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Correction of Ear Lobule Deformity Using Diamond Shaped Flap

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ABSTRACT

Objective — *To determine the outcome of diamond shaped flap as an option for reconstruction of ear lobule deformities.*

Study design — *Descriptive case series.*

Place & Duration of study — *Department of Plastic & Reconstructive Surgery, Dow University of Health Sciences and Dr. Ruth KM Pfau Civil Hospital Karachi, from January 2015 to December 2017.*

Methodology — *Diamond shaped flap was used to reconstruct the soft tissue deformity of the ear lobule. The outcome of the recipient and donor sites were assessed along with the aesthetic appearance of the ear. Both male and female patients with ages 15-60 years having ear lobule defects due to congenital or acquired deformities (trauma, human bites) were included. Patients with previously scarred donor site (cheek and mastoid region) were excluded. Data was collected on a pre designed form and descriptive statistics were used to present data.*

Results — *A total of 15 diamond shaped flaps were performed for the reconstruction of ear lobule defect. There were 11 females and 4 males with age between 15 - 60 years (mean 38.4 year). Congenital ear deformity was present in 11 cases, 2 had history of trauma and in 2 patients deformity occurred due to human bite. Aesthetic outcome was good in 10 patients and fair in 4 patients. Flap dehiscence occurred in one patient and donor site skin dehiscence in 2 patients.*

Conclusion — *Diamond shaped flap is an excellent option for reconstruction of ear lobule having good aesthetic appearance with acceptable lobule shape and skin color along with primary closure of the donor site without any major complications.*

Key words — *Ear lobule, Diamond shaped flap, Rhomboid flap, Ear lobule reconstruction, Ear deformity.*

INTRODUCTION:

Ear lobule is defined as the rounded, soft fleshy part that hangs from the lower part of the ear. It plays an essential role in the overall appearance of the ear and the face. It is important for wearing earring and other jewelry, especially for women in our society where wearing jewelry is a part of the culture. Any deformity of the ear lobule will affect the psychosocial life of the patient.[1]. It also serves as an essential reference point for facial symmetry, loss of which results in an obvious aesthetic abnormality.[2] Deformities of the ear can be congenital or acquired. Malformations of the lower ear are less common than the malformations of upper ear.

Cleft ear lobule is the most common congenital lower auricular malformation followed by question mark ear and ectopic anti helical fold deformity.[3] It is essential to classify the ear anomalies before proceeding for any surgery. Many different classifications exist but Avelar classification is the one that is most useful in terms of surgical planning. The key to a successful repair depends on correct diagnosis made and appropriate technique chosen for the repair.[4] Acquired deformities of the ear are the result of trauma, burns, animal and human bites

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and after tumor excision.[5,6] Reconstruction of these defects is a challenge for the surgeon. Key to reconstruction is the preservation of the auricular cartilage.[7]

Many different techniques for reconstruction of the ear have been described including wedge excision, local flaps such as post auricular flap, skin substitute like bovine matrix, single stage or two stage techniques, but most of these resulted in unsightly scar or incomplete repair needing further modification of the surgical technique.[8,9] Most of the techniques have used adjacent tissues to compose a bilobe or a pedicle flap. Gavello in 1970 was the first person who described a bilobe flap located beneath the auricular defect. Weerda modified Gavello's technique and used it for partial helical defects associated with ear lobule loss.[10] Pardue reconstructed ear lobule cleft with preservation of the perforation for earrings. Flap based on the mastoid process that is folded on it, is commonly used for this purpose.[3] Converse two flap technique marks the flap at the posteromedial aspect of the auricle and a second flap at the retroauricular area. Brent had reconstructed the ear lobule with an auriculo-mastoid flap that is also known as the reverse contoured flap. Alanis performed a vertical flap from the cheek for ear lobule reconstruction.[3] Seidman and Novelly in 1991 described a U-shaped single stage flap technique drawn inferiorly to the lower part of the earlobe.[7]

The objective of this study was to reconstruct the ear lobule deformities using diamond shaped flap in terms of skin color match, texture, contour and donor site morbidity. Recipient and donor site deformities were assessed in all patients.

METHODOLOGY:

This descriptive case series was conducted in the Department of Plastic & Reconstructive Surgery, Dow University of Health Sciences and Dr. Ruth KM Pfau Civil Hospital Karachi, From January 2015 to December 2017. The procedure was done under general anesthesia. After refreshing the defect margins, a diamond shaped flap for the reconstruction of the ear lobule using normal side as a template, marked. This flap is based on the perforator of the occipital artery which is located just below the ear lobule in the center of the flap. The flap is designed in infra-lobular area of the cheek. Dimension of the flap is designed in such a way that the base is at the inferior aspect of the ear lobule.

Flap is raised at the level of subcutaneous tissue by sharp dissection and rotated in such a way that the tip of the diamond comes in contact with the upper limit of the defect and small limbs are approximated anteriorly and posteriorly. Once sutured, it constitutes the curved free edge of the ear lobule. The flap donor site was closed primarily after undermining (Fig I). In few cases a penrose drain was placed to prevent hematoma. Wounds were closed with polypropylene 5/0 and dressing applied. Regular follow up visits were planned. Stitches were removed after one week and postoperative scar management was instituted (Fig II & III). The aesthetic outcome of the patients was assessed according to the size of the lobule, skin colour match, texture, contour, composition and donor site morbidity. The follow-up period was 3 months.

RESULTS:

The reconstruction of 15 earlobe defects was performed in this study. There were 4 (23.5%) males and 11 (76.5%) female patients. Age ranged between 15- 60 years (mean 38.4 year). Congenital ear abnormalities were present in 11 (73.3%) of the cases, 2 cases (13.3%) were caused by trauma and human bites each. Of the 15 patients, the left earlobe was affected in 9 cases and the right earlobe was affected in 6 cases. Four (23.5%) patients were between the age group 15-30 years, 7 (53%) between the age 31-45 years and 4 (23.5%) between 46-60 years of age.

Ten (66.66%) patients showed good aesthetic outcomes. Four (26.67%) cases showed fair and 1 (6.67%) poor outcome. No complication was seen in 12 (80%) patients, while 1 (6.6%) patient had flap dehiscence and 2 (13.34%) donor site dehiscence, which was closed in delayed primary fashion (table I).

DISCUSSION:

Reconstruction of ear lobule defect has always been a challenge for the plastic surgeon as it requires a three dimensional understanding of the defect and the approach needed to reconstruct it. It requires the plastic surgeon to use his creative skills, knowledge and planning to accomplish the task. The goal however remains to reconstruct an aesthetically pleasing ear that is symmetrical with the opposite ear.

Numerous techniques for correction include z-plasty, w-plasty, local flaps, Y-V advancement, 7 flap plasty, flap and grafting, hinge flap etc.[11] Congenital ear lobule deformity, such as cleft lobule is a rare anomaly that can range from mild to severe tissue

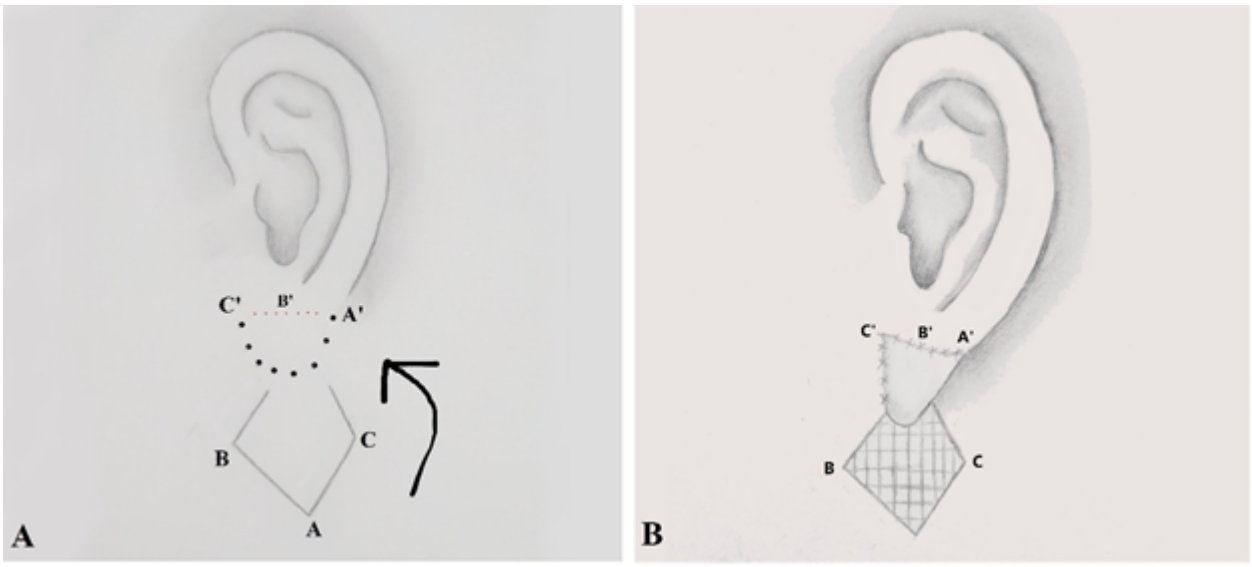

Fig I: Above illustration shows the diagrammatic representation of the flap. A diamond shaped flap was marked as the inferior portion of the defect. Flap raised and rotated. Point A* sutured to point A. Point B* sutured to point B. Poinc C* sutured at the anterior surface of the defect at point C. Point B and C approximated to close the donor site primarily.

Fig II: A) 20 years old female with history of congenital ear lobule loss. B). Diamond shaped flap marked. C) Flap raised and skin approximated. D) Flap inset, skin sutured and penrose dressing placed to prevent hemartoma.

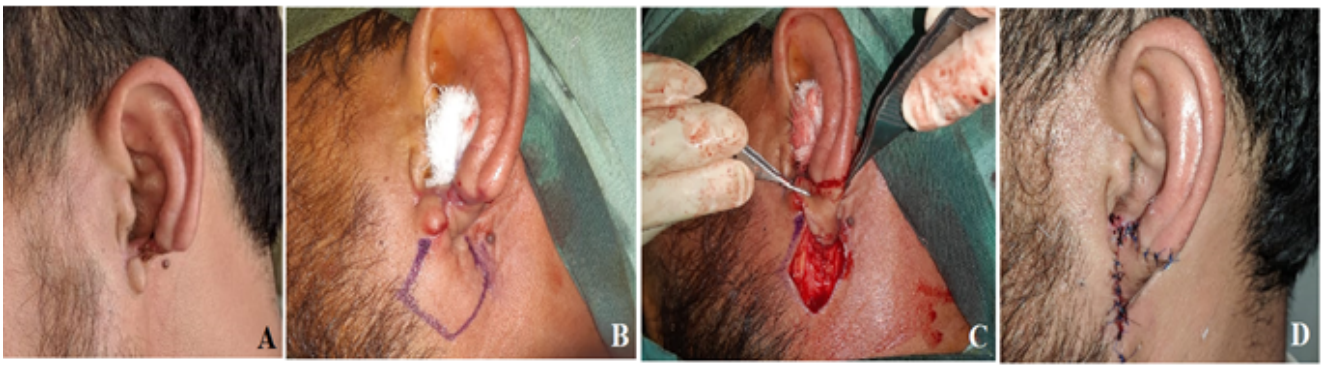

Fig III: A) 35 year old male with history of human bite. B) Flap marked at the inferior portion. C) Flap raised. D) Postoperative appearance of the flap.

deficiency. Maral T et al successfully used a Y-V advancement flap of the anterior and posterior parts of the cleft to reconstruct the cleft.[12] Borman H introduced a 7 plasty or inverted L plasty for correction of longitudinal ear lobule defects. This technique included incisions at both medial and

Table I: Demographic Data of the Patients, Complications and Aesthtic Outcome			
Variables		**Frequency (n)**	**Percentage (%)**
Age	15 - 30 year	4	23.5
	31- 45 year	7	53.0
	46 - 60 year	4	23.5
Gender	Female	11	76.5
	Male	4	23.5
Diagnosis	Congenital	11	73.3
	Trauma	2	13.3
	Human bites	2	13.4
Complications	None	12	80.0
	Flap dehiscence	1	6.6
	Donor site dehiscence	2	13.4
Aesthetic outcome	Good	10	66.6
	Fair	4	26.67
	Poor	1	6.67

lateral parts of the lobule for approximation of the flaps.[13] Hwang K corrected a transverse ear lobule defect by using a ipsilateral dermofat graft from the retroauricular area and anterior de epitheliazied tongue flap for the inset.[14] Alanis et al in 1970 had proposed a very effective method for ear lobule reconstruction by using the skin just inferior to the site of the malformed ear lobe. The procedure was done under local anesthesia and showed favorable results.[15]

Padhy et al used a triangular rotation advancement flap (TRAF) for reconstructing ear lobule defects. A triangular flap was designed from the medial segment of the ear and was advanced into the defect that was created.[16] Alconchel et al used a combined technique of Davis and Alanis. It required only a single stage for reconstruction and grafts were not used to cover the defects. In this technique, an extended retro-auricular flap along with anterior ear flap was used for reconstruction of the ear lobule defect.[17]

Many different techniques for ear lobule reconstruction for acquired defects have been described. They mainly include transposition of flap from the pre auricular region, post auricular region, using tissue expansion by using a tube flap or combination of these techniques. A few drawbacks include two stage procedure causing burden on the patient, unaesthetic and unnatural lobule contour, skin color mismatch and firmness due to placement of cartilage. Using a skin graft for cover the secondary defect leads to poor aesthetic outcome while harvesting cartilage from the opposite ear causes a new defect that increases the chances of infection and may also result in secondary cartilage absorption.

Limberg first described the rhomboid flap. The rhomboid flap, a random pattern cutaneous flap having a subcutaneous pedicle, is a transposition of a parallelogram with 120° and 60° angles.[18]. The flap may be a little bulky and may need defatting 4-5 months later. Careful suturing of the donor defect is essential to give a fine scar. It is a single stage procedure that is simple, safe and maybe performed under local anesthesia. Skin grafts are not required and the donor defect can be easily closed primarily. It has an acceptable aesthetic outcome with good contour and skin color match. However, this flap is not suitable for larger defects.

CONCLUSIONS:

Rhomboid flap is an excellent option for reconstruction of ear lobule defects with good cosmetic outcome and donor site closure and minimal recipient site complications. The shape of the lobule is acceptable and the skin color matches with the ear. The donor site is closed primarily eliminating the need for any secondary defect. Therefore, rhomboid flap for ear lobule reconstruction should be considered.

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