Periscar Tissue Expansion

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Abstract

By increasing the number of traumatic cases, burn victims and detection of rare congenital defects, plastic surgeons should improve their surgical techniques to manage these patients with better quality. Correction of these deformities is important cosmetically, increases the self-confidence of the patients and enhances their mental health.

Tissue expanders have been used for several decades to eliminate different body scars, but healthy skin around the lesion would also be damaged. To prevent this complication, the author has used transscar incision technique and inserted the tissue expander under normal and abnormal skin (scarred area) to expand the healthy tissue and then after removing tissue expander, scarred area is covered by multiple flaps. This method has been used in 5 patients with scars of scalp (in two cases 2 tissue expanders were used and in 3 patients only one tissue expander was inserted). The result were satisfactory.

By this method which is suggested by the author as periscar tissue expansion technique, it has two advantages:

1. No new scar would be created.
2. By expansion of healthy skin adjacent to the scar, the maximum expansion of normal skin will be achieved.

In the present article, the periscar tissue expansion technique and its results in 5 patients is discussed.

Key words: Tissue expansion, scar, burn

Introduction

Old scars of the body due to burn, trauma and rare congenital defects are among daily challenges of plastic surgeons. For elimination of these scars, there are different methods. One method is direct removal of scar and primary closure of healthy skin. Even though this procedure is commonly used but it is not effective in all cases. For example, the scars of head and some parts of body, especially in young age group with low skin elasticity, respond less.

Method of removing the scar and direct suturing could be successful in small scars and old patients but in other conditions such as large scars, the results are unsatisfactory. Removal of scars and performing skin graft is a useful method in special cases.2 For removal of bad looking, double color and projected contracted scars, proper skin graft could be useful but in sensitive areas of the head and face or hairy areas of head and face it has bad results.2,3

Regional (local) flaps for removal of scars of different parts of the body have its own place.1 This method has mostly been used for correction of contractures, but it can’t be used in all parts of the body. In some cases, multiple operations with unsatisfactory results are needed.

Free flaps are safe and useful for correction of wide scars of limbs and neck and provide a good coverage, but they are not indicated in all cases. Extension and duration of procedure plus possible damage to donor site and tissue bulk in recipient site are main reasons to hesitate using this method.

Tissue expansion is one of the useful and routine methods in plastic surgery.4 In this method, tissue expander is inserted beneath healthy tissue near the scar and by periodic expansion of expander, normal tissue would be expanded. After tissue expansion, the scar would be removed and the expanded tissue will be replaced. In this technique, usually a tissue expander is used through a skin incision near the scar,5,5 or with a distance of few millimeters to 2 cm.6 In spite of its good results, because of creating an incision and new scar formation in healthy tissue, it can damage the healthy skin. So author has been using a new method that is insertion of the tissue expander through the scar. It is called periscar tissue expansion technique. In this method, by expansion of healthy tissue adjacent to the scar, damage to the healthy tissues would be prevented.

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Patients and Method
The author's new technique was used for the patients who referred to the department of plastic surgery at 15th of Khordad Hospital for correction of old burn and congenital scars in the middle parts of the scalp. Before operation, all advantages and disadvantages of this new method were explained to the patients. By complete shaving of the scalp, all scars and adjacent tissues were properly visible (Figures 1 and 2).

Then, under general anesthesia, the exact site of insertion of the tissue expander was defined. After preparation, draping and taking photography, adrenaline solution (1/250,000) was injected to decrease bleeding around the area of tissue expansion.

Skin incision at the center of biggest scar (in the cases of multiple scars) was made and through the incision, scar dissection was done, then tissue expander was inserted under the skin. The port site was in a proper distance from apparatus. The apparatus is inserted in desired place and hemostasis of dissected site was performed.

Intraoperative injection of the tissue expander (10-20% of its final capacity) was performed and after proper insertion of tissue expander, in all cases a vacuum drain was used and the incision was sutured in two layers. A light and non-pressure dressing was applied.

Further injections were done 10 days after operation at out patient clinic. The interval between injections varied in different patients and it was between 3 to 10 days. Each injection was at least 10% of final tissue expander volume. After adequate expansion (Figures 3 and 4), tissue expander(s) was (were) removed and by making suitable flaps, scarred tissue was replaced by normal expanded tissue.

Results
In 5 patients who had scar on the scalps, periscar expansion technique was used. These scars had different shape. Two cases had more than one scar. Out of 5 patients, 4 had history of burn of the scalp and one patient had congenital alopecia. In three cases, one tissue expander was used and in two cases two apparatuses were inserted.

At the end of injections (once or twice per week) and after proper expansion, apparatus was removed and healthy skin was sutured. Scattered scars away from the central scar were also excised because there was normal expanded tissue around them. In all cases, tissue expansion was adequate and no peri-operative complications occurred (Figures 5 and 6).

Discussion
Tissue expanders are used commonly in plastic surgery. Proper selection of apparatus (type, shape and dimensions), choosing proper tissue for apparatus insertion and selection of good incisional site are major factors that affect the outcome of operation. Since the beginning of tissue expanders’ application, several changes have been made in their type, structure and applications. Using tissue expander for developing healthy tissue and coverage of soft tissue defects (congenital or acquired) by expanded tissue was started many years ago but the plastic surgeons avoid approaching through the scarred tissue.
There are different methods for tissue expansion. They are as follows:

In first method, an incision is made with sufficient distance from the scar and after recognizing the site of expansion, apparatus will be inserted beneath healthy skin and its port outside the body. Necessary expansion would be achieved by regular fluid injection inside the apparatus and the developed scar at the site of apparatus insertion (in the healthy skin) and the old scar will be removed too. Although this method creates tissue expansion but skin expansion will be limited and may not be effective because some parts of healthy skin will be lost due to the scar operation.

In the second method, tissue expander is inserted near the scared tissue (but in normal skin) and site of injection (port) is beneath the skin. This method is better than the previous one but because of creating a new scar due to surgery at the site of apparatus insertion damage the healthy skin results or occurs and if scar surface is large it is not good.

In the third method, tissue expander is inserted through the skin and an incision is made in the border between the scar and healthy skin. This method has the risk of apparatus extrusion more than previous methods but it gives a larger surface of expansion for rebuilding. Despite this advantage, half of the pressure sutures will be in the healthy skin, so there may be damage to healthy tissue.

In the fourth method, the apparatus will be inserted through the scar within a close distance to the borders of healthy and scarred skin.
In this method, if the scarred skin is weak and thin, it may lead to extrusion of the apparatus. In this technique, healthy skin will not be damaged and tissue expansion would be more. This is the suggested method of author presented in the annual conference of the Iranian Society of Surgeons, in 1991.

The fifth technique which is called periscar tissue expansion is the new suggestion of the author. In this technique, expansion of the healthy tissue, around the scars with regular and irregular shapes is possible. The apparatus is inserted through the center of the scar, the biggest scar of the area is selected and through an incision, the subdermal tissue will be dissected and the apparatus is inserted beneath the skin. First injection at the port site is done which is inserted in a good distance from the required site of expansion (10-20% of maximum expander). After repeated injections, all of the normal skin around the affected areas are expanded and sufficient expansion will be available so the tissue expander is removed. The scars with different shapes are removed by this method and healthy skin is sutured. It is a useful and effective technique especially for multiple scars of scalp in which the scar thickness is proper. The periscar tissue expansion technique is used successfully in 5 cases for scars of scalp. So the author recommends it for removing multiple scars of head and face.

References