

The cervicofacial flap ^{☆,☆☆}

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KEYWORDS

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Surgical and traumatic defects of the face present a reconstructive challenge to restore facial symmetry. The cervicofacial flap is a rotational and advancement flap with random blood supply utilized to close moderate- to large-sized defects of the cheek. Subcutaneous dissection of the cervical region allows for a large amount of tissue mobilization. Depending on the location of the cheek defect, the flap can be pedicled either anteriorly or posteriorly. This article presents the authors' preferred surgical technique as well as reported surgical variations. Routine postoperative care and management of potential complications are discussed.

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Introduction

A person's face is a critical aspect to their identity and social interactions. A major deformity secondary to injury or iatrogenic resection can take a devastating toll on quality of life and continues to challenge reconstructive surgeons to restore a harmonious appearance. Facial reconstructive surgeons attempt to achieve balance of color, texture, and contour while avoiding facial nerve injury and overly visible scars. The face is divided into well-known subunits. The central units consist of the nose, lips, and eyelids. The

peripheral units are less complex and consist of the cheeks, forehead, and chin. When viewing a person's cheek, the contralateral cheek is not entirely visible, and therefore obtaining symmetry is not as an important consideration compared to reconstruction of the central units.^{1,2}

The reconstructive ladder escalates from healing by secondary intention, to primary closure, skin grafting, tissue expanders with subsequent closure, local tissue transfer, regional tissue transfer, and microvascular free flap reconstruction.^{1,3} Cheek reconstruction is accomplished using a variety of these methods. Cheek restoration should primarily focus on uniformity of skin color and texture and secondarily on attempting to duplicate the contour of the contralateral cheek.² Therefore, local and regional tissue transfer from the neck, chest, and adjacent cheek tissue is preferred over distant tissue.^{2,4} There are many well-described algorithms in the literature for evaluation and reconstruction of cheek defects.⁵⁻⁸ Generally, defects greater than 30% of the cheek are not amenable to primary closure.^{2,4} The goal of this article is to outline the

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operative technique of the cervicofacial flap for its use in the closure of moderate to large-sized cheek defects.

History

The cervicofacial flap is categorized as both an advancement and rotational flap based on a random blood supply.¹ Esser first described using a rotational cheek flap for closing defects in 1918.⁹ Beare expanded on this flap as an alternative for closing orbital exenteration defects.¹⁰ Mustarde described utilizing an advancement and rotational flap for lower lid reconstruction.¹¹ Furthermore, in 1972, Stark and Kaplan described using an advancement flap from the neck to cover large cheek defects.^{12,13} Juri and Juri further refined these reconstructive methods by describing both upward advancement and forward rotation to cover cheek defects.¹⁴ These flaps have proven advantageous due to their ability to cover large surgical or traumatic defects using a single-stage procedure. Concern arises from these flaps due to their random blood supply, which may lead to distal edge necrosis after mobilizing the soft tissue with extensive subcutaneous dissection.^{1,15} Careful patient selection is necessary because patients who smoke and patients with a history of radiation therapy are at greater risk for compromise. If necessary, use of tissue expanders can increase the amount of tissue available for closure in a delayed fashion.

Anatomy

The cheek is one of the peripheral subunits of the face (Figure 1). It is bounded laterally by the preauricular crease, superolaterally by the zygomatic arch, superiorly by the infraorbital rim, medially by the nasomalar fold, inferomedially by the nasolabial junction, and inferiorly by the mandible. The cervicofacial flap is based on a random blood supply arising from the subdermal plexus. The arterial supply varies depending on if the flap is anteriorly- or posteriorly based and is derived from the facial, submental, superficial temporal, transverse cervical, and suprascapular arteries. The venous supply is variable and drains into both the anterior and external jugular veins.^{16,17} The superficial musculoaponeurotic system (SMAS) is the superficial fascia of the face and is composed of a fibromuscular layer of connective tissue that extends from the platysma, invests the muscles of facial expression and continues superiorly to become continuous with the galea. In the cheek region, the facial nerve branches are deep to the SMAS, and therefore dissection during the cervicofacial flap proceeds immediately superficial to the SMAS, protecting the facial nerve from injury.

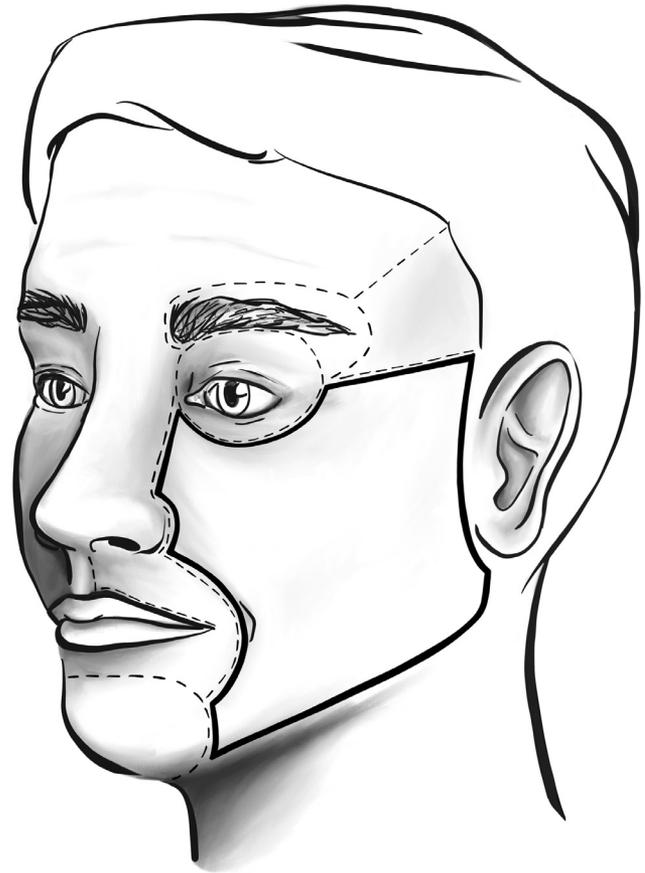


Figure 1 Cheek subunit.

Operative technique

Preoperative counseling should include identifying and, if possible, modifying risk factors for flap failure, including history of radiation, immune suppression, diabetes mellitus, smoking, and prior head and neck surgeries.^{3,4,15} Depending on the depth of the wound, contemplation for management of the facial nerve is necessary with consideration for concurrent neuroorrhaphy and grafting as indicated. For resections extending intraorally, microvascular free flap reconstruction may provide superior reconstruction. Confirmation of sound oncologic resection is required prior to proceeding with reconstruction. If there are concerns for positive margins, delayed reconstruction is optimal until final pathology is available and the wound is temporized with a bolster for coverage. Concurrent performance of neck dissection and/or parotidectomy is also possible.

The site of the cheek defect will determine whether an anteriorly- or posteriorly based flap is ideal.^{2,18} In addition to evaluating the site and size of the defect, the surrounding skin laxity of the ipsilateral neck and chest is considered. As usual, incisions are optimally placed within natural skin creases whenever possible.

Betadine antiseptic paint is used to prep the entire face. The authors prefer to apply lacri-lube to the eyes and use a 6-0 silk suture for tarsorrhaphy.

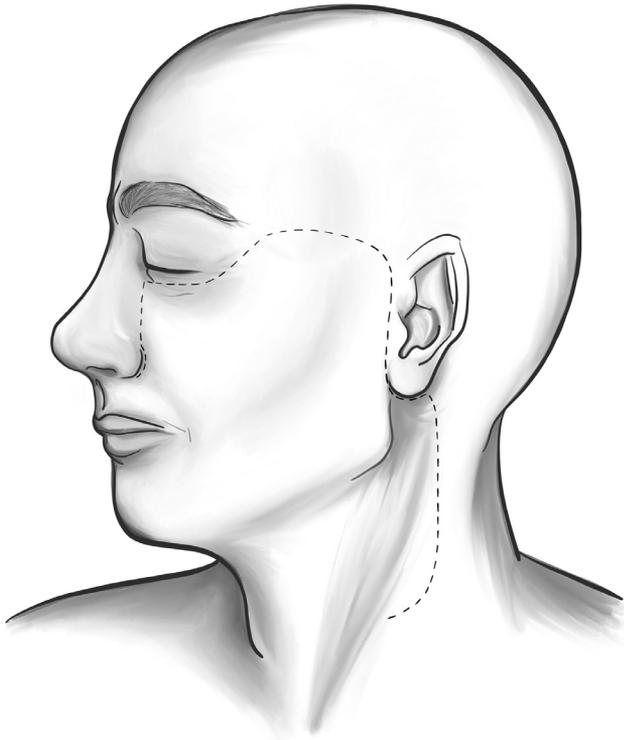


Figure 2 Anteriorly based flap.

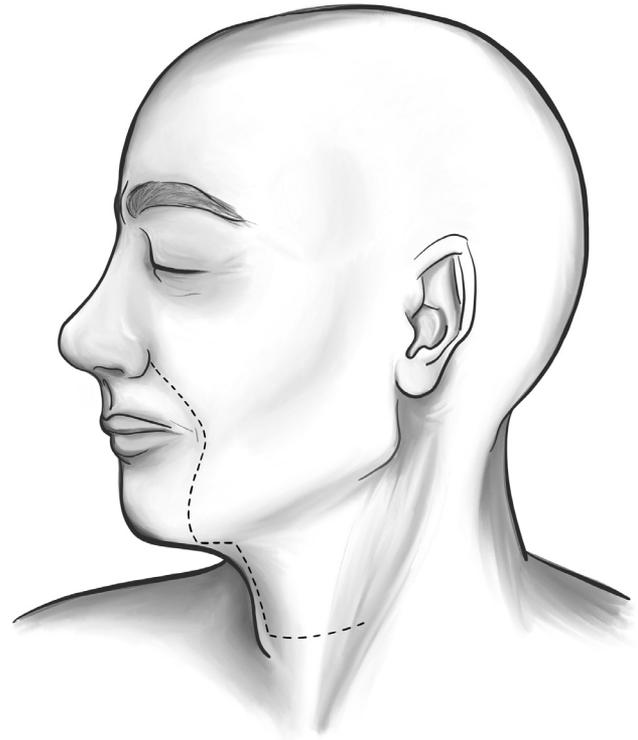


Figure 3 Posteriorly based flap.

Incision planning

Anteriorly based

Anteriorly based cervicofacial flaps are used to address posterior and anterior defects using skin from the cheek, neck, and anterior chest. The elasticity of the skin from the neck and shoulder combined with the large amount of surface area allow for a significant amount of tissue availability. The incision extends horizontally from the superior margin of the cheek defect, inferior to the orbit within a subciliary crease, and onward laterally and slightly superiorly to lateral canthus (Figure 2). The superior extension allows for future anchoring of the flap to periosteum in this region to prevent scleral show.¹⁹ Next the incision continues to the preauricular region and then inferiorly within a preauricular crease.² At this point, the incision can extend inferiorly into a cervical skin crease similar to a modified Blair incision allowing for a parotidectomy and neck dissection, or it extends around the ear lobule to the occipital hairline. The length of the cervical extension of the incision depends on the size of the defect as well as skin laxity. With the extension of the incision to the neck, a broad pedicle is designed to not compromise vascular supply to the flap. For larger defects (6–10 cm), the incision is continued to the pectoral region to allow for more soft tissue transfer.^{2,20,21}

Posteriorly based

Posteriorly based flaps utilize excess skin located in the jowl region to facilitate closure of anterior cheek defects.

This approach is most useful for medial cheek defects adjacent to the lips or nose.^{2,18} The incision can be placed within the nasolabial fold to the oral commissure, and can continue further inferiorly to the submental region if necessary (Figure 3).

This flap is largely based on the superficial temporal vessels, and therefore undermining should stop anterior to the tragus.^{2,16} Again, extension of this incision to the pectoral region will provide more tissue as required.^{2,20,21}

Flap elevation

After incision planning, dissection begins laterally within the subcutaneous plane superficial to the SMAS (Figure 4). After reaching the anterior border of the parotid gland, care must be taken to not injure the facial nerve, which theoretically is protected by staying superficial to the SMAS. Various authors have described a sub-SMAS, deep-plane dissection similar to composite rhytidectomies for enhanced blood supply. With this technique, dissection proceeds just deep to the parotid fascia 2 cm anterior to the tragus.^{17,22} Whereas this technique improves blood supply and decreases the tension on the final wound closure, the facial nerve is at increased risk during dissection. Furthermore, Delay et al describes proceeding with subplatysmal dissection once inferior to the mandible, creating a musculocutaneous flap.¹⁵ This subplatysmal dissection does place the marginal mandibular branch of the facial nerve at risk.¹²

After elevation is complete (Figure 5), adequate hemostasis is achieved using bipolar cautery. Oftentimes,

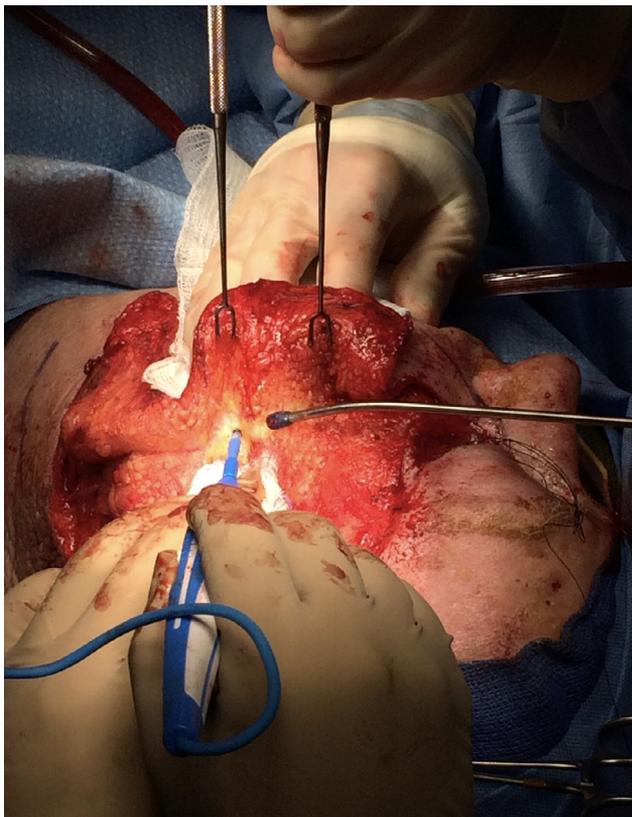


Figure 4 Intraoperative flap elevation.

the authors will apply a fibrin sealant to assist with hemostasis. Closure begins by using 4-0 polydioxanone suture to anchor the flap superiorly. The authors agree that securing the flap to the periosteum of the inferior orbit or zygoma can help prevent excessive tension, ectropion, lagophthalmos and scleral show.^{1,12,15,18} If the reconstruction involves the lower lid or gravity is anticipated to cause scleral show, then a lateral canthopexy or additional flaps are used to address this region.²

The subcutaneous layers are closed using interrupted 4-0 polyglactin 910 suture. Superficially, the epidermis is approximated and everted using 5-0 polypropylene sutures in horizontal mattress fashion. The authors often use staples to expedite closure of the cervical and pectoral incisions. Areas near the lower eyelid and lips are closed last to ensure tension-free closure in these delicate regions.¹⁹ Dog-ears resulting from closure can be excised at the time of surgery, or delayed if excision would create concern for flap compromise. **Figures 6-8** illustrate a large cheek defect closed using an anteriorly based cervicofacial flap combined with an island flap.

Postoperative care

It may help to ask the patient to keep their head slightly flexed postoperatively to decrease closure tension.^{12,13} Patients are typically discharged home following surgery unless postoperative issues arise. The authors typically leave a flat, 10-french JP drain in the inferior portion of the neck.



Figure 5 Completed flap elevation.



Figure 6 Preoperative cheek defect.

A temporary tarsorrhaphy is sometimes indicated during the early postoperative period, to protect the globe. The patients are instructed to apply Bacitracin to their incisions twice daily for 5 days, and then use a petroleum-based ointment thereafter until the wound is completely healed. The ophthalmic version of Bacitracin is also helpful to prevent exposure keratopathy. The sutures and staples are removed on the fifth to seventh postoperative day. It is recommended to protect the incision from sunlight for at least the next year.

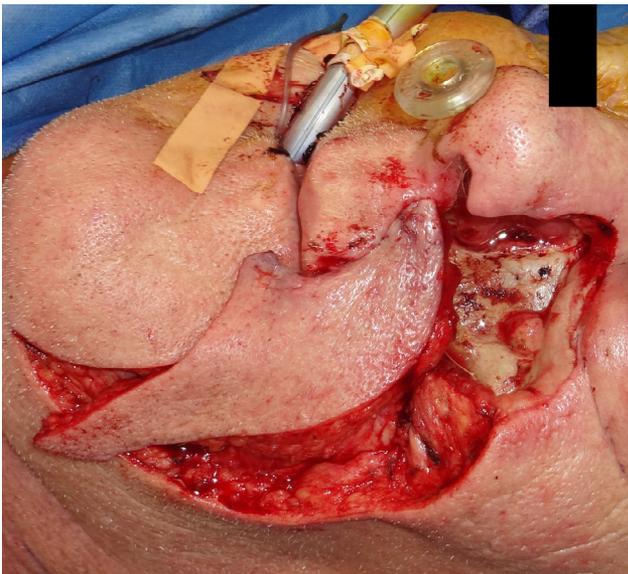


Figure 7 Intraoperative defect with creation of island flap.



Figure 8 Closure with anteriorly based cervicofacial flap.

Complications

One major disadvantage of the cervicofacial flap is the susceptibility to distal edge necrosis and dehiscence due to the random blood supply and amount of subcutaneous dissection required, especially for larger defects. Greater tension at wound closure will contribute as well. Patients who have a history of radiation and use tobacco are at greater risk for flap compromise. The authors ask patients to participate in a verbal contract that they maintain tobacco-free status for at least 2 weeks prior to surgery. The management of a flap with distal edge necrosis includes local wound care and educating the patient on the long-time course to healing. There is also a well-described role for hyperbaric oxygen therapy to maximize tissue viability

and prevent infections in compromised flaps.^{23,24} Medicinal leech therapy is an alternative option used to reduce venous congestion until further revascularization has occurred.²⁵

An additional risk of the procedure includes patients' concern with postoperative cosmesis, which is minimized by using strategically placed incisions as described. Patient education on appropriate postoperative wound care including protection from sun exposure is important. Additional revision procedures are performed as needed after the wounds have fully healed. Caution during subcutaneous dissection is important during the procedure to avoid facial paresis or paralysis. The facial nerve is theoretically at risk; however staying superficial to the SMAS during dissection decreases this risk.

Conclusions

The cervicofacial flap is a practical option to close moderate- and large-sized defects involving the cheek region. The surrounding tissue of the remaining cheek and neck serve as an ideal reconstruction option for similarity in tissue color and texture. Patient comorbidities and risk factors should be identified for appropriate preoperative counseling to avoid preventable complications.

Disclosure

The authors do not have any proprietary or commercial interest in any products mentioned or concepts discussed in this article.

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