



Self tissue expanders in facial scar correction

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ABSTRACT

In facial scar correction, there is a shortage of soft tissue. Hence, reconstruction using tissue from surrounding areas needs to be performed. However, the tissue from distant area does not guarantee similarity in color, function and texture. Further, additional scars in the donor site are also inevitable. Replacement using tissue with similar colour and texture is one of the major challenges in facial reconstruction. In order to overcome this hurdle, tissue expanders are used. This has become a more practical and easy way of facial reconstruction surgeries.

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Introduction

Tissue expansion is a less damaging option for defects that must be closed. The disadvantages of conventional tissue expanders are risk of infection, time needed for inflation of the device, multiple appointments and risk of expander punctures. However, an osmotic expander does not suffer from these disadvantages. Self tissue expanders are made of vinyl pyrrolidone and methylmetacrylate with porous silicone shell. Osmotic tissue expanders are biocompatible and possess better mechanical properties. They are also available in many shapes and sizes according to the need.¹ Technically, fewer problems are encountered with the osmotic tissue expanders compared to the conventional tissue expanders.²

Neumann in 1957, was the first to use a device to expand skin which was further improved by Radovan and Argenta in the 1970s.^{3,4,5} To overcome the disadvantages like repeated appointments and repeat punctures to inflate expanders, the self-inflatable device was invented. Self inflation model was described by Austad and Rose in 1982. This model was a failure because, the fluid caused necrosis of the adjacent skin in the event of leakage of the balloon.⁶ Ronert et al. in 2004 published their experiences with expanders, where they treated 55 patients with 75 expanders and demonstrated a success rate of 88.8%.⁷ Cunha et al. showed a significant increase in complications when an expander was used in the head and neck.⁸ Wiese et al in 1993 developed a copolymer of methylmetacrylate and vinyl pyrrolidone and their studies resulted in the commercial self-inflatable expander.^{9,10}

Case Report

A 27 years old male patient with Fitzpatrick type II skin presented with scarring in lower mid forehead region following childhood trauma (Figure 1).



Fitzpatrick type II skin presented with scarring in lower mid forehead region

Figure 2



The osmotic tissue expander

Figure 3



The expander imbibes body water and expands to its final volume after six weeks

Figure 4



Primary closure of the wound after tissue expander removal and excision of the scar

The case was first examined for the amount of intact skin in the vicinity of the scars. Tissue expander was the treatment of choice because of the very tense nature of skin. Standard surgical protocol was followed for expander insertion. Surgical area was prepared for the treatment. Under local anesthesia (Lidocaine 0.5% and Epinephrine 1:200,000), a short incision was made at a distance from the scar approximately 4.5 times, imaginarily to the outside margin of post expansion region to prevent less tension on the incision line in order to prevent wound dehiscence. Working in the subcutaneous plane, the deep scar was completely freed from the present adhesions. A subcutaneous pocket was created at the site with thick normal skin over the hard bony base. The osmotic tissue expander (Osmed, Ilmenau, Germany, India distributor - Kanchan Health Care, Mumbai) (Figure 2) was then placed in the pocket and layered closure of wound was done. Patient was followed up after a week for suture removal. After six weeks, the expander had imbibed body water and expanded to its final volume 3 to 4.5 times (Figure 3). After an assurance that we had gained enough tissues, patient underwent the second surgery under local anesthesia for scar excision. Simultaneously, retrieval of the tissue expander was done. Primary closure of the wound was achieved because we gained sufficient tissue by the tissue expanders (Figure 4).

Conclusion

Tissue expanders play a major role in facial aesthetic surgery because of its advantages like providing similar color, texture and function of tissue, unlike distant flaps and free flap. Unlike conventional expanders, self inflating tissue expanders have an uncontrolled inflation process and the expanders begin to expand immediately once the expander has been inserted in the body. The process cannot be slowed down or stopped in between in case of pain or ischemia. Osmotic tissue expanders are widely used in facial aesthetic correction and reconstruction surgeries. However,

complications such as infection, tissue ischemia, migration of device and necrosis need to be considered. Higher incidence of complications rate necessitates proper case selection and proper surgical plan.

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