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DOIZUMJ-1908-1467 (R1)  
10.21608/zumj.2020.16423.1467**ORIGINAL ARTICLE****Lip and Perioral Reconstruction Using Local and Loco-Regional Flaps**Mona Galal Shahin<sup>1</sup>; Mohammed Hassan Abd El Aal<sup>2</sup>; Yehia Zakaria awaad<sup>3</sup>; Mohammed abbas wahsh<sup>4</sup>

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**ABSTRACT**

**Background:** Peri-oral and oral soft tissue defects can be caused by several conditions, as resection of malignant and benign tumors, congenital malformations, traumatic injury. They can cause alterations in function and appearance of the affected area. Primary closure is the most commonly used technique for small defects, whilst medium and large defects require reconstruction with local, regional or free flaps. Local flaps are a good choice for reconstruction of medium-size defects of the lip, because they provide the same type of tissue, they are situated in proximity to the resected area, and they can be performed also in patients with multiple co-morbidities.

**Aim:** To evaluate the role of lip and perioral reconstruction in plastic surgery unit of General Surgery Department, Zagazig University Hospitals.

**Methods:** This study was carried out in plastic surgery department, Zagazig University Hospitals, from August 2018 to January 2019. It included 18 patients with perioral defects undergoing surgical tumor ablation. These patients were operated upon and referred to our outpatient clinic for the follow-up visits.

**Results:** Out of 18 cases included, Karapandzic flap was used in 6 cases while mucosal advancement, rhomboidal flap were used in 4 cases. Hypothesia in 27.8%. Sialorrhea was in 16.7%. Microstomia was in 33%, partially satisfied in 50% and satisfied 50% after 6 months of the study.

**Conclusion:** Local flaps provide the most satisfactory results and should be considered as the first choice for reconstruction of perioral defects.

**Keywords:** Perioral reconstruction, local flaps, perioral defects.

**INTRODUCTION**

Peri-oral and oral soft tissue defects caused by many conditions, as excision of malignant and benign tumors, congenital anomalies (i.e cleft lip and palate), traumatic injury and cysts removal or vascular conditions. They can cause significant changes in function and appearance of the affected area, and they are responsible for patients' quality of life [1-4].

So, reconstruction represents a continuous challenge for surgeons. In order to choose the most suitable reconstructive option, surgeons have to consider lesions' characters and patients' factors. The first one is affected by size and site of the defect, the natures of tissues involved and by the associated functional impairment; the second one

deals with each patient's clinical factors and their expectations [5, 6].

The main functional results to be preserved are: oral competence and oral access, mobility of tongue, intelligible talk, ability to swallow and separation of mouth from nose, para-nasal sinus and neck [6].

Also, microstomia should be limited, preservation of orbicularis oris muscle, which plays a role in oral competence, represents one of the main aims in lip reconstruction. Furthermore, an appropriate understanding of the lip's aesthetic unit and a careful vermilion reconstruction are important to avoid disfigurement and imperfections, via respecting lip symmetry and proportion, as well [7].

Primary closure is the usually used technique for small defects, whilst medium and large defects require reconstruction with local, regional or free flaps [5].

Local flaps are a good tools for reconstruction of medium-size defects of mouth and lip, as they provide the same kind of tissue, situated in proximal to the resected area, and can be used also in patients with multiple medical conditions or who have had previous local treatment; also, they need less time and do no specific microsurgical skills [8].

But they could show few limitations in their mobilization from the arc of rotation of their pedicle, and they are not suitable for reconstruction of complicated defects [9].

Studies have affirmed that pedicle flaps are equally feasible for oral reconstruction as regard to functional outcomes, complications, and prognosis [10].

### THE AIM OF WORK

The aim of our study is to give an overview of the main local flaps currently used for oral and lip defect reconstruction through an analysis of recent literature by focusing on their indications and complications.

### OBJECTIVES

To define the feasibility & applicability of lip and perioral reconstruction. And to identify the possible advantages of lip and perioral reconstruction.

### SUBJECTS AND METHODS

**The Site of study:** This study will be conducted in plastic surgery department, Zagazig university hospitals.

**Sample size:** The study included 18 patients with perioral defects undergoing surgical tumor ablation.

**Inclusion criteria:** All patients admitted to Zagazig University Hospitals with perioral defects need perioral reconstruction.

**Exclusion criteria:** Patients unfit for surgery.

**Ethical Considerations:** Written informed consent was obtained from all participants and the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

#### Methods:

All patients were subjected to the following:

**History taking:** We asked about: Demographic data including name, age, sex, residence, occupation, marital status, special habits of

medical and surgical importance (e.g. smoking and alcoholism). Past history: of previous operations and its postoperative events (e.g. wound infection), chronic diseases (e.g. cardiac diseases, Diabetes Mellitus, liver disease).

**Clinical Examination:** General examination for vital signs (blood pressure, heart rate, respiratory rate and temperature). Other systems examination to assess fitness for surgery and anesthesia. Local examination was done to show site, size, number of lesions, and type of perioral deformity and presence of lymph node metastases.

Pre-interventional investigations include: Laboratory investigations (routine) were done e.g. CBC, Coagulation Profile, ALT, AST, urea, creatinine, and serum albumin and if the patients were over 40 years or have history of cardiac disease, ECG and Cardiac consultation was done. Metastatic work up (Chest x-ray, Neck ultrasound and Pelvi-abdominal ultrasound) for cases of perioral malignancy.

**Preparation:** Preoperative surgical chemoprophylaxis: third generation Cephalosporin e.g. one gram of cefotaxime sodium was given I.V to all patients one hour preoperatively.

**Procedure:** All patients entered the operation room, introduction of intravenous line. All patients had prophylactic Antibiotic. Start anesthesia, sterilization of perioral region. Excision of perioral tumor, identification of the defect and its dimensions. Coverage with one or more of local flaps according to the defect's size and site as shown in **figures (1,2,3)**.

**Post-Operative:** At the end of surgery, the wounds were dressed in a loosely applied dressing for 5 to 10 days. The patients were advised to set in semi-sitting position in bed. The patients were advised to start oral clear fluids as soon as they tolerate oral fluids using straw. Patients were also advised to use topical Boric acid 2% continuously on the wounds to reduce edema.

**Follow up:** All patients were followed in the outpatient clinic for wound healing, flap sensory function as pain, paresthesia or anesthesia, Range of mouth opening, oral competence, comprehensive pronunciation, disorders of digestion, symmetry of mouth opening and microstomia.

Preoperative and postoperative photographs were taken for all patients.

#### Statistical analysis

Data collected throughout history, basic clinical examination, laboratory investigations and outcome measures coded, entered and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) (Statistical Package

for the Social Sciences) software for analysis. According to the type of data qualitative represent as number and percentage, quantitative continues group represent by mean ± SD, the following tests were used to test differences for significance; difference and association of qualitative variable by Chi square test (X<sup>2</sup>). Differences between quantitative independent groups by t. P value was set at <0.05 for significant results & <0.001 for high significant result.

**RESULTS**

In this study, Age was distributed as 66.83±10.48 with minimum 53 and maximum 80. Male represent 61.1% and female 38.9% of studied group. 38.9% were not working 22.2% were farmer and 22% worker finally 16.7% were professional , regarding marital status , married were 83.3% and widow 16.7%, 50% were rural and 50% were urban and also smoking distribution were half & half.

**Table (1)** showing distribution of site, size of lesion and defect among studied group where lesion’s size was 30.0±9.9 while the defect size was 41.11±13.6. Also the lower lip lesions were more and represented about 55.5% (in the lateral part about 33.3% while in the center about 22.2%). The commissure lesions represented about 38.9%. Upper lip lesions represented about 33.3%. Other sites as cheeks about 33.3% taking in the considerations the overlap between different sites together.

**Table (2)** showing flaps used in coverage of perioral defects among the studied group where

karapandzic flap was the most flap used in our study by about 33.3%. While mucosal advancement flaps and rhomboidal flaps were used in 22.2% each. Submental flap in 16.7%. Bilateral fan Flap in 16.7%. Also primary closure without any flaps in 16.7%. Flaps like Zisser, cheek advancement and transposition flaps were the least to be used in our study by about 11.1%.

In our study, after 3 months, 61.1% of patients had hypothesia, Sialorrhoea was in 16.7%, Asymmetry were in 61.1%, 66.7% were with limited subjective mouth opening, abnormal pronunciation were in 27.8%, Ingestion disorders was in 16.7%, microstomia was in 33% , regarding satisfaction: dissatisfied were 16.7%, partially satisfied in 55.6% and satisfied 27.8% as shown in **Table (3)**. But after 6 months, there was improvement in some of these functional aspects as follows: hypothesia improved as only 27.8% still have it, no sialorrhoea, Asymmetry was in 61.1%, 50.0% were with limited subjective mouth opening, Normal Comprehensive pronunciation were in 100.0%, Ingestion disorders was in 16.7%, Microstomia were in 33%, regarding satisfaction: partially satisfied in 50.0% and satisfied 50.0% as shown in **Table (3)**.

**Table (4)** showing relation between flap used and patient’s satisfaction where Karapandzic flap, Submental flap, rhomboidal flap and Zisser flap were significantly associated with partial satisfaction. While mucosal advancement flap got the most full satisfactory result in patients by about 44.4%.

**Table (1):** Showing distribution of site, size of lesion and defect among studied group

		N	%
Time course	Progressive over 1 year	6	33.3
	Progressive over 2 years	8	44.4
	Progressive over 3 years	2	11.1
	Progressive over 5 years	2	11.1
Upper lip	Lateral	6	33.3
	No	12	66.7
Lower lip	Central	4	22.2
	Lateral	6	33.3
	No	8	44.4
Commissure	Lt side	7	38.9
	No	11	61.1
Other sites	No	10	55.6
	Inner side of Lt cheek	6	33.3
	RT naso-labial fold	2	11.1
Lesion size	Mean± SD	30.0±9.9	
	Median (Median)	20.0 (20-50)	
Defect size	Mean± SD	41.11±13.6	
	Median (Median)	40.0 (20-70)	

(Table 2) showing flaps used in coverage of perioral defects among the studied group

Flap	N		%	
	Inferior based transposition flap	2	11.1	
karapandzic flap	6	33.3		
mucosal advancement flap	4	22.2		
Sub-mental flap	3	16.7		
Bilateral fan flap	3	16.7		
Zisser flap	2	11.1		
Cheek advancement flap	2	11.1		
primary skin closure	3	16.7		
rhomboidal flap	4	22.2		
<b>Total</b>	<b>18</b>	<b>100.0</b>		

(Table 3) Showing Distribution of functional results obtained by the flap after 3 and 6 months

		3 months		6 months	
		N	%	N	%
Subjective Neuro-sensitivity	Hypothesia	11	5	27.8	61.1
	Normal	7	13	72.2	38.9
Objective Neuro-sensitivity	Central	4	2	11.1	22.2
	Cheek	3	3	16.7	16.7
	Lateral	2	0	0.0	11.1
	Both lateral and central	2	0	0.0	11.1
	Normal	7	13	72.2	38.9
Competence	Competent	15	18	100.0	83.3
	Sialorrhea with fluid	3	0	0.0	16.7
Asymmetric	Asymmetric	11	11	61.1	61.1
	Symmetric	7	7	38.9	38.9
Limited subjective mouth opening	No	6	9	50.0	33.3
	Yes	12	9	50.0	66.7
Maximal mouth opening	<40%	9	9	50.0	50.0
	>40%	9	9	50.0	50.0
Comprehensive pronunciation	Abnormal	5	0	0.0	27.8
	Normal	13	18	100.0	72.2
Ingestion disorders	No	15	15	83.3	83.3
	Yes	3	3	16.7	16.7
Oral hygiene	Hampered	3	3	0.0	16.7
	Normal	15	18	100.0	83.3
Micro-stomia	No	12	12	66.7	66.7
	Yes	6	6	33.3	33.3
Satisfaction	Dissatisfied	3	0	0.0	16.7
	Partially satisfied	10	9	50.0	55.6
	Satisfied	5	9	50.0	27.8
	<b>Total</b>	<b>18</b>	<b>18</b>	<b>100.0</b>	<b>100.0</b>

((Table 4) showing relation between flap used and patient's satisfaction

Flap		Satisfaction		X <sup>2</sup>	P	
		Partially satisfied	Satisfied			
Inferior based transposition flap	N	0	2			
	%	0.0%	22.2%			
	karapandzic flap	N	6	0		
		%	66.6%	0.0%		
mucosal advancement flap	N	0	4			

			Satisfaction		X <sup>2</sup>	P
			Partially satisfied	Satisfied		
Submental flap	%		<b>0.0%</b>	<b>44.4%</b>	<b>18.0</b>	<b>0.003*</b>
	N		<b>3</b>	<b>0</b>		
Bilateral fan flap	%		<b>33.3%</b>	<b>0.0%</b>		
	N		<b>0</b>	<b>3</b>		
Zisser flap	%		<b>0.0%</b>	<b>33.3%</b>		
	N		<b>2</b>	<b>0</b>		
Cheek advancement flap	%		<b>22.2%</b>	<b>0.0%</b>		
	N		<b>0</b>	<b>2</b>		
primary skin closure	%		<b>0.0%</b>	<b>22.2%</b>		
	N		<b>0</b>	<b>3</b>		
rhomboidal flap	%		<b>0.0%</b>	<b>33.3%</b>		
	N		<b>4</b>	<b>0</b>		
			%			
				<b>44.4%</b>		
				<b>0.0%</b>		



**Figure (1)** Case (1) Male patient 64 years old presented with malignant ulcer on inner aspect of left cheek which proved by HPE to be SCC. Excision of lesion with safety margins and reconstruction using mucosal advancement flap, graft and skin closure



**Figure (2) Case (2)** Male patient 58 years old presented with lower lip malignant ulcer at left side which is proved to be SCC by HPE. Excision of the malignant ulcer and reconstruction using Rt Karapandzic flap, Lt double rhomboidal flap and mucosal advancement flap



**Figure (3)** Case (3) male patient presented with multiple lesions of upper lip, nasolabial fold and nose. Where excision of lesion of nasolabial fold and nose then reconstruction using cheek advancement flap. Then excision of upper lip lesion and reconstruction using inferiorly based transposition flap and the post-operative outcome

### DISCUSSION

The lips play a role in facial esthetics. To achieve the best functional and esthetic outcomes, surgeons should have the ability to choose an appropriate reconstructive method. In the process of management, we must consider the defect's characters as: the remaining tissue after tumor excision, skin laxity and the most important, patient's participation in decision making because these reconstruction techniques are challenging and esthetic outcomes could be away from patient's satisfaction [11].

In reconstruction, local flaps show the most convenient results either on: aesthetics or functions. But, considering defect size and site, patients' expectations and surgeon's skills and knowledge; a variety of flaps are presented for reconstruction of defects following tumor excision. In this article, we reviewed the most commonly reconstruction techniques performed. It's important for surgeons to follow the recent techniques in lip reconstruction to give the best choices to their patients [11].

Local flaps are a good tools for reconstruction of medium-size defects of mouth and lip, as they provide the same kind of tissue, situated in proximal to the resected area, and can be used also in patients with multiple medical conditions or who have had previous local treatment; also, they need less time and do no specific microsurgical skills [8].

The lip is a complicated structure made of skin, muscle and mucosa. The muco-cutaneous line is known as the vermillion border and represents an important facial land-mark. The RSTLs, known as relaxed skin tension lines, are situated radially around the mouth, they are vertical in the center and oblique in the lateral region [12].

Full-thickness lip defects must be reconstructed by transposition of different tissues consisting of mucosa, muscle, and skin from the lips. But, such a reconstructive method is feasible in small defects of the lip. As can be achieved by either modified Bernard's procedures, rotation flaps (Karapandzic), double cross lip flaps, or composite nasolabial flaps. These flaps provide lip with nearly normal functions. But, it can end with

microstomia when the defect is large, as following cancer resection [13].

In cases of lip and peri-oral reconstruction, we should preserve the muscle function. Successful restoration of function and strength of lips depends on the structure and integrity of the orbicularis oris muscle with its reinnervation [14].

We evaluated the flaps used in this study with mouth opening and closing, oral continence and presence or absence of lip asymmetry and dynamic distortion, at six-months postoperatively. Our patients have not experienced any difficulty in phonation up to six months postoperative follow-up.

These figure is nearly similar to another study in which the mean age was 53 with male dominance with 84% of patients with no significant difference and its study included 25 patient [15].

In this study the cause of perioral defects was post tumor ablation either SCC 66.7% or BCC 33.3%.

The majority of defects were in the lower lip 55.5 % either central area 22.2% or in the lateral area 33.3%, whereas the rest of defects were in the upper lip 33.3 %, nasolabial fold 11.1%, cheek 11.1%. With considering that there is an overlap between defect sites.

These figures are nearly comparative to a study where the majority of defects was in lower lip and represented 85%, while the upper lip defects represented 15%, where lower lip defects represented 78% of cases [15].

The major advantage of Karapandzic flap over other techniques is that it can be utilized for repair of as large as complete lower lip loss in a single-stage surgical procedure. The fact of vascularity on the prognosis of flap cannot be overemphasized, and the rich blood supply by superior and inferior labial arteries of the lips permits large volumes of lip tissue to be regularly and successfully transferred to reconstruct lip defects [16].

Frequent complications can occur following perioral reconstruction and it can be divided into major complications like total flap necrosis and minor complications like partial flap necrosis, wound dehiscence, microstomia, neurosensitivity impairment, asymmetry of mouth opening, sialorrhea and disturbed pronunciation. But this is less to occur with the use of local flaps in reconstruction of perioral defects.

We noticed in our study that the incidence of complications following perioral reconstruction using local flaps showing 61.1% of patients had hypothesia after 3 months which is improved as only 27.8% of patient still have hypothesia after 6 months of surgery. This can be compared to other authors who reported that 15-20% of cases underwent reconstruction of lower lip defects using

modified Bernard-Webster flap experienced hypothesia with significant resolution after six months [17].

Asymmetric mouth opening were in 61.1%. This figure was reported as assymetric mouth opening in only 1-20% of the cases under went Karapandzic flap in his study [18].

Microstomia were in 33% of our patients which is nearly similar to 25% of permanent microstomia reported by [18] in cases underwent Karapandzic flap.

Other complications as: limited subjective mouth opening by 66.7% in the first three months of study which is relatively improved as 50% of patient still have limited subjective mouth opening after six months of study. Maximal mouth opening was >40% in 50% and <40% in 50.0%, abnormal pronunciation was in 27.8% after three months which was completely resolved after six months, Ingestion disorders was in 16.7%, and 16.7% were hampered oral hygiene.

As regard patient satisfaction, it was multifactorial and we linked it with many data as the patient demographic data, final outcome, lesion size and site and the type of flap used for reconstruction of perioral defects.

But the most important is the relation between the type of flaps and patients' satisfaction. We noticed that there are partial satisfactory results with the use of Karapandzic flap, rhomboidal flap and submental flap by 66.6%, 44.4% and 33.3% respectively. While there are more satisfactory results with flaps like mucosal advancement flap 33.3%.

## CONCLUSION

The aim of reconstruction of perioral skin defects is to obtain the best possible aesthetic and functional result. Every case should be approached in an individual manner as no two patients, nor two facial defects are the same. Although we have described many various flaps, based on our clinical experience and it can be concluded that local flaps provide the most satisfactory results and should be considered as the first choice for the reconstruction of perioral defects.

And also, we recommend further studies including larger number of patients and long-term follow up to clarify the most suitable flap to be used for reconstruction of certain lip or perioral defect.

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