

Marginal mandibulectomy for lower gingival carcinoma with a cheek-splitting transbuccal approach and reconstruction by buccal fat pad flap: A case report

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Abstract

In cases of a malignant tumor at the posterior region of the mandibular gingiva, a submandibular approach is usually chosen for secure resection of the lesion. This technique allows a good view of the surgical site and makes the operative procedure relatively easy. However, this approach is more surgically invasive and increases the operating time. On the other hand, it is difficult to resect the tumor with a sufficient safety margin via an intraoral approach.

We present a case of squamous cell carcinoma arising at the posterior mandibular gingiva that was completely resected via a cheek-splitting transbuccal approach.

Subsequently, the buccal fat pad flap was used to reconstruct the defect. The patient has been followed up for one year, and no recurrence has been observed. Moreover, there was only a very faint scar at the cheek and few instances of trismus.

This technique should be added to the useful approaches for resection of the posterior mandibular tumor, because the resection is possible under direct vision with only slight side effects.

Keywords: cheek split, transbuccal approach, buccal fat pad, marginal mandibulectomy

Short phrase: Marginal mandibulectomy with a cheek-splitting transbuccal ap

Introduction

Marginal mandibulectomy is a frequent surgical procedure to treat tumors arising at the mandibular gingiva. If a tumor exists in the anterior region of the mandible, an intraoral approach makes it possible to resect the tumor adequately under direct visual guidance. On the other hand, it is difficult to resect the tumor at the posterior of the mandibular gingiva with a sufficient safety margin via an intraoral approach due to difficulties with instrumentation and an obstructed view of the surgical site. Therefore, a submandibular approach is frequently utilized to treat tumors arising at the posterior site of the mandible.¹ This approach expands the visual field of operators and improves instrumentation, making adequate resection possible. If neck dissection is also a component of the scheduled surgery, this approach does not increase the surgical invasiveness and should be acceptable to both clinicians and patients. However, in the case of patients who do not require neck dissection or demand not only minimally invasive surgery but also a minimal operative duration due to severe systemic illness, a submandibular approach may be too surgically invasive and require too long a surgery. Moreover, this approach may have some risks such as damaging the mandibular branch of the facial nerve or the facial artery. A cheek-splitting transbuccal approach provides an alternative to the submandibular approach.

The cheek-splitting transbuccal approach was first introduced in 1988 as a surgical technique to remove lesions in the posterior portion of the alveolar ridge.² This approach can avoid invasion to the cervix, thus avoiding injury of the facial artery or the marginal mandibular branch of the facial nerve. The cheek split involves a combination archwise and serriform incision from the lower lip to the cheek skin. Few anatomical critical organs exist around this area unless the incision is made too posteriorly. This incision allows marginal resection at the posterior mandible under direct vision via a transbuccal approach, resulting in a shorter operative duration and less surgical invasion.

Scammon first described the anatomical structure of the buccal fat pad in 1919.³ In 1997, Egyedi reported adaptation of the buccal fat pad to close off oronasal and oroantral communication.⁴ Since then, there have been some reports that the buccal fat pad flap can be adapted to various defects, including oronasal or oroantral fistulae.⁵⁻⁷

We present in this report a case of squamous cell carcinoma arising at the posterior mandibular gingiva that was treated by marginal mandibulectomy via a cheek-splitting transbuccal approach, with the defect after surgery being reconstructed by the buccal fat pad flap. It was necessary to minimize the operative duration and surgical invasion in this case, as the patient suffered from adult T-cell leukemia lymphoma (ATLL).

Case report

A 70-year-old Japanese woman was referred to the Department of Oral and Maxillofacial Surgery, Nagasaki University Hospital. She had complained of an uncomfortable feeling around the posterior site of the left side mandibular gingiva for 3 months prior to visiting to her medical doctor, and he recommended that she visit a specialist physician. The induration (22 x 15 mm) was found around the second molar or left mandible with an ulcer whose margin was irregular and size was 15 x 13 mm (Fig. 1). She reported no pain. In the magnetic resonance imaging (MRI) findings, the enhanced area showed a 16 x 13 mm mass (Fig. 2). In the positron emission tomography (PET) findings, the lesion was detected just as by MRI. No metastatic lymph node was detected by MRI, computed tomography (CT), ultrasound (US), or PET. The pathological histology of the biopsy specimen was diagnosed as a well-differentiated squamous cell carcinoma (Sq.C.Ca.), and the patient's illness was diagnosed as a Sq.C.Ca on the left side of the mandibular gingiva (T2N0M0, Stage II).

The patient had suffered from adult T-cell leukemia lymphoma (ATLL) since she was 55 years old. There had been no remarkable change in her general condition between the onset of ATLL and the age of 67 years. Since abnormal lymphocytes were increased in her peripheral blood and superficial and deep lymph nodes were increased in size, her ATLL was considered to be worse. She then underwent general chemotherapy with so-called mLSG-15. After that, her condition improved and she did not undergo any additional vigorous treatment for ATLL.

If the prognosis of her ATLL had been very poor, as it is for acute-type ATLL, observation might have been considered an option. However, her ATLL remained in remission. Since the stage of the tumor was Stage II (T2N0M0), surgical resection was chosen rather than radiotherapy and chemotherapy. We consulted with the patient's medical doctor and anesthesiologist about the method of anesthesia to be used during

the surgery. According to the doctors, no special method of anesthetization is required for ATLL patients, but they recommended that the surgical invasion be minimized and that the operative duration be shortened due to the acute transformation risk of her ATLL in response to surgical stress. Therefore, marginal mandibulectomy via a transbuccal approach with cheek-splitting and primary closure of the resected region was planned.

The incision line for the cheek is shown in Figure 3. The incision started on the left side of the lower lip 5 mm anterior from the left angulus oris and then continued 15 mm downward with a slight curve. Subsequently, the incision went 15 mm upward on the nasolabial fold and then continued 20 mm in a posterior direction (Fig. 3a). Tumorectomy was performed from anterior to posterior with a cheek incision. The marginal mandibulectomy was performed with a reciprocating saw (Fig. 3b), and the extent of the resection included a part of the buccinator with a sufficient safety margin. No malignant cells were observed in the intraoperative frozen specimen harvested from five points of the remaining tissue margin after the excision. Since a part of the buccinator remained and the buccal fat pad was not exposed, we decided to perform the reconstruction using the buccal fat pad instead of carrying out primary closure. The buccal fat pad was reached by passing through the posterior region of the exposed buccinators in blunt. The buccal fat pad was gently withdrawn into the oral cavity without harming the coating layer of the fat pad. A sufficient volume of buccal fat pad was withdrawn to fill the defect without tension. Finally, the transplanted pad was sutured into place using 5-0 nylon (Fig. 3c).

Over the one-year follow-up period since the procedure was completed, there has been no finding of recurrence and no sign of metastasis to the cervical lymph nodes. A linear scar was found at the reconstructed site (Fig. 3d). However, the width of the jaw opening was 35 mm and little trismus was observed. The wound was scarcely visualized, resulting in little aesthetic disturbance (Fig. 3e).

Discussion

Considering about recurrence of malignant tumor at the posterior region of the mandibular gingiva, segmental resection is a more reliable strategy than marginal resection. However, in the present case there were no findings of bone absorption on the orthopantomographic, US and CT images. Moreover, if a segmental resection were performed, the operative duration would be longer because of plate bending and fixing, and expanded abrasion of the periosteum. Since this patient suffered from ATLL, we considered it important to minimize the risk of infection. The reconstruction of plates

may cause local infection, and intra-maxilla fixation after surgery may pose a risk of pneumonia. For all of the above reasons, we chose the marginal resection. The biggest advantage of the transbuccal approach is that it allows a direct view of the posterior site and good handleability of tools, such as the reciprocating saw. It is therefore easy to carry out the resection with a sufficient margin and minimal surgical invasion. However, damage to the parotid duct and buccal branch of the facial nerve should be guarded against due to the location of the incision area.² Fortunately, since the peripheral nerve of the buccal branch is usually connected to the peripheral nerve of the marginal mandibular branch, it is not necessary to consider damage to the peripheral nerve of these branches. The most critical disadvantage of cheek-splitting is the risk of incision into the tumor. To avoid this invasion in the present case, tumor resection was performed from anterior to posterior under direct vision with an expanding cheek incision. In carrying out this procedure, it is also important to consider the design of the incision to minimize scarring and aesthetic problems. For this purpose, we designed the incision line on the creases and nasolabial fold.

The incision used in the cheek splitting method reported by Wood² aligns from the angle of the mouth to the posterior cheek. On the other hand, Jaeger's jugal extended incision makes a "Z" on the nasolabial sulcus and extends to the posterior cheek with a slight arch.¹¹ This incision method is designed in consideration of the final aesthetics. However, the start point of the incision is the angle of the mouth just as in the incision used by Wood, and the incision is longer than Wood's and almost reaches the tragus. In both cases, it is difficult to recreate the natural angle of the mouth, and the incision cuts across wrinkle lines. These methods can thus cause dysmorphic problems after surgery. Our incision was shortened to minimize the cutting across wrinkle lines and is curved slightly with the cheek. Moreover, the incision started at a position 5 mm anterior from the angle of the mouth. These modifications may have contributed to the excellent aesthetic results. Hirsch et al. reported a new technique for marginal mandibulectomy in 2007.⁸ They performed the marginal mandibulectomy using a reciprocating saw that was inserted through cheek skin. Although this approach can minimize the skin incision, there are some disadvantages, such as insufficient vision or difficulty of the surgical method. On the other hand, a transbuccal approach provides a simple and familiar method without any special training.

Yousuf et al. reviewed the anatomy and clinical use of the buccal fat pad and concluded that this flap is very useful and reliable for intraoral reconstruction.⁹ In our case, a part of buccinators remained after tumor resection, and no buccal fat pad was exposed. We then determined that the buccal fat pad was free from cancer cells and

could be used as a flap to reconstruct the defect. The important advantages of using the buccal fat pad flap include a lower incidence of infection and absorption after reconstruction.¹⁰ According to previous reports, there are few failure cases using this approach.⁵ Since our patient was a susceptible individual who suffered from ATLL, it was extremely important that the buccal fat pad flap be insusceptible to bacterium after surgery. One of the disadvantages of this flap is that the size of the area to be reconstructed is limited,^{6,7} with maximum dimensions of approximately 50 x 40 mm. Another disadvantage is contraction. Chien et al. have calculated the width of the jaw opening after reconstruction using three different strategies, the forearm free flap, the skin graft, and the buccal fat pad flap. The widths in these cases were decreased 7.4, 24.5 and 33.1%, respectively.¹⁰ To inhibit the contraction, our patient started jaw-opening exercises early; as a result, she can now open her mouth 35 mm and has no problems in her daily life.

Conclusion

When minimal surgical invasion and operative duration are necessary due to a patient's general condition, marginal mandibulectomy with a cheek-splitting transbuccal approach and reconstruction using a buccal fat pad after resection are useful procedures for treatment of a tumor arising at the posterior site of the mandibular gingiva.

Figure Legends

Figure 1: Intraoral findings at the first visit.



Figure 2: MRI findings. The arrow shows the mass lesion.



Figure 3: a-c) During operation. a) The incision line on the cheek. b) The marginal mandibulectomy with the cheek splitting. c) Reconstruction with the buccal fat pad. d, e) One year after operation. d) Intraoral finding. A small linear scar was found. e) A faint scar was found on the cheek.



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