

# Introduction

Ear reconstruction is a challenging process owing to the sophisticated anatomy of the ear. The aim of facial plastic surgeons is to restore the ultimate aesthetic shape of the ear according to the anatomical considerations as smooth external contours, surface standards, and the proper physical dimensions and to ensure contentment of the patient. The auricle is most commonly associated with congenital abnormalities. Traumatic damages and pathologic disorders, especially cancer may cause acquired defects of the auricle. The chondrocutaneous helical rim advancement flap (CHRAF) described by Antia and Buch is a good method of reconstructing defects of the helix and the modifications that have been reported broadened the scope of its use to large defects and defects extend beyond the helix  
A variant of CHRAF includes a pedicle flap based on ear lobule providing blood supply (axial) to the flap named Ear Lobe Based Flap.

## Aim of the work

The aim of this study was to assess the versatility of the chondrocutaneous helical rim advancement flap with its different modifications when needed for the reconstruction of marginal auricular defects that include the helix alone or may extend onto the scapha, antihelix, and triangular fossa.

## Subjects and Methods

After approval of ethical committee of Alexandria University, Faculty of Medicine, this Prospective study has been conducted on 10 patients (n=10) suffering from marginal auricular defects on the entire helical rim even that extend onto the scapha, antihelix, and triangular fossa who were admitted Plastic Surgery Department in Alexandria Main University hospital or casualty from January 2020 to November 2020. Informed consent was obtained from all cases in the study. Preoperative assessment of size of defect, ear length and helical length  
Under local anesthesia or general anesthesia we did the modified Antia-Buch flap or its variant Ear lobe based flap according to the size and the extent of the defect. We assessed post-operatively the size of the ear after operation and the difference between the ear height before and after the operation and relative relation to the other one. (Percentage of ear reduction), flap survival, complications as (oedema, hematoma formation ,infection, wound dehiscence and ear deformity ) within the first 2 weeks and by detecting any ear deformity as ear cupping within 3 months post-operativeand patient satisfaction.

# Results

- Age: most of the patients with age range 8.0 – 55.0years old
- Sex: both sex groups were involved in the study with male to female ratio(9:1).
- Etiology of injury: the most common etiology was human bite (60%). The site of injury of studied cases was right ear and left ear with equal percentage(50) and upper third and middle third with equal percentage (40%). Helical (70%)
- The Mean of Size of defect (cm) was 2.24 and SD 0.63, Percentage of the defect to the ear length (height) range was (23%-46%) the mean percentage was 33.5% and the Mean of Helical length was 8.89 and SD 0.43.
- The reduction of the ear height ranged from 1 mm to 1 cm. Decrease in size was obvious (more than 5 mm) in 40% associated with defects equal 2.2 cm or more although in a case (10%) with 2.8 cm auricular defect the decrease in size was 5 mm and associated with scaphal excision.
- The percentage of Complications: there were 2 (20.0%) Patient who had oedema Post-operative, 1 (10.0%) had Slight Flap congestion, 1 (10.0%) had Infection, 1 (10.0%) had Hematoma formation, 1 (10.0%) had Wound dehiscence and 2 (20.0%) had Minimal Ear cupping,

Table (1): Descriptive analysis of the studied cases according to size of defect and helical length (n=10)

	Min. – Max.	Mean ± SD.	Median (IQR)
Size of defect (cm)	1.40 – 3.20 23%-46%	2.24 ± 0.63 33.5%	2.05 (1.80–2.80)
Helical length	8.40 – 9.70	8.89 ± 0.43	8.85 (8.50–9.0)

Table (2): Comparison Between Before and After Regarding Ear height

Ear height	Before	After	t	P
Min. – Max.	6.0 – 7.0	5.50 – 6.80	4.445*	0.002*
Mean ± SD.	6.59 ± 0.37	6.13 ± 0.36		
Median (IQR)	6.65 (6.40–6.90)	6.10 (5.90–6.30)		

t: Paired t-test  
p: p value for comparing between **before** and **after**  
\*: Statistically significant at  $p \leq 0.05$

Figure (1): Case (1) A:pre-operative, B:C:intra-operative D:early post-operative



## Conclusion

In conclusion, the chondrocutaneous helical rim advancement flap as it was originally described or in modified form presents an elegant method of restoring the contour of the auricle. This technique allows single-stage, immediate reconstruction of helical rim defects as well as those that may extend beyond the helical rim. It can provide good to excellent cosmetic results with minimal reduction in vertical height of the ear, no change in ear projection and maximal preservation of the anatomic landmarks. It should be considered one of the most valuable procedures in the armamentarium for ear reconstruction.