



RESEARCH PAPER

# Applied anatomy of the submental island flap and its clinical application in the repair of defects following hypopharyngeal carcinoma resection



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## KEYWORDS

Submental island flap;  
Submental artery;  
Submental vein;  
Hypopharyngeal neoplasms;  
Reconstructive surgical procedures

**Abstract** *Objective:* To explore the feasibility of the submental island flap in the repair of hypopharyngeal defects.

*Methods:* We collected wet specimens of fresh cadaveric heads from the Han Chinese adult population for applied anatomy of the submental island flap, and followed five patients with pyriform sinus carcinoma after reconstruction surgery using submental island flaps.

*Results:* We found that the average length and width of the submental island flaps were  $(65.20 \pm 11.69)$  mm and  $(46.70 \pm 6.59)$  mm, respectively. The skin flap in all five patients survived after surgery, and tracheal tubes and gastric tubes were removed 7–36 days after surgery. Patients were followed up for 24–42 months, pharyngeal flaps grew well, and speech and swallowing functions were satisfactory.

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**Conclusion:** The submental island flap is a preferred material for the repair of hypopharyngeal defects after hypopharyngeal carcinoma resection, because of good blood supply, easy harvesting, and high survival rate.

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## Introduction

Maintenance and reconstruction of function are hot topics in head and neck surgery, especially functional reconstruction following the resection of head and neck malignant tumors, such as laryngeal carcinoma and hypopharyngeal carcinoma. Martin et al.<sup>1</sup> first reported the advantages of the submental island flap applied for post-operative repair of orofacial defects, with respect to highly consistent color and flexibility compared with the head and neck skin, simple harvesting, high survival rate, easy suturing at the donor site, and small scars. With advances in anatomy and surgical techniques, submental island flaps have been increasingly used to repair various types of head and neck defects. However, current clinical research focuses on the use of flaps in maxillofacial defects, and to our knowledge, there has been no systematic study addressing repair and reconstruction in laryngeal and hypopharyngeal defects. We studied the local anatomy of the submental artery and accompanying veins, observed vascular paths and possible variations, as well as links with adjacent organs, to explore the dominant region supplied by the submental artery and investigate the feasibility of the submental island flap in the repair of hypopharyngeal defects after radical resection of hypopharyngeal carcinoma under the premise of maintaining laryngeal function.

## Materials and methods

### Applied anatomy of the submental island flap

#### Path of the submental artery and accompanying veins

Ten head specimens (20 sides) were collected from Han adult cadavers. The arterial system was perfused with red dye emulsion (Fig. 1), while the venous system was infused with blue dye emulsion (Fig. 2). The specimens were then subjected to gross observation and microscopic anatomy. Measurement parameters included the initial diameter of the submental artery and accompanying veins, the length of the submental artery (Fig. 3), and the correlation with the primary body surface landmarks.

#### Dominant perfusion area of the submental artery

Five head specimens (10 sides) were collected from Han adult cadavers. The submental artery was dissected and perfused with black ink *via* the artery to observe the staining scope of the submental skin. The maximal length and width of the submental island flap were measured. Surgical procedures were simulated, as follows, briefly: the specimens were cut along the stained edges, and separated

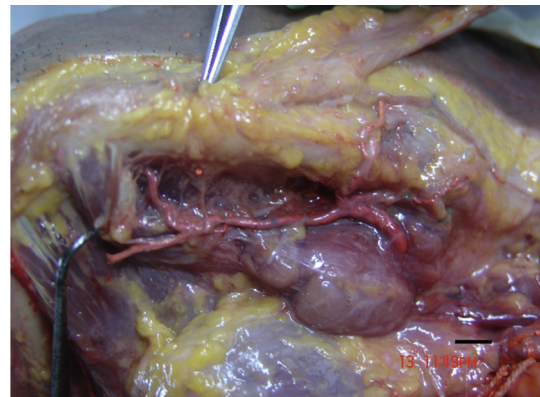


Fig. 1 Submental artery (red) after perfusion.

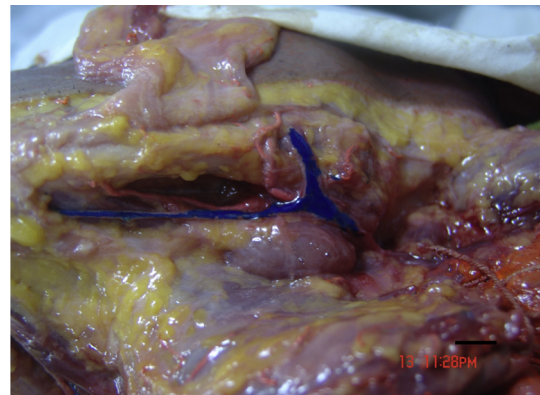


Fig. 2 Submental vein (blue) accompanying the submental artery.

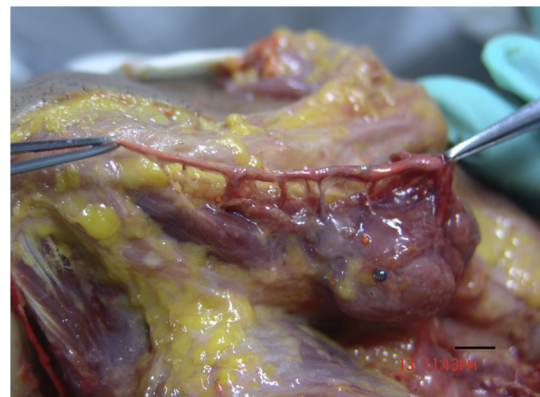


Fig. 3 Submental artery branches.

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