28	12

Patients had their perioral defects after tumour ablation presented with T1 carcinoma (0-2cm) in 10 cases, T2 carcinoma (2-4cm) in 7 cases, T3 carcinoma (4-6cm) in 5 cases and T4 carcinoma (more than 6cm) in 2 cases. All patients had No Mo stage. 18 patients had squamous cell carcinomas, and 6 patients had basal cell carcinomas. 12 patients had ulcerative growth, 6 had nodular growth, and 6 had exophytic verrucous growth (Table 2).

Table (2): Total number, staging, and morphology of tumours.

Tumour	Total number	T1	T2	T3	T4	Ulcerative	Nodular	Exophytic
Squamous	18	8	5	3	2	8	4	6
Basal	6	2	2	2	–	4	2	–
Total	24	10	7	5	2	12	6	6

Post traumatic defects were due to fights (4 patients), falls (3 patients), accidents (2 patients), human bite (one patient), and firearm injury (2 patients).

Congenital deficiency in the horizontal diameter of the upper lip was confronted with in 4 patients, and these lips were augmented by Abee flap.

The resultant defects in the upper lip were classified according to their site and size as shown in Table (3).

Table (3): Methods of repair of the upper lip defects according to size and site of the defect.

Defect site & size	Number of patients	Method of repair
More than one third and up to one half (philtral subunit)	11	Abbe flap (Figs. 1,2,4)
More than one third and up to one half involving the commissure (lateral subunit)	4	Eslander flap (Fig. 5)
Subtotal and total defects (One half and more)	4	Reversed Karapandzic flap

The resultant defects in the lower lip were classified according to their site and size as shown in Table (4).

Table (4): Methods of repair of the lower lip defects according to site and size.

Defect site & size	Number of patients	Method of repair
Up to one half not involving the commissure	4	Abbe flap (Fig. 3)
Up to one half involving the commissure	5	Eslander flap
Subtotal and total defects (One half and more)	12	Karapandzic flap (6 cases) (Fig. 6) Palmaris longus RFF (6 cases) (Fig. 7)

Fig. (1-A): Basal cell carcinoma of the upper lip invading the vermilion.

Fig. (1-B): Intraoperative view of the resected carcinoma with planned reconstruction by Abbe flap.

Fig. (1-C): Immediate postoperative view.

Fig. (2-A): Congenital deficiency in the horizontal diameter of the upper lip.

Fig. (2-B): Planned Abbe flap for augmentation of the upper lip.

Fig. (2-C): Immediate postoperative view with cross lip flap in situ.

Fig. (2-D): Late postoperative view showing augmentation of the horizontal diameter of the upper lip.

Fig. (3-A): T1 squamous cell carcinoma of the lower lip.

Fig. (3-B): Planned area of resection and reconstruction according to Abbe flap.

Fig. (3-C): Cross lip flap in situ before separation.

Fig. (3-D): Separation of the flap has been done.

Fig. (4-A): Post traumatic defect in the philtral subunit of the upper lip.

Fig. (4-B): Cross lip flap in situ to reconstruct the philtral subunit of the upper lip.

Fig. (5-A): Lateral subunit upper lip defect after resection of commissural carcinoma with plan for Eslander flap.
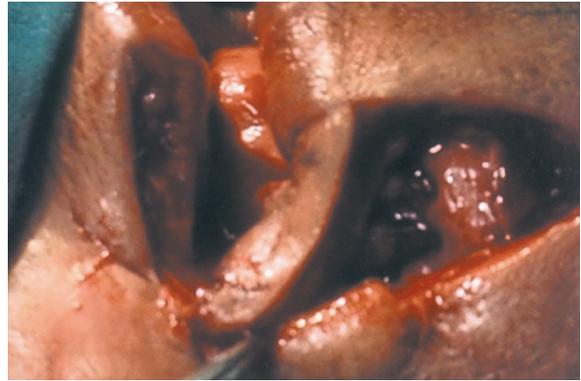

Fig. (5-B): Intra-operative view with Eslander cross lip flap harvested.

Fig. (5-C): Immediate post-operative view with flap in situ.

Fig. (6-A): T4 squamous cell carcinoma of the lower lip with planned resection and reconstruction by bilateral Karapandizic flaps.

Fig. (6-B): Intraoperative view after resection of the carcinoma and rotation of the flap.
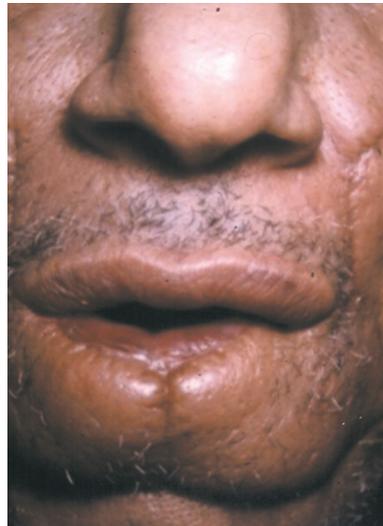

Fig. (6-C): Late postoperative view with accepted esthetics.

Fig. (7-A): T4 squamous cell carcinoma of the lower lip.

Fig. (7-B): Immediate postoperative view of the previous patient after resection of the carcinoma and reconstruction by Karapandzic flap.
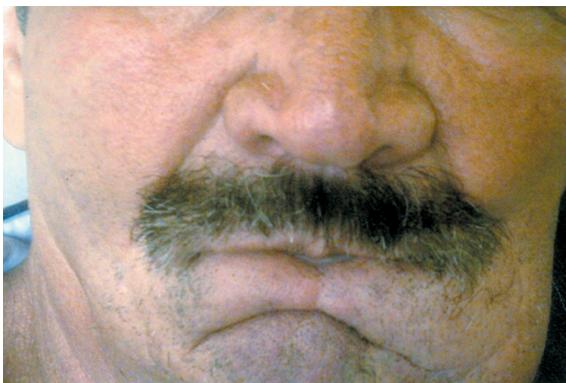
Fig. (7-C): Late postoperative view of the previous patient with lip competence and evident microstomia.
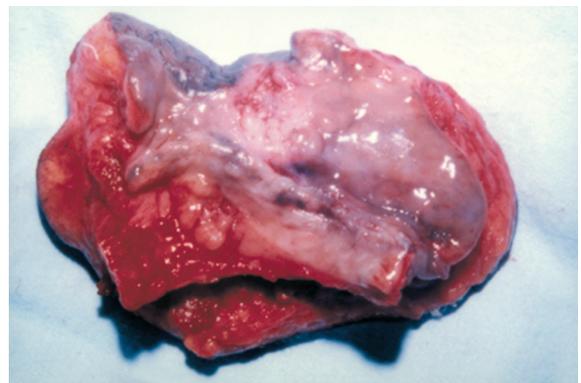

Fig. (8-A): Internal view of a resected lip having labial mucosal carcinoma.

Fig. (8-B): External view of the resected lip.

Fig. (8-C): Double folded RFF with evident palmaris longus tendon anchored to the orbicularis oris muscle.

Fig. (8-D): Post-operative frontal view of the patient.

Fig. (8-E): Post-operative cervical view of the patient.

Abbe flap was planned about one-half the size of the defect and was incised full thickness down one side, and three fourths up the other side. The flap was left pedicled on a small amount of mucosa and the labial artery either the superior or inferior one. The arteries are present constantly within 10mm of the free margin of the upper lip [13]. Separation of the flap has been done 21 days post operatively [2] Eslander flap was placed in the melolabial crease and left pedicled on the labial artery.

Karapandzic flap was outlined on tha patient's nasolabial crease. The incision took through the skin and subcutaneous tissue to the level of the orbicularis oris muscle. The fibers of the orbicularis muscle were dissected free of the zygomaticus major, levator anguli oris, and depressor anguli oris muscles. The oral mucosa was left intact, and rotated medially to recreate the mucosa of the lip. Skin, subcutaneous tissue, muscles and mucosa were closed in a tension free manner. The neurovascular bundle supplying the orbicularis oris muscle was left intact [8].

In radial forearm-palmaris longus free flap technique, the flap was double folded. The inner fold was fixed to the mucoperiosteum. The outer fold was suspended and folded over the inner one and over the palmaris longus tendon that was anchored with adequate tension to the intact orbicularis muscle of the upper lip [12].

RESULTS

Patients had a follow-up between 12 and 18 months. In the immediate post operative period, one RFF developed no reflow phenomena and the flap was not salvaged. The defect was successfully reconstructed with bilateral Karapandzic flap. Otherwise, no major side effects recorded, however, infection in the suture line and partial flap necrosis observed in two patients carried according to karapandzic technique. Healing obtained by secondary intention. The scar effects were more prominent though they do not seem to affect function. Mild skin numbness in the mental area observed with all techniques and resolved 6 months postoperatively in all cases.

Microstomia observed after Karapandzic flap. Roundation of the commissure noticed after Eslander flap. Both conditions were not observed after Abbe flap. They were of little concern to the patients as compared with the benefits and corrected 3 months postoperatively. Late postoperatively, patients had resonably good function, can purse their lips, suck through straws, and inflate ballon type devices.

Local recurrence developed in only one patient 15 months after the surgical procedure carried out according to Karapandizic flap. Lymph node metastasis was found in level one and two. This patient was subjected to another surgical cession where excision with safety margin, classical radical neck dissection, and reconstruction by Pectoralis major was done. Pathological analysis showed involvement of level one and two lymph nodes.

Patients with congenitaly deficient lips augmented by Abbe flap showed nice esthetic appearance and resonably good function.

DISCUSSION

Successful reconstruction of perioral defects requires attention to oncologic principles, anticipation of functional outcome, and recognition of patient's cosmetics expectation. The reconstruction options are numerous and are dictated by the size and location of the defect. Smaller defects, measuring less than one third of the lip, are amenable to W or V resection followed by direct three layer closure without the need for local flaps. Defects greater than this often requires local flaps to close [5].

The reconstruction options include the Abbe, Bernard,Gillies, Eslander, Zisser, Karapandzic flaps, and Staircase technique. Central defects that ranges from 30-50% of the lip can be reconstructed by Abbe flap, however it requires a second procedure to divide the vascular pedicle. Staircase technique has also been described for reconstruction of such defects. It seems to be flexible, and simple to use. In cases of loss more than 60% of the lower lip, combination of Abbe flap and bilateral staircase have been reported [3,5,11].

The Karapandzic and Bernard flaps can be used for near total reconstruction of the lower lip. Karapandzic designed his flap on the assumption that many lip resections for cancer were old patients that had compromised vascular supply, often secondary to radiation therapy to the area. His goal was to provide a mobile and sensate flap with its own vascular supply. The primary drawback of the Karapandzic flap has been reported to be microstomia [7,8].

Laterally situated large sized defects can be reconstructed by Bernard advancement flap. It provides good mucosal reconstruction and recreation of the vermilion border, however, it has been reported that Bernard flap can lead to altered kinetics of smiling and reduced opening from scarring [2].

Although some cases seem to be easily managed by local flaps, yet the temptation is always there that free flaps offer reliable reconstruction. However, this interrupts the rule of using local flaps and keeping the free flaps as a last choice. This explains why Karapandzic flaps have been used after failure of RFF in one of the patients.

Reconstruction of defects that directly involve the upper and lower lip portions of the commissure with a resultant large composite defect including the cheeck, buccal mucosa, commissure, and lips will almost always require facial advancement. Because the defect is a lateral perioral one involving both the upper and lower lips, the Abbe and Karapandzic flaps are contraindicated because of their inability to repair both lips simultaneously. Zissure technique is ideal for such large commissure defects. The decreased frequency of commissural carcinoma compared with that of lower lip carcinoma decreases the frequency for using such technique. Lateral defects more or less affecting the commissure can be reconstructed by Eslander flap, Bernard technique, or by a nasolabial flap, however, Eslander flap needs a second surgery to release the flap from the opposing lip [9].

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