

## Case Report

# Salvaging collateral damage by COVID-19 pandemic in form of exposed silicone ear framework in 33-year post reconstructed ear

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### ABSTRACT

Total ear reconstruction is being practiced by different techniques. Ready to use Silicone ear framework (Silastic ear framework by Dow corning) was being used frequently by Plastic surgeons in the eighties and nineties of the twentieth century. Framework exposure, either due to skin necrosis or due to infection used to be the commonest complication in the early postoperative period. A follow-up case of a 50 year old male patient, our 33 years follow up case of Total ear reconstruction by silicone ear framework implantation presented to us with exposed silicone framework and infection. Due to constant use of facemask with elastic ear loop for support during COVID-19 pandemic. The exposed infected implant successfully salvaged using negative pressure wound therapy. In all cases of autologous or alloplastic ear reconstruction, we strictly recommend not to use facemasks with elastic ear loops. If a facemask has to be used it should have a head loop or to be used with an ear protector.

**Keywords:** Silicone ear framework, Negative pressure wound therapy, COVID-19

### INTRODUCTION

Total ear reconstruction is being practiced by different techniques. Ready to use Silicone ear framework (Silastic ear framework by Dow corning) was being used frequently by Plastic surgeons in the eighties and nineties of the twentieth century. Framework exposure, either due to skin necrosis or due to infection used to be the commonest complication in the early postoperative period.<sup>1</sup> Advantages of silicone framework implants over autologous reconstruction are improved aesthetic results, earlier age of intervention, shorter surgery times, a fewer number of required procedures, a simpler postoperative recovery process, no framework reabsorption, and no donor site morbidity from harvesting rib cartilage.

A follow-up case of reconstructed auricle by Silicone framework (reconstruction was done in the year 1987) has reported to us with exposed implant due to constant

use of facemask with elastic ear loop for support during COVID-19 pandemic. The exposed infected implant successfully salvaged. Details of the case were discussed with advice for precautions to be taken while using different facial protective devices for COVID -19 protection.

### CASE REPORT

A 50 years old male patient, our 33 years follow up case of total ear reconstruction by silicone ear framework implantation presented to us with exposed silicone framework and infection.

Initially in the year 1987, the patient was referred to us 1 month after traumatic ear avulsion, with a healed scar around the external auditory meatus and loss of whole external ear except for tragus and lobule. We counseled the patient and thoroughly investigated. We planned to

reconstruct the ear with silicone ear framework implantation. Surgery was done in two stages and post-operative recovery was uneventful. Follow up, till now was uneventful. In between patient got married and has three children also.



**Figure 1: Follow image of the result post-reconstruction of the ear with silicone implant.**



**Figure 2: Discharging sinus with exposed ear framework in the posterior aspect of the ear.**



**Figure 3: Mask used by the patient.**

On probing the sinus it was found to be going deep up to the silicone framework.

We immediately took a wound swab, started empirical antibiotics (Ciprofloxacin 500 mg B.D.), and changed the antibiotics (Cefuroxime Axetil 500 mg B.D.) according to the culture report. After doing the basic investigation, we posted the patient for debridement and

sinus exploration. After thorough debridement, we applied a portable single-use negative pressure wound therapy device on the wound (Figure 4). The wound was completely healed on the 7th day of the first dressing change. (Figure 5)



**Figure 4: Negative pressure wound therapy.**



**Figure 5: Wound healed after negative pressure wound therapy.**

## DISCUSSION

Ear reconstruction was initially performed using autologous grafts in the 1920s; since then alloplastic implants and prosthetics have been introduced as additional options for ear reconstruction.<sup>7</sup> Each method has its advantages and disadvantages that lead to surgeons favoring one method over another.

### *Autologous reconstruction*

Tanzer pioneered the techniques for autologous ear reconstruction using rib cartilage.<sup>2</sup> Brent, Nagata, and Firmin later modified these methods to achieve finer results in fewer stages.<sup>3-5</sup> Autologous reconstruction is a lengthy process consisting of multiple procedures as well as donor-site morbidity and pain. The techniques themselves can be difficult to perform for non-experienced surgeons and can leave visible scars. Over time, the cartilage can resorb, leading to poor ear projection and loss of auricular definition.

### *Prosthetic reconstruction*

Prosthetic ear models made of silicone can be useful in patients who are not optimal surgical candidates or have

poor surrounding tissue that is not useful for other methods of total ear reconstruction. In elderly patients or those who had auricular cancer resection, radiation, or trauma, prosthetic ears are an excellent alternative to surgical reconstruction.<sup>8</sup> The prosthesis can either be held in place by adhesive or titanium Osseointegrated fixtures. Prosthetic ears can be disadvantageous because they are expensive and need to be replaced every few years due to silicone deterioration and color fading.<sup>9</sup> Prosthetic ears in children are primarily indicated as a salvage procedure when other methods of total ear reconstruction have failed, especially because children often refuse to wear the prosthetics and may not be mature enough to maintain the device hygiene required on a consistent basis.<sup>6</sup>

### ***Alloplastic implant-based reconstruction***

In 1966, Cronin published details on alloplastic ear reconstruction using nonbiologic Silastic ear implants.<sup>10</sup> The use of a soft (no.370), molded, silastic ear frame with smooth, rounded edges has proven itself a simplified method, capable of producing an excellent representation of the external ear. The high percentage of exposures of the silastic prosthesis precludes it's being recommended as a standard procedure at present, but a cautious use and continued investigation of this method is justified, especially in patients not subject to trauma, such as young girls and adults.

In 1968, Cronin published in his follow-up study in which he modified Silastic frame by suturing a strip of D-116 Tricot Dacron mesh loosely over the helical rim of the implant.<sup>11</sup> Of all 30 patients with Silastic implants, only 5 required removal, 4 of these were successfully re-implanted later. One patient lost follow-up. The major complication was exposure. The cosmetic results are excellent; only two or three procedures are usually required. These ears are soft and flexible to the touch and have a natural contour. Once the surgeon learns how to handle the prosthesis, it appears to offer the best available structural support for the reconstruction of the external ear.

In 1973, Wray RC published his experience of Silastic ear frameworks vs. autologous rib cartilage in total ear reconstruction and observed a high rate of complications in the form of implant exposure due to skin necrosis. This necrosis could have been due to the following: injury to the vessels of the pocket ("thin flaps"); hematoma; constant pressure from the "memory" of the frame; and a combination of factors.

Reinisch described the early use of porous polyethylene in 1994.<sup>13</sup> Early experience with the product showed a fair amount of reconstructive failures. Later refinement of the technique has lowered the complication rate by placing a temporoparietal flap over the implant construct for adequate soft tissue coverage. After the popularization of this technique, porous polyethylene (Medpor) has become a comparable alternative to rib cartilage for total

ear reconstruction for a variety of reasons.<sup>6</sup> In addition, rib cartilage reconstruction typically requires an overnight stay for pain control.<sup>7</sup>

Patients who undergo autologous reconstruction with rib cartilage have a visible chest scar, chest wall deformity, or pneumothorax.<sup>8</sup> Alloplastic reconstruction does not involve this donor-site morbidity and can even be performed at a younger age. There is no period of waiting for a suitable-sized cartilage graft.

In our patient after 33 years of reconstruction of the ear by silicon framework, it got exposed by simple ignorance of the patient. Though the patient was following instructions of care of the reconstructed ear, during COVID-19 times wearing a facemask being mandatory, he unknowingly used a facemask having elastic ear loops for support. Being a shopkeeper, prolong use of a mask with an ear loop, combined with insensate posterior-medial aspect grafted skin over the implant caused the damage. It was detected late as the area was concealed and was detected with pus discharge. So, we want to emphasize that face masks, face shields or any other facial protective gear should be worn properly considering the problem it can create for the reconstructed part. Any ignorance from the patients side would sometimes lead to disastrous complication of implant exposure requiring redo surgery.

### ***Complications and their suggested management***

Acute complications of Alloplastic reconstruction include hematoma, infection, and flap loss.<sup>7</sup> In general, an implant infection, a result of implant exposure, typically involves a strongly adherent biofilm surrounding the implant that is usually impenetrable by oral and intravenous antibiotics.<sup>1</sup> Treatment is guided by the type of exposure—a limited exposure with a good seal and vascular cover elsewhere can heal with a small turnover flap (a "dry" exposure). If the wound is not sealed, and there is bacterial contamination evidenced by granulation tissue peel around the implant, the implant will have to be removed (a "wet" exposure).

In exposures with a biofilm around the implant without infection, the old implant is removed, granulation tissue debrided, and a new implant is fashioned immediately to preserve the ear and soft tissue architecture. Salvage of the implant is possible by aggressive irrigation, scrubbing, and debridement of the recipient site, as well as sterilization of the implant prior to replantation.<sup>1</sup> There are sub acute cases in which the implant is exposed without a bacterial biofilm and granulation tissue. In these situations, minor debridement and a local turnover flap typically suffice to treat the problem, thus salvaging the implant. Defects less than 1 cm can heal by secondary intention because the implant has fibrovascular integration into deep pockets of the framework, allowing for inflammation and healing response.<sup>1,7</sup> A local advancement flap or additional full-thickness skin grafts

can be harvested to cover the defects. If the wound bed is avascular, the implant can be salvaged by harvesting a TPF flap, deep temporal fascia flap, or local skin flaps to completely cover the open reconstructed ear.<sup>13</sup> Appropriate wound care is crucial to safely preserve the framework and prevent further exposure. The added bulky soft tissue coverage from a local skin flap may decrease the definition of the reconstructed auricle, but this may be a better alternative than losing the entire reconstructed ear.<sup>14</sup>

We feel that negative pressure wound therapy is the ideal treatment for such types of exposed implants and implants are usually salvaged with timely intervention. None of the articles mentioned negative pressure wound therapy in salvaging exposed ear framework because, during 1980 and 1990, negative pressure wound therapy was not available; otherwise we could have salvaged many exposed ear implants. Nowadays, small size disposable negative pressure wound therapy devices are commercially available. These can be applied to small areas and are very effective.

## CONCLUSION

Implant exposure is one of the serious complication if not dealt with judiciously, leads to complete extrusion of the implant. So any case of implant exposure should be managed immediately. Secondly, we recommend not to use face mask which has elastic ear loops for support. These elastic loops can cause necrosis of the skin due to constant pressure. In all cases of autologous or alloplastic ear reconstruction, we strictly recommend not to use facemasks with elastic ear loops. If a facemask has to be used it should have a head loop or to be used with an ear protector. So, patients should be well-informed about proper skincare, regular inspection of the area, and avoid use of gadgets like face masks and face shields that apply continuous pressure in that area.

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