



Supraclavicular Fasciocutaneous Pedicle Flap Expanded and Supercharged with Paravertebral Dorsal Vessels for Treating Face and Neck Burn Scars and Contractions

Guilherme C. Barreiro, MD., Ph.D.^{1,2} Rachel Jordan¹, Grayson Hostetler¹, Angel Farinas, MD¹, Michael Li¹, Jonathan Fennell¹

¹University of Oklahoma College of Medicine, Oklahoma City, Oklahoma

²Hospital do Servidor Publico Estadual de Sao Paulo

Background

Facial and neck aesthetic, movement, and somatosensory function are affected by the thickness and elasticity of the skin.^{1,2} Supraclavicular fasciocutaneous flaps have been a staple choice in facial and cervical reconstruction due to their adjacent location, similar skin tone, mobile pedicle, and diverse vascular supply.¹ Gradually pre-expanding flaps decreases the donor skin thickness allowing it to closer match the recipient site.³ Supercharging is a method of dissecting an additional arterial supply with the flap, then performing anastomosis with a donor site artery. This is to counteract the large flap size and decrease risk of post-operative flap ischemia, necrosis, or failure.⁴

Methods



Figure 1. A. 16yo thermal burn victim with hypertrophic scars on the face and neck with cervical contractures limiting neck hyperextension and ectropion of lower lip. **B, C, & D.** Stage 1 tissue expanders placed. **E.** Stage 2 tissue expander removal and raising of flap. Cases at Hospital do Servidor Publico de Sao Paulo between January 2017 and July 2018.

Case 1: 16yo male with severe thermal burns to bilateral face, anterior neck, chest, and right upper extremity at 10yo
Case 2: 16yo male with severe thermal burns to total face at 10yo
Case 3: 41yo male with severe thermal burns to bilateral neck and chest at 11 yo

Results

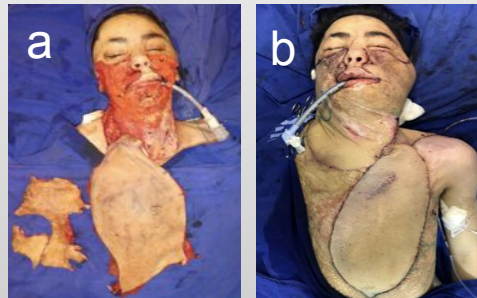


Figure 2. A. Scar tissue removed and contractures freed on the head and neck. Flap transposition to cover the defect area. **B.** Flap inset (second flap to chest).



Figure 3. Eight months postoperative period. Evidence of improved neck hyperextension and ectropion of the right eye and lower lip.

- Flap sites ranged from approximately 297cm² to 1984cm²
- Donor sites were closed primarily
- No incidence of full thickness necrosis or flap loss
- Post-operative complications:
 - Stage 1: expander site hematoma, resolved without complications
 - Stage 2: Epidermolysis of distal flap edges and post-operative flaccidity, corrected operatively. Fibrotic band formation on flap edge, corrected with a z-plasty revision.

Conclusion

Pre-expanding an SFF allows for reconstruction of large facial and neck scars due to post-burn contractures and matches the unique thickness of the face and cervical areas. Supercharging the flap with a dorsal paravertebral perforator to the temporal artery with no evidence of flap necrosis or failure secondary to ischemia could be a possible option for other large flap sites. More cases are needed to prove significant risk reduction compared to traditional SFF facial-cervical reconstruction.

References

1. Ismail H, Elishobaky A. Supraclavicular artery perforator flap in management of post-burn neck reconstruction: clinical experience. *Ann Burns Fire Disasters*. 2016. PMID: PMC5266240
2. Wei JCJ, Edwards GA, Martin DJ, Huang H, Crichton ML, Kendall MAF. Allometric scaling of skin thickness, elasticity, viscoelasticity to mass for micro-medical device translation: from mice, rats, rabbits, pigs to humans. *Sci Rep*. 2017. doi: 10.1038/s41598-017-15830-7
3. Karacaoglan N, Uysal A. Reconstruction of postburn scar contracture of the neck by expanded skin flaps. *Burns*. 1994. doi: 10.1016/0305-4179(94)90019-1
4. Ogawa R, Hyakusoku H, Iwakiri I, Akaishi S. Severe neck scar contracture reconstructed with a ninth dorsal intercostal perforator augmented "Super-Thin Flap". *Ann Plast Surg*. 2004. doi: 10.1097/01.Sap.0000070640.49193.96
5. Tredgett EE, Levi B, Donelan MB. Biology and principles of scar management and burn reconstruction. *Surg Clin North Am*. 2014;94(4):793-815. Epub 2014/08/03. doi: 10.1016/j.suc.2014.05.005. PubMed PMID: 25085089; PubMed PMC4286257

