

# Use with Tissue Expander Face, Scalp and Neck Reconstruction

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## ABSTRACT

The tissue expander has found widespread use in reconstructive surgery. The donor area is needed, the recipient site with similar characteristics (color, thickness, hair follicle) features, minimal scarring and leads to donor site morbidity. In our study, presented face, scalp and neck reconstruction results obtained with the use of expander. The face, scalp and neck areas expander was used to evaluate patients in the Plastic, Reconstructive and Aesthetic Surgery Department of Yüzüncü Yıl University. Age, gender, expander indication, defect or scar area localization, expander residential area, expander shape, volume, valve location (internal-external), expansion time, major and minor complications were reviewed. 30 number expanders were used in 17 patients (8 male, 9 female patients). Expanders were used burn sequelae in 14 patients, tumor-related defects in 2 patients and due to giant hairy nevus in 1 patient. The expanders are scalp (19 cases), face (3 cases), supraclavicular (7 cases) and the neck (1 case) has to be placed. In 4 of 17 patients (three major and one minor) complications were encountered. Use the expander is a good option especially in the reconstruction of soft tissue defects in the head and neck region.

**Key words:** Expander, face, scalp, neck, reconstruction.

## Yüz, baş ve boyun rekonstrüksiyonunda doku genişletici kullanımı

### ÖZET

Doku genişletici rekonstruktif cerrahide yaygın kullanım alanı bulmuştur. Donör saha duyulu, alıcı saha ile benzer karakterde (renk, kalınlık, saç folikülü olup olmama gibi) özelliklere sahiptir, minimal skar ve donör saha morbiditesine neden olur. Çalışmamızda, yüz, baş ve boyun rekonstrüksiyonunda doku genişletici kullanımı ile elde edilen sonuçlar sunuldu. Yüzüncü Yıl Üniversitesi Plastik, Rekonstruktif ve Estetik Cerrahi Anabilim Dalı'nda yüz, scalp ve boyun bölgelerinde doku genişletici kullanılan hastalar değerlendirildi. Yaş, cinsiyet, doku genişletici endikasyonu, defekt veya skar lokalizasyonu, doku genişletici yerleşim alanı, şekli, volumü, ekspansiyon sonrası volüm, ekspansiyon süresi, major ve minor komplikasyonlar gözden geçirildi. 30 adet doku genişletici 17 hastada kullanıldı (8 erkek, 9 bayan). Doku genişletici 14 hastada yanık sekeli, 2 hastada tumöre bağlı defekt ve 1 hastada dev kıllı nevus nedeniyle kullanıldı. Doku genişleticiler baş (19 olgu), yüz (3 olgu), supraclavikuler (7 olgu) ve boyun (1 olgu) olacak şekilde yerleştirildi. 17 olgunun 4 tanesinde (3 major ve 1 minör) komplikasyon ile karşılaşıldı. Doku genişletici kullanımı özellikle baş boyun bölgesi yumuşak doku defektlerinin rekonstrüksiyonunda iyi bir seçenektir.

**Anahtar kelimeler:** Doku genişletici, yüz, baş, boyun, rekonstrüksiyon.

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## INTRODUCTION

Aesthetic results are achieved by transfer to surrounding tissues rather than distant tissues in reconstruction for deformity and defects in different parts of the body. Transfer the tissues of the recipient field color texture, structure, in terms of characteristics such as hair and balding occurs in the tissues near the defect is better fit (1). Tissue expansion in the last 50 years, a good method for soft tissue reconstruction has become. Tissue expander provides the use of a similar adjacent tissue to provide the optimum aesthetic result is achieved. It also reduces the morbidity of the donor site (1-3). Expanded flaps advantages: Safely quite thin, large flaps can be planned. Structure and color harmony is better. Donor site can be closed primarily. Microsurgery would not need to. Regional aesthetic units without significant scars can be achieved by paying attention to Disadvantage: Is that it requires two or more surgical (1,4). In our study, face, scalp and neck reconstruction results obtained with the use of expander presented.

## MATERIALS AND METHODS

The face, scalp and neck areas expander was used to evaluate patients between the years 2010-2014 in the Plastic, Reconstructive and Aesthetic Surgery Department of Yüzüncü Yıl University. The study protocol was approved by the ethics committee of the Yüzüncü Yıl University. Age, gender, expander indication, defect or scar area localization, expander residential area, expander shape, volume, valve location (internal-external) expansion after volume, expansion time, major and minor complications were reviewed. Major complications of infection, displacement of the expander, exposure, expander rupture, exposition of the port to function, wound separation and necrosis was defined as. Minor complications include hematoma, seroma, delayed wound healing (14 days long) was defined as (5,6). If treatment of complications led to the completion of the expansion this was termed 'salvage'; if treatment can not be achieved expansion this was termed failure. Smooth surface having a separate expansion port expander has usage. Expander will generally then excised scar tissue or expander disposed to come into and away from the edge of the area to be respectively formed by incisions were placed in the pouch. Expanders were placed under galea in scalp and subfascial or subcutaneous in other regions. Externally to the skin leaving port expander has been detected. Apply

in cases of need, negative pressure drain was placed. Also intraoperative circulation of the skin flap expander disposed in a manner that 10% of the volume of saline solution was infused. Often the first expansion was started 2 weeks after surgery and was continued at regular intervals of 5-7 days. Expansion took according to the location of defect and placed expander 2 to 3 months. Will be given volume expander on patient discomfort and skin color was determined according to (5,7). After removing the expander capsule excision wasn't done in 2nd seance. Because it was not asked to adversely affect the circulation of the flap. Only to increase the movement of the flap incisions were made in the capsule.

## RESULTS

30 number expanders were used in 17 patients (8 male, 9 female) between the years 2010-2014. The range varies between 5 and 77 years and average age was found to be 21.76 years. Expanders were used burn sequelae in 14 patients, tumor-related defects in 2 patients and due to giant hairy nevus in 1 patient. In all patients with a separate valve system expander smooth surface was used. Lesion residential areas scalp (n:8), face (n: 7), neck (n: 3), and scalp and facial lesions (n:1) were observed. Anatomically 19 expander subgaleal in the scalp, 8 expander subfacial in the neck and supraclavicular and 3 expander subcutaneously in the face were placed (Table 1). Expander volumes of 50 ml to 400 ml (mean 236.6 ml) after expansion, while the volume 70 ml and 500 ml of range (mean 283.3 ml), respectively. Treatment time (expander placement of expanders for reconstruction to be removed until the last time) 2 to 3 months (mean 2.3 months) has changed. In 4 of 17 patients (three major and one minor) complications were encountered. two expanders were exposed, but they were protected and controlled expander with expansion process has been completed. The expansion of skin flap necrosis in 1 patient during the procedure was terminated by removing the expander on the development.

**Table 1. Anatomical localization of expanders**

Anatomic area	Expander numbers
Scalp	19
Face	3
Neck	1
Supraclavicular area	7
Total	30



**Figure 1.** (a) Preoperative frontal view of the scar on the face. (b) Preoperative laterally view of the scar on the face. (c) Postoperative frontal view of the face. (d) Postoperative laterally view of the face.

### Case 1

26 year old female patient left half of the face, nose and chin were admitted to the burn scars. In the first surgery, the patient's left subfacial plan supraclavicular area 400 cc expander was placed in a rectangular smooth surface. 480 cc 3-month volume expansion was achieved. The scar



**Figure 2.** (a) Preoperative frontal view of the alopecia on the scalp. (b) Preoperative from behind view of the alopecia on the scalp. (c) Postoperative frontal view of the scalp. (d) Postoperative from behind view of the scalp.



**Figure 3.** (a) Preoperative frontal view of the nevus on the face. (b) Preoperative oblique view of the nevus on the face. (c) Postoperative frontal view of the face. (d) Postoperative oblique view of the face.

tissue was excised in the second operation, the defect area in the cheek area was closed with interpolation flap. The flap was separated from the pedicle 2,5 weeks after this treatment. With the adaptation of flap was closed defect in the jaw area (Figure 1).

### Case 2

19 year old female patient was admitted with burn related alopecia in scalp. In the first surgery, right temporo-parietal, right oksipitopariyetal and left temporo-parietal areas subgaleal fields are 250-250-100 cc expander was placed in a rectangular smooth surface. 2 months after a 3-week period 260-250-120 cc volume expansion was achieved. In the second surgery, they removed the expander after excision of alopecia field defects were closed with flaps (Figure 2).

### Case 3

8 year old female patient with giant congenital nevus in the left cheekbone was admitted with complaints. In the first surgery of the left cheek in the background 50 cc subcutaneous tissue expander was placed in a rectangular smooth surface. In one corner of expander in 2nd month of expansion exposure has occurred. Tapes exposed area with 2 weeks off and supported by more than 70 cc in volume expansion has been reached. With advancement flap, prepared by removing the expander used in second surgery was closed resulting defect after excision of the 90% of nevus (Figure 3). Whether nevus

excision was planned to be done to the rest.

## DISCUSSION

Tissue expansion is used in plastic surgery for over 50 years. The tissue expander concept was partial by Neumann in 1957, following avulsion is used for ear reconstruction. The early 1980s, breast, soft tissue and burn reconstruction has been popularized by Radovan (3,5,8-14). The tissue expander has found widespread use in reconstructive surgery. The donor area is needed, the recipient site with similar characteristics (color, thickness, as to whether the hair follicle) features, minimal scarring and leads to donor site morbidity. Alopecia, burns deformities (scars, contractures and poor primary skin graft areas) and other areas of the head and neck is used in soft tissue reconstruction (8,9,15,16). Best results are obtained in breast and scalp (12). Today, 50% or more of total surface comprising scalp alopecia can be treated with the tissue expansion (5). Since 1957 in the texture of expanded skin has been many studies on biological adaptation. They have revealed that, on the amount of skin tissue expander is increasing. Through tissue expansion, epidermis thins, thickens the dermis, subcutaneous tissue thins. Also dermal increased mitotic activity and causes an increase general cellular. Tap a result of increased vascularity expanded increases microcirculation, especially around expander capsule structure (8,9,17,18). The compensatory circulation in the vicinity of the increase in the vascularity of random pattern skin flaps according to normal surveillance increases (9,17).

The major advantages of this method with tissue transfer agreement between the recipient bed and donor site morbidity is less. However, disadvantages are numerous clinical visits requiring long treatment period, two or more operations, and is prolonged deformation (5). Children are often expander system with valve to tissue expansion is observed to be incompatible. However, adjustment problems usually happen and you do not need to terminate early expansion (5). Ports in the pediatric population can be successfully excluded. Thus, there is no need for percutaneous application (9). In our study, five patients were in the age group of children. Port excluded because there were no compliance issues, ensuring the desired expansion, reconstruction was completed. Tissue expansion is associated with a relatively high

complication rate. In the literature has been found in the range of % 10 to 80 complication rate (14). The use of tissue expanders in the extremities is associated with a high complication rate (12). Despite the higher risk of complications expander is often used in reconstructive surgery. Major complications include infection, displacement of the expander, expander rupture, exposure, the port to see not the function, wound separation and tissue necrosis (5,6,8,19). Minor complications include hematoma, seroma, delayed wound healing (more than 14 days) (5,6). In our study, 3 patients with major complications were encountered. Exposure occurred in 2 patients, but the exposed area with dressing tape to supporting appropriate volume expansion was continued. Expander was rescued by providing adequate expansion and reconstruction was completed. 1 case of scalp expanders (two expanders) é placed was developed necrosis of the skin on during expansion in another center. Thereupon they removed the expander process is terminated. 1 patient with minor complication was encountered. Hematoma in patients who developed a surgical procedure was done. Follow spontaneous hematoma in the process of correcting and expansion was completed in the desired manner.

Skin grafts and flaps away widely used transmitters in adjacent tissues due to limitations in the repair of large defects on the face and neck. However, these beds are transferred to the buyer the significant differences between the tissue from the desired results usually can not be achieved due. With the lateral side of the neck, supraclavicular structure has the same skin area. This skin is hairless and has a fine structure (1). The expansion allows for optimal aesthetic reconstruction, donor site morbidity without major facility allows the use of a similar texture. In facial trauma reconstruction with free flap reconstruction after a good stroke, found that tissue is provided. However, the poor color and thickness can not be obtained a good aesthetic result alignment (1). Expander better aesthetic results are obtained with the use. For best results, this shows that there is need for complex procedures. No other tissue expansion better results are obtained according to procedures (1). In our study, seven cases in face, 3 cases of defect in the neck region were present. The expanders was placed to face in three cases, to supraclavicular area in seven cases (bilateral in one case), and to neck area in one case in reconstruction of these cases. Cosmetic and functional as were obtained good results. The key to a successful expansion and closure of defect spots, good planning and

making incisions are very carefully designed. Preferred for optimal cosmetic results and minimal risk of flap shape (training, rotation or interpolation) should be given careful decision. Scar length and position should be considered. The disadvantage of requiring several operations and may cause stress for patients. To do this, patients must be prepared mentally and physically for surgery (1). Careful planning and aesthetic reconstruction unit according to obtain good results. The donor area size is determined according to the width expander. Injection of small amounts reduces tension in the suture line (1). Over expansion causes the thinning of the skin. Expanded very thin skin contraction leads to lower premiums, it causes the reduction of tension in the suture line. Rectangular expanders necrosis can be seen more in the corner (1,20).

To prevent complications: expander is created from the large pocket. Slow the pace of expansion is maintained. Cylinders made to create a pouch large limbs of the difficulty of dissection is used to protect small expander. Or suprafascial subfascial dissection is done, cover the top of the soft tissue expander to increase and if you subfascial extremity compartment syndrome is made to protect the slow expansion. Unscarred tissue incision and expansion takes place away from the area, leaving the incision is prevented. As a result, despite the relatively high complication rate, careful planning, selection of appropriate expander can be obtained with good results. Defect area with very good tissue compatibility, donor site morbidity and lack an uncomplicated process to have advantages today with expander use a variety of soft tissue defects in the reconstruction, particularly the head and neck region and a is beter option.

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