

Reconstruction of Complex Defects of the Eyelids and Periorbital Region

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ABSTRACT

Background: Eyelids and periorbital region defects constitute a serious problem and significant challenge in the reconstruction surgery due to difficulty in restoring the anatomy and the function of the eyelid as well as the aesthetic appearance. Urgent management is mandatory in all cases. Then reconstructive plans is designed to restore the anatomy of the missing part, as well as the different modalities of reconstruction.

Aim: To evaluate the aesthetic and functional results after reconstruction of the eyelids and periorbital defects by different reconstructive techniques.

Patients and Methods: This study was conducted on 64 patients with defects of the eyelids and periorbital region. All patients underwent a full detailed history, complete ocular examination, visual acuity assessment, photography and radiological investigations. Treatment of 45 patients was done by local flaps, 15 patients by free skin grafts and 4 patients by distant flaps.

Results: Patients were evaluated as regards the aesthetic outcomes and functional results. The results were excellent in those patients treated by local flaps or free skin grafts. The distant flaps are used when the defect is large and the local tissues are not sufficient. In patients treated by split thickness grafts the results were excellent in 66%; good in 32% and poor in 2%. In patients treated by local flaps the results were excellent in 60% and good in 40%. In patients treated by distant flaps the results were excellent in 52%; good in 43% and poor in 5%. The functional results were excellent in all patients except 4 patients treated by local flaps and required additional split thickness skin graft to correct a mild degree of ectropion.

Conclusion: Reconstruction of the eyelids defects must be treated urgently to avoid the serious complications resulting from exposure of the ocular surface and also to regain the cosmetic appearance of the face. The various methods presented in this study may be a guide to help in reconstruction of the periocular area. It is of utmost importance to maintain mobility of the upper eyelid and stability of the lower eye lid while addressing their reconstruction.

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INTRODUCTION

Eyelids and periorbital region defects constitute a serious problem and significant challenge in the reconstruction surgery due to difficulty in restoring the anatomy and the function of the eyelid as well as the aesthetic appearance. Urgent management is mandatory in all cases. Strategic plans should involve accurate and clear diagnosis for defects as regards etiological diagnoses, functional diagnoses and anatomical and pathological diagnoses. Then reconstructive plans is designed to restore the anatomy of the missing part and to know whether the defect involves the anterior lamellar, the posterior lamellar, or both. Defects in this region could be congenital, traumatic including burns; following tumor excision whether benign or malignant or secondary to severe inflammatory or gangrenous lesions. A complex defect is the one that is composed of multiple different tissues or larger than one third of the aesthetic unit. Finding the most satisfactory flap in both functional and aesthetic aspects to repair such defects is a big challenge. This requires not only the flap knowledge but also an ability to plan the repair in three dimensions. The aim of the present study is to study the result of the reconstruction of eyelids and periorbital defects by different reconstructive techniques as regards the function and the aesthetic look.

PATIENTS AND METHODS

This study is a retrospective study, carried out at Cairo University Hospitals between December 2015 – November 2020.

Patient's evaluation: All patients have undergone the following:

• *Preoperative:*

- A full medical history was taken from all patients along with general and local examination considering the site, size, shape and depth of the defect.
- Donor site examination regarding infection or scars.

Ocular examination: Slit lamp examination, fundus examination, extraocular motility, cranial nerve assessment, visual acuity, color vision, optic nerve evaluation and lacrimal drainage system examination.

- Laboratory (CBC, LFTs, KFTs, Blood sugar and Coagulation. Profile) and radiological investigations (plain X-ray) were done.
- Photographs were taken pre, intra and postoperatively after having a consent from patients.

• *Intraoperative:*

In our study all patients were operated upon under general anesthesia, and an intravenous antibiotic prophylaxis (was preoperatively administered. All operative procedures were performed by the same surgical team and it included the following steps: Examination of the defect, baring of the edges of the defect, hemostasis by cautery, harvesting of the flap or the graft, flap dissection, flap insertion, donor site closure.

• *Postoperative:*

A light sterile dressing was used to cover the wound for a week. Close monitoring for any possible complications such as hematoma, dehiscence and donor site problems. Intravenous antibiotics were prescribed for 2 weeks post-operatively. Donor site sutures were removed after 3 weeks post-operatively. Patients were followed-up for 2 years. During that, results were compared by photographs all through along with researcher's direct clinical evaluation. All patients' data were recorded and documented.

- Patients were evaluated regarding the aesthetic outcome and patient's psychological satisfaction by patient questionnaire and clinical examination and comparison to the primary lesion.

RESULTS

Our study included 64 patients with eyelids and periorbital defects; 47 were males and 17 females. Their ages ranged between 12 and 67 years. Causes of the defects were burns in (30 patients), trauma (12 patients), benign lesions (8 patients) malignant neoplasm (7 patients) and congenital (7) patients (Table 1).

Table (1): The Causes of the defects.

Cause of the defect	Number of patients
Burns	30
Trauma	12
Benign lesions	8
Malignant neoplasm	7
Congenital	7

In our study 45 patients were treated by local flaps; 15 patients by split thickness skin graft and 4 patients by a distant flap.

Regarding aesthetic outcome grades, there was a statistically significant improvement 3 months post-operatively (Table 2). In patients treated by split thickness grafts the results were excellent in 66%; good in 32% and poor in 2%. In patients treated by local flaps the results were excellent in 60% and good in 40%. In patients treated by distant flaps the results were excellent in 52%; good in 43% and poor in 5%. (Table 2). (Figs. 1-5).

Table (2): Aesthetic outcomes of the surgical techniques.

Technique	Excellent	Good	Poor
Split thickness flaps	66%	32%	2%
Local flaps	60%	40%	0
Distant flaps	52%	43%	5%

Regarding post-operative complications, no recorded complications in all groups.

Regarding patient's post-operative psychological satisfaction, there was a significant improvement 2 years postoperatively.

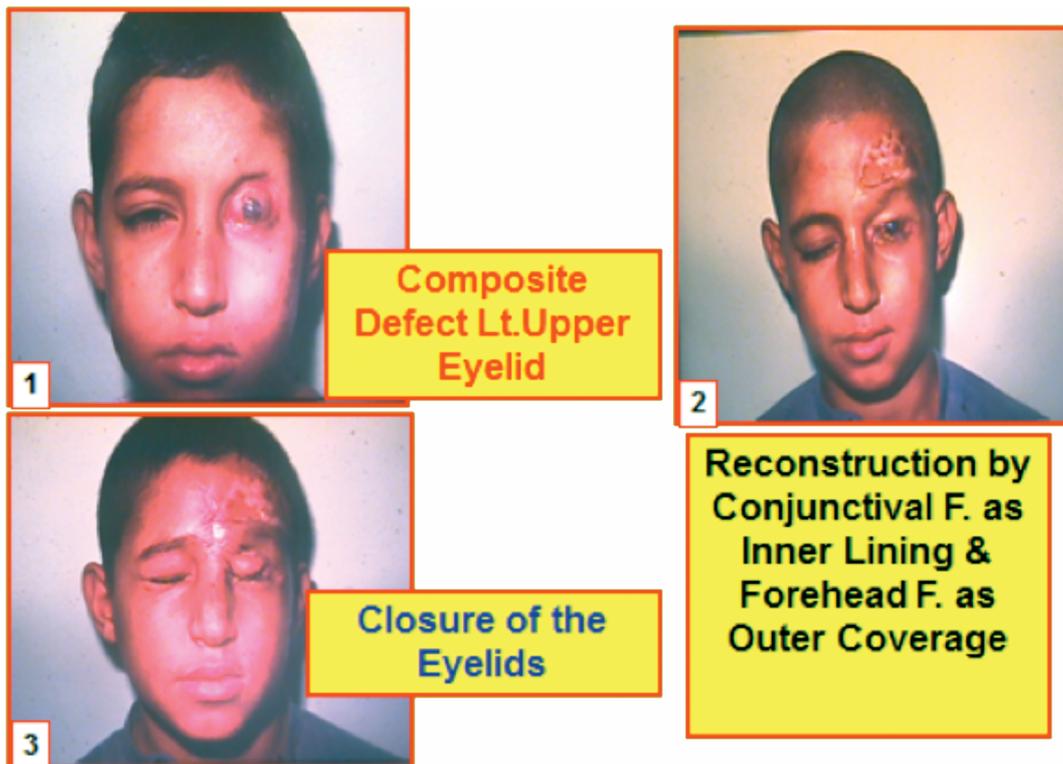


Fig. (1): Pre and postoperative photo of case 1.
1- Preoperative composite defect left upper eyelid.
2- Postoperative photos showed reconstruction by conjunctival flap as inner lining and forehead as outer coverage.
3- Postoperative photo showed proper closure of the eyelid.

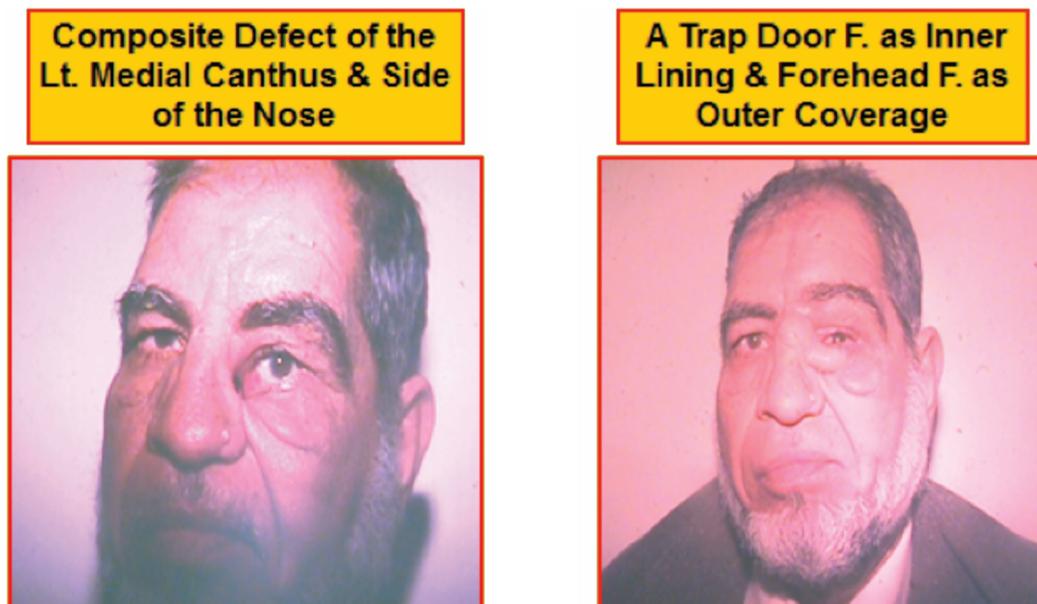


Fig. (2): Postoperative photos.
A- Composite Defect of the Left Medial Canthus & Side of the Nose.
B- A Trap Door Flap as inner Lining & Forehead Flap as Outer Coverage.

**POST CHEMICAL BURN
COMPOSITE DEFECT
OF LF.UPPER EYELID** **RECONST. THE INNER
LINING BY MUSC.CONJ.F.
SKIN GRAFTS FOR COVER**



Fig. (3-A): Post Chemical Burn Composite Defect of Left Upper Eyelid. Reconstruction the Inner Lining by Musculo-conjunctival Flap and Skin Grafts for Coverage.

**THE RECONSTRUCTED
EYELID DURING
CLOSURE OF THE EYE** **RECONSTRUCTION OF
EYEBROW BY A SCALP
SKIN GRAFT**

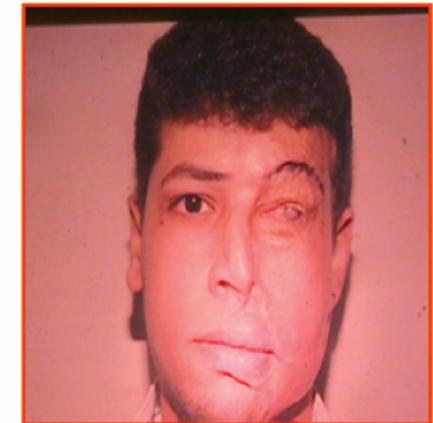


Fig. (3-B): The Reconstructed Eyelid During Closure of the Eye. Reconstruction of Eye Brow by a scalp Skin Full Thickness Graft.

**Extensive Mole Rt.
Side of the Face**

**Excision & Split
Thickness Skin Graft**



Fig. (4): Pre and postoperative. Extensive Mole Rt. Side of the Face. Excision & Split Thickness Skin Graft.



Fig. (5-A): Hairy Mole of the Rt. Cheek. Operative Picture after Excision of the Mole. Pedicled Para scapular Flap.

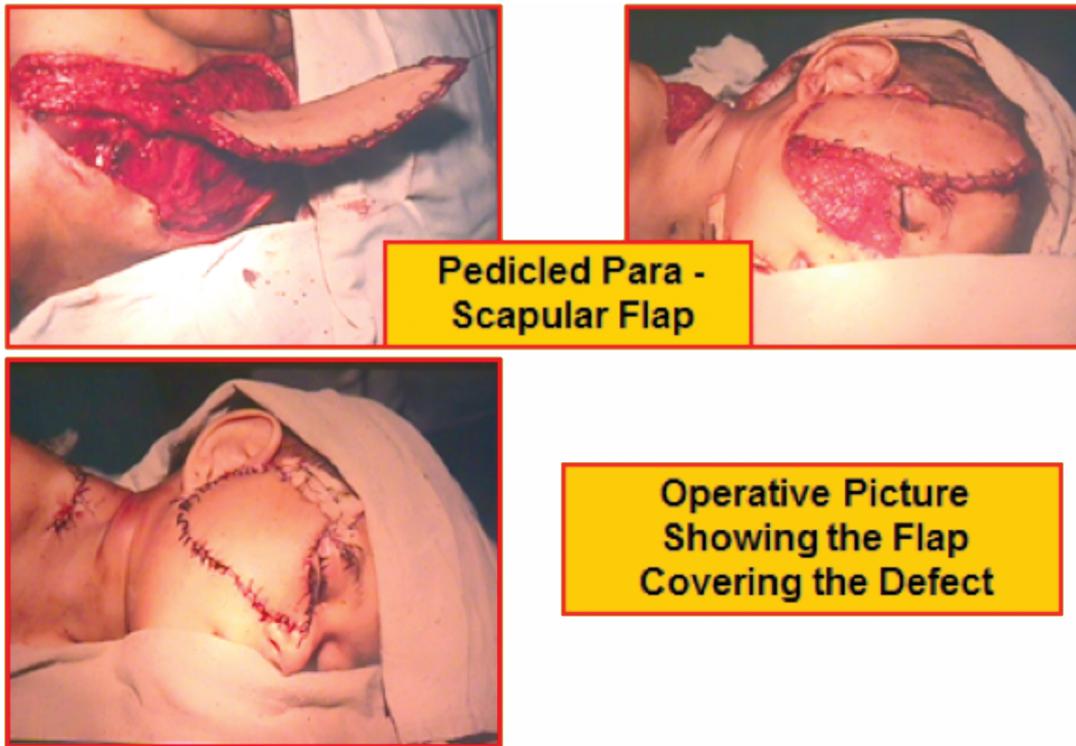


Fig. (5-B): Pedicled Para scapular Flap. Operative Picture Showing the Flap Covering the Defect.

Fig. (5-C): Post-operative photo two years after reconstruction.



DISCUSSION

The eyelids are very important for globe protection against trauma and excessive light. They also maintain and distribute the precorneal tear film as well as pumping the tears into the lacrimal sac. They are also part of the face beauty and expression via their appearance and muscles [4,5].

The eyelids and periorbital region defects constitute a major problem from the aesthetic and functional aspects. The patient if not treated properly may lose his vision beside the psychological disturbance of his morale. Reconstruction of these defects are not easy and requires a deep structured knowledge of the anatomy of this area [6,7,8]. There are many techniques for reconstruction and the surgeon has to choose the suitable method for each case [9,10].

In this study, reconstruction of 64 defects of the eyelids and periorbital region were done using three different techniques: Local flaps; free skin graft alone or a distant flap. Local flaps seem to be ideal for reconstruction of both upper or lower eyelids. The tissues used are near the defect and more or less similar in consistency; color and thickness to the tissues of the defect [11-14].

In superficial defects of the eyelids and large defects of the periorbital region free skin graft either split thickness or full thickness may be ideal for reconstruction [15,16]. The color match is to some degree different but it changes by time and after exposure to sun rays.

Distant flaps are not ideal for reconstruction of the eyelids and periorbital region. They can only be used in reconstruction of complicated defects of the face involving the periorbital region or eyelids [17].

Reconstruction of alopecia of the eye brows can be corrected easily by a full thickness skin graft from the scalp (Fig. 3-B). Other techniques may be tried e.g. hair transplants [18]. Due to some limitations of the surgical techniques and the quick advances of tissue engineering, the methods of eyelid reconstruction, especially posterior lamella reconstruction, will transform from a replacement strategy to a regenerative strategy [4].

In conclusion, defects of the eyelids and periorbital region have to be reconstructed urgently to prevent serious complications. The methods presented in this study may be a guide to help in this problem. Many techniques are available for periorbital reconstruction, however during planning,

the surgeon should consider using pliable tissues in reconstructing the upper lid to maintain its mobility and focusing on keeping the lower lid well stabilized via fixating its canthi during reconstruction.

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