European Journal of Molecular & Clinical Medicine

ISSN 2515-8260 Volume 09, Issue 04, 2022

ORIGINAL RESEARCH

LIP RECONSTRUCTION: VARIOUS LOCAL / REGIONAL FLAPS

Shashidhar K[1], Swarnamba U N [2], Ravi Koppad [3], Shivashankar Ajur*[4], Joseph John Menachery[5], Sunita yallannanavar[6]

[1]Associate Professor & HOD, [3]Assistant Professor, Department of Surgical oncology KIMS, Hubli Karnataka, India

[2]Associate Professor, Department of Anaesthesia KIMS, Hubli Karnataka, India

[4]Consultant ENT Surgeon and H &N oncosurgeon

[5,6]Junior Resident Department of otorhinolaryngology, KIMS, Hubli Karnataka, India

ABSTRACT

Background: Lip reconstruction after lip cancer resection is challenging to the surgeons. Loss of tissue in the lips after resection is treated with various flap techniques depending on the extension and location of the defect **Objectives:** This study aims to compare various techniques and outcome of reconstruction of both upper and lower lip and including the commissure **Materials and Methods:** A prospective study was performed involving lip cancer patients who underwent lip reconstruction between August 2015 to January 2021at tertiary care cancer center. The outcome of lip reconstruction by various flaps techniques was studied. **Results:** satisfactory functional and aesthetic outcomes, with similar tissue texture, static and dynamic symmetry achieved for most of the patients.

Conclusion: The use of nasolabial , Karapandzic, Abbe -Estlander, Double Abbe flap, Webster-Bernard cheek advancement flap, forehead flaps have shown to be reliable techniques that offers good functional and cosmetic outcome.

Keywords: Lip reconstruction, Karapandzic, Abbe-Estlander

Corresponding Author: Dr. Shivashankar Ajur, #83, Guru krupa, Teacher's colony Oppo jnanayogashram, Vijayapura Karnataka, India 580021

Shivent460@gmail.com, +917022987696

INTRODUCTION

In the past, lip reconstruction after resection of the primary tumor was performed by primary closure and more recently by free flap transfer technique. The main aim of lower lip reconstruction are for restoration of oral competence; maintenance of adequate mouth opening; to preserve sensation; speech; to provide both skin cover and oral lining and prevent show of teeth; and to produce satisfying result with good resemblance of vermillion[1]. The mainstay of lip reconstruction is for providing an adequate balance between mouth opening and closure. Local flaps are more commonly used for small lip defects and free flaps may

also be used for more extensive defects. Cheek's skin flap has been used to reconstruct the lower lip cutaneous portion.

MATERIALS& METHODS:

This prospective study was undertaken in a tertiary cancer hospital from a period of August 2015 to January2021, after ethical clearance from the institutional review board. A total of 16 patients were treated with Carcinoma of either the upper or lower lip with involvement of the commissure. All the patients underwent surgery with reconstruction of the defect.

All patients were pre-operatively studied by computed tomography, confirming the local tumor extension. Excision was performed full-thickness with a safe margin of 1 cm of tissue free from the tumor at clinical evaluation at the surgical field. After excision, fresh biopsies were performed on the margins around the excision resulting in free from tumor invasion. After excision, the reconstruction was performed in all patients with various flaps techniques. The follow-up period ranged from 1 month to 1 year. All subjects signed a consent form. 16 patients divided into 4 groups based on technique of reconstruction used.

RESULTS: The postoperative period was uneventful and the early postoperative appearance was satisfactory. No corrective surgery was required. At one-year follow-up, the patients were doing well with excellent functional and aesthetic outcome. Lip movements were normal, with adequate mouth opening and oral competence, good colour and texture match with adjacent tissues, and excellent volume and quality of the vermillion. The patients were pleased with the results.

Out of the 16 patients studied the most commonly used flap for lip reconstruction was naso-labial flap followed by the pectoralis major myo-cutaneous flap.

The participants of group 1 where naso-labial flap was technique definitely appears to be advantageous in terms of decreased operative morbidity, minimal scarring and excellent vermillion quality and preserved function of the reconstructed lower lip.

The participants of group 2 where pectoralis major flap was used patients developed post-operative oedema.The flap showed good uptake. It provided good oral competence, cosmetically better with no flap necrosis.

The patient where fore-head flap was used, patient oral competence was not as much as those where naso-labial flap was used.

The patients where cross lip and rotating flap were used the patients had good oral competence, maintained the lip structure and provided good post-operative uptake.

All the patients on follow up had flap uptake with no post-operative complications.

DISCUSSION

Lip reconstruction requires a proper understanding of the surgical, neuro-vascular and muscular anatomy. The upper lip is composed of the philtrum and tubercle centrally, the paired philtral columns laterally and vermilio-cutaneous junction. [2]The orbicularis oris muscle maintains oral competence by acting as a circumoral sphincter. Its horizontal fibers link the modiolus and philtral columns producing a tightening of the upper lip. Oblique fibers between the commissure and nasal floor act to evert the upper lip. The levator labii superioris, levator anguli oris, and the zygomaticus major and minor elevate the upper lip, and the mentalis, depressor labii inferioris, and the depressor anguli oris pulls the lip downwards. The blood supply to the lips is derived from the facial artery with the inferior labial artery supplying the lower lip and the superior labial artery and branches from the angular artery supplying the upper lip. Motor innervation arises from the buccal and marginal mandibular branches of the facial nerve and sensory innervation of the upper lip is from the infraorbital nerve V2 and the mental nerve V3 supplies the lower lip. The lip vermilion separates the skin of the external lip and the mucosa of the inner lip. It is composed of keratinizing glabrous epithelium with numerous sebaceous glands.

Head and neck cancer is the sixth most common type of cancer globally[3]. Among these, squamous cell carcinoma (SCC) of the lower lip includes more than a quarter of all oral cancers [4]. SCC of the lip is more commonly seen in males above the age of 40years.The main risk factors associated with SCC of lip are those with chronic sun exposure, smoking, and alcohol abuse, along with the concomitance of systemic lupus erythematosus, cheilitis, and leukoplakia. Alcohol and cigarettes smoking are the most important risk factors alone or in association [5].

The most common reconstructive techniques used are the “fan flap” according to Gillies, the Estlander lip exchange technique and the “universal principle” of the lower lip reconstruction according to Grimm [6]. The basic principle of lip reconstruction postulates the use of “like with like” tissues, avoiding different skin textures with annexes, thereby reconstructing the resected lip by incision and flap rotation of a lip section from the opposite side. By these techniques, oral stoma size will reduce due to dimension reduction of the sphincter ring. As

our institute is referral center cases present with higher stage which needs extensive surgery and variety of reconstructive technique. So more cases required nasolabial and pectoralis myocutaneous flap for reconstruction.

Group 1

A total of 8 patients with carcinoma of the lower lip with selective neck lymph nodes underwent a wide local excision of the tumor with neck dissection and reconstruction of the defect with naso-labial flap.

Primary lip tumor (figure1) was excised. The nasolabial flap was elevated deep to the subcutaneous tissue and superficial to the underlying muscles (figure2).During dissection, the facial artery, submental artery, and external jugular vein are ligated if the neck dissection is combined with the resection of a primary tumor in a clinically node-positive neck. For all of reconstructions, inferiorly based flaps were utilized. The tip of the flap was extended to a point approximately 15 mm distal to the medial canthus, while the width depended upon the width of the defect. The flap was rotated inwards and sutured using 4-0 PDS sutures. Primaryclosure done at donor site (figure 3,4).

A unilateral nasolabial flap can cover a defect of 2 to 3 cm, whereas a bilateral flap is sufficient for a defect 5×5 cm.The nasolabial flap receives its blood supply from the angular artery (a branch of the facial artery), the infraorbital artery and the transverse facial artery. Due to this rich vascular anastomosis between all the feeding vessels makes it an ideal and versatile flap for reconstruction of the anterior floor of mouth, lips, and nose tip. Disadvantages of the nasolabial flap are that there is a limited amount of tissue available, the reconstruction may lead to asymmetryof the cheek can occur when the flap is used for intraoral reconstruction.

Group 2

A total of 4 patients with lower lip carcinoma with adjacent structure involvement were treated with reconstruction using pectoralis major myo-cutaneous flap (figure 5, 6).

The surface markings of the vascular pedicle were made by drawing a line from the ipsilateral acromion to the xiphi-sternum and another line vertically from the midpoint of the clavicle to intersect the first line. Skin paddle of the flap was positioned over the pectoralis muscle along the course of the pectoral branch of the thoraco-acromial artery.During flap elevation, care was taken to include as many myocutaneous perforators as possible. The skin

paddle was sutured to the underlying pectoralis muscle with a few sutures to minimize the risk of shearing injury to myocutaneous perforators. The dissection plane between the pectoralis minor and pectoralis major muscle with its vascular pedicle was found by dissecting the lateral border of pectoralis major muscle. Once in the plane the pectoralis major with its vascular pedicle was freed from pectoralis minor muscle. Pectoralis major was freed from the humerus.A portion of the clavicular fibers of the muscle was divided to create a sub-cutaneous tunnel to accommodate the flap, neurovascular pedicle and its adventitia. The flap was then passed into the neck through a subcutaneous tunnel created superficial to the clavicle. The flap was then sutured with 3–0 vicryl interrupted sutures. Suction drains were placed in the neck and chest, and the wounds were closed in layers.PMMC flap has turned out to be the main-stay flap being used in those hospitals with a huge case-load and it is cost effective, has easy learning curve and can be picked up faster.

Group 3

One patient with carcinoma lip underwent reconstruction using forehead flap.Forehead flap can be used for primary reconstruction in full thickness cheek defects and in a salvage setting in the event of failure of an earlier axial flap. The flaps after harvesting is tunneled deep to the zygoma into the oral cavity have a better outcome.However, a folded forehead flap was used to reconstruct lip, oral commissure and part of buccal mucosa defect (figure 7,8). Forehead flap is marked which is based on superficial temporal artery, flap elevated symmetrically till contralateral side for better cosmetic result. Flap was direted to defect site and sutured with 3-0 vicryl and 3-0 ethilon. Split skin grafting done at donor site (figure 9). Flap devision done after 3 weeks. Advantage of this flap is that it's a useful option in patients with malnutrition, severe comorbidities and in resource constrained hospitals with regard to availability of microvascular surgeon. Disadvantage is that it leads to persistent drooling of saliva due to oral incompetence.

Group 4

One patient underwent reconstruction following wide local excision with Bilateral rotating flap or Karapandzic flap(figure 10,11) and one patient with Abbe Cross lip Flap.**The Karapandzic flap** was designed to reestablish the circumoral sphincter by rotating and advancing the remaining innervated orbicularis oris muscle [7]. Dissection is performed to release muscle fibers and suspensory ligaments while taking great care to preserve the inferior and superior labial artery branches and the buccal motor nerve branches to the

orbicularis as they enter the muscle at its lateral extent. A horizontal incision is taken laterally from the left corner of the mouth. The incision was continued in a slightly curved fashion parallel to the nasolabial fold, in the superior direction and in the inferior direction. From the end of the curved lower section, an incision was made almost perpendicular to the horizontal line upto the halfway point. The horizontal line on its medial half was composed of full-thickness, vermilion oral mucosa tissue.The medial two-thirds of the orbicularis oris muscle was cut at the commissure, while the lateral one-third of the muscle was kept intact. The lateral half included skin and subcutaneous tissue superficial to the underlying musculature. The rotation flap provides skin and muscle in the more medial part and only skin in the lateral section. The new labial vermilion was created using an oral mucosa flap in the shape of a parallelogram extending from the commissure.

Advantage of this flap is that it can be used to resurface up to near total defects of both the upper and lower lips and it can provide a dynamic functional reconstruction with smaller innervated flaps preserving better function. Disadvantage is that it leads to overall lip circumference is reduced to close the defect with a corresponding decrease in stoma surface area.

The cross-lip flap or Abbe flap, is a flap based on the labial artery. The Abbe flap is well suited for central full-thickness defects that do not involve the commissure [8]. This flap is more commonly used as a lower lip flap which serves as a donor site and is transferred to the upper lip. When the upper lip is used as donor tissue, the central philtral region is preserved to maintain aesthetic balance of the central upper lip. Advantage of the cross-lip flap is the ability to replace a vertical segment of both vermilion and cutaneous lip tissue. The facial vessels are readily accessible at the angle of the mandible.

Few flaps which are not used in our study are highlighted

cheek advancement flaps: Webster-bernard flap

The Webster-Bernard flap is used to reconstruct the lower lip by advancing cheek tissue and the remaining lip tissue medially[9]. This technique is well suited for subtotal defects of the lower lip where the commissure is preserved. Cheek skin is used to add length to the lip repair to lessen the degree of microstomia.The Webster-Bernard flap provides reliable resurfacing of large lip defects with adjacent cheek skin. Adding local tissue to the lip reduces the incidence of microstomia. The disadvantages include notching of the central lip incision and effacement of the gingivobuccal sulcus [10] and adynamic reconstruction which

requires care in setting the tension of the lower lip. This flap harvesting will be more difficult in those who have undergone previous facial surgery or neck dissections.

free-flap reconstruction of large lip defects

Free-flap reconstruction is often required for large-scale defects with associated loss of mucosa, cheek, nasal, and chin skin that exceeds the availability of local soft tissue. Free-tissue transfer can provide an abundance of soft tissue but care must be taken in selecting a donor site with an appropriate match in color, texture, and pliability. The radial forearm flap has been used extensively because of its thin profile, long pedicle, and reasonable color match[11].

CONCLUSION

The naso-labial flap is good option for covering a large superficial defect of the upper lip. This method maintains the normal contours of the upper lip with little risk of complications.It is also be done in hospitals with huge patient load and has an easier learning curve compared to micro-vascular surgery. Pectoralis major myo-cutaneous flap is easier learning curve for harvesting the pectoralis major myco-cutaneous flap but bulky and functionally less satisfactory. Forehead flap is aesthetically not pleasing.

REFRENCES

1. Uzunov NG, Trifonov M, Sarachev EL. Total and subtotal lower lip reconstruction using modified Webster's cheek advancement flaps after cancer resection. Trakia J Sci 2008;6:220-4.
2. Williams PL, ed. Gray's Anatomy: The Anatomical Basis of Medicine and Surgery. London: ELBS; 1995:1235-47.
3. Editorial for the Special Issue "Squamous Cell Cancer of the Head and Neck-Time to Arrive in the 21st Century of Oncology". Int. J. Mol. Sci. 2021, 22, 1592. https://doi.org/10.3390/ijms22041592.
4. Effective Reconstructive Option in Middle Lower Lip Defect Reconstruction. Ann. Dermatol. 2017, 29, 210–214.
5. Grimaldo-Carjevschi, M.; Lopez-Labady, J.; Villarroel-Dorrego, M. Squamous cell carcinoma on the palate in a patient with systemic lupus erythematosus: Case report and review of literature. Lupus 2011, 20, 519–522. https://doi.org/10.1177/0961203310383068.

6. Grimaldo-Carjevschi, M.; Lopez-Labady, J.; Villarroel-Dorrego, M. Squamous cell carcinoma on the palate in a patient with systemic lupus erythematosus: Case report and review of literature. Lupus 2011, 20, 519–522. https://doi.org/10.1177/0961203310383068.
7. Langstein HN, Robb GL. Lip and perioral reconstruction. Clin Plast Surg 2005;32:431–445
8. Karapandzic M. Reconstruction of lip defects by local arterial flaps. Br J Plast Surg 1974;27:93–97
9. Effective Reconstructive Option in Middle Lower Lip Defect Reconstruction. Ann. Dermatol. 2017, 29, 210–214.
10. Hasson, O. Squamous cell carcinoma of the lower lip. J. Oral Maxillo
11. Salgarelli AC, Sartorelli F, Cangiano A, Collini M. TreaTment of lower lip cancer: an experience of 48 cases. Int J Oral Maxillofac Surg 2005;34:27–32 4 2008 Downloaded by: Collections and Technical Services Department. Copyrighted material.

FIGURES:

Figure 1,2,3,4: Carcinoma lower lip and Reconstruction with nasolabial flap(Group 1).

FIGURE 1

FIGURE 2

FIGURE 3

FIGURE 4

Figure 5,6 : Reconstruction with pectoralis myocutaneous flap(Group 2).

FIGURE 5

FIGURE 6

Figure 7,8 : Reconstruction with forehead flap(Group 3).

FIGURE 7

FIGURE 8

Figure 9: Split skin grafting for donor site in forehead flap (Group 3).

FIGURE 9

Figure 10,11: Carcinoma lower lip and Reconstruction with Karapandzic flap(Group 4).

FIGURE 10

FIGURE 11