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Use of a folded reverse facial-submental artery submental island flap to reconstruct soft palate defects following cancer ablation



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ABSTRACT

Introduction: Although several techniques have been described for the repair of soft palate defects, soft palate reconstruction remains challenging. This study was performed to evaluate swallowing and speech functions in patients undergoing placement of folded reverse facial-submental artery submental island flaps (FRFF) to reconstruct soft palate defects following cancer ablation.

Materials and methods: FRFFs were designed for eight patients with soft palate defects resulting from soft palatal squamous cell carcinoma ablation. The clinical stages of tumours were I in two patients, II in four patients, and III in two patients. FRFFs were created to reconstruct soft palate defects. Swallowing and speech functions were evaluated 3 months postoperatively.

Results: One minor flap failure occurred, but all flaps survived. No donor-site problem occurred. Five patients managed ingestion of a solid diet, two managed a soft diet, and one remained on a liquid diet. Six patients achieved normal speech, one achieved intelligible speech, and one retained slurred speech. The patients were followed for 8–48 months; seven patients were living with no evidence of disease, and one was living with disease.

Conclusions: The FRFF is reliable for soft palate defect reconstruction following cancer ablation and can achieve satisfactory swallowing and speech functions.

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1. Introduction

The palate is a pharyngopalatal structure that plays pivotal roles in speech, swallowing, and mastication. The folded radial forearm flap (Biglioli and Brusati, 2008; Kang et al., 2013), the free antero-lateral thigh flap (Ozkan et al., 2011) and the temporalis muscle flap (Michaelidis and Hatzistefanou, 2011) have all been used for soft palate reconstruction. Although the radial forearm flap is a good option for reconstruction, the sacrifice of a major artery to the hand and the high risk of complications associated with a skin graft to the forearm are problems of this donor site (Ozkan et al., 2011). These techniques are not appropriate in elderly patients, patients with systemic disease who are not suitable candidates for lengthy operations, or patients who have had previous surgery and lack adequate recipient vessels. Moreover, the patient may wish to undergo more conservative treatment. We previously used a facial-submental artery flap and de-epithelialized submental island flap to reconstruct an oral and maxillofacial defect following tumour removal (Chen et al., 2008, 2009, 2010, 2011; Wang et al., 2011). In

the present study, we used a folded reverse facial-submental artery submental island flap to reconstruct soft palate defects following cancer ablation. Satisfactory speech and swallowing results were obtained.

2. Material and methods

2.1. Patients

Folded reverse facial-submental artery submental island flaps were designed for eight patients with soft palate defects resulting from cancer ablation between March 2009 and January 2013 in the Department of Oral and Maxillofacial Surgery, Sun Yat-sen Memorial Hospital, Sun Yat-sen University. The institutional review board of Sun Yat-sen Memorial Hospital approved this study. The study included six men and two women with a mean age of 61.3 (range, 48–75) years. All patients presented with soft palatal squamous cell carcinoma (Fig. 1). The clinical stages of tumours were stage I (T1N0M0) in two patients, stage II (T2N0M0) in four patients, and stage III (T2N1M0) in two patients. The diagnoses were confirmed pathologically. The soft palate was resected in all patients. Four patients underwent ipsilateral or bilateral supraomohyoid neck

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Fig. 1. A 63-year-old man (case 1) presented with T2N1M0 squamous cell carcinoma of the soft palate.



Fig. 2. The facial-submental artery was detected with three-dimensional computed tomography angiography.

dissection. Reverse facial-submental artery submental island flaps measuring 10–15 cm in length and 3–4 cm in width (average, 12.0 × 3.5 cm) were created as foldable flaps to reconstruct the soft palate defects. Three patients underwent radiotherapy. All patients were followed for 3 months postoperatively to determine swallowing function, including the ability to ingest a solid, soft, or liquid diet, and speech function, including normal, intelligible, or slurred speech (Table 1). A panel of three surgeons assessed the outcomes.

2.2. Surgical technique

Three-dimensional computed tomography angiography was used to identify the locations and strikes of the facial and submental arteries (Fig. 2). The facial-submental artery submental island flap was raised under general anaesthesia. The patient was placed in the supine position during surgery, with the head and neck moderately extended. After location of the facial artery pulse, the flap was outlined. Flap size ranged from 3.0 × 10.0 cm to 4.0 × 15.0 cm (Fig. 3), including the submental skin, platysma muscle, and anterior belly of the digastric muscle. The incision in the upper margin of the flap extended from 1.5 cm below the body of the mandible, to avoid the marginal mandibular branch of the facial nerve, to the midline of the mandible; the lateral margin was set below the mandibular angle. While raising the flap, the marginal mandibular branch of the facial nerve was identified and preserved at the level of the platysma muscle and the overlying facial artery, and both tips of the flap over the mandibular angle that rose above the platysma and subplatysmal



Fig. 3. The incisional design of the facial-submental artery submental island flap.

plane were approached anterior to the facial artery. The anterior belly of the digastric muscle was included in the flap to prevent venous congestion; downward retraction of the gland revealed the submental artery. The submental vein lies on the surface of the gland

Table 1

Demographic, clinical, and outcome characteristics of eight patients with soft palatal squamous cell carcinoma.

Case, age (years), sex	Clinical stage	Treatment	SPF (cm)	Flap complications	Adjuvant treatment	Follow-up duration (months)	Functional outcomes/status
1, 63, M	T2N1M0	TR, bSOND	15 × 3	None	—	48	SoFD, NS/AND
2, 75, M	T2N1M0	TR, bSOND	10 × 4	Minor flap failure	RT (60 Gy)	40	LD, SS/AND
3, 59, F	T2N0M0	TR	10 × 4	None	—	31	SoFD, NS/AND
4, 62, F	T2N1M0	TR, iSOND	12 × 3	None	RT (60 Gy)	28	SoID, IS/AWD×
5, 66, M	T1N0M0	TR	10 × 3	None	—	21	SoFD, NS/AND
6, 48, M	T2N0M0	TR	14 × 3	None	—	20	SoFD, NS/AND
7, 56, M	T1N0M0	TR	10 × 4	None	—	12	SoFD, NS/AND
8, 62, M	T2N1M0	TR, bSOND	15 × 4	None	RT (60 Gy)	8	SoID, NS/AND

Abbreviations: M, male; F, female; TR, tumour resection; iSOND, ipsilateral supraomohyoid neck dissection; bSOND, bilateral supraomohyoid neck dissection; SPF, skin paddle of the flap; RT, radiotherapy; SoID, solid diet; SoFD, soft diet; LD, liquid diet; NS, normal speech; IS, intelligible speech; SS, slurred speech; AND, alive no disease; AWD, alive with disease; ×contralateral cervical recurrence.

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