A New Technique to Preserve Ear Projection after Successful Non-Microvascular Ear Replantation: A Case Presentation

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Abstract

Objective: To present a new technique to preserve ear projection after successful non-microvascular ear replantation.

Case Report: A Saudi male aged 22 years had avulsion of his right ear. The cartilaginous skeleton was anatomically repaired as much as possible. Then, the cartilaginous skeleton was widely fenestrated. The postauricular skin on both the amputated ear and the head was excised and discarded; the ear was sutured to the remaining part and to the postauricular bed with a tie over as a composite graft. Three months later, the patient was readmitted for separation of the attached ear. A silicone implant was inserted under the attached ear by creating a pocket under the ear; which is slightly bigger than the replanted part, to allow for edge folding after removal of the implant. The implant was kept for almost 1.5 months. The patient was taken for the last time for removal of the implant and correction of the ear projection. An incision was made around the outer margin of the implant in a zigzag manner, to help in edge folding then the implant was removed. The outer layer of the formed fibrous capsule was partially excised and scored and the inner layer was folded over itself to produce projection of the ear. Full thickness skin graft taken from the right grown area was harvested and defatted and applied to both the postauricular and back of the separated ear with tie over. The first postoperative dressing was done one week after surgery and showed good graft take and projection. The patient was followed for 6 months after discharge in the outpatient clinic with accepted aesthetic results and projection, in spite of the marked disfiguring nature of the trauma to the ear.

Conclusion: The modification used in this case presentation, though multi-staged, could be an alternative for both safe ear separation and correction of projection after successful replantation. Moreover, the folded capsule that caused projection can make good cover for an implant over which skin graft can be laid safely if the projection caused by the capsule folding is not enough.

Key Words: Non-microvascular – Ear replantation – Silicone implant – Fibrous capsule – Ear projection – Road traffic accidents.

Introduction

TRAUMATIC ear amputation is a complete avulsion of a part or of the total auricular tissue. It is rare (only 74 cases have been described in the literature till 2009) & their handling is complex [1].

Loss of an ear due to trauma is a great disfigurement that greatly affects the victim’s psychology. Moreover, the severed ear constitutes a great challenge for the plastic surgeon, due to the high possibility of bacterial contamination. The surgeon’s objective is to obtain the best cosmetic result without demolishing the auricular area in order to allow future ear reconstruction in case of replantation failure. The difficulty of ear reconstruction is mainly related to the exceptional structure of the auricle, with fine skin covering, a thin and elastic cartilage, and small size vessels responsible for its perfusion [2].

Microvascular ear replantation necessitates the presence of a surgical microscope and a talented plastic surgeon, which are not available in most of the peripheral hospitals dealing with trauma cases [3]. Moreover, the technical difficulties of microsurgery and the nature of the trauma; like in avulsion with or without crushing; can affect the rate of success dramatically [4].

On the other hand, many non-microvascular techniques for ear replantation have been developed as a less complex alternative for microvascular replantation. Removing the skin from the cartilage and burying it beneath retro-auricular skin is a poor choice. The thin, delicate cartilage will not maintain its shape sufficiently against the forces of scar contracture. An alternative is to cover the de-skinned cartilage with a temporoparietal fascial flap (TPFF) and skin graft over it. The aesthetic result will be poor for the reasons mentioned above, keeping in mind that this useful tissue (TPFF) will
not be available for secondary reconstruction if needed [8].

One of the successful techniques that has been used is that one in which the posteromedial (inner) skin was removed from the amputated part, the cartilage was “fenestrated”, retro-auricular skin was excised, and the part was placed on the healthy bed as a composite graft. The anterolateral auricular skin is vascularized through the cartilage fenestrations by direct contact with this healthy vascularised bed [6].

In this case presentation, this technique was used for non-microsurgical replantation of a crushed avulsed right ear after a road traffic accident with a new technique to preserve ear projection after successful replantation.

Case Presentation

On July 28th, 2008, a male Saudi aged 22 years was brought to the ER Department of Aseer Central Hospital by an ambulance with a dressing & bandage covering the area of his right ear. His amputated right ear was brought in a small sterile sealed plastic container inside another insulating container in which cold water with ice cubes were put.

The patient was thoroughly examined according the advanced trauma life support (ATLS) protocol [7]. Prophylactic broad spectrum antibiotics were started, with radiological assessment of different parts of his body. The patient was put under observation by neurosurgery and general surgery teams and was discharged from the orthopedic side as there were no associated fractures or dislocations.

When the general condition of the patient was stabilized and approval from both neurosurgery and general surgery teams for shifting the patient, he was taken to the operative theatre; almost 9 hours after arrival to the hospital. The surgery was started under general anesthesia. The wound of the right ear was exposed properly, prepared with antiseptic solutions and draped. Hemostasis was performed with bipolar diathermy; sparing the cartilage. Examination under anesthesia revealed that almost all the right ear was amputated sparing only the tragus, part of the ear lobule, part of the crus helix and part of the chonca (cymba and cavum) (Fig. 1).

The preserved amputated part of the ear was brought and thoroughly cleaned with normal saline and was thoroughly examined. The anterolateral (outer) side of the ear showed a long oblique wound cutting the skin and cartilage (Fig. 2). The posteromedial (inner) side showed crushing of the cartilage of the amputated part with multiple wounds and areas of skin loss of the medial side of the ear (Fig. 3).

The cartilaginous skeleton was anatomically repaired as much as possible using 6/0 monofilament non-absorbable suture (prolene). Then, the cartilaginous skeleton was widely fenestrated (Fig. 4) using 2-mm diameter punch biopsy knife. The postauricular skin on both the amputated ear and the head was excised and discarded; the ear was sutured to the remaining part and to the postauricular bed with a tie over as a composite graft.

The first dressing after removal of the tie over showed promising take of the replanted ear (Fig. 5). The patient was regularly dressed and followed up; areas of the skin and cartilage which did not survive were debrided till complete healing.

Three months later, the patient was readmitted for separation of the attached ear. During the operation, there was noticeable bleeding from the post-auricular attachment and dissection was difficult. Besides, possibility of necrosis of the separated ear was still present.

The researcher inserted a silicone implant (Fig. 6) under the attached ear (Fig. 7) by creating a pocket under the ear; which is slightly bigger than the replanted part, to allow for edge folding after removal of the implant. This provided the chance to make use of the capsule that formed around the implant.

The implant was kept for almost 1.5 months (Fig. 7). The patient was taken for the last time for removal of the implant and correction of the ear protrusion. Under general anesthesia, an incision was made around the outer margin of the implant in a zigzag manner, to help in edge folding (Fig. 8) then the implant was removed.

The outer layer of the formed fibrous capsule was partially excised and scored and the inner layer was folded over itself to produce projection of the ear (Fig. 9). Full thickness skin graft taken from the right grown area was harvested and defatted and applied to both the postauricular and back of the separated ear with tie over. The first postoperative dressing was done one week after surgery and showed good graft take and projection (Fig. 10).

The patient was followed for 6 months after discharge in the outpatient clinic with accepted aesthetic results and projection, in spite of the marked disfiguring nature of the trauma to the ear (avulsion and crushing) (Figs. 11,12).
Fig. (1): The site of the amputated ear after cleaning, debridement and haemostasis.

Fig. (2): The amputated right ear (outer view).

Fig. (3): The amputated right ear (inner view) showing the extensive crushing of the cartilaginous framework.

Fig. (4): The cartilaginous framework after repair by prolene sutures and fenestration by 2mm punch biopsy knife.

Fig. (5): Replanted ear after first dressing.

Fig. (6): The silicone implant patronised to simulate the ear but slightly larger to permit folding of the edge when separated.

Fig. (7): The silicone implant in the postauricular pocket on the same day for ear separation.
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Fig. (8): (A) The implant before removing it from its pocket. (B) The anterior layer of the fibrous capsule.

Fig. (9): (A) The folded posterior layer of the capsule which caused projection. (B) The anterior layer of the capsule.

Fig. (10): Showing the replanted ear after removal of the tie over in the first post op. dressing with good take of the graft on both sides.

Fig. (11): The replanted ear a few months after complete healing.

Fig. (12): The replanted ear in relation to the face (lateral view).

Discussion

Many techniques for ear replantation have been described. Microsurgical replantation should be achieved every time it is possible. When it is not possible, the surgeon can choose between ear reattachment and a pocket technique. Ear reattachment can be achieved when the amputated part is smaller than 15mm or when amputation involves the earlobe. Pocket techniques, which are appropriate for the replantation of the auricular cartilage, can be used when the amputated part is bigger than 15mm and does not comprise the earlobe [1].

Non-microvascular ear replantation using the previously mentioned technique is not a recent
To correct the ear projection after it, a temporoparietal fascial flap (TPFF) is used for coverage of a graft taken from costal cartilage; inserted in the postauricular area, then covered by skin graft [8]. This technique will sacrifice the temporoparietal fascia which could be used for further reconstructive procedures. Besides, it will leave a scar in the chest wall created by the wound for costal cartilage graft taking [9].

In conclusion, the modification used in this case presentation, though multi-staged, could be an alternative for both safe ear separation and correction of projection after successful replantation. Moreover, the folded capsule that caused projection can make good cover for an implant (synthetic like silicone or medpor, or nonsynthetic like cartilage) over which skin graft can be laid safely if the projection caused by the capsule folding is not enough.

References


