

Original Research Article

Is reconstruction of composite defects of nose and cheek following tumor excision utilizing subunit principle better?

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ABSTRACT

Background: Composite defects of nose and cheek are best stage reconstructed with separate nose and cheek flaps to recreate a blended nose-cheek junction, achieved by cheek advancement flap for cheek and forehead flap or local grafts for the nasal defect. This article analyses whether reconstruction of defects utilizing well-known subunit principle is cosmetically the best?

Methods: Case records of fifteen patients of nasal cancers extension into the cheek from January 2011 to December 2015 were analyzed retrospectively.

Results: Out of fifteen patients 8 were men and 7 women, two patients had squamous cell carcinoma, rest had basal cell carcinoma. Average size of defect was 4.5 cm. Modified Imre's cheek advancement flaps was used in all to reconstruct cheek defects while paramedian forehead flap was used for nasal reconstruction in 13 patients, skin graft and nasal advancement flap in one each. Eight patients underwent single stage reconstruction while seven with full thickness nasal defects had a delayed reconstruction. 13 patients rated their final appearance as satisfactory, while surgeon rated 12 patients with well-blended nose-cheek junction as satisfactory and lateral migration of junction being unsatisfactory. Alar retraction was observed in two patients with full thickness nasal defects. Two patients who underwent inner nasal lining reconstruction developed wound dehiscence while simultaneous reconstruction of nose and cheek was performed.

Conclusions: Subunit principle application for composite nose and cheek results in symmetrical nose-cheek junction and appears excellent technique in achieving a satisfactory aesthetic outcome. Optimal results in full thickness nasal defects are achieved where reconstructing is delayed.

Keywords: Composite defect, Cheek advancement flap, Forehead flap, Cheek-nose junction

INTRODUCTION

Composite defects of nose extending into cheek are actually two separate facial subunits.¹ Discriminating contours of the subunits makes aesthetic reconstruction challenging. Nasal alar subunit has free round margins, lies medial to nasolabial fold, contrary to the broad and flat cheek component, which joins the nasal sidewall, which is separated from upper lip by nasolabial groove.²

A single flap cannot mimic characteristics of multiple facial units. If reconstruction of composite nasal and cheek defect is done with a forehead flap alone it would distort the nasal-cheek groove leading to cosmetic dissatisfaction (Figure 1a) and would create an obvious dissimilarity from the cheek skin (Figure 1b). Principles of reconstruction of such defects are well explained by Menick.² Each subunit must be treated individually and reconstructed with independent flap, known aphorism

replacing like with like.³ Its advantages are first it looks aesthetically pleasing with better cosmesis since the nose cheek confluence lies at the junction of subunits. Since a large defect is divided into smaller units, lesser tissue is borrowed from surrounding donor sites, is another advantage.⁴ For these reasons reconstruction with two flaps is always considered superior.² Thus composite nasal and cheek defects when reconstructed individually

with cheek advancement flaps, local nasal flaps including paramedian forehead flaps respectively yield better results. A third flap or modification of forehead flap is required to provide inner nasal lining, making the reconstruction more complex requiring delayed nasal reconstruction. Cheek reconstruction performed prior provides a stable platform for future nasal reconstruction leading to facial symmetry and less perceptibility.^{2,4}



Figure 1: (a) Composite nasal cheek defect reconstructed with forehead flap giving patch like appearance; (b) forehead flap looks different than cheek skin.

There are a few reported clinical case series addressing reconstruction of such defects but validity of this approach has not been evaluated.^{5,6} The objective of this study was to analyze the outcome of various reconstructive options for nasal composite defects and whether reconstruction should be treated as individualized units, while utilizing subunit principle is better cosmetically with their efficacy in rebuilding symmetric nose-cheek junction.

METHODS

Case records with photographs of all patients with skin cancers of nose extending into adjacent cheek operated from January 2011 to December 2015 at Jilani hospital Quetta, Pakistan were retrospectively analyzed. The study had approval from the ethical committee of the hospital. Sampling technique used was non-probability purposive sampling. Cases undergone reconstruction with cheek advancement flaps and local nasal or forehead flaps were included in the study. Very large or total nasal or individual cheek defects requiring options of superficial temporal artery based forehead flaps or free flaps were excluded. Reconstruction was carried out after biopsy confirmed negative margins. Location of tumor, size and type of defect, method and stages of reconstruction along with patient's demographics were recorded on a proforma. Depending upon the nasal defect, a full thickness skin graft, nasal advancement flap or paramedian forehead flap was used simultaneously or in

deferred stages. Patient rated its aesthetic outcome on appearance as satisfactory or unsatisfactory, on the other hand the surgeon analyzed the outcome on various parameters. Nose cheek junction compared with opposite side if symmetrical was rated positive and negative if laterally migrated, with alar symmetry compared to the opposite being symmetrical and asymmetrical if superiorly displaced. Wound dehiscence was the other parameter. All data was analyzed using SPSS 20.

RESULTS

Seventeen patients with skin nasal cancers extending into cheek were identified from the database. Two patients who did not undergo complete reconstruction were excluded. There were eight males and seven females. Mean age was 60 years with range from 40-90 years. Thirteen patients had basal cell carcinoma (BCC) with two squamous cell carcinoma (SCC). Twelve patients were operated in local anesthesia, three patients underwent general anesthesia. Excision margins were from 8-10 mm. Mean dimension of defect following tumor excision was 4.52 cm with range 3.5-7 cm. Nine patients had defects involving ala and sidewall, three had only alar defect, nasal sidewall defect in two patients and dorsum with nasal sidewall in one patient. Full thickness nasal defect was present in 10 patients while five patients had partial thickness. In all cases, cheek defects were immediately reconstructed with modified Imre's cheek advancement flap and was secured to periosteum of nasal

bone or pyriform aperture with 3 0-prolene sutures. Characteristics of the defects with reconstruction details are mentioned in Table 1. Cartilage reconstruction was performed in only two patients, rest of them did not opt for it. Histopathology revealed complete excision in all

except two where postoperative radiation was advised for one patient who was recurrence free after one and half years follow up while the second patient underwent revision surgery.

Table 1: Characteristics of defects and reconstruction.

Patient number	Location of nasal defect	Nature of nasal defect	Timing of nasal reconstruction	Method of nasal reconstruction
1	Ala+sidewall	Full thickness	Delayed	Traditional forehead flap
2	Dorsum+sidewall	Partial thickness	Immediate	Nasal advancement flap
3	Ala+sidewall	Partial thickness	Immediate	Traditional forehead flap
4	Ala+sidewall	Partial thickness	Immediate	Traditional forehead flap
5	Ala+sidewall	Full thickness	Delayed	Folded forehead flap
6	Ala+sidewall	Full thickness	Delayed	Traditional forehead flap
7	Ala only	Full thickness	Delayed	Folded forehead flap
8	Ala only	Full thickness	Delayed	Traditional forehead flap
9	Sidewall only	Partial thickness	Immediate	Traditional forehead flap
10	Ala+sidewall	Full thickness	Immediate	Folded forehead flap
11	Ala only	Full thickness	Immediate	Folded forehead flap
12	Ala+sidewall	Full thickness	Delayed	Folded forehead flap
13	Ala+sidewall	Full thickness	Immediate	Folded forehead flap
14	Sidewall only	Partial thickness	Immediate	Full thickness skin graft
15	Ala+sidewall	Full thickness	Delayed	Traditional forehead flap

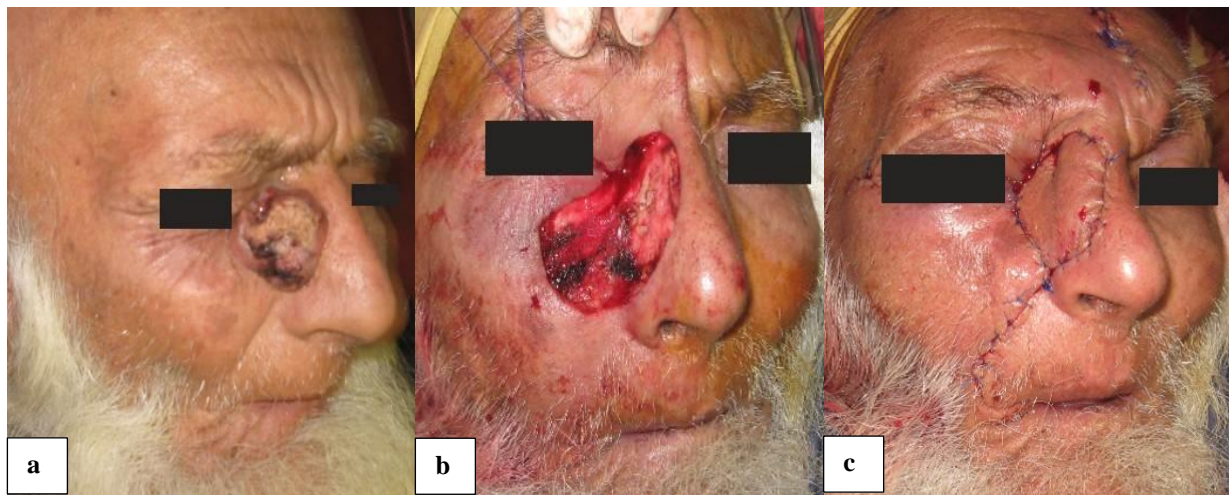


Figure 2: (a) BCC involving nasal sidewall and medial cheek; (b) composite defect with bare nasal bone and cheek defect; (c) subcutaneously islanded forehead flap for nose and cheek advancement flap for cheek.

Two patients were lost to follow up. In the rest of the patients, mean follow up was three months (range 9-18 months). In three patients lateral migration of lateral margin of forehead flap was observed, two of which had partial thickness nasal defects and one had full thickness nasal defect where cheek and nose were reconstructed simultaneously. Patients rated their reconstruction satisfactory in 13 patients and unsatisfactory in two patients. From surgeon's point of view, 12 patients had satisfactory reconstruction of nose cheek junction. Alar displacement superiorly leading to asymmetry was noted in two patients. All cheek flaps survived completely with no partial or complete necrosis. Distal flap necrosis of 1 cm was observed in one patient following thinning of

forehead flap on the second stage. Two patients with full thickness defect had dehiscence of forehead and cheek flaps at nose cheek junction while attempting simultaneous reconstruction.

Case examples

Case 1

70 year old male with BCC involving nasal sidewall and cheek (Figure 2a). Excision of tumour led to exposed nasal bone necessitating flap repair (Figure 2b). Utilizing subunit principle, cheek was reconstructed using horizontal cheek advancement flap and nose was

reconstructed by subcutaneously islanded single stage para median forehead flap (Figure 2c). The forehead flap was created a bit larger than defect to overcome possible contraction at the junction of two flaps to create normal nose-cheek junction.

Case 2

40 years old male after SCC excision leading to full thickness ala and cheek defect (Figure 3a). Cheek

advancement flap was used to reconstruct cheek defect, which was allowed to heal for 2 weeks, followed by nasal reconstruction with folded forehead flap (Figure 3b). Three weeks later flap was elevated, thinned and conchal cartilage was used for lower lateral cartilage reconstruction (Figure 3c). Good symmetrical nostril reconstruction was achieved although lining was a thick (Figure 3d). Pedicle of forehead flap was subsequently divided after three weeks. A very good cheek-nose junction was created (Figure 3e) although the colour match of forehead flap was contrasting.

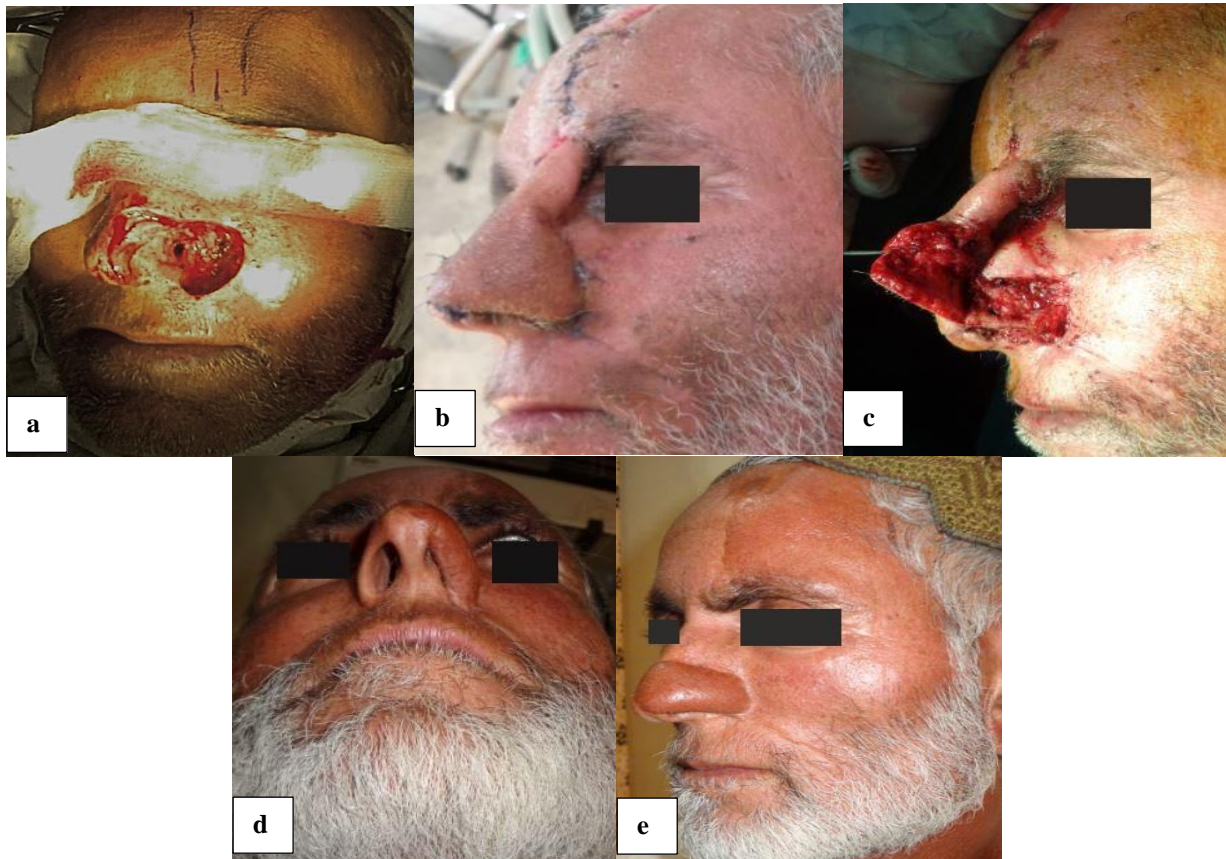


Figure 3: (a) Composite defect following SCC resection; (b) healed cheek advancement flap and folded forehead flap; (c) flap elevation and conchal cartilage placement; (d and e) basal and lateral view showing cosmetically acceptable nose-cheek junction reconstruction.

DISCUSSION

Composite defects of nose extending into cheek can be broadly classified into two groups on the basis of stages of reconstruction, simultaneous or staged.⁷ Once the nasal thickness alar defect with an intact lining defect simultaneous cheek and nose reconstruction can be performed, creating a divide between two subunits. The main drawback noticed is the lateral migration of cheek flap with displacement of cheek nose junction. Maximum advancement of cheek flap can be achieved by securing it to the periosteum of nasal bone or pyriform aperture with non-absorbable sutures. However in case of full thickness nasal defect, to prevent this complication nasal reconstruction should be delayed till the cheek flap is healed. To limit the incidence of contracture at the

defect involves the nasal sidewall, the defect can be reconstructed with full thickness graft and cheek advancement flap for cheek defect. However in case bone is exposed, then using a local nasal flap or forehead flap along with cheek flap has to be used. In case of partial junction of flaps a larger forehead flap than the defect should be used.⁸

The second case necessitating staged reconstruction is full thickness alar defects, which also requires reconstruction of inner lining. Our approach was to delay the nasal reconstruction by 2 weeks once modified Imre's horizontal cheek advancement flap had healed and a stable platform was obtained, however on violation of this principle in two patients when single a single stage reconstruction was attempted, dehiscence at nose cheek

junction was observed. Nasal reconstruction can be achieved either by folded forehead flap described by Menick with intranasal lining flaps for lining or forehead flap for providing skin covering with conchal cartilage for alar cartilage reconstruction, which has been excellently described by Menick but it failed to discuss the disadvantage of using two flaps for such composite defects.^{2,9,10} NS Jones et al have discussed the main disadvantage.^{8,7} Postoperative healing of the junction of flaps leads to shifting of ala superiorly and laterally resulting in nostril asymmetry. We had this problem initially in two of our patients and to overcome this problem we used a relatively larger flap than the proposed defect to minimize the effect of cicatrization. We preferred using folded forehead flap to reconstruct lining in cases of small loss and replacing loss of lateral bony wall avoiding separate intranasal lining flaps. Our experience relates difficulty in achieving nostril symmetry with folded forehead flap in the beginning. Another observation was once the cheek flap platform is

healing was stabilized subsequent nasal reconstruction yields better results.

Reconstructing composite defect of nose and cheek with full thickness nasal defect is challenging in achieving nostril symmetry.⁴ As we were able to reconstruct lower lateral cartilage in only two patients, we cannot comment on the outcomes. However, we achieved symmetry in only one patient. Baker has observed the unpredictability of scar contracture leading to smaller nostril and advised utilizing a bigger flap to create a bigger nostril, which could easily be revised at a later stage rather a formidable task of enlarging a small nostril.⁴

Finally based on our experience and review of literature an algorithm is proposed for reconstruction of composite defects of nose (Figure 4). It is the nature of nasal defect that is, partial thickness or full thickness and its location that determines the stages of reconstruction.

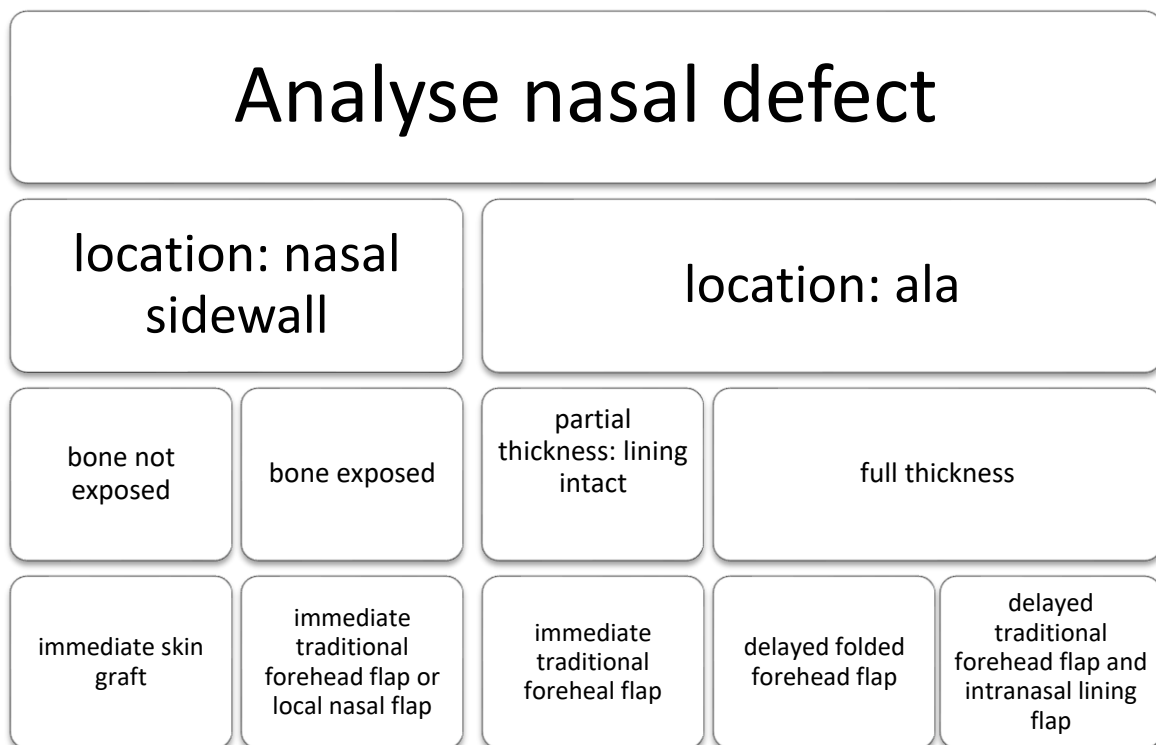


Figure 4: Reconstruction of composite defects of nose.

CONCLUSION

Subunit principle application for composite nose and cheek results in symmetrical nose-cheek junction and appears excellent technique in achieving a satisfactory aesthetic outcome. Optimal results in full thickness nasal defects are achieved where reconstructing is delayed.

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