

Surgical Incisions: Balancing Surgical and Cosmetic Outcomes in Head and Neck Oncosurgery

Jagadish Tubachi, Vivek Jainkeri, Vinay Gadagi, Prasad Gunari

ABSTRACT

The oral and oropharyngeal cancer surgery is challenging due to presence of carotid arteries, internal jugular vein and cranial nerves in close proximity to the primary tumor or metastatic lymph node. So surgical incisions should be planned to improve oncologic resection without compromising functional and esthetic outcomes. Macfee and Crile's incision are commonly used in present day oncologic practice. Extension and probable modification of these incisions depending on case scenerio are discussed.

Keywords: Oral cavity cancer, MacFee incision, Crile's incision.

How to cite this article: Tubachi J, Jainkeri V, Gadagi V, Gunari P. Surgical Incisions: Balancing Surgical and Cosmetic Outcomes in Head and Neck Oncosurgery. *Int J Otorhinolaryngol Clin* 2013;5(2):47-50.

Source of support: Nil

Conflict of interest: None declared

INTRODUCTION

In the era of modern surgery, planning of incision has immense value. Surgical incision should provide wide exposure of operative field, facilitate reconstructive techniques and thereby maximize oncologic and cosmetic outcome. Surgical incisions are always designed based upon certain anatomical landmarks.¹ Here we discuss various surgical incisions and their modifications pertaining to the surgical management of oral cavity and oropharyngeal malignancy.

The exact location and type of skin incision will depend on the site of the primary tumor and whether a unilateral or bilateral neck dissection is planned. Sitting increase the visibility of natural creases. So incision planning requires the patient to sit upright preoperatively. The following are the main criteria to be achieved by the skin incision:²

1. Should have clear anatomical landmarks.
2. Allow wide exposure of the surgical field.
3. Ensure adequate vascularization of the skin flaps for good healing and early initiation of radiotherapy.
4. Should be easy to repair.
5. Should be designed to protect important nerves in the vicinity, e.g. marginal mandibular nerve.
6. Protect the carotid artery if the sternocleidomastoid muscle has to be sacrificed.
7. Include scars from previous procedures, e.g. biopsy.
8. Provision for extension of incision, if primary tumor needs resection in the same setting.

9. If skin needs to be sacrificed, the incision should be suitably modified.
10. Facilitate the use of reconstructive techniques.
11. Produce acceptable cosmetic results with minimal functional sequelae.
12. Should be readily teachable.

In today's oncology practice, we commonly use MacFee and Crile's incision. This will be discussed in this article.

MacFee incision: This is a safe approach to neck dissection (Fig. 1). This incision has two components:

1. *Submandibular component:* The incision begins from the mastoid process in a curvilinear fashion up to the tip of the hyoid, extending superiorly to the submental area.
2. *Supraclavicular component:* Extends from sternoclavicular joint to anterior border of trapezius.

Between these two incisions a bipediced flap is raised, based anteriorly on the midline and posteriorly on the anterior border of trapezius.

Advantage

1. Between two incisions, the resultant flap has good blood supply from medial and lateral aspects. So chances of flap necrosis are very rare.³ This incision is suited for radiated neck.⁴
2. Central bipediced flap has good vascularity and covers most length of carotid vessels and protects carotid artery.¹⁴
3. Its easy to repair.
4. It has acceptable esthetic results.^{4,5}

Disadvantage

1. Difficult to perform in short neck patients.
2. Dissection under central bipediced flap is tedious, so intensive retraction is required by the assistant for proper exposure. Dissection begins in the supraclavicular area and proceeds upward. The specimen is then pulled upward into submandibular area and dissection is completed.

Crile's Incision

The incision begins from the mastoid process in a curvilinear fashion upto the tip of the hyoid, extending superiorly to the submental area. The vertical limb starts behind the carotid artery and goes down to the middle portion of the clavicle in a lazy 'S' fashion (Fig. 2).⁶

A vertical limb is dropped at 90° from the posterior aspect of this incision behind the carotid artery and extending inferiorly to the middle portion of the clavicle in a lazy 'S' fashion. A straight vertical incision is likely to lead to scarring and contracture, thus a lazy 'S' incision is used.^{7,9}

Advantage

1. Its easy to perform.
2. Provides maximum exposure of the operative field. 'The bigger is the exposure of operative field, the better is the chance for cure.'

Disadvantage

1. Trifurcation point is prone for delayed healing.⁸
2. Vertical limb of this incision overlies carotid artery. Compromised healing results in exposure of carotid vessels with disastrous results.
3. This incision is prone to produce unsightly scar. This later forms contracture band.

Modification of the Incision

When the primary tumor is being resected in the same setting, the incision needs to be modified depending upon

the extent of the tumor. These modifications will be discussed in the following case scenario.

Case 1: Extension of Incision for Lip Split

When primary oral cancer is to be resected in continuity with neck dissection specimen or for approaching oral cavity in case of severe trismus, the submandibular incision is extended to midline lip split incision. Center of lower lip is identified by fusion line. Incision is marked by center of lower lip which continues downwards along center of chin to meet the submandibular incision (Fig. 3).¹⁰

This incision provides excellent exposure of oral cavity and oropharynx. This incision produces acceptable midline chin-lip scar and low self-perception of disfigurement for patients. Lower-lip sensation, movement or oral continence are preserved in midline lip split incision.¹⁵

Case 2: Extension of Incision for Splitting Angle of Mouth

Buccal or gingivobuccal carcinoma nearing angle of mouth needs excision of angle of mouth for the sake of wide margins. In such scenario, angle split incision is used. This



Fig. 1: MacFee incision



Fig. 3: Extension of submandibular incision to midline lip split



Fig. 2: Crile's incision



Fig. 4: Extension of submandibular incision for splitting of angle of mouth

incision takes a gentle downward curve from angle of mouth along the inferior buccolabial sulcus to meet the submandibular incision (Fig. 4).

It is suited to patients who require excision of the oral commissure. The incision provides excellent access to the oral cavity.

This incision gives satisfactory scarring low self-perception of disfigurement for patients. Speech and oral continence are relatively well preserved.¹⁶

Case 3: Gingivobuccal Carcinoma with Full Thickness Infiltration of Angle of Mouth or Lower Lip

Gingivobuccal carcinoma involving angle of lip needs full thickness excision of lesion with segmental mandibulectomy. So the submandibular incision needs modification. The area of skin to be excised is outlined. A perpendicular line is dropped from 6'o clock position of outlined area to meet the submandibular incision. This is described in Figure 5.

Case 4: Gingivobuccal Carcinoma with Full Thickness Infiltration of Cheek

Gingivobuccal carcinoma with full thickness infiltration of cheek needs full thickness excision of lesion with segmental mandibulectomy. In this case submandibular incision needs modification. The area of skin to be excised is outlined. A perpendicular line is dropped from 6 o'clock position of outlined area to meet the submandibular incision. This is described in Figure 6.¹³

Case 5: Visor Flap

This a very useful flap to approach the anterior aspect of oral cavity as in case of floor of mouth carcinoma requiring composite resection of floor of mouth with middle third of mandible.

Creation of this flap employs an incision extending from one mastoid process to other through natural submental crease. The paramandibular soft tissue is released by a gingivobuccal and gingivolabial incision. The resultant flap is retracted upwards exposing anterior part of oral cavity (Fig. 7).^{11,12}



Fig. 6: Modification of submandibular incision to include indurated area of cheek



Fig. 5: Modification of submandibular incision to include ulcerated area of lower lip



Fig. 7: Visor flap



Fig. 8: Post-lymph node biopsy status. Incision is modified to include scar of previous biopsy

Case 6

When skin over the node infiltrates the skin or fascial planes have been violated by previous biopsy, the incision should include the involved skin or scar tissue of previous biopsy.

The nodal mass over level Ib has involved the skin. In such case, the submandibular incision divides in elliptical manner to include the involved skin with adequate margin to reunite and to continue toward the center of chin. The skin is incised and flaps are raised so that the infiltrated skin remains with neck dissection specimen (Fig. 8).

CONCLUSION

Appropriate incision should be planned depending upon extent of disease to ensure optimal disease clearance without compromising vascularity of skin flaps. Appropriate incision also helps in good healing and early initiation of adjuvant treatment. MacFee incision has an advantage in this regard. This is suited for radiated neck. Dissection under the bridging flap is tedious. Crile's incision is easy to perform and provides maximum exposure. So it is logical for the beginners to start neck dissection with Crile's incision and later switch to MacFee incision.

REFERENCES

1. Patnaik VVG, Singla RK, Sanjus B. Surgical incisions--their anatomical basis: part 1—head and neck. *J Anat Soc India* 2000;49(1):69-77.
2. Gavilán J, Herranz J. Modified neck dissection. *Operat Tech Gen Surg* 2004 Jun;6(2):83-94.
3. White K, Mosdell DM, Morris D. MacFee incision: a safe approach to the neck. *South Med J* 1993 Aug;86(8):871-874.
4. Daniell CH, Fee WE Jr. Fee incisions: dispelling the myth of cervical flap vascular inadequacy. *Head Neck Surg* 1987 Jan-Feb;9(3):167-171.
5. Naumann, Hans Heinz.; Helms, Jan. Reconstruction of neck. In: Naumann, Hans Heinz; editor. *Head and Neck Surgery: neck*. New York: Thieme; 1998p258.
6. Crile GW. Excision of cancer of the head and neck. *JAMA* 1906;47:1780-1786.
7. Bailey, Byron J. Various incisions for neck surgery. *Atlas head and neck surgery—otolaryngology*. 3rd ed. Philadelphia: Lippincott Williams & Wilkins; 2001. 138 p.

8. Pai PS. Complications in head and neck surgery. *Otorhinolaryngol Clin: An Int J* 2010 Apr;2(1):61-67.
9. Shah, Jatin P.; Patel, Snehal G.; Singh, Bhuvanesh. *Head and neck surgery and oncology*. 4th ed. Philadelphia: Mosby; 2012. p 449. Chapter 11, Cervical lymph nodes.
10. Shah, Jatin P.; Patel, Snehal G.; Singh, Bhuvanesh. *Head and neck surgery and oncology*. 4th ed. Philadelphia: Mosby; 2012. p 252. Chapter 8, Oral cavity.
11. Shah, Jatin P.; Patel, Snehal G.; Singh, Bhuvanesh. *Head and neck surgery and oncology*. 4th ed. Philadelphia: Mosby; 2012. p 276. Chapter 8, Oral cavity.
12. Cilento BW, Izzard M, Weymuller EA, Futran N. Comparison of approaches for oral cavity cancer resection: lip-split versus visor flap. *Otolaryngol Head Neck Surg* 2007 Sep;137(3): 428-432.
13. Myers LL, Sumer BD, Truelson JM, Ahn C, Leach JL. Resection and free tissue reconstruction of locally advanced oral cancer: avoidance of lip split. *Microsurgery* 2011 Jul;31(5):347-352.
14. White K, et al. MacFee incision: A safe approach to neck. *South Med J* 1993 Aug;86(8):871-874.
15. Devine JC, et al. The lip-splitting mandibulotomy: aesthetic and functional outcomes. *Oral Oncol* 2010 Aug;46(8):612-617.
16. Srivastava A, et al. A new incision for intraoral access without lip split. *JR Coll Surg Edinb* 1994 Aug;39(4):218-220.

ABOUT THE AUTHORS

Jagadish Tubachi (Corresponding Author)

Consultant, Head and Neck Surgical Oncologist, Department of Head and Neck Oncosurgery, Sampige Superspeciality Clinic, Hubli Karnataka, India, e-mail: drtubachi99@yahoo.co.in

Vivek Jainkeri

Consultant, Head and Neck Surgical Oncologist, Department of Head and Neck Oncosurgery, Sampige Superspeciality Clinic, Hubli, Karnataka India

Vinay Gadagi

Consultant, Head and Neck Surgical Oncologist, Department of Head and Neck Oncosurgery, Sampige Superspeciality Clinic, Hubli Karnataka, India

Prasad Gunari

Consultant, Medical Oncologist, HCG NMR Cancer Center, Hubli Karnataka, India