

# Single Stage Auricular Reconstruction Using Temporoparietal Facial Flap and Skin Graft

Salah M., Alziady G. M., Abdel Azeem Kh, Sakr W.

Plastic surgery Department, Beni-Suef University, Faculty of medicine, Beni-Suef, Egypt

## ABSTRACT

Since the aim of the plastic surgeons is to improve both the patient quality of life and the psychiatric status, they always search about the best technique for each case. This study evaluates the aesthetic outcome and patient satisfaction after auricular reconstruction using Medpor enveloped in a temporoparietal facial flap with full-thickness skin graft. The aesthetic results were assessed by taking the experts score from 1 (failure) to 5 (very good). The results of reconstructions were accepted as an aesthetically pleasing with high degree of patient's satisfaction. There were two complicated cases, one exposure which were managed without implant removal and one infected implant was salvaged by irrigation with antibiotics.

**Keywords:** Auricular Reconstruction, Temporoparietal Fascia, Medpor.

## I. INTRODUCTION

Auricular defects and deformities include both congenital auricular malformations and acquired defects which may be due to trauma, burns, tumours, and inflammation<sup>1</sup>.

Since malformed auricle, represents a significant social and psychological burden on the patient<sup>2</sup>, and Improved psychosocial aspects have been reported after auricular reconstruction<sup>3</sup>. The principal challenge facing the plastic surgeon is to achieve a satisfactory ear framework with an aesthetically good and stable coverage that requires a broad view of different techniques to find the most suitable treatment for each patient.

The auricular reconstruction was performed as early as the 6th century BC as claimed by Berghaus et al., (2010). In 1891 there were more than 40 different materials for ear framework was available for this operation, such as cartilage, bone and alloplastic substances<sup>4</sup>.

Medpor was proved to have many properties that made it the material of choice for auricular reconstruction<sup>5</sup>. However, Griffiths, (ear reconstructive specialist)

demonstrated in his website that Medpor implant is considered a foreign material and any laceration at any time on the ear could expose the framework, and then there is a great risk for infection requiring complete removal<sup>6</sup>.

The temporoparietal facial flap (TPFF) is a versatile tool in head and neck reconstruction, it was first described more than a century ago, it was established in the mid-twentieth century after understanding the temporal anatomy that surgeons experimented more prolifically with this flap<sup>7</sup>.

The TPFF is the thinnest flap described in the human body, and it is the only pedicelled facial flap available in the head and neck. Its thin pliability allows it to drape easily into concavities or envelop irregular convexities without architectural distortion. It also offers rich vascularity, making it an exceptionally reliable scaffold to accept skin grafts, or to nourish free cartilage or bone. This is true even in devitalized, radiated or chronically infected recipient beds<sup>8</sup>, these characters made the TPF a unique additional protecting covering layer for the medpor.

As most of auricular reconstructive techniques require multiple stage surgery, the aim of this research is to reach an aesthetically pleasant outcome and high degree of patient satisfaction with single stage operation using Medpor enveloped in a temporoparietal facial flap with full-thickness skin graft.

## II. METHODS AND MATERIAL

This is a prospective randomized study. A series of 10 patients of ages between 5 and 45 years, who undergone auricular reconstruction operation for partial or total ear reconstruction using Temporo-parietal fascia and skin graft as a single stage procedure within a period from March 2015 to March 2017.

### A) Inclusion and exclusion criteria.

The patients were invited to participate in the study. Written informed consent was obtained from each participant after explaining all the possible complications and outcome. Both genders over 4 years of age with auricular defects of different aetiologies were included in the study. However, Patients with extensive damage of the temporal region affecting the STA, chronic heavy smokers, un controlled diabetes and patients with chronic or debilitating diseases were excluded.

### B) Preoperative assessment including:

- Full history.
- General examination was performed; to detect any present illness or other associated anomalies in congenital cases or if present any other associated injuries.
- Local examination for the defect was done, to assess and determine the extent of the missing tissue with analysis of the defect.
- Routine laboratory investigations.
- Audiogram & CT petrous bone for patients of microtia.
- ENT consultation for middle ear abnormalities.
- Doppler ultrasound examination was done to assess the vascular pedicle.
- Pre, intra and post-operative photography.

### C) Operative technique.

Pre-operative demonstration of the operative steps and knows the Patient expectations. Pre-operative consent was obtained.

Pre-surgical marking for proper positioning of the framework. The exact location for reconstruction is determined based on the location of the normal contralateral ear; by using an x-ray film template.

#### • Operative steps.

All patients had undergone surgical repair under General anesthesia. A handheld Doppler was used to identify the course of the superficial temporal artery superiorly, toward its bifurcation for harvesting an ipsilateral temporoparietal facial flap.

Local infiltration with 0.5% lidocaine with 1: 200,000 epinephrine was done. A #15 blade is used to incise and initially raise a sub papillae flap, taking care not to damage the sub dermal plexus of vessels. A bipolar cautery was used to achieve hemostasis.

The cartilage remnants were delicately dissected free from the surrounding soft tissue and removed. After completing the dissection proper positioning of the frame and suturing in place with 3-0 Prolene sutures then the vertical and horizontal limbs of the temporalis fascia flap are then incised with cutting electrocautery, every surface of the framework is now covered with the temporoparietal fascia.

To cover the temporoparietal facial flap, local skin, and a full-thickness skin graft was done.

Vacuum drains were inserted underneath the flap to suck away wound secretion and to ensure a close contact between the skin, facial flap, and skeleton.

Reconstruction of the lobule and scar revision, if needed, follows within the next 3 months. A simple transposition flap is used to relocate the lobule into a natural, contiguous position.

#### D) Postoperative Care:

All patients were asked to sit with head up at 45° to reduce edema.

Medications: antibiotics and analgesics and anti-edematous were given postoperatively, initially by injections, then by oral rout.

A solid plastic cup dressing (oxygen mask) is worn over the ear constantly for 2 to 4 weeks.

The sub cutaneous drain removed within 2 days and that under the flap after two weeks.

Follow up of cases after 3, 6 and 12 months

For results evaluation (early after 3 months; late after 6 months up to one year post-operative).

- 1) Aesthetic results were judged by 3 senior plastic surgeons using a four point Likert- scale (1=failure; 2=poor; 3= fair; 4=good; 5= very good).
- 2) Degree of patient satisfaction was assessed as very satisfied, satisfied and poorly satisfied.
- 3) Complications and donor site morbidity was reported.

#### E) Statistical analysis:

Results were statistically analysed using Chi square test using SPSS 20.

### III. RESULTS AND DISCUSSION

This is a prospective study aiming at using the temporo-parietal fascia as a universal coverage in total and partial auricular reconstruction. It includes 10 cases, seven of them were males (70%), three were females (30%) most of cases were of congenital aetiology (9 cases) and this percent agreed with Brent (2002)<sup>9</sup>, The age incidence of the patients ranged from five to forty-five years with mean age (21.25 years). Regarding the complications total complicated cases were 2 (20.00%) represented in extrusion and infection, the result with some extent agreed with that of Daniel et al., (2013)<sup>10</sup> but was not in case with that of Berghaus et al., (2010)<sup>4</sup> who claimed that there are extremely rare complications after similar technique of auricular reconstruction, this may be

attributed to the relatively small number of cases. Regarding the aesthetic results an average of 3.9 on a scale of 1(failure) to 5 (very good) with a significant difference ( $P<0.01$ ) at  $X^2=10.008$  between the patient score percentage (Table 1) and this is parallel with the results of Daniel et al., (2013).

TABLE I AETHETIC OUTCOME

Score	Number (%)
Very good (5)	4 (40.00%) <sup>a</sup>
Good (4)	4 (40.00%) <sup>a</sup>
Fair (3)	0 (0.00%)
Poor (2)	2 (20.00%) <sup>b</sup>
Failure (1)	0 (00.00%)

Results are expressed as percentage

<sup>a,b</sup> indicates a significant difference ( $P<0.01$ ),  $X^2 = 10.008$

Concerning the degree of patient satisfaction table 2 showed the percent of patients and their degree of satisfaction, which significance ( $p<0.0001$ ), and this is like the results of Hempel et al., (2014)<sup>11</sup> who reported higher rates of patient satisfaction.

TABLE 2. PATIENT SATISFACTION

Degree of satisfaction	Percent of patient
Very satisfied	10.00% <sup>c</sup>
Satisfied	70.00% <sup>a</sup>
Poorly satisfied	20.00% <sup>b</sup>

Results are expressed as percentage

<sup>a,b</sup> indicates a significant difference ( $P<0.0001$ ),  $X^2 = 16.036$

FIGURE 1. SHOWS THE MALE TO FEMALE PERCENT

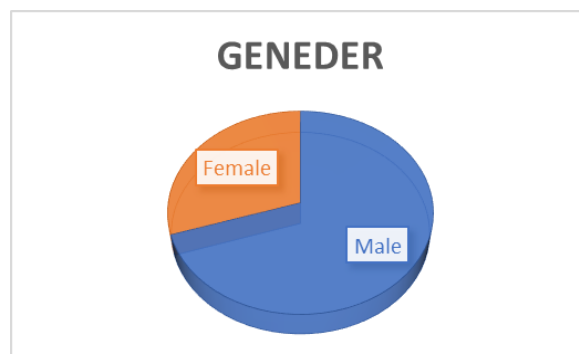
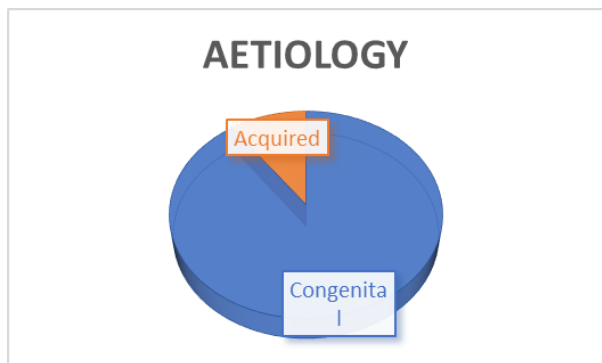


FIGURE 2. SHOWS THE AETIOLOGY OF AURICULAR DEFECTS



PATIENT PHOTOS



A) Pre-operative photo, B) The medpor framework, C) Harvesting the TPF. D) the post-operative photo

#### IV. CONCLUSION

The use of TPF with skin graft as a coverage for medpor framework in auricular reconstruction is considered a suitable choice as a single stage procedure to achieve an aesthetically pleasant result with high degree of patient satisfaction.

#### V. REFERENCES

[1] K. Storck, R. Staudenmaier, M. Buchberger, T. Strenger, K. Kreutzer, A. von Bomhard, and T. Stark. 2014. Total Reconstruction of the Auricle:

Our Experiences on Indications and Recent Techniques. BioMed Research International. Volume 2014, Article ID 373286, 15 pages <http://dx.doi.org/10.1155/2014/373286>

[2] Sivayoham E and Woolford T J 2012 Current opinion on auricular reconstruction *Curr. Opin. Otolaryngol. Head Neck Surg.* 20 287–90.

[3] Johns A. L., Ryan E. Lucash, Daniel D. Im, Sheryl L. Lewin: Pre and post-operative psychological functioning in younger and older children with microtia. *Journal of Plastic, Reconstructive & Aesthetic Surgery* (2015) 68, 492e497

[4] Berghaus A., Stelter K., Naumann A. and Hemple J.M. (2010). : ear reconstruction with porous polyethylene implants, *Adv Otorhinolaryngol.* Basel, karger vol68, pp 53-64.

[5] Cabin J. A., Bassiri-Tehrani M., Sclafani A. P., Romo T. 2014. Microtia Reconstruction Autologous Rib and Alloplast Techniques. *Facial Plast Surg Clin N Am* 22, 623–638

[6] Griffiths R H., 2017: Treating Microtia with Natural-looking MEDPOR™ Ear Reconstruction. <http://www.earreconstructionspecialist.com/microtia-reconstruction-options/medpor>

[7] Collar RM, Zopf D, Brown D, Fung K, Kim J. 2012. The versatility of the temporoparietal fascia flap in head and neck reconstruction. *J Plast Reconstr Aesthet Surg.* 65(2):141-8.

[8] Park C. 2010. Ear reconstruction chapter 31 .In: H. Hyakusoku et al., (eds.). *color atlas of burn reconstructive surgery.* DOI: 10.1007/978-3-642-05070-1\_31, © Springer-Verlag Berlin Heidelberg

[9] Brent B. 2002. Microtia repair with rib cartilage grafts: A review of personal experience with 1000 cases. *Clin Plastic Surg* (2002) 29, 257– 271

[10] Daniel D., Paskhover B., Staffenberg D. A. and Jarrahy R. 2013. Current Management of Microtia: A National Survey. *Aesth Plast Surg* (2013) 37:402–408

[11] Hempel J.M., Braun T., Patscheider M., Berghaus A. and Kissner U. 2014. Partial auricular reconstruction with porous polyethylene frameworks and superficial temporoparietal fascia flap. *Eur Arch Otorhinolaryngol* (2014) 271:2761–2766