

# Outcome of Tissue Expansion for Reconstruction of Post Burn Scarring of Head and Neck Region

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## ABSTRACT

**Objective:** The objective of this study is to evaluate the outcome of tissue expansion for reconstruction of post burn scarring of head and neck region.

**Study design:** Descriptive case series.

**Place & Duration of study:** Department of Plastic Surgery, Pak-Italian Burn center, Multan. two years from 01-08-2014 to 31-07-2016.

**Material & Methods:** 20 patients included in the study for tissue expansion of post burn scarring defect in head and neck region. Overall expanded flap survival, color matching, hypertrophic scarring and complications were studied.

**Results:** In majority of cases smooth texture, aesthetic outcome, color match, normal scarring was noticed. Only 1(05%) case showed complication.

**Conclusion:** Tissue expansion technique is a reliable, safe and versatile technique. It provides a good aesthetic outcome in terms of color matching, texture and scarring.

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**Key words:** Tissue expansion, Head and Neck, Aesthetic, color match, texture.

## Introduction

No other part of the body is as conspicuous, unique or aesthetically significant as the face. An individual's self-image and self-esteem are often derived from his or her own facial appearance – so any disturbance in this feature can lead to psychological trauma to the person.<sup>1</sup>

The repair of skin defects in the head and neck region still poses a significant problem for many clinicians.<sup>2</sup>

Tissue expansion expands the tissue to attain an optimal aesthetic and functional result

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using local tissue when the primary closure is not possible.<sup>3</sup> Tissue expansion for medical purposes was first reported in 1905 by Codvilla who attempted to lengthen tissue in the hip area. It was not until 1976 that another study concerning tissue expansion surfaced, when Radovan successfully expanded the tissue of the chest of a woman who had undergone a mastectomy.<sup>4</sup>

Tissue expansion relies on the ability of skin and soft tissue to generate in response to tension.<sup>5</sup> Tissue expanders are balloons made of silicon and filler ingredients, molded into a pre-shaped prosthesis, which can be filled with saline through a valve system.<sup>6</sup>

Advantages of the expanded flaps are: (1) large flaps can be harvested because of the

expander; (2) extremely thin flaps can be safely employed; (3) texture and colour match are good.<sup>7-10</sup> Motamed S. et al conducted a study using tissue expanders for post burn head and neck reconstruction in 72 patients out of which reconstruction of 68 patients were fully successful in the context of optimal aesthetic and functional reconstruction (94%)<sup>8</sup>

Ghanime G. et al conducted study using tissue expansion for burn sequelae in 14 patients where they used 22 expanders out of which only 3 showed complications.<sup>5</sup>

The rationale of this study is to assess the benefits of tissue expansion in terms of its aesthetic outcome in our local population.

**Data Analysis**

All the data collected was entered and analyzed by SPSS version 20.0. Numerical variable of interest like age has been presented as mean and standard deviation. Nominal variables like color match, texture, scar and successful outcome has been presented as frequencies and percentages.

Effect modifiers like age, gender, scar location and scar size have been controlled by making stratified tables. Post stratification chi square test has been applied to see their effect on outcome. P-value equal or less than 0.05 was considered as significant.

**Data Collection Procedure**

A total of 20 patients meeting inclusion and exclusion criteria of this study were registered. Out of these 20 study cases, 08 (40 %) were males and 12 (60 %) were females.

Majority of our study cases i.e. 16 (80%) reported with the history of flame burns

followed by Scald burns and chemical burns as shown in Table-1 and picture no.1 and 2

**Table-1:** Distribution of Etiology of defects among study cases. (n=20)

Etiology	Frequency	Percentage
Fire Burn	16	80
Scald burn	03	15
Chemical Burns	1	5
<b>Total</b>	<b>20</b>	<b>100%</b>



**Figure 1:**Preoperative Expander insertion scalp flame burn



**Figure 2:** Filling after insertion

Overall flap survival was observed in 18 (90%) of the study cases.

Facial region was the pre-dominant location of defect in these study cases i.e. 15(75 %), as shown in figure no.3 followed by Neck i.e. 03 (15 %). Color matching was comparable to that of recipient site in 18 (90%) of our study cases, while hyperpigmentation was observed in 02 (10%) of our study cases. (Table-2).



**Figure 3:** Facial burn scar reconstruction with expander flap.

**Table-2:** Distribution of study cases by color match (n = 20)

Color Match	Frequency	Percentages
Comparable	18	90
Hyper pigmented	02	10
<b>Total</b>	<b>20</b>	<b>100</b>

Smooth texture was seen in 18 (90%) while edematous in 2 (10%) of our study cases. Normal scarring was noted in 19 (95%) of our study cases while hypertrophic scarring was seen in 1(05 %) of our study cases. Aesthetic outcome was successful in 18 (90%) of our study cases while in only 02

(10%) aesthetic outcome remained unsuccessful. (Table-3)

**Table-3:** Distribution of study cases by Aesthetic outcome. (n = 20)

Aesthetic Outcome	Frequency	Percentages
Successful	18	90
Unsuccessful	02	10
<b>Total</b>	<b>20</b>	<b>100</b>

Complications were seen in 1(05%) of our study cases.

### Discussion

Tissue expansion is a reliable method of providing additional cutaneous tissue, thereby optimizing contour and color match in a given reconstructive effort. The effects of expansion on skin, which include increased surface area and vascularity, allow coverage of a variety of complex wounds <sup>11-18</sup>

Genesis of modern-day tissue expansion is credited to innovators such as Radovan and Austad <sup>19</sup> the technique takes some of its roots from early lessons in distraction osteogenesis. In 1982, the first National Tissue Expansion Symposium was sponsored by Plastic Surgery Educational Foundation (PSEF), marking the recognition of a new advance and field in reconstructive surgery. Better understanding of expansion has allowed many modifications in flap design, increasing its worth as a reconstructive option <sup>20,21</sup>

According to our study results, neck region was predominantly employed for the purpose of expander placement. Different studies have also reported that healthier skins of the

neck region have the increased similarity with that of the facial skin in terms of color matching and texture. Color matching was comparable to that of recipient site in 18 (90%) of our study cases, while hyperpigmentation was observed in 02 (10%) of our study cases. Smooth texture was seen in 18 (90%) while edematous in 02 (10%) of our study cases. Normal scarring was noted in 19 (95%) of our study cases while hypertrophic scarring was seen in 01(05 %) of our study cases.

Tissue expansion is associated with lower rate of complications. Our study results also support this finding as only 05% complication rate was observed. Similar findings have been described by different authors.<sup>8,22-25</sup>

Different authors have reported satisfactory aesthetic outcome using tissue expansion technique in the post burn reconstruction of head and neck region<sup>8, 20-25</sup>. Aesthetic outcome was successful in 18 (90%) of our study cases while in only 02 (10%) aesthetic outcome remained unsuccessful. Motamed S and others<sup>8</sup> have reported 94 % satisfactory aesthetic outcome. Yamin et al<sup>22</sup> reported 78 % satisfactory results. Similar results have been reported in another study<sup>23</sup>.

## Conclusion

Tissue expansion technique is a reliable, safe and versatile technique. It provides a good aesthetic outcome in terms of color matching, texture and scarring. Reconstruction of face with this technique had resulted in significant improvements in patient's appearance. Higher satisfaction level of the patients was noted. Not only Aesthetic outcome was excellent but

functional outcome in terms of neck rotation and extension was also up to the mark.

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