



## Use of the Intrathoracic Tube for Repositioning Free Flap Pedicle *via* Transoral Approach

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### Abstract

**Background:** The common site of oral cavity and oropharyngeal cancer including maxilla, soft palate, tongue, tonsil, buccal mucosa and mouth floor. Immediate oral reconstruction is always necessary because of surgical resection lead to inevitable functional loss. It has a unique procedure, that is, to reposition the pedicle via transoral approach to recipient vessels. Sometimes the flaps pedicle could be squeezed during the transportation so that the tunnel must be expanded, which may cause extra damages.

**Methods:** An intrathoracic tube could solve the problem. Patients with oral carcinoma underwent primary surgical resection and neck dissection without mandibulotomy, and immediate reconstruction with radial free forearm flap or superficial fascia layer were appropriate for this technique.

**Results:** This technique based a modified intrathoracic tube allows the thin and reliable free flaps smoothly transported intraoral, decreasing the need of additional debulking procedures. Time to transport the flap as presented ranged between 3 min and 5 min. There was no loss of arterial Doppler signal.

**Conclusion:** We utilized the intrathoracic tube for ensuring flap and pedicle orientation. What's more, it is the prophase of our design---a guide wire-like instrument to "guide" the flap pedicle *via* transoral approach. Most oropharyngeal cancer patients will be benefit from it.

**Keywords:** Oral cavity and oropharyngeal cancer; Intrathoracic tube; Free flap pedicle; Transoral approach

### Introduction

Oral cavity and oropharyngeal cancer make up approximately 3.25% of all human cancers and keep on rise in recent years [1]. 90% of them are squamous cell carcinomas. The common sites are maxilla, soft palate, tongue, tonsil, buccal mucosa and mouth floor. Unlike many cancers, the shifts on treatment of oral cavity and oropharyngeal cancer are focused on non-surgical intervention, as the oropharynx has major function on speech, mastication, swallowing, and aesthetics [2,3]. Nevertheless, for those invasive tumors in advanced stage open surgical approach is still inevitable [2,4]. Immediate reconstruction is always necessary, because of the inevitable functionless caused by the defects [5]. Radial forearm free flaps and anterior-lateral thigh fascia lata free flaps are optimal for the oral reconstruction [6-8]. External carotid branches are commonly used for oral microvascular reconstruction [9]. The facial artery and vein are most common recipient vessel for free flap. Superior thyroid artery, arising as the first branch of the external carotid artery, is also commonly used [10]. The advantage of these arteries is obvious when the patient is having a neck dissection. Namely, the pedicle length is determined by these donor vessel, therefore long pedicle length in facial-oral reconstruction is considerably required. Reconstruction of oral defects has a unique procure in the microvascular surgery, that is, to transport the flap pedicle via transoral approach. Generally, the anterior pedicle is firstly clamped to the beaks of hemostats and pulled to the recipient vessel region through the submandibular tunnel. The pedicle is easily damaged during the stretching so that the tunnel must be expanded.

There must be many ways for ensuring the flap and pedicle orientation. We introduced in the current study that intrathoracic tube could solve the problem without extra damages. This technique allows intraoral transposition of the thin and reliable flap which are optimal for oral reconstruction, such as fascia lata and radial forearm free flap.

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Figure 1: Schematic illustration of preparing the intrathoracic tube.

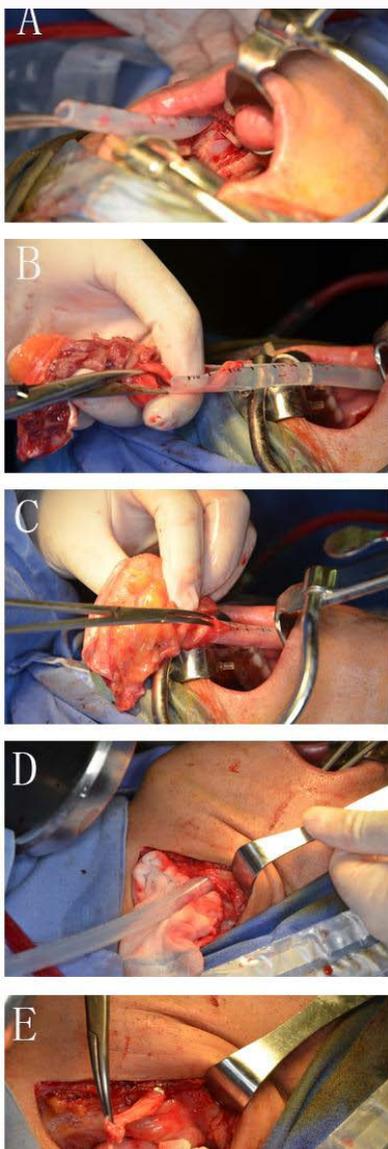


Figure 2: Use of the intrathoracic tube as the guide wire in repositioning free pedicle via transoral approach.

## Patients and Methods

Patients with oropharyngeal carcinoma underwent primary surgical resection and neck dissection without mandibulotomy, and immediate reconstruction with radial free forearm flap or superficial fascia layer were appropriate for this technique.

### Surgical procedure

Tracheostomy was performed in all patients before surgical

resection. Step 1 the intrathoracic tube (Size-F34, Diameter =11.33 mm) as presented in (Figure 1) is inserted from neck-site through the tunnel approach to oropharynx. Step 2 use the hemostats to grasp the proximal end of tube and gently pull it out. Use a clamp to infibulate the distant end of tube (Figure 2A). Step 3 cut a tear in about 1 cm long at the proximal end of tube, in order to make large opening to contain flap. Keep the tear opening with stiff membrane scissors, meanwhile slowly push the pedicle into tube which injected with saline in advance (Figure 2B). Step 4 move back the scissor to close the tear, so that the pedicle could be fixed in the tube (Figure 2C). Step 5 stretch the tube backward slowly until the pedicle is guided to the recipient site (Figure 2D). Withdraw the tube smoothly (Figure 2E).

## Results

The Mean final flap thickness was 0.7 cm. Mean pedicle length was 7.5 cm (range from 6 cm to 9 cm). It decreased the additional debulking procedures. Time to transport the flap as presented in Figure 2 (A-E) ranged between 3 min and 5 min. Until now there was no case who lost arterial Doppler signal after the transposition.

## Discussion

We introduced that the intrathoracic tube could be differently used for transposition of free flap *via* transoral approach. It reduced the complication of pedicle tear and avoided a over-expanded tunnel. It is prophase of our work, to design a guide wire-like instrument to “guide” the flap pedicle through the tunnel. Undoubtedly, improving the surgical technique is responsible for the success of oropharyngeal reconstruction. The method we introduced is not only about a advanced surgical technique, but a useful instrument which hasn't been commonly applied. In another words, ordinary things used in non-routine ways could make surprise.

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