Case Report

Two Cases of Prostheses for Flap Protection after Buccal Mucosal Incision

Syuntaro Nomoto^{1,2)}, Toru Sato²⁾, Shuji Yoshida¹⁾, Shion Saito¹⁾,
Isao Kamiyama¹⁾, Aki Ito¹⁾ and Jun-ichi Tanaka¹⁾

¹⁾ *Department of Stomatology, Tokyo Metropolitan Ohtsuka Hospital,
2-8-1 Minamiohtsuka, Toshima-ku, Tokyo 170-8476, Japan*

²⁾ *Department of Crown and Bridge Prosthodontics, Tokyo Dental College,
2-9-18 Misaki-cho, Chiyoda-ku, Tokyo 101-0061, Japan*

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Abstract

Here we describe two patients in whom prostheses were applied for flap protection after buccal mucosal incision. In the first case, the patient was a 65-year-old man with a diagnosis of buccal mucosa squamous cell carcinoma (T2N0M0). Left buccal mucosa squamous cell tumor resection and dermoplasty were performed, followed by alveolar ridge augmentation and buccal mucosal graft in the scar area. The carcinoma recurred, however, and left buccal mucosa carcinoma resection was performed, followed by reconstruction surgery using a free forearm flap. After a 12-week healing period, a molar support was constructed on the unaffected side and a protective prosthesis placed on the affected side. Training in ingestion and swallowing were given postoperatively. The patient in the second case was a 62-year-old woman with a diagnosis of buccal mucosa squamous cell carcinoma (T2N1M0). Right buccal mucosa carcinoma resection and supraomohyoid neck dissection were performed, followed by reconstruction surgery using a free forearm flap. A molar support was constructed on the unaffected side and a protective prosthesis placed on the affected side at 5 months postoperatively. Training was given in ingestion and swallowing postoperatively. The prostheses prevented bite wounds to the flaps in the affected areas due to jaw movement during swallowing or speaking. The postoperative courses were uneventful, and the average masticatory score was 92.5 (85, 100), not affecting daily life. The prostheses were placed after reconstruction surgery using free flaps after buccal mucosa squamous cell carcinoma resection. Dysphasia recovered to the preoperative level by dysphasia and pronunciation training in both cases. The postoperative prognosis was favorable, with the prosthesis preventing damage to the flap.

Key words: Buccal mucosa squamous cell carcinoma — Postoperative management — Prosthesis — Protection — Forearm flap

Introduction

Malignant tumors are the leading cause of

mortality in the Japanese population, accounting for approximately 30%⁶⁾. Buccal mucosa carcinoma accounts for between 5 and 10%

of oral cancers. The surgical methods employed to treat it include partial excision, skin flap resection, and extended surgery^{6,8,12)}. The forearm flap procedure is often selected for reconstruction after partial resection of cancer^{5,9,13,14,16)}. However, it is necessary to prevent bite wounds to the flap following this procedure. Therefore, in the present two cases, prostheses were placed on the upper affected side to protect the flap during mastication. Favorable results were obtained.

Case Report

Case 1: Man, 65 years old at first visit

1) Treatment

The patient had initially presented at a general hospital in 2003 with the chief complaint of haphalgesia in the left buccal mucosa. The patient had a medical history of type B hepatitis. Treatment with steroid ointment yielded no improvement, so he was subsequently referred to our hospital. Cytodiagnosis of the left buccal mucosa revealed a class IV lesion which was diagnosed as buccal mucosa squamous cell carcinoma (T2N0M0). Resection of the tumor and dermoplasty were performed, followed by alveolar ridge augmentation and buccal mucosal graft in the scar area in 2006. In 2009, however, an irregular, bulge-like wart was found in the area of scarring during the follow-up period. There were signs of erosion. The results of cytodiagnosis revealed a class II lesion, and a biopsy revealed inflammation. The clinical diagnosis was recurrence of the buccal mucosa squamous cell carcinoma, and resection of the affected area and reconstruction using a free forearm flap were performed. No tooth extraction was performed, and occlusal support was B4 base according to the Eichner Index and 18 according to the Cummer Index. Swallowing function⁴⁾ was evaluated at 8 weeks postoperatively, yielding an MTF score of M5T3F5. A score of 98 was achieved on the swallowing ability scale postoperatively; at 4 weeks postoperatively this decreased to 92 (Fig. 1-a). The degree of mouth-opening was 30 mm at 12

weeks postoperatively. A precise impression of the upper and lower jaws was taken using an individual tray and vinyl silicone impression material for the fabrication of a prosthesis. The maxilla-mandibular relation was registered using an occlusal plate after fabrication of the working cast. Wire clasps in $\overline{56|3}$ and $\overline{3|5}$ were made on a working cast mounted on a mean value articulator, and a lower partial wax denture with prosthetic teeth only in the right molar area was fabricated. The base plate of the upper palatal and tooth-missing area was fabricated. This plate was tried in the mouth on the following visit, and instruction was given to the patient to bite. The outline of the protection plate was formed using paraffin wax, taking care not to interfere with the alveolar crest or flap of the affected upper and lower alveolar ridge. The wax was replaced with heat-curing resin for fabrication of the prosthesis.

2) Observation

Now, at 4 years and 6 months postoperatively, follow-up on the surgical area, the superficial area of the flap, and adjustment of the prosthesis are being performed every 3 months. The grafted flap is not interfering with occlusion. The MTF score is M5T3F5, swallowing ability has improved to 100 (Fig. 1-a), and masticatory function evaluation is 100, suggesting a favorable treatment course.

Case 2: Woman, 62 years old at first visit

1) Treatment

The patient presented at our department in 2012 with the chief complaint of roughness of the right buccal mucosa and a smarting pain on eating. The right buccal mucosa showed signs of redness and a lesion comprising a lace-like network of white spots; there was also evidence of erosion and bulging in some areas. The results of cytodiagnosis revealed a class III lesion, which was later diagnosed as a squamous cell carcinoma (T2N1M0) based on the results of a biopsy. A 15×12-mm lymph node was confirmed in the submandibular area of the affected side by contrast-enhanced CT. Supraomohyoid neck dissection, right buccal mucosa resec-

Fig. 1 Swallowing Ability Scale

I: Water, tea etc..., II: Liquid diet, soup etc..., III: Yogurt, jelly,
IV: Congee, paste food, V: Regular diet

tion, and reconstructive surgery using a free forearm flap were performed. The upper right molar was also extracted. After tooth extraction, the Eichner Index changed from B3 to B2, and the Cummer Index changed from 17 to 19. Evaluation of swallowing function at 4 weeks postoperatively yielded an MTF score of M4T2F5. The score for swallowing ability was 100 at 4 weeks pre- and post-operatively (Fig. 1-b). Masticatory function was 50 at 4 weeks postoperatively. The degree of mouth-opening was 30 mm at 12 weeks

postoperatively. A precise impression of the upper and lower jaws was taken using an individual tray and vinyl silicone impression material for the fabrication of a prosthesis. Cast clasps in $\overline{3}|45$ and $\overline{5}8$ were made on a working cast mounted on a mean value articulator, and a lower left partial wax denture with prosthetic teeth in the left molar area was fabricated. The base plate of the upper palatal and tooth-missing area was fabricated. This base plate was tried in the mouth on the following visit, and instruction was given to

Fig. 2 Intraoral image of placed prosthesis (Case 2)

the patient to bite. The outline of the protection plate was formed using paraffin wax, taking care not to interfere with the alveolar crest or flap in the affected upper and lower alveolar ridge. The wax was replaced with heat-curing resin for fabrication of the prosthesis (Fig. 2).

2) Observation

Now, at 1 year and 6 months postoperatively, follow-up of the surgical area, the superficial area of the flap, and adjustment of the prosthesis are performed every 3 months. The grafted flap is not interfering with occlusion (Fig. 3). The MTF score is M5T4F5, swallowing ability is being maintained at 100 (Fig. 1-b), and masticatory function has improved to 85.

Discussion

In 1975, treatment for oral and pharyngeal cancers in Japan mainly comprised surgery, chemotherapy, and radiotherapy. Radiotherapy alone and chemoradiotherapy accounted

Fig. 3 Intraoral image obtained during follow-up period (Case 2)

for approximately 65% of all such treatments. However, surgical resection alone is now the mainstream of treatment, accounting for approximately 75%⁶⁾. In case 1 in the present study, local recurrence of cancer was suspected, and the TMN in case 2 was T2N1M0. Surgical resection and reconstruction using a free forearm flap were selected in both cases.

A free forearm flap is widely used in the reconstruction of the head and neck region due to its high flexibility^{5,13,14,16)}. Offering

greater flexibility than pedicle free flap reconstruction, this procedure can be applied at any site where blood vessels exist³⁾. A flap in the buccal mucosa area cannot stretch as much as one in the oral mucosa, so one large enough to facilitate maximal mouth-opening is grafted. Postoperatively, this means that the grafted flap will be lifted towards the oral side during mouth-closing. The flap also often interferes with the path of masticatory movement during eating postoperatively. Damage to the flap, including by biting, increases the risk of infection due to slow healing, as donor arteries are few¹⁵⁾. This means that protective prostheses must be applied to prevent such damage occurring.

Such prostheses have to be tailored to the individual in order to coordinate them with the remaining teeth and improve occlusal, esthetic, and pronunciation function. In the present case, the prosthesis was designed only to improve occlusal function in the remaining teeth on the unaffected side, as its main purpose was to protect the flap. Occlusal function on the affected side has not yet been recovered in either case.

Occlusal support in the molar area is the key to smooth mastication. In patients with buccal mucosa squamous cell carcinoma such as in the present cases, molar extraction on the affected side is sometimes performed, in addition to tumor resection. Here, tooth extraction was performed in case 2. It has been reported that instability of occlusion increases with the greater the number of missing teeth in the molar occlusal support area, resulting in a change in the mandibular position⁷⁾. A change in the mandibular position and malpositioning of the mandibular condyle due to a loss of occlusal support in the molar area causes mandibular dysfunction. One series of studies proposing the Shortened Dental Arch (SDA) Concept^{7,11)} noted that subjective oral health was not markedly impaired, even if molars were missing, as long as certain conditions were met. In the present cases, occlusion in the non-affected molar area was maintained by fabricating a partial denture in the lower non-affected side.

There was no change in dentition or occlusion, and no significant decrease in the masticatory score. The changes that did occur had no effect on daily life.

The swallowing ability scale is an index for evaluating ingestion and swallowing functions after surgical procedures, including oral cancer treatment. The patients are asked about symptoms experienced on eating according to each food type, including sensation of food remaining un-swallowed, choking, and aspiration. This questionnaire does not require any special equipment. Furthermore, it is simple to administer, and suitable for serial measurements. The score in case 1 on the swallowing ability scale at postoperative week 4 was 7/10. No significant decrease in swallowing ability was noted, and it showed a slight improvement during follow-up.

In patients with head and neck cancer, improvement of the resected area markedly influences the quality of life, including masticatory and conversational functions. It has been reported that impairment of eating and conversational ability decreases the patient's sense of pride and independence in their interactions with society and family^{2,10)}. When surgically treating head and neck cancer in elderly patients^{1,6)}, care should be taken not to impair mandibular movements such as those involved in mastication and conversation to prevent mental stress.

Conclusion

In the present 2 patients with buccal mucosa squamous cell cancer who underwent surgical resection and free flap reconstruction, a prosthesis for the protection of a grafted flap from masticatory movement was placed in the upper affected side. The prosthesis protected the grafted flap without impairing the patient's ability to verbally communicate, indicating a favorable result. The results showed that if the ability to masticate on the non-affected side was maintained, quality of life would not be severely affected.

Conflict of Interest Statement

The authors declare no conflict of interest.

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Reprint requests to:

Dr. Syuntaro Nomoto
Department of Crown and
Bridge Prosthodontics,
Tokyo Dental College,
2-9-18 Misaki-cho, Chiyoda-ku,
Tokyo 101-0061, Japan
Tel: +81-3-6380-9195
Fax: +81-3-6380-9195
E-mail: nomotos@tdc.ac.jp