

## Management of Acquired Ear Defects and Its Outcome.

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Received: June 2017

Accepted: June 2017

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### ABSTRACT

**Background:** Acquired ear defects are common, frequently subtotal, and the complexity of the auricular anatomy renders them challenging to reconstruct. In contrast to congenital ear deformities, these defects have received little-concentrated effort to formulate a systematic approach to their analysis and treatment. **Aim:** To study the various types of acquired defects of ear classified based on etiology and anatomical location of the injury and assessment of outcome after reconstruction. **Methods:** 20 patients of acute and delayed presentation of acquired ear defect patients were included. **Results:** The commonly performed surgery was a cutaneous and composite flap. Donor site morbidity was the commonest complication in our study group constituting 25% of the patients. 40% of the patients scored overall outcome as excellent whereas surgeons were fully satisfied with the outcome of only 25% of the patients. **Conclusion:** While reconstructing ear, thin, pliable flaps with good contour and color match should be chosen and it should be completed in one or two stages, giving equal priority for the donor site scar as for the ear.

**Keywords:** Ear reconstruction, acquired defects, outcome.

### INTRODUCTION

External ear reconstruction presents many challenges for the Plastic surgeon because of its unique structure. The goal of external ear reconstruction is to achieve an ear as normal as possible in appearance and position. The shape, orientation, and size of the reconstructed ear must match its counterpart as closely as possible.<sup>[1,2]</sup> The postauricular sulcus must be preserved, and the relationship of the retroauricular skin to the scalp maintained. The reconstructive efforts are complicated by the features that include an unusually high ratio of cartilage to skin and the limited and variable blood supply. The success of auricular reconstruction lies with thin, well – vascularized skin coverage.<sup>[3]</sup> Local and regional flaps need to be carefully chosen and executed, to reconstruct the intrinsic anatomy of the ear. The ear, because of its protruding position and exposed nature is prone to injuries frequently. Despite its unique challenges, ear reconstruction is not without its own set of disappointments and frustrations for both the reconstructive surgeon and patient. Underestimation of the requirements of skin and cartilage needed will lead to multiple revisional surgeries, with the risk of increased scar formation and decreased vascularity at each stage.<sup>[4,5]</sup> However, if the Plastic surgeon sticks to well - established principles, the rewards of ear reconstruction will surpass those obtained from all other types of reconstructive surgery.

The defects were patterned using the template of the contralateral ear and appropriate flaps were planned and executed. Cartilage, if needed, was harvested from the ipsilateral or contralateral ear or costal cartilage. Reconstruction was carried out in single or multiple stages.

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#### Aim

To study the various types of acquired defects of ear classified based on etiology and anatomical location of the injury and assessment of final outcome after reconstruction.

### MATERIALS AND METHODS

This prospective observational study was conducted in Department of Plastic Surgery, Coimbatore Medical College Hospital. 20 patients of acute and delayed presentation of acquired ear defect patients were included. Patients were explained in detail about the planned procedure, need for multiple stages, flap revision, scar revision, donor site morbidity, complications and expected outcome. Patient's expectations were also recorded and considered during selection of the reconstructive option. Laterality of the injury, the segment of the ear involved, whether it is partial thickness or full

thickness, were also recorded. Measurement of both the ears including height, width and conch mastoid angle and defect size were made. Donor site for flap and cartilage were assessed for scarring, associated injury, infection, and adequacy. The template of the normal ear, affected the ear and the defect was made using X-Ray films. Planning was done for reconstruction taking into consideration the defect size, site, the extent of injury and availability and adequacy of the donor site. After completion of the surgery, patient was reviewed every month. Was examined for nature of scar, hyperpigmentation, keloid formation of the donor and recipient site scar, flap bulkiness and irregularity.

## RESULTS

A total of 20 cases of acquired ear defects were studied. The commonest age group with acquired ear deformity in our study was 21-30 years. Acquired ear defect was more common in male (80%) in our study group.

**Table 1: Distribution of Etiology.**

Mode of injury	Number	Percentage
RTA	3	15%
Bite	11	55%
Assault	2	10%
Burns	1	5%
Infection	1	5%
Fall from height	1	5%
Keloid	1	5%

The commonest mode of injury was bite (55%), because of the protruding position of the ear, it is being easily bitten. [Table 1] The right ear was injured in 12 (60%) patients whereas left ear was injured in 8 (40%) patients only.

**Table 2: Anatomic location of defect.**

Location	Number	Percentage
Upper third	2	10%
Middle third	5	25%
Lower third	3	15%
Upper & middle third	3	15%
Middle & lower third	3	15%
Upper, middle & lower third	4	20%

In our study group middle, third ear defect was commonly followed by the defect involving upper, middle and lower third together, because the middle third is the more protruding part of the ear and hence prone to injury. [Table 2] Full thickness defect was common in our study group involving 65% of the patients. Smoking was the common risk factor in our patients, present in 25% of our patients. [Table 3]

**Table 3: Distribution of Risk Factors.**

Illness	Number of patients	Percentage
Smoking	5	25%
Diabetes mellitus	1	5%
Hypertension	1	5%
No risk factors	13	65%

**Table 4: Distribution of type of surgery**

Surgery	Number of patients	Percentage
Skin to skin repair	3	15%
Full-thickness excision and primary suturing	1	5%
Cutaneous Flap	8	40%
Composite flap	8	40%
Conchal cartilage	3	15%
Costal cartilage	3	15%

The commonly performed surgery was the cutaneous and composite flap. [Table 4]

**Table 5: Distribution of a number of stages**

Stages	Number of patients	Percentage
I	7	35%
II	6	30%
III	5	25%
IV	2	10%

In our study group, 7 patients had single stage surgery (35%), next being two-stage surgeries in 6 patients which constitute 30%. [Table 5]

**Table 6: Distribution of Complications**

Complication	Number of patients	Percentage
Infection	2	10%
Flap tip necrosis	4	20%
Scar contracture	1	5%
Donor site morbidity	5	25%
No complications	8	40%

Donor site morbidity was the commonest complication in our study group constituting 25% of the patients. [Table 6]

**Table 7: Distribution of Contour**

Score	Objective assessment	Percentage	Subjective assessment	Percentage
Excellent (5)	10	50%	6	30%
Good (4)	4	20%	5	25%
Fair (3)	2	10%	6	30%
Poor (2)	3	15%	2	10%
Unacceptable (1)	1	5%	1	5%

50% of the patients were fully satisfied with the contour, but we were satisfied with the contour of only 30% of the cases. According to us, another 30% of the patient had an only fair contour. [Table 7]

**Table 8: Distribution of Colour match**

Score	Objective assessment	Percentage	Subjective assessment	Percentage
Excellent (5)	11	55%	12	60%
Good (4)	6	30%	6	30%
Fair (3)	3	15%	1	5%
Poor (2)	-	-	1	5%
Unacceptable (1)	-	-	-	-

Colour match was satisfactory for 55% of the patients and in 60 % of the patients for the surgeons'. Another 30% was good according to the patient and the surgeons'. [Table 8]

**Table 9: Distribution of Bulkiness**

Score	Objective assessment	Percentage	Subjective assessment	Percentage
Excellent (5)	4	20%	8	40%
Good (4)	3	15%	6	30%
Fair (3)	10	50%	3	15%
Poor (2)	3	15%	3	15%
Unacceptable(1)	-	-	-	-

Only 20% of the patients were satisfied with the bulkiness of the flap, whereas 50% of them have scored them as fair only. On analysis by the surgeons' 40% of the patients had fully acceptable bulkiness and another 30% had been score as good. [Table 9]

**Table 10: Distribution of Stages**

Score	Objective assessment	Percentage	Subjective assessment	Percentage
Excellent (5)	13	65%	13	65%
Good (4)	2	10%	6	30%
Fair (3)	4	20%	1	5%
Poor (2)	1	5%	-	-
Unacceptable(1)	-	-	-	-

In 65% of the patients, the number of stages of surgery was acceptable by both patient and the surgeons'. [Table 10]

**Table 11: Distribution of Donor site**

Score	Objective assessment	Percentage	Subjective assessment	Percentage
Excellent (5)	9	45%	8	40%
Good (4)	2	10%	3	15%
Fair (3)	3	15%	1	5%
Poor (2)	2	10%	4	20%
Unacceptable(1)	-	-	-	-
Not applicable	4	20%	4	20%

45% of the patients were satisfied with the donor site, whereas surgeons were fully satisfied with only 40% of the patient's donor site. [Table 11]

**Table 12: Distribution of Overall Satisfaction**

Score	Objective assessment	Percentage	Subjective assessment	Percentage
Excellent (5)	8	40%	5	25%
Good (4)	3	15%	7	35%
Fair (3)	6	30%	5	25%
Poor (2)	2	10%	2	10%
Unacceptable(1)	1	5%	1	5%

40% of the patients scored overall outcome as excellent whereas surgeons were fully satisfied with the outcome of only 25% of the patients. [Table 12]

## DISCUSSION

Management outcome of acquired ear defects is analyzed on the basis of the aesthesis that is achieved finally. The factors considered for that were the colour match of the reconstructed part of the ear with the adjacent skin, contour of the ear, bulkiness of the reconstructed part, donor site, number of stages of surgery an overall satisfaction. The analysis was done objectively by the patient and subjectively by the Professor, Guide and myself and put together to get the average. Both analyses were compared and patient and surgeons' perspective of the outcome is obtained.

Elsahy N uses the medial surface skin of the ear because it is pliable.<sup>[6]</sup> Chang YL et al consider poor ear definition as the major drawback in retro auricular flap.<sup>[7]</sup> In our study also subjective assessment score of the contour is only 30% as excellent and another 30% is only fair. This is because 20% of our patients had undergone retro auricular flap and hence we have obtained only fair ear definition in a majority of our patients. Whereas in objective assessment 50% of the patients have felt that contour is excellent and another 20% as good. This difference of opinion indicates that patients' are less concerned than the surgeons about the contour outcome.

According to Gill PS et al., local flaps will give the most natural appearing ear with the perfect match of skin quality.<sup>[8]</sup> According to Elsahy N6, the retro auricular skin provides a satisfactory color match. Lai A et al., found that the temporoparietal fascia flap can accept split skin or full thickness graft with the good color match. In our study color match was considered to be excellent in 55% of the patients and another 30% as good. Surgeons also felt that it was excellent in 60% of the patients and good in another 30%. This was because majority of our patients underwent local and retro auricular flaps.<sup>[9]</sup>

Converse JM et al., and Songehroen I et al., favored retro auricular flap because of its sufficient bulkiness.<sup>[10,11]</sup> Elsahy N uses flap from the medial surface of the ear because the skin is thin.<sup>6</sup> On objective assessment, only 20% of the patients were completely satisfied with the bulkiness of the flap, whereas 50% of them commented it as fair. But on subjective assessment, 40% of the patients had completely acceptable bulkiness and another 30% patients had good bulkiness. This shows that majority of the patients want thin flap and more concerned about the bulkiness of the flap, whereas surgeons thought that the flap bulkiness will decrease over a period of time as the edema settles and the majority of the cases had thin retro auricular flap only.

According to Elsayh N6 the advantage of the preauricular flap is, it is a one-stage operation, and retro-auricular flap based posteriorly on the mastoid scalp as two stage operation. In 65% of the patients, the number of stages of surgery was acceptable by both Patient and the Surgeons. Another 10% and 30% were considered good by the patient and the surgeons respectively. This is because complex lacerations, keloid excision, preauricular flap, Conchal chondrocutaneous flap and temporoparietal fascia flap needed only one stage surgery, which constituted the majority of our patients.

According to Elsayh N6, the donor defect of the retroauricular flap will be hidden behind the ear. Also, the preauricular flap donor site lies in the face-lift incision which will not be obvious. The donor site scar of temporoparietal fascia can be hidden within the hair. 45% of the patients were satisfied with the donor site completely, whereas surgeons were fully satisfied with only 40% of the patient's donor site. This is because the skin grafted donor site in 10 % of the patients was uneven and hyperpigmented. 5% of the patients developed keloid over the donor site which settled with Injection triamcinolone.

Thus this study shows the significance of analyzing the outcome of the management of acquired ear defects by both the patient and the surgeon which will help us to improve our techniques and to give satisfactory results.

## CONCLUSION

In our study over a period of 22 months, we treated 20 patients with acquired ear defects, out of which 16 were male and 4 were female. The commonest age group involved was 21-30 years and the human bite was the commonest etiology. After analysis of the outcome of the patient and the surgeons, we have come to a conclusion that while reconstructing ear, thin, pliable flaps with good contour and color match should be chosen and it should be completed in one or two stages, giving equal priority for the donor site scar as for the ear. This outcome can give satisfaction for both patient and the surgeon.

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**How to cite this article:** Senthilkumar R, Vimalasowndaravalli D, Anandan H. Management of Acquired Ear Defects and Its Outcome. Ann. Int. Med. Den. Res. 2017; 3(4): SG49-SG52.

**Source of Support:** Nil, **Conflict of Interest:** None declared