

RECONSTRUCTION WITH TEMPORAL FLAP ON MAXILLARY DEFECTS POST LATERAL RHINOTOMY AND CHEMORADIATION

Tengku Iqbal Munawwir, Boedy Setya Santoso, Muhtarum Yusuf

Department/KSM of Health Sciences Ear, Nose and Throat Head and Neck Surgery, Faculty
of Medicine, Universitas Airlangga
Rumah Sakit Umum Daerah Dr. SOETOMO Surabaya, Indonesia Iqbal.adn99@gmail.com

KEYWORDS

Maxillary
defect
reconstruction,
Temporal flap,
Chemoradiation
complications

ABSTRACT

This case report discusses a 68-year-old male patient with a maxillary defect caused by multiple medial maxillectomy surgeries with lateral rhinotomy (MM-RL) and subsequent chemoradiation for adenoid cystic carcinoma. The patient experienced a recurring defect despite prior local flap reconstructions. A temporal myofascial flap was used for maxillary reconstruction to address functional and aesthetic needs, with minimal impact on chewing and speech. The surgical outcome was positive, with no recurrence or complications over a six-month follow-up period. This case highlights the effectiveness of temporal flap reconstruction for complex maxillary defects, emphasizing the technique's high vascularity and stability for both functional and cosmetic recovery.

INTRODUCTION

Reconstruction of maxillary defects caused by resection or trauma is a challenge for surgeons to restore function and aesthetic value. The maxilla has a function for occlusion, chewing, articulation and forming the contour of the middle face. Large defects can disrupt speech and swallowing functions. The basic principle of reconstruction is to rebuild the anatomical structure of the resected area with similar tissue. Obturator placement was the main surgical treatment strategy before the advancement of skin flap techniques. Reconstruction with skin flaps can close the defect and restore the shape and function of the maxilla.¹

Medial maxillectomy with lateral rhinotomy approach (MM-RL) is the gold standard procedure for maxillary tumors. The MM-RL technique is a resection of the medial and superomedial walls of the maxilla with the aim of removing all tumor tissue. Complications that can occur after MM-RL are bleeding, epiphora, diplopia, corneal damage, infection, trismus, facial injuries, palate dysfunction and flap failure which can cause maxillary defects.²

Chemoradiation is a procedure performed after resection of a malignant tumor of the head and neck. A side effect of chemoradiation that often occurs in skin tissue is ulceration. Chemoradiation can cause a decrease in blood intake, fibrosis and disrupt the potential for cellular repair in skin tissue. Ulceration due to chemoradiation is difficult to heal and is susceptible to infection which can cause skin defects.³ Facial skin defects need to be repaired with good planning based on

aesthetic aspects. The use of temporal flaps is one of the facial reconstruction techniques that is often used for good results.⁴

The temporal flap is a tissue flap *myofascial* which lines the temporal muscle. Maxillofacial reconstruction often uses temporal flaps because they have high vascularity, are easy to remove, and are located close to the defect. The temporal flap is easy to shape and has no hair-like skin. Removal of the temporal flap also does not affect mobility and will only cause a slight depression of the skin.

The use of a temporal flap can avoid interference with chewing and speaking functions because it is strong tissue.⁴

This case report aims to report the reconstruction of a maxillary defect in a patient after MM-RL and chemoradiation *temporal* flap.

CASE REPORT

A 68-year-old male patient came to the ENT-KL Outpatient Unit (URJ) with complaints of a hole in his right cheek for 1 year. The MM-RL operation has been carried out six times and the last time was in 2018 at RSUD Dr. Soetomo, a small hole appeared after opening the surgical suture and grew bigger over time. There are complaints of a thick feeling on the skin of the cheeks, but congestion, nosebleeds, discharge from the nose, headaches and facial pain are denied. Grebeks in the ears, double vision, throat complaints and lumps in the neck were denied. There was no history of diabetes mellitus and hypertension. The patient has a history of disease *adenoid cystic* sinonasal and has undergone MM-RL surgery twice at RSUD Dr. Soedono Madiun, as well as four MM-RL operations at Dr. Soetomo. The patient has undergone chemotherapy once and radiation 30 times at RSUD Dr. Soetomo in 2018.

Physical examination of the patient showed a fair general condition with stable vital signs. Examination of the ears, throat, tonsils, pharynx and neck were within normal limits. Anterior rhinoscopic examination showed an airy nasal cavity, no secretions and no visible mass. A hole measuring 1 x 0.5 cm was found in the right maxillary area (Figure 1). The results of the biopsy on February 26 2015 were *adenoid cystic carcinoma*. The patient was planned for reconstruction of the maxillary defect with a skin flap and this was done in July 2019. The first control after reconstruction of the maxillary defect in August 2019 showed that the hole in the patient's right cheek had reappeared. Laboratory examination and chest x-ray in preparation for surgery were within normal limits. Based on examination data the patient was diagnosed with a maxillary defect *on the right* post MM-RL 6x, chemoradiation and post maxillary defect reconstruction. Maxillary defect reconstruction surgery with *temporal* flap planned for the patient.



Figure 1. Clinical photo of maxillary defect

The operation is carried out under general anesthesia, there are two surgical steps, namely taking a temporal muscle fascia graft followed by reconstruction of the maxillary defect with *flap* temporal. The operation begins with disinfection of the operating field with povidone iodine and narrowing the operating field of the retroauricular area *right* with sterile drapes. Retroauricular cutis and subcutis incision followed by injection of sterile water for hydrodissection. The operation continues with fascial incisions and *undermining* fascia as wide as

possible. The fascia was cut using scissors and this step was repeated for three grafts. The retroauricular cutis and subcutis are then closed again with subcuticular sutures (Figure 2).

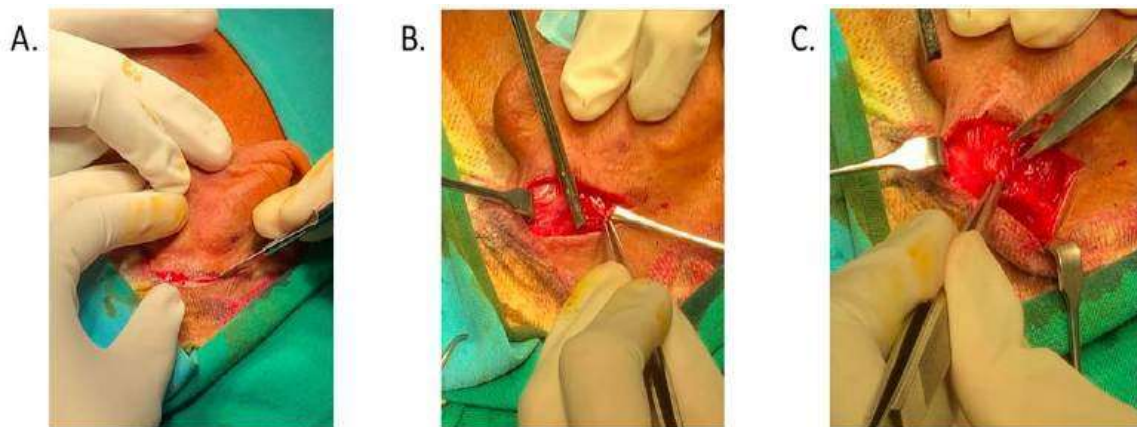


Figure 2. A. Insisi retroauricula. B. *Undermining* fascia. C. Cutting and removal of the temporal fascia

The operation continued with reconstruction of the maxillary defect with a temporal flap as a base followed *flap* rhomboid skin. *Marker* with methylene blue performed according to the rhomboid shape of the maxillary defect area. The nasal cavity and maxillary sinus were washed with a solution of 0.9% NaCL, povidone iodine and hydrogen peroxide, which were then dried with *suction*. An incision is made at the wound edge of the maxillary defect, followed by infiltration *flap* rhomboid with adrenaline 1:200,000 according to the marker that has been drawn. The incision follows the shape *flap* rhomboid and *undermining flap* from the cutis and subcutis done. Kemicetin tampons are placed in the maxillary cavity. The operation continued by suturing the temporal flap on the periosteum around the maxillary defect with running sutures. *Flap* The rhomboids are then rotated to close the defect. *Flap* sewn layer by layer with stitches *simple interrupted* (Figure 3). Bleeding during surgery was 100ml. Tissue from the edge of the maxillary defect is sent to anatomical pathology for examination. The results obtained were chronic inflammatory tissue and no visible signs of malignancy.

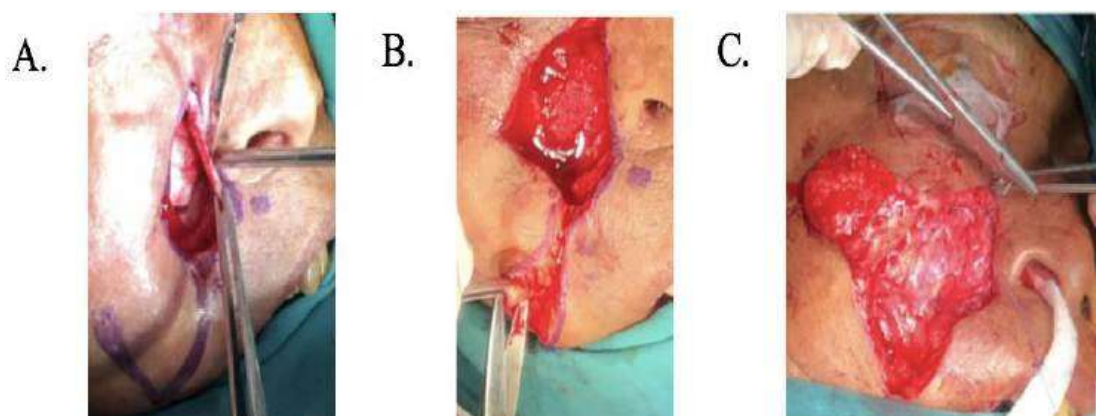


Figure 3. Photo during surgery. A. Incision of the edge of the wound defect. B. Incision follows *flap rhomboid*. C. Suturing *flap* temporal to the periosteum of maxillary defects

Postoperative therapy includes ceftriaxone 1 gram intravenously every 12 hours, mefenamic acid 500 mg tablet every 8 hours and tranexamic acid 500 mg intravenously every 8 hours. The patient was discharged 2 days after surgery (Figure 4). The patient's history revealed no complaints from the nose, throat or ears. The wound is closed and the surgical sutures are good.

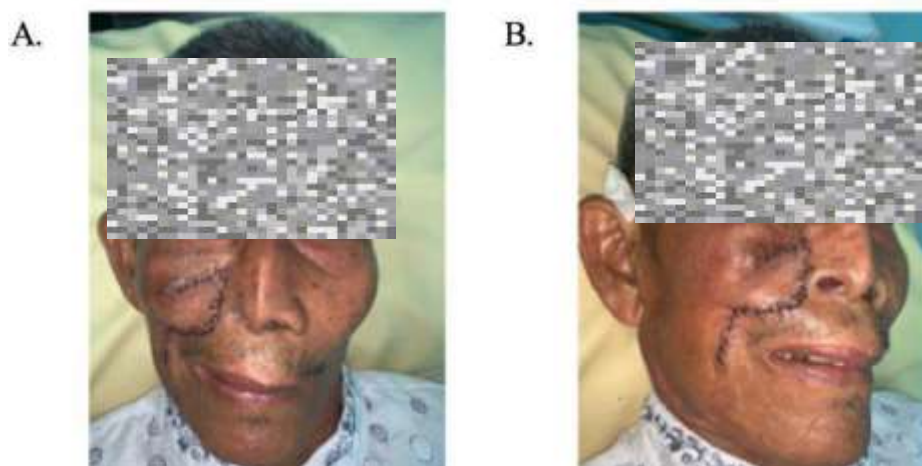


Figure 4. Clinical photo 2 days after surgery A. Front. B. Edge

Control patient at URJ THT-KL 1 week after surgery. The patient's history revealed no complaints from the nose, throat or ears. The wound is closed and the surgical sutures are good. The sutures are removed alternately (Figure 5).

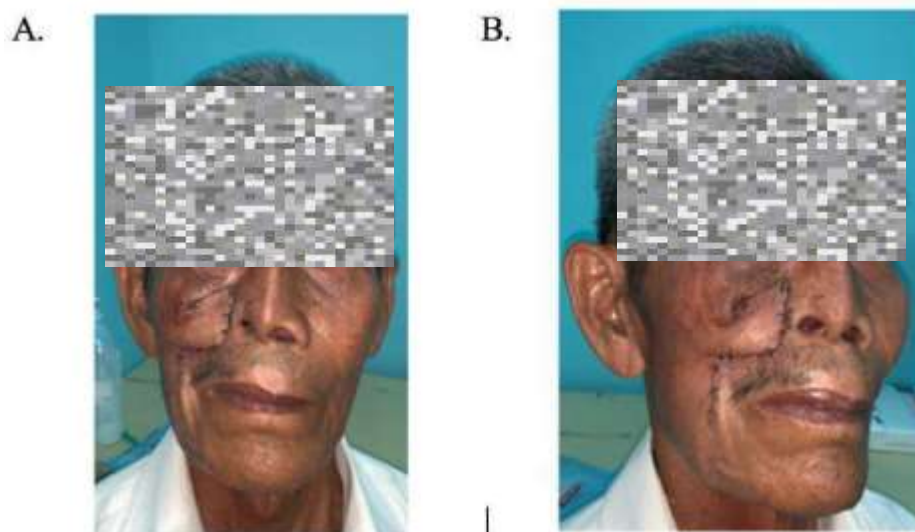


Figure 5. Clinical photo 1 week after surgery A. Front. B. Edge

Two weeks after the operation, the patient was checked at the THT-KL URJ, and the history showed that complaints of the nose, throat and ears were denied. The wound is closed and the surgical sutures are good, all stitches are removed (Figure 6).

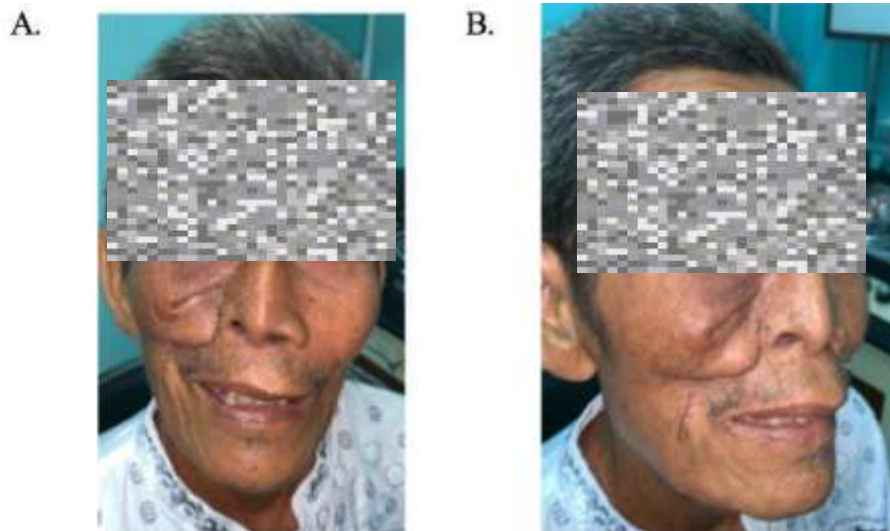


Figure 6. Clinical photo 2 weeks after surgery A. Front. B. Edge

Three months after surgery, the control patient returned to URJ THT-KL. The patient's history revealed no complaints of the nose, throat or ears. Physical examination showed that the surgical wound was healing well and no defects appeared (Figure 7).

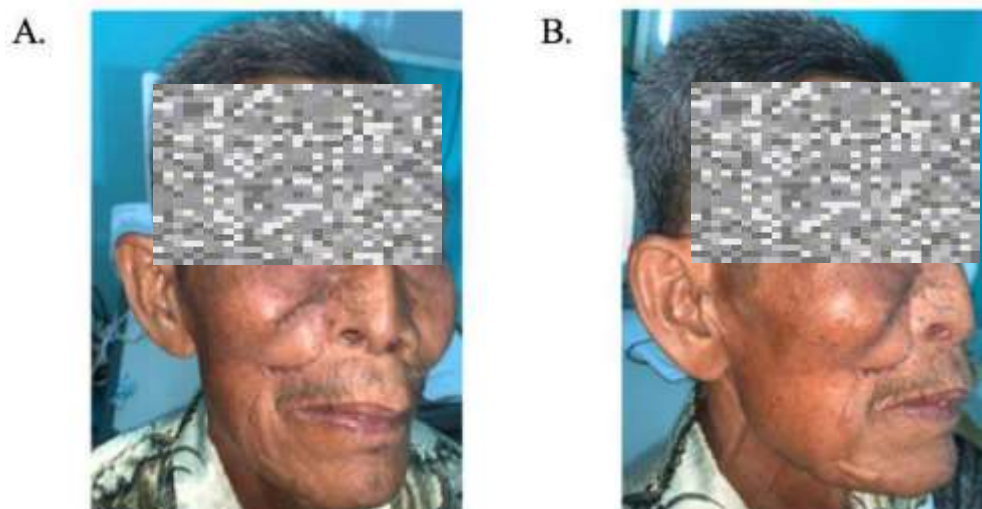


Figure 7. Clinical photo 3 months after surgery A. Front. B. Edge

The control patient returned to the plastic reconstruction clinic 6 months after surgery. The patient's history revealed no complaints of the nose, throat and ears. Physical examination showed that the surgical wound was good and the defect did not reappear (Figure 8).

A.



Figure 8. Clinical photo 6 months after surgery

RESULT AND DISCUSSION

Skin defects on the face can occur due to trauma and excision of tumors. A complication of removing sinonasal tumors using the MM-RL approach that causes skin defects is skin flap failure. Surgical trauma to the skin causes imperfect healing and is prone to defects. Research shows that repeated operations on the facial area have a linear relationship with the occurrence of postoperative complications.³

The use of chemotherapy drugs in oncology has increased the survival rate in malignant patients. One of the side effects of chemotherapy is on the skin, which is rarely life-threatening but reduces the patient's quality of life. Chemotherapy drugs which are *spindle inhibitors* like *vinca alkaloid* and the taxane group can cause dermatitis and ulceration through direct tissue damage. The platinum group is an agent *genotoxic* can cause allergic reactions mediated by immunoglobulin E and disrupt skin tissue proliferation. Side effects on the skin due to chemotherapy often become worse due to susceptibility to infection.⁶

Radiation has side effects on the skin, namely ulcers. Ulcers caused by radiation are difficult to heal because of decreased angiogenesis and concentration *matrix metalloprotein* the high one. Fibrosis of surrounding tissue, impaired blood supply, lack of contraction due to decreased function *myofibroblast* and wound contamination is also a factor in the formation of ulcers and defects. After radiation the skin is difficult to heal if a defect occurs and flaps are often used for reconstruction.⁷ The patient has a history of MM-RL operation six times, chemotherapy once and has undergone radiation 30 times.

Facial reconstruction has two main goals, namely to correct facial dysfunction and to restore or improve the aesthetic aspects of the face. Plastic reconstruction procedures are needed to revise scars, close wound defects in soft tissue or correct deformities resulting from trauma or after tumor surgery. Skin flaps can be divided based on donor location, namely local flaps, regional flaps and distant flaps. Local flaps involve the use of tissue directly adjacent to or close to the wound defect. Regional flaps involve the use of tissue outside the face, scalp or neck where the

arterial pedicle is sufficient to reach the wound defect, for example a pectoral muscle flap, whereas distant flaps involve tissue from another location that requires microvascular anastomosis of blood vessels, for example a temporal fascia flap tissue transfer.⁸ The patient had a history of surgical reconstruction of the maxillary defect using a local skin flap without a fascial base but 1 month after surgery the defect in the maxilla reappeared.

Surgical reconstruction of maxillary defects has been performed in patients with temporal *free flap*. *Free flap* And *flap* regional is the best choice for defect reconstruction due to good vascularity, mobility *donor site* low and large quantities, but requires experienced operators and takes a little longer.⁹ Defect reconstruction in patients obtained good post-operative results functionally and aesthetically, this is in accordance with Rahman's research *et al.*, which gives results *flap survival* as much as 100% and Hassanein's research *et al.*, also presented similar results of 96.9%.^{9,10} The patient in this case did not experience problems opening the mouth, chewing, swallowing and speaking after reconstruction, this is in accordance with previous research where it was found that 84.4% of patients had no problems. Facial and temporal contours are indicators of post-reconstruction aesthetic success, in this case patients had good contours for both. Previous research also provided similar results, namely 84.4% of patients with good facial contour and 15.6% with moderate facial contour. Temporal contour results found in research by Hassanein *et al.*, is as much as 71.8% good and 28.1% moderate.¹⁰

Six months after reconstruction, there were no complications or defect recurrence in this case patient, this is in accordance with previous research where no complications occurred. Complications that can occur are necrosis *flap*, temporal defects, facial nerve damage *transient*, hematoma, and trismus.¹² Ein Research *et al.*, provides data on 19.2% of patients experiencing reversible paresis of the facial nerve, 2.7% permanent paresis of the facial nerve, and 1.6% necrosis *flap*.¹²

ONCLUSION

We have reported a 68-year-old male patient with a maxillary defect after MMRL and chemoradiation who underwent reconstruction of the maxillary defect with *double* flaps. No recurrence or complications occurred up to 6 months after surgery.

Conflict of Interest Statement

The authors declare that there are no conflicts of interest that may influence the results or process of this research. All data and findings presented in this research have been obtained independently without influence or pressure from any party.

The authors also ensure that all parties involved in this research have no personal, commercial, financial, or other interests that may interfere with the research's objectivity.

Deceased Patient Consent Statement

This research involves data or information related to deceased patients. The authors ensure that:

1. Written consent has been obtained from the patient's family or heirs for the use of patient data.
2. This research complies with the principles of research ethics, including the confidentiality and privacy of patient data.
3. The data used are limited only to research purposes and do not reveal the patient's identity directly.

4. This research has obtained approval from the Research Ethics Committee to ensure that the procedures followed are in accordance with applicable ethical standards. 5. If necessary, documents of permission and approval from the family or heirs can be attached to verify compliance with the principles of research ethics.

REFERENCES

1. Mucke T, Holze F, Loeffelbein DJ, Ljubic A, Kesting M, Wolff KD, *et al.* Maxillary reconstruction using microvascular free flaps. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2011; 111:51-7.
2. Ishak MN, Lazim NM, Ismail ZI, Abdullah B. Open and endoscopic medial maxillectomy for maxillary tumors – a review of surgical options. *Curr Med Issue* 2019; 17:75-9.
3. Fujioka. Surgical reconstruction of radiation injuries. *Advances in wound care* 2014; 3(1):25-37.
4. Krzymanski G, Dabrowski J, Przybysz J, Domanski W, Biernacka B, Pietka T. Temporal muscle flap in reconstruction of maxilla-facial tissues. *Wspolczesna Onkol* 2012; 16(3):244-9.
5. Kang AS, Kang KS. Rhomboid flap: best option for skin defects of all sizes? A comprehensive review of literature. *Open Access J Surg* 2020; 11(4):71-6.
6. Fabbrocini G, Cameli N, Romano MC, Mariano M, Panariello L, Bianca D, *et al.* Chemotherapy and skin reactions. *J Exp Clin Cancer Res* 2012; 31(50):1-3.
7. Gieringer M, Gosepath J, Naim R. Radiotherapy and wound healing: principles, management and prospects. *Oncology Reports* 2011; 29:299-307.
8. Chang JW, Lim JH, Lee JH. Reconstruction of midface defects using local flaps. *Medicine* 2019; 98(46):1-6.
9. Rahman MM, Mamood MA, Rubel ATMT, Tymur FR, Talukder MA, Haider IA. Use of temporalis myofascial flap for reconstruction of maxillectomy defect. *Bangladesh Dent J.* 2016;32(1):4-8.
10. Hassanein AG. Continuous validity of temporalis muscle flap in reconstruction of postablative palatomaxillary defects. *J Craniofac Surg.* 2016;27(8):e719-24.
11. Singh AK, Mishra N, Janani T, Sharma NK. Temporalis myofascial flap in reconstruction of maxillary defect: a case series. *Natl J Maxillofac Surg.* 2020;11(2):280-284.
12. Ein L, Daniyan O, Nicolli E. Temporalis muscle flap. *Oper Tech Otolaryngol Head Neck Surg* 2019; 30:120-6.