Original Article

Reconstruction of Hemi Fascial Scars Using Expanded Transposition Flap of Neck

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ABSTRACT

Background: Neck tissue expansion is a widely accepted method for facial scar reconstruction due to its optimal color and texture match

Methods: This retrospective study evaluated outcomes in 42 patients who underwent hemifacial scar reconstruction using tissue expanded transposition flaps from the ipsilateral neck.

Results: Patient records were reviewed for demographic data, surgical variables, and complications. The majority (95.2%) had burn-induced scars; a single expander was used in 92.9% of cases, while three patients required two expanders. The mean expansion duration was 115.86 days. Major complications occurred in 9.5% of patients, and minor complications in 14.3%; extrusion and infection were most common

Conclusion: Transfer of expanded neck skin as transposition flap, is demonstrated to be a reliable reconstructive technique for complete resurfacing of hemifacial scars with minimal contour deformities and optimal final scar.

KEYWORDS
Burn Injuries; Facial scar; Tissue expander; Neck

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INTRODUCTION

Burn injuries as one of the most destructive injuries affecting healthcare system in all countries [1,2,3]. Facial burn scar may lead to significant disfigurement and contractures with high aesthetic and functional impact [4,5]. Hence the main goal of facial reconstruction surgery is to restore aesthetics and function [4].

Among available techniques—such as skin grafts, local flaps, distant flaps, free flaps and laser resurfacing [5-7,] —tissue expansion through increasing the skin surface area produce new tissue to resurface defects in a nearby areas [8-11]. As a gold standard technique, neck tissue expansion provides adequate amount of optimal skin to replace scarred face with the skin with highest color and texture match [12-14]. The convenient way of expanded tissue transfer from neck to face is advancement flap, that is associated with some contour deformities and unfavorable final scar position [15-19].

To avoid these potential unfavorable results, we used expanded transposition flaps as our standard technique of transfer of expanded

neck skin for hemifacial resurfacing. In this retrospective study, we analyzed the outcome of cases with hemifacial scar deformities reconstructed with expanded flaps transposition flap from ipsilateral neck.

METHODS

A retrospective review was conducted of patients with hemifacial scars operated as tissue expanded transposition flap from neck. In all patients, through intra scar incision, at least 3 cm far from mandibular border, appropriate rectangular tissue expander was placed in supra-platysmal plane within the ipsilateral neck in vicinity of hemi-facial area planes to be reconstructed. Serial expansion in timely manner continued until the required surface area to maximally cover the facial scar be achieved. Then in second stage, tissue expander removed and the expanded neck skin was used to resurface the area of resected hemi-facial scar. The mode of transfer in all cases in this study were transposition flap. Data collected included demographics, surgical details, and postoperative complications. Statistical analysis was performed using SPSS(v.16) (Chicago, IL, USA), applying appropriate descriptive methods for qualitative and quantitative data.

RESULTS

A total of 42 patients underwent hemifacial scar reconstruction using the expanded transposition flap technique. The mean patient age was 28.2 years (range 5–57), with 64.3% females and 35.7% males. The predominant etiology was burn injury, accounting for 95.2% of cases; and traumatic scars represented the remaining 4.8%. In all patients a single tissue expander was placed in the ipsilateral neck. Three individuals required additional re-expansion to complete the treatment. The average surgery time for placement of tissue expander was 53.9 minutes; mean hospital stay was 28.2 hours.

Major complications (Table 1) occurred in 9.5% (4/42) of patients and included expander extrusion (2 cases) and partial flap necrosis (2 cases), both requiring surgical intervention. Minor complications were noted in 14.3% (6/42) of patients, consisting primarily of superficial infection (3 cases) and tissue ischemia (3 cases); all resolved with conservative management.

DISCUSSION

This study shows that hemifacial scar reconstruction using expanded transposition flaps from the neck provides reliable and aesthetically favorable outcomes. (Figure 1)

In our series of 42 patients, a transfer of expanded neck skin enabled complete resurfacing of the hemi-face. Final scars were optimally placed along facial aesthetic unit border, the cervico-mental angle was preserved, and the complication rate was low (9.5% major, 14.3% minor), with high patient satisfaction regarding both function and appearance.

Geometrically, transposition flaps provide clear reconstructive advantages: (1) They enable resurfacing of the entire ipsilateral hemiface in one operation, expanding reconstructive reach. (2) Scars are inconspicuously placed on the borders of facial aesthetic units, blending into natural anatomical

Table 1. Complications of tissue expander placement

% Per Expander	% Per case	N	Complication
Major			
Dehiscence	1	2.38%	2.22%
Deflation	1	2.38%	2.22%
Skin perforation	0	-	-
Extrusion	2	4.76%	4.44%
Minor			
Seroma	1	2.38%	2.22%
Infection	2	4.76%	4.44%
Hematoma	1	2.38%	2.22%
Leak	0	-	
Ischemia	2	4.76%	4.44%

Figure 1. Left sided hemifacial burn scar with severe disfigurement, front and oblique views (Left); Completed ipsilateral Neck expansion, front and oblique views (Middle); Resurfaced left hemi-face with expanded transposition flap, front and oblique views (Right)

boundaries for superior cosmetic results[20]. (3) The well-defined cervico-mental angle and transition line between the face and neck are preserved, as the flap's rotation avoids the blunting effect seen with direct advancement. These geometric benefits yield optimal contour, minimize visible scarring, and produce more harmonious facial reconstruction compared to advancement flaps—which may result in excessive tension, less coverage, and loss of facial-cervical distinction. Our experience and literature strongly support the supremacy of transposition flaps in expanded neck flap facial reconstruction[21,22] Our findings are in accordance with previous studies on tissue expansion for facial reconstruction. Yamin et al. reported that over 94% of reconstructed scars and 98% of donor site scars were deemed acceptable, with most patients satisfied with their outcomes. Their overall complication rate was 13.9%, comparable to our results[23]. Other researchers have noted that tissue expansion allows for substantial resurfacing, with most lesion areas (over 68%) being completely removed after a single expansion, and

success rates above 85%[21]. In our study, complete hemifacial resurfacing was achieved in all patients with a complication rate of 9.5% for major events, closely aligning with the 8.73% overall complication rate reported by Azzi et al. in their systematic review of 7,058 head and neck tissue expanders [24]. This review, as well as a large case series by Bauer et al., identifies expander extrusion and infection as the most frequent complications, echoing our findings of primary complications being extrusion and tip ischemia[21,24]. Further, closure and success rates in our series mirror those from recent systematic reviews and large retrospective studies. A review on post-burn contracture reconstruction of the head and neck found most facial areas (over 68%) could be resurfaced after a single round of expansion, with an acceptably low-risk profile[24,25]. Similarly, a systematic review summarized that high closure and functional success rates can be achieved with cervical tissue expanders, reinforcing the reliability of our approach. Systematic reviews broadly confirm that expanded neck flaps provide superior color and texture match compared to traditional skin grafts or regional flaps, with distinct advantages in contour restoration and minimized donor morbidity[21-23]. The complication spectrum in our practice did not exceed established benchmarks, and all surgically-managed adverse events resolved, consistent with the literature.

Potential limitations of our study include its retrospective nature and single-center experience, which may introduce selection bias and limit the generalizability of our findings. Follow-up duration was variable, and long-term aesthetic or functional outcomes may not be fully captured. Additionally, the lack of a directly comparable control group treated exclusively via advancement flaps precludes definitive quantification of the relative advantages of transposition flaps.

Overall, our results reinforce the role of expanded transposition flaps as a preferred strategy for the reconstruction of extensive facial scars, offering reproducible, aesthetically superior outcomes with acceptably low complication rates, consistent with published literature.

CONCLUSION

Transposition flaps using expanded neck skin offer a clear advantage over conventional advancement flaps for hemi-facial scar reconstruction. They enable reliable coverage of complex, irregular defects with favorable aesthetic outcomes and manageable complication rates. Plastic surgeons should consider this method as the preferred approach in similar reconstructive cases, especially following severe burns.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interests.

REFERENCES

1. Forjuoh SN. Burns in low-and middle-income countries: a review of available literature on descriptive epidemiology, risk factors, treatment, and prevention. *Burns* 2006;**32**(5):529-37.
2. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *The lancet* 2006;**367**(9524):1747-57.
3. Ahuja RB, Bhattacharya S. Burns in the developing world and burn disasters. *BMJ* 2004;**329**(7463):447-9.
4. Rose EH. Aesthetic Restoration of the Severely Disfigured Face in Burn Victims: A Comprehensive Strategy. *Plast Reconstr Surg* 1995;**96**(7):1573-85.
5. Bui DT, Cordeiro PG, Hu Q-Y, Disa JJ, Pusic A, Mehrara BJ. Free flap reexploration: indications, treatment, and outcomes in 1193 free flaps. *Plast Reconstr Surg* 2007;**119**(7):2092-100.
6. Sniezek JC, Sabri A, Burkey BB, Barille DJ. Reconstruction after burns of the face and neck. *Curr Opin Otolaryngol Head Neck Surg* 2000;**8**(4):277-81.
7. Alster TS. Laser treatment of hypertrophic scars, keloids, and striae. *Dermatol Clin* 1997;**15**(3):419-29.
8. Kawashima T, Yamada A, Ueda K, Asato H, Harii K. Tissue expansion in facial reconstruction. *Plast Reconstr Surg* 1994;**94**(7):944-50.
9. Radovan C. Tissue expansion in soft-tissue reconstruction. *Plast Reconstr Surg* 1984;**74**(4):482-92.
10. Cunha MS, Nakamoto HA, Herson MR, Faes JC, Gemperli R, Ferreira MC. Tissue expander complications in plastic surgery: a 10-year experience.

Rev Hosp Clin Fac Med Sao Paulo. 2002;**57**(3):93-7.
11. Bauer BS, Vicari FA, Richard ME. The role of tissue expansion in pediatric plastic surgery. *Clin Plast Surg* 1990;**17**(1):101-12.
12. Argenta LC, Marks MW, Pasyk KA. Advances in tissue expansion. *Clin Plast Surg* 1985;**12**(2):159.
13. Tavares Filho JM, Belerique M, Franco D, Porchat CA, Franco T. Tissue expansion in burn sequelae repair. *Burns* 2007;**33**(2):246-51.
14. Chun JT, Rohrich RJ. Versatility of tissue expansion in head and neck burn reconstruction. *Ann Plast Surg* 1998;**41**(1):11-6.
15. Gürlek A,Alaybeyoğlu N, Demir CY, Aydoğan H, Bilen BT, Æztürk A. Aesthetic reconstruction of large scalp defects by sequential tissue expansion without interval. *Aesthetic Plast Surg* 2004;**28**(4):245-50.
16. Hafezi F, Naghibzadeh B, Pegahmehr M, Nouhi A. Use of overinflated tissue expanders in the surgical repair of head and neck scars. *J Plast Reconstr Aesthet Surg* 2009;**62**(11):e413-20.
17. Motamed S, Niazi F, Atarian S, Motamed A. Post-burn head and neck reconstruction using tissue expanders. *Burns* 2008;3**4**(6):878-84.
18. Gao JH, Ogawa R, Hyakusoku H, Lu F, Hu ZQ, Jiang P, et al. Reconstruction of the face and neck scar contractures using staged transfer of expanded "Super-thin flaps". *Burns* 2007;**33**(6):760-3.
19. Bozkurt A, Groger A, O'Dey D, Vogeler F, Piatkowski A, Fuchs P, et al. Retrospective analysis of tissue expansion in reconstructive burn surgery: evaluation of complication rates. *Burns* 2008;**34**(8):1113-8.
20. Gao B, Xiao K, Zhu H, et al. An algorithm for using expanded cervical flaps to resurface facial defects based on five different methods. *Burns* 2016 Dec;**42**(8):1867-1874
21. Bruce S Bauer 1, Alexander Margulis .The expanded transposition flap: shifting paradigms based on experience gained from two decades of pediatric tissue expansion *Plast Reconstr Surg* 2004 Jul;**114**(1):98-106.
22. Robert J Spence Expanded Transposition Flap Technique for Total and Subtotal Resurfacing of the Face and Neck. *J Burns Wounds* 2007; **30**;e8.
23. Ashab Yamin MR, Mozafari N, Mozafari M, Razi Z. Reconstructive Surgery of Extensive Face and Neck Burn Scars Using Tissue Expanders *World J Plast Surg* 2015 Jan;**4**(1):40–49.
24. Jayson L. Azzi, Chloe Thabet, Alain J. Azzi, Mirko S. Gilardino. Complications of tissue expansion in the head and neck. *Head Neck* 2020 Apr; **42** (4):747-762.
25. Colten P. Wolf, Amy L. Pittman. Tissue expanders of the head and neck: A case series and discussion of lessons learned. *Otolaryngology Case Reports* 2024 June;**31** 100607.