

Local & Regional Soft Tissue Flaps of Facial Region

Dr. Prabhakar Gupta¹, Dr. Tanu Gupta², Dr. Sachin Kumar³

Lecturer^{1,2}, Reader³, Department of Oral & Maxillofacial Surgery^{1,3}, Department of Prosthodontics², Sharda University of Dental Science, Greater Noida

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Introduction

Physically the face is the most prominent visible part of the body and provide a person sense of identity. Functionally it animates emotions, communication, intellect, and provides the essential access roots to the respiratory and gastrointestinal systems. Cognitively, the region is the soul source of vision, hearing, taste and smell. Thus facial disfigurements, whether congenital (eg. Cleft lip/palate) or acquired (eg. trauma, disease processes and their treatment), have the potential to cause multiple problems and psychosocial dysfunction.^{1,2} Facial reconstructive surgery aims to establish anatomic normality as closely as possible on an individualized basis to optimize functional and esthetic outcomes.³ Options for the repair of facial defects include healing by secondary intent, primary closure, skin grafts, local and regional flaps and free tissue transfer. Local and regional flaps represent the most common method for repair of facial defect.⁴ Manysmaller and less complex facial defects can be addressed with local and regional flaps that provide a suitable match for facial tissue characteristics such as color, contour, texture, pliability, thickness and the presence or absence of hair.³ These flaps use tissue imported from nonadjacent sites with an inherent blood supply (vascular pedicle) to support the flap while attached to the recipient defect until neovascularization has been ensured between the flap and recipient bed.⁶ The choice of flap is predominantly determined by the characteristic of a given defect.³

Keywords

Buccal fat pad (BFP), Sternocleidomastoid Muscle (SCM),

Classification of Flaps

Many different methods have been used to classify flaps. Furthermore, these classification systems are often complex and varied in principles.

Flaps Classically Categorized Based On:-

Table 1 Classification of local flaps

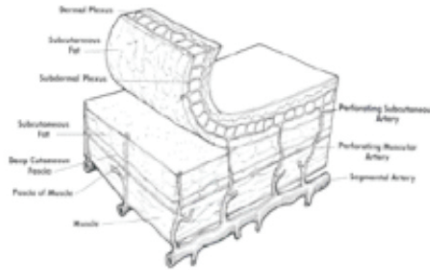
1. Vascular supply
2. Composition
3. Method of transfer and design

1) Vascularity

Like any living tissue, flaps must receive adequate blood flow to survive. A flap can maintain its blood supply in 2 main ways.

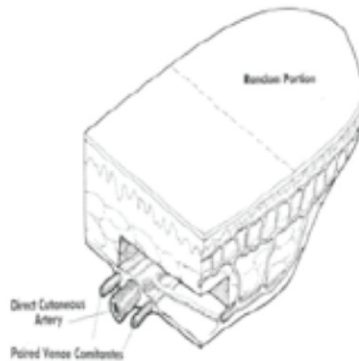
Random Flap: Random flaps depend on the vascular supply of the subdermal plexus and not a named skin perforator. The length of the random flap depends on the intravascular resistance of the supplying vessels and the perfusion pressure. When the perfusion pressure

drops below a critical closing pressure of the arterioles in the subdermal plexus, nutritional blood flow ceases and flap ischemia occurs.⁷



(Baker.S.R, Swanson.N.A; Local Flaps in Facial Reconstruction)

Axial Flap: Axial flaps are flaps based off a specific direct cutaneous artery (also called Septocutaneous artery) or musculocutaneous artery. These flaps have a more generous blood flow with improved survival lengths.⁸



(Baker.S.R, Swanson.N.A; Local Flaps in Facial Reconstruction)

2) Composition

In general, flaps may comprise in part or in whole almost any component of the human body, as long as an adequate blood supply to the flap can be ensured once the tissue has been transferred.⁹ Flaps composed of one type of tissue include skin (cutaneous), fascia, muscle, bone, and visceral (eg, colon, small intestine) flaps.

Composite Flaps Includes

Osseocutaneous: Vascular connections between muscle & bone are generally observed at the muscle–bone interface. If these vascular connections are preserved, it is possible to elevate a segment of vascularized bone with the flap.⁹

Sensory/Innervated Flaps: Sensory innervation of cutaneous islands after transfer is unpredictable. Regional dysesthesias is a potential consequence with injury to, or harvest of, sensory nerves supplying a cutaneous area.⁹

3) Method of Design & Transfer

Pivotal Flaps: The three types of pivotal flaps are rotation, transposition, and interpolated. A pivotal flap should be designed to account for

this reduction in effective length which may be as much as 40% with flaps that are pivoted through an arc of 180 degrees.¹⁰

Rotation Flap: They are designed immediately adjacent to the defect and are best used to close triangular defects. Because the flap has a broad base, its vascularity tends to be reliable.¹⁰

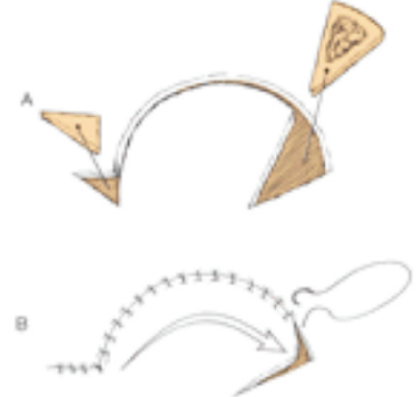


Figure - A. Rotation flaps are pivotal flaps with curvilinear configuration. Removal of a Burrow's triangle can facilitate repair of the donor site. B. Standing cutaneous deformity will form at the base of the flap. Triangle-shaped defects use a portion of this redundant tissue.¹¹

Transposition Flap: In contrast to rotation flaps, which have a curvilinear configuration, the transposition flaps have a straight linear axis. Such a transfer leaves a secondary triangular defect which is at least equal in area to the primary defect.¹²

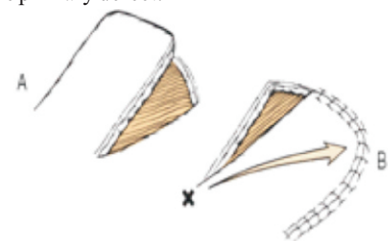


Figure - A. Transposition flaps have a linear configuration. B. The flap turns about a pivotal point at the base

Interpolated Flap: The interpolation flap, though it is a pivotal flap with a linear configuration, differs from transposition flaps in that its base is located at some distance from the defect.



Figure - Interpolated flaps are pivotal and have a linear configuration. A and B- Flap pedicle passes over intervening tissue. C and D- Flap requires pedicle division and inset during second surgical procedure.

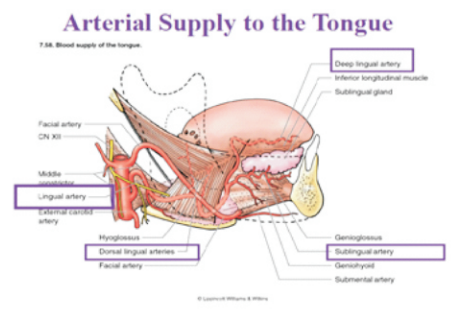
Intraoral Flaps

Buccal Fat Pad: The buccal fat pad (BFP) as an anatomic element was first mentioned by Heister¹³ in 1732 and was described by Bichat¹⁸ in 1802. The use of the BFP to cover intraoral defects was first described by Egyedi¹⁹ in 1977.¹⁴

Anatomical Consideration: The BFP is a simple lobulated mass described as consisting of a central body and 4 extensions: buccal, pterygoid, pterygopalatine and temporal. The body is centrally positioned and is located above the parotid duct and extends along the anterior border of masseter muscle. Posteriorly it travels through the pterygoid maxillary fissure in contact with the maxillary artery.¹⁵

Tongue Flap: The Tongue is an excellent donor site for soft tissue oral reconstruction mainly because of its abundant vascularity and the low morbidity associated with its use. The tongue has been used in reconstruction of the oral cavity for more than 100 years.¹⁶

Vasculature of Tongue: The lingual artery is the second branch of the external carotid artery. Its origin is just caudal to the posterior belly of the digastric and the angle of the mandible. As it passes anteriorly, it gives off a tonsillar branch. The lingual artery then travels deep to the posterior part of the digastrics tendon. It leaves the submandibular triangle and passes deep to the posterior border of the hyoglossus muscle where it gives off a small suprahyoid branch. Once caudal to the hyoglossus muscle, the lingual artery gives off the dorsal lingual artery which supplies the dorsum of the tongue, vallecula, epiglottis, tonsils and adjacent soft pallet. Once the lingual artery reaches the anterior edge of the hyoglossus muscle, it divided in its terminal branches- the sublingual and deep lingual artery.¹⁷



Anteriorly Based (set-back) Tongue Flap:

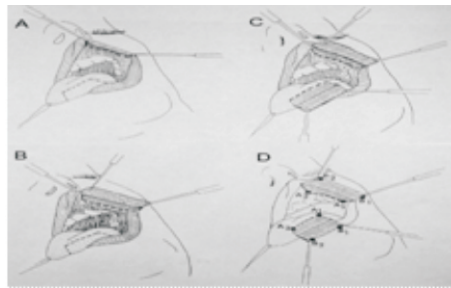
This flap has been described by De Santo to reconstruct defects of the tongue base. This preserved the anterior branches of the lingual artery and the hyomandibular complex, the presumed blood supply of this flap. The hypoglossal nerve was spared if there was no evidence of tumor invasion.¹

Clinical Indication: Repair of Oronasal communication. When a palatal defect is present, an anteriorly or posteriorly based tongue flap can be used. The closure of perforations in the soft palate is preferably done with the use of the palatal tissues themselves, and in extensive perforations, we can use a combined reconstructive method that uses a

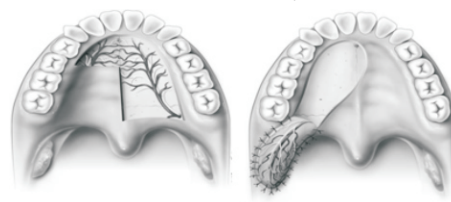
tongue flap and a pharyngeal flap.¹⁹

Posteriorly Based Tongue Flap: Posteriorly based tongue flaps are indicated to treat defects of the soft palate, retromolar region, or posterior buccal mucosa. This incision is carried from the tip backward to a point 1 to 2cm posterior to the circumvallate papillae. When more bulk is needed, flaps of 10-mm thickness including up to two thirds of the dorsum of the tongue can be used.¹⁸

Lip Reconstruction: The tongue flap has been used as a carrier of buccal mucosa in the reconstruction of posttraumatic lip deformities. An incision is performed at the junction of the atrophic vermilion and the lip mucosa. The medial edge of the tongue flap is first sutured to the posterior edge of the lip incision. A two layer closure is performed, and the pedicle is released at 2 week.¹⁶



Palatal Flaps: In 1974 Takahashi and Henderson, and in 1980 James, modified the operational method of the palatal flap by the application of a mucosal palatal island flap so that in the anterior of the flap only the mucous membrane was separated from the palate, which was shaped according to the size and shape of the oroantral fistula, and the submucosal layer and periosteum remain on the site of the defect in the palatal surface. In 1985 Yamazaki et al. described a method of submucosal palatal island flap.²⁰ There have been variations in the shape and in the methods of adaptations but have proven as a reliable method of soft tissue reconstruction in the oral cavity.²¹

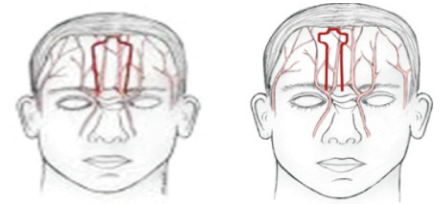


Palatal Rotation Advancement Flap: It's the most selective technique for intraoral reconstruction. Sometimes too the opening of the fistula may be towards the palatal aspect of the ridge. In these circumstances a palatal flap is more convenient.²⁰



Facial Flaps

Forehead Flap: Forehead flap (median and paramedian) is a commonly used interpolation flap and remains the workhorse flap for large nasal defects. It is a robust and dependable flap.



Median Forehead Flap Paramedian Forehead Flap

Median forehead flap were first described in an Indian medical treatise, the Sushruta Samita, in approximately 700 BC.²² the operation was performed by members of a caste of potters known as the Koomas. The need for this operation arose from the common Indian practice of amputating the tip of the nose as punishment for a variety of crimes.²³ The flap had a revival in 1794 by J.C. Carpie, initially he practiced median forehead flap operations on cadavers and then later he performed the operation in 2 patients successfully.²⁴

Forehead Flap Based on Superior Temporal Artery: Forehead flap and its modification can be used for a large number of reconstruction procedure: cheek (inside and outside), floor of the mouth, nose, upper eyelid, chin covering for reconstructed mandible, portion of tongue and alveolar region. Split thickness skin graft taken from the anterior chest wall if practical is best for covering the donor site of the forehead. It is to be remembered that not to cause more deformity than what is being reconstructed.²⁶

Vascular Supply- Superior Temporal Artery

Highpoints- A full thickness flap down to periosteum of skull using the frontalis muscle is taken. Only non-hair bearing portion must be used for intraoral reconstruction. Some surgeons bring the flap through the cheek, via a separate incision well below the zygomatic arch. When the teeth are present, the flap can be pinched as it crosses the occlusion line. The base or the pedicle can be returned in 3 to 4 weeks, but limit it only to hair bearing areas.²⁷

Nasolabial Flap: The melolabial crease delineates the cheek from the caudal nose and from the upper and lower lips. It is created by the insertion of the muscular aponeurotic system into the skin at the junction of the cutaneous lips and the cheek. With time forces of muscle contraction, gravity and aging results in the progressive deepening of the melolabial crease.²⁷

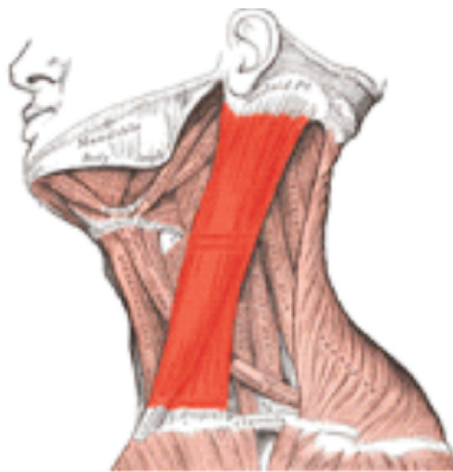
Blood Supply: The flap is supplied by the angular artery. The cheek skin on the face has a rich blood supply from perforating branches of the facial artery and is drained by the facial angular vein.

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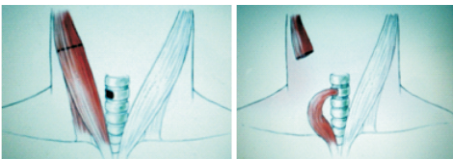
Abbe Flap: Sabattini in 1836 was first to describe cross lip transfer of full thickness lip tissue²⁴, also known as lip-switch flap. The lower lip can supply a flap of one-quarter of its length, and the Abbe flap offers immediate replacement of total lip anatomy.²⁸

Anterior Neck Flap

Sternocleidomastoid Flap: The sternocleidomastoid muscle also known as stern mastoid and commonly abbreviated as SCM, is a paired muscle in the superficial layers of the anterior portion of the neck. When acting together it flexes the neck and extends the head. Contraction of the SCM leads to tilting of the head, bringing the ipsilateral ear close to the shoulder.²⁹



It divided the neck into anatomical anterior and posterior triangles. The SCM flap can be used as a muscle, myocutaneous or a myo- osseous flap.²⁹



The SCM flap has been extensively studied but not widely used. Finally this flap has been criticized for the unreliability of the skin paddle and the contour deformity of the neck following flap transfer.²⁹

Blood Supply: It is supplied in 3 sections: the occipital artery supplies the superior third, the superior thyroid artery supplies the middle third, and the thyrocervical trunk supplies the inferior third of the muscle. This flap can be used for resurfacing of the oral cavity or lining a pharyngeal reconstruction.²⁹

Platysma Flap: The platysma flap was first used by Gersuny (1887) for reconstruction of a through-and-through cheek defect. In 1951, Edgerton described a lateral cervical island flap based on the platysma muscle for reconstruction of intra-oral defects. DesPrez and Kiehn (1959) reported the modified apron flap, which included the platysma muscle. In 1978, Futrell

and colleagues reported the use of the platysma muscle as a true myocutaneous flap.²⁹



Anatomy: The platysma muscle lies within the superficial fascial layer of the neck. The muscle originates from the subcutaneous tissue of the upper thorax, drapes the anterior neck extending the border of mandible, to insert in the facial skin at the lateral angles of the oral commissure.

Surgical Technique: The outline of the flap is initially made with the inferior margin low in the neck. As the platysma muscle is very thin the incision should be made carefully, a small deep nick can incise the platysma muscle. When an apron flap is used for the neck dissection, the inferior margin of the flap will become the inferior margin of the platysma flap. The inferior skin incision will pass through the platysma, whereas the superior skin incision will only through the skin. A skin only flap is then raised superior to the skin paddle upto the mandible, leaving the platysma down. At this point the distal skin island with its supporting platysma is elevated superiorly in a subplatysmal plane, typical for standard exposure for neck dissection. After the tumour ablation and neck dissection, the platysma musculocutaneous flap is rotated superiorly and 180 degrees into the defect and sutured in position. The donor site is closed primarily with undermining of the upper chest wall skin.

References


1. Dropkin MJ. Body image and quality of life after head and neck cancer surgery. *Cancer Pract* 1999; 7:309-13.(4)
2. Sarwer DB, Bartlett SP, Whitaker LA, Paige KT, Pertschuk MJ, Wadden TA. Adult psychological functioning of individuals born with craniofacial anomalies. *Plast Reconstr Surg* 1999; 103:412-18.(4)
3. Chang Gung, Med J, Vol.31 NO.5, Sept-Oct 2008.
4. Frederick S, Shwan B, J of Otolaryngology, April 2003.
5. Kayser MR. Surgical flaps. *Selected Readings in Plastic Surgery* 1999; 9:1-63.(4)
6. Mellet Jr, Ho Dq. Interpolation Flaps. *Dermatol.Clin* 2005; 23(1),87-112.
7. Baker.S.R.Reconstruction of Facial Defects, Chapter-24,pg no342-344.
8. Cutting C: Critical closing and perfusion pressures in flap survival. *Ann Plast Surg* 9:524,1982.
9. Krishna G. Patel, MD, PhD,a Jonathan M. Sykes, MD; Concepts in local flap design and classification, *Operative Techniques in Otolaryngology* (2011) 22, 13-23)
10. Baker.S.R, Swanson.N.A; Local Flaps In Facial Reconstruction, St.Louis, Mosby, 1995,P69.
11. Mellet Jr, Ho Dq. Interpolation Flaps. *Dermatol.Clin* 2005; 23(1),87-112.
12. Heister A. Oral and maxillofacial surgery. 1th ed. Philadelphia:W.B. Saunders Co; 2000. P.348.
13. Bichat F. Anatomic generale appliqué a la physiologic

eta la medicine paries, france,Grossen, Gabon et cie. 1802.

14. Dr.GunjanShrivastava, Dr.SubratPadhiary, Dr.Harshmohan Pathak, Dr.Swagatika Panda, Dr.ShitaprajnaLenka; Buccal Fat Pad To Correct Intraoral Defects, *International Journal of Scientific and Research Publications*, Volume 3, Issue 2, February 2013 ISSN 2250-3153.
15. Alkana, Dolanmaz D, Uzun E, ErdemE.The reconstruction of oral defects with buccal fat pad. *Swiss Med Wkly* 2003;133:465-70.(25)
16. ChicarilliZN.Sliding posterior tongue flap. *Plast Reconstr Surg* 1987;79:697-700.
17. Smith TS, Schaberg SJ, Collins JC. Repair of a palatal defect using a dorsal pedicle tongue flap. *J Oral Maxillofac Surg* 1982;40:670-3.
18. Lore JM, Klotch DW, Lee KY. One-staged reconstruction of the hypopharynx using myomucosal tongue flap and dermal Graft. *Am J Surg* 1982;144:473-6.
19. Arnold Komisar, M.D., D.D.S.; The Applications Of Tongue Flaps In Head and Neck surgery.
20. Komisar A, LawsonW. A compendium of intraoral flaps. *Head Neck Surg* 1985;8:91-9.
21. Maher WP. Distribution of palatal and other arteries in cleft and non-cleft human palates *Cleft Palate J* 1977;14:1-2.
22. Conley JJ, Prince JJ; Midline vertical forehead flap; *Otolaryngol. Head and neck Surg*;1981,89:38.
23. Converse JM, *Reconstruction plastic surgery*; Philedilphia, P.A, W.B Saunders; 1964:797.
24. Baker SR, *Regional flaps in facial recons.;Otolaryngo. Clinics of North America*;1990;23:125.
25. Millard DR, Total reconstructive rhinoplasty and a missing link; *Plastic reconstructive surgery*, 1966,37-167.
26. Kazanzian VH, The repair of nasal defect with median forehead flap; *Primary closure of the forehead wound*, *Surgynecol Obstet*, 1946,83:37.
27. Shan R.Baker, Local flaps in facial reconstruction, Chapter12;231:239.
28. Sabattini P:CennoStoricoDell'Origine e Progressi Della rinoplastica e cheiloplastica,Bologna, Belle arti 1838.
29. John B Mc Craw, Philip G Arnold; Mc Craw and Arnold's Atlas of muscle and myocutaneous flaps,Platysma, PgNo49:58.

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