

Prefabricated Free Jejunal Transfer: A New Reconstructive Technique for High Pharyngeal Defects

[Articles]

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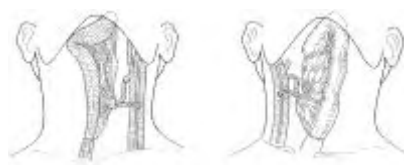
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Abstract

A new method that uses a prefabricated free jejunal transfer has been applied to three cancer patients with pharyngoesophageal defects with a high pharyngeal deficit extending up to the nasopharynx. In this method, the jejunum harvested in the usual manner is divided into two segments with a single vascular pedicle. Its distal segment is used to reconstruct the cervical esophagus, and its proximal segment is turned over to create a mucosal patch to cover the high pharyngeal defects. The two segments are then co-apted in a side-by-side anastomosis. The esophagus can be reconstructed in a naturally straight shape without a curved portion or blind loop formation, thus leading to good swallowing function. In our series, all grafts survived well and there was no complication directly related to jejunal transfer. All patients could tolerate a soft diet without difficulty. This method is easy to perform and applicable to any shape or size of very high pharyngeal defects that cannot be reconstructed properly by other methods. Although patients with an advanced hypopharyngeal cancer usually have a poor prognosis, this technique allows a better quality of life for a probable short life span.

In pharyngoesophageal reconstruction, free jejunal transfer has been accepted as an excellent option because of its many advantages.^{1,2} It has a lubricated, smooth surface suitable for the passage of food, and its diameter generally matches that of the esophagostoma. The jejunum is well vascularized, facilitating wound healing, with a low incidence of fistula formation and postoperative stricture. It is easy to harvest, and donor site morbidity is minimal.

However, pharyngoesophageal defects with a large pharyngostoma after tumor extirpation still remain a difficult challenge. To overcome the discrepancy in diameter between the jejunum and the pharyngostoma, a long incision along the antimesenteric border of the jejunal wall is required. Consequently, some element of kinking at the pharyngojejunal junction or blind loop formation is inevitable, leading to poor swallowing function (Fig. 1).



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Fig. 1. Schematic drawing of a free jejunal graft used to reconstruct a cervical esophagus with a high pharyngeal defect. Either (*left*) kinking at an acute angle at the pharyngojejunal anastomosis or (*right*) blind loop formation occurs, leading to poor swallowing function.

We, therefore, devised a new method to overcome the discrepancy between the size and shape of the pharyngostoma and that of the jejunum. In our method, two free jejunal segments with one vascular

pedicle are coapted in a side-by-side anastomosis. We applied this new method in three cases with a high and long pharyngeal defect after total pharyngolaryngoesophagectomy and obtained good functional results. This article aims to describe our operative procedure and demonstrate the versatility of this method in cases with a pharyngeal defect reaching the nasopharynx.

Operative Procedure⁺

The jejunum is harvested with its nutrient vessels through an upper abdominal incision. The required length of the jejunum is approximately twice as long as the cervical esophageal defect (ca. 20 cm). After harvesting the jejunum, it is divided into two segments by removing a small portion in the middle of the harvested length ([Fig. 2, above](#)). Its distal segment is used for esophageal reconstruction, whereas the proximal segment is used mainly for oropharyngeal and nasopharyngeal reconstruction. The proximal segment is turned over and partly opened along its antimesenteric border to make a mucosal patch. The upper portion of the distal segment is opened along its antimesenteric border for a few centimeters, and the mucosal patch is trimmed and sutured to this V-shaped space ([Fig. 2, center](#)). This mucosal patch is also trimmed to suit the requirements of the oropharyngeal and/or nasopharyngeal defects. The funnel-shaped intestinal tube can be prefabricated with optional extension of the wall according to the individual requirements of the defect ([Fig. 2, below](#)). To make the long and difficult mucosal suture exact, it is recommended to perform the intestinal anastomosis first before microvascular anastomosis.

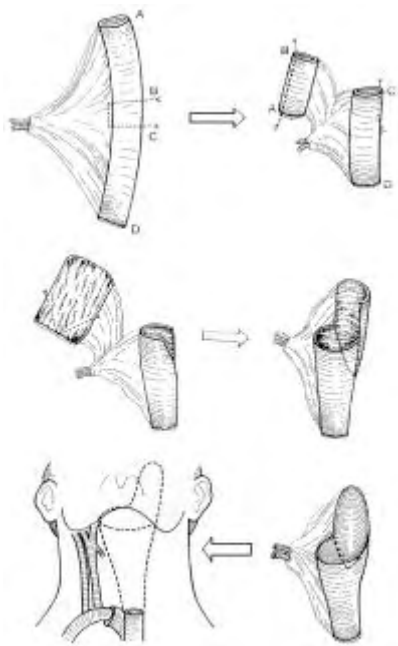


Fig. 2. Schematic drawing of a prefabricated free jejunal transfer. (*Above*) A jejunal graft is divided into two segments by removing a small portion in the middle of the harvested length. The proximal segment is opened to create a mucosal patch. (*Center*) An incision is made in the antimesenteric border of the distal segment to gain a wide orifice and a mucosal patch is sutured to this open edge. (*Below*) The prefabricated jejunal graft is inset into the defect.

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Materials and Methods¹

In the past 6 months, we have performed this prefabricated free jejunal transfer in three patients after total pharyngolaryngoesophagectomy with extended resection up to the nasopharynx at the University of Tokyo Hospital (Table I). Two patients had a hypopharyngeal cancer with invasion to the oropharynx. The remaining one patient had triple cancers in the oropharynx, hypopharynx, and esophagus, and colon interposition was required to reconstruct the esophagus as well as free jejunum transfer to reconstruct the upper segment. All patients were male, ranging in age from 62 to 70 years with a mean of 65 years. The follow-up period ranged from 4 months to 6 months.

Case	Sex	Age	Primary Tumor	Time to Surgery	Time to Jejunum Transfer	Time to Oral Feeding	Time to Discharge	Survival
1	M	64	Soft palate carcinoma	3 years	14 days	20 days	28 days	12 months
2	M	64	Soft palate carcinoma	2 years	14 days	20 days	28 days	12 months
3	M	64	Soft palate carcinoma	2 years	14 days	20 days	28 days	12 months
4	M	64	Soft palate carcinoma	2 years	14 days	20 days	28 days	12 months
5	M	64	Soft palate carcinoma	2 years	14 days	20 days	28 days	12 months

TABLE I Patient Summary

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Results

All grafts survived well. Contrast swallowing studies were performed on all patients postoperatively. There were no fistulas or strictures, and good passage of contrast was seen in all cases. Although there were no postoperative problems directly related to free jejunal transfer, one patient developed neck skin necrosis associated with lymphorrhea, which resulted in subcutaneous infection and required transfer of a pectoralis major musculocutaneous flap. Another patient developed a pleural effusion, which resolved with drainage (Table I).

Oral feeding started between 20 and 25 days postoperatively, with a mean of 23 days. All patients could take a soft diet, although one patient (patient 1) had slight difficulties in swallowing because of a defect of the soft palate.

Case Reports

Case 1

A 64-year-old man presented with biopsy-proven squamous cell carcinomas both in the posterior hypopharyngeal wall and in the nasal side of the soft palate (Fig. 3). The patient had received curative radiation therapy of 60 Gy for a laryngeal cancer 3 years before. He also had undergone both chemotherapy and radiation therapy of 70 Gy for carcinoma of the soft palate 2 years before. Computed tomographic examination showed tumor encircling the cervical esophagus. Endoscopic examination of the thoracic esophagus was not possible due to stenosis.

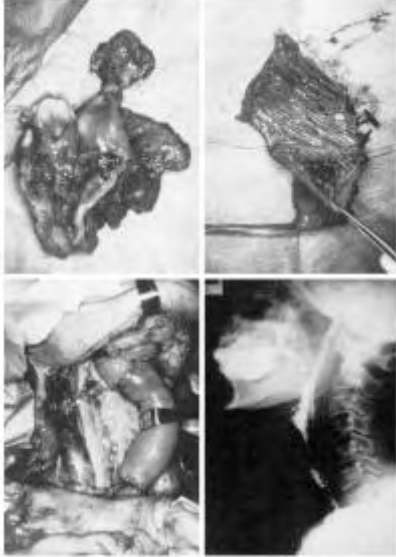


Fig. 3. Patient 1. (*Above, left*) The resected specimen includes the lateral oropharyngeal wall and a part of the soft palate. (*Above, right*) Prefabricated jejunum has a wide orifice. (*Below, left*) The jejunum is inset between the pharyngostoma and the colon graft which is supercharged by venous anastomosis. (*Below, right*) Postoperative x-ray shows good passage of contrast medium without leakage.

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TABLE I

Patient	Age/Sex	Cancer Diagnosis	TNM (UICC 1987)	Preoperative Treatment	Combined Reconstructive Procedure	Complications	Resume Oral Intake (POD*)
1	64/M	Recurrent oropharyngeal and hypopharyngeal and esophageal	rT2N0M0 T2N0M0	Radiation: 70 Gy and chemotherapy	Right colon interposition	Pleural effusion	25
2	70/M	Hypopharyngeal	T4N2aM0	Radiation: 42 Gy	Deltpectoral flap	Lymphorrhea and neck skin necrosis	26
3	62/M	Recurrent hypopharyngeal	rT4N0M0	Radiation: 60 Gy and chemotherapy	(-)	None	25

* POD, postoperative day

TABLE I Patient Summary

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