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Mandibular lingual release versus mandibular lip-split approach for expanded resection of middle–late tongue cancer: A case-control study



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ABSTRACT

Objective: The mandibular lingual release (MLR) and mandibular lip-split (MS) approaches are the two common access approaches for resection of malignant tongue tumors. This case-control study aimed to evaluate the effectiveness and safety of these two approaches for the expanded resection of middle–late tongue cancer.

Material and methods: A total of 56 matched patients with resectable middle–late squamous cell carcinoma of the tongue body were consecutively hospitalized for expanded resection using the MLR ($n = 26$) or MS approach ($n = 30$) between March 2004 and November 2012. Main outcome measures consisted of tumor exposure, surgical morbidity, maxillofacial motor–sensory return, and head/neck-specific quality of life.

Results: The two approaches achieved similar en bloc R0 resection with similar tumor exposure. The MLR approach was associated with a significantly lower frequency of maxillofacial pain ($P < 0.05$) and no incidence of mandible nonunion. The MLR approach was also associated with a significantly better quality of life with respect to local pain, facial appearance, and mood.

Conclusion: Compared to the MS approach, the MLR approach was associated with significantly less surgical morbidity and a significantly better quality of life for middle–late tongue cancer patients undergoing expanded resection.

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1. Introduction

Tongue cancer is the most common type of oral cancer. Radical resection remains the mainstay of treatment for middle–late tongue cancer, along with chemo-radiation therapy. A major challenge facing maxillofacial surgeons is the procedural complexity and unfavorable functional recovery after radical resection. Unsuccessful resection has adverse effects on tongue cancer patients' prognosis, mainly due to the high risk of tumor recurrence and metastasis. The traditional COMBINED MANDIBULECTOMY and Neck Dissection Operation (COMMANDO) procedure for resection of middle–late tongue cancer involves the tongue, mandible and neck, namely, supraomohyoid neck dissection or modified radical neck dissection (Guo et al., 2014) and the resection of primary

lesion, including the tumor and some surrounding tissue such as the unilateral intrinsic and extrinsic tongue muscles, mainly genioglossal, hyoglossal, and stylohyoid muscles (Calabrese et al., 2009, 2013), with the tongue defect reconstructed simultaneously according to clinicopathological staging (Kessler et al., 2013). The appropriate operative approach is a key determinant of the effectiveness and safety of compartmental tongue resection with respect to tumor exposure and en bloc R0 resection, the latter of which further affects patient survival and quality of life (QoL). However, the operative approach for resection of cancer of the tongue body is highly variable among regions, practices, and surgeons, and the optimal approach remains an open question (Iseli et al., 2012; Karatzanis et al., 2012). Two common access approaches, namely, the mandibular lip-split (MS) approach and the mandibular lingual release (MLR) approach, are widely used in current maxillofacial surgery practice for resection of middle–late tongue cancer. In the MS approach, the median lower lip and the midline of the mandible are incised to expose and remove the

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primary tumor. In contrast, in the MLR approach, the lower lip and the mandible remain intact, and the mylohyoid muscles and hyomandibular furrow are incised to retract the tongue from the submandibular triangle for resection. Findings in the current literature are contradictory with regard to whether the MLR approach is superior to the MS approach in terms of surgical effectiveness, morbidity, functional recovery, esthetic appearance, survival, and QoL, or vice versa (Devine et al., 2001; Cantu et al., 2006; Dziegielewski et al., 2010; Karatzanis et al., 2012; Tei et al., 2012).

The primary objective of this study was to re-evaluate the effectiveness and safety of the MS and MLR approaches for expanded resection of middle–late tongue cancer with respect to surgical and oncological outcomes in the setting of a single-center, case-control study.

2. Material and methods

The study protocol was approved by the institutional review board at Beijing Stomatological Hospital, Capital Medical University, in accordance with the latest version of the Declaration of Helsinki. Medical charts of 106 middle–late tongue cancer patients, who were consecutively hospitalized at our Department of Maxillofacial Surgery between March 2004 and November 2012, including 57 men and 49 women aged 18–87 years, were retrospectively reviewed. The inclusion criteria were as follows: at least 18 years of age; pathologically diagnosed advanced squamous cell carcinoma of the tongue body; naive to chemo-radiation therapy; eligible for simultaneous radical tongue resection and tongue reconstruction; and requiring ipsilateral supraomohyoid neck dissection. The exclusion criteria were as follows: a primary tumor larger than 5 cm; a tumor involving the mylohyoid groove, root of tongue, or epiglottis; or refusal to participate in this study. Eligible patients were carefully matched with respect to age, sex, TNM staging, concomitant conditions, neck dissection, pathology, and adjuvant chemo-radiation therapy. All patients voluntarily provided informed consent before participation in this study.

All patients received routine cardiopulmonary function reserve assessment and underwent bilateral neck ultrasound examination or enhanced computed tomography if necessary prior to operation. Expanded resection of primary tongue cancer with simultaneous tongue reconstruction was performed by the assigned maxillofacial surgery team led by the corresponding author (Z.H.), which consisted of resident maxillofacial surgeons, anesthesiologists, clinical pathologists, radiologists, surgical nurses, and research nurses.

For the MS approach, a median incision of the lower lip was made, and the affected side of the mandible was dissected toward the anterior margin of the mental foramen. The mandible bone was transected using the surgical reciprocating saw (Aesculap AG & Co., Tuttlingen, Germany) through the median between the mandible incisors and vertically transected along the posterior margin of the digastric muscle mandible attachment until the level of the mental foramen. The mandible bone was further horizontally transected along the level of the mental foramen and split into a Z-like shape (Fig. 1A,C). Two titanium internal fixation plates (AO, Davos, Switzerland) were prefashioned to the osteotomy lines. The lingual side of the gingiva was dissected along the buccal mucosa of the hyomandibular furrow to fully expose the tongue body. The tongue body was extensively resected, including the primary tumor, at least 1.5 cm peritumoral tissue, the sublingual gland, and the hyoglossal, genioglossal and partial mylohyoid muscles.

For the MLR approach, following neck dissection, the ipsilateral mylohyoid muscle was transected, and the midline of the anterior tongue was split. The hyomandibular furrow was dissected, and then the tongue was retracted through the submandibular triangle

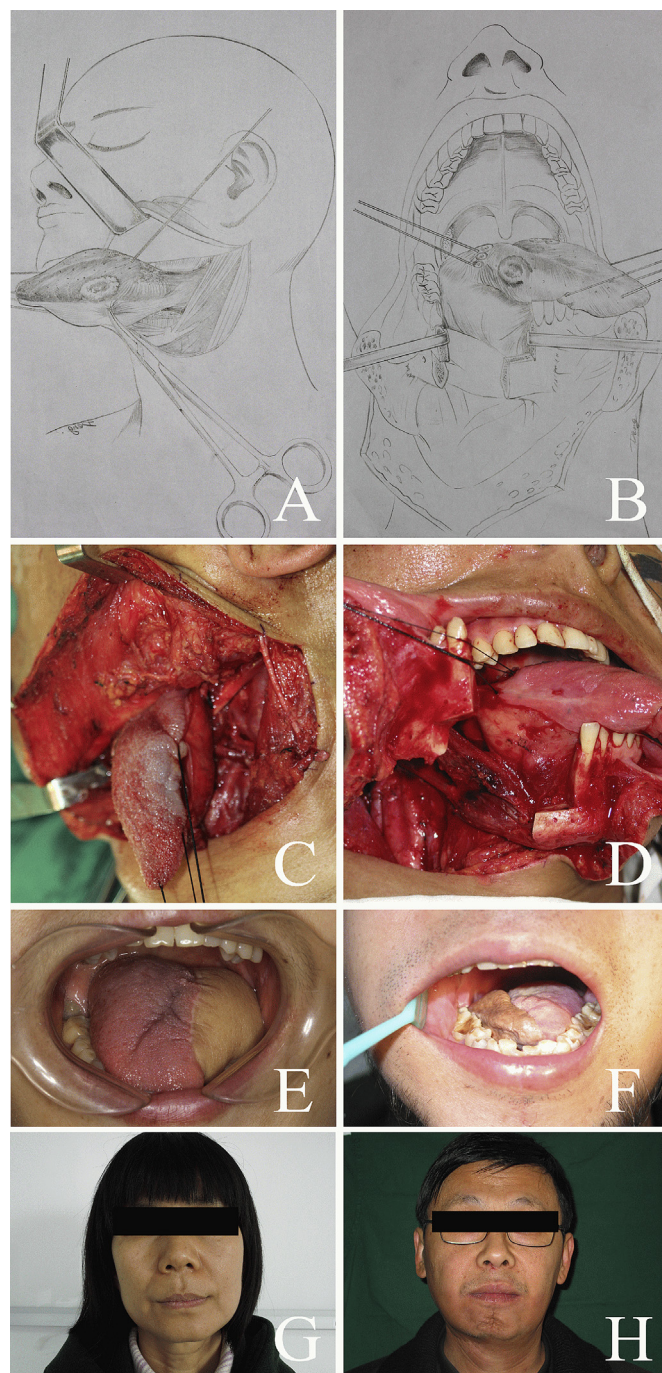


Fig. 1. Mandibular lingual release (MLR; left column) and mandibular lip-split (MS; right column) approaches. (A, B) Schematic diagram of access achieved by the MLR and MS approaches. (C, D) Identification of tongue cancer. (E, F) Appearance of reconstructed tongues 6 months after operation. (G, H) Facial appearance 6 months after operation.

using sterile gauze to fully expose the primary tumor and to remove the tumor not beyond the median sulcus (Fig. 1B,D).

Ipsilateral functional or supraomohyoid neck dissection was performed after radical resection of the tongue body. The internal jugular vein was preserved, and the free radial forearm flap was used to repair the tongue defect (Fig. 1E,F).

Patients were hospitalized and closely monitored in the intensive care unit the first 48 h after the operation. Symptomatic and supportive therapy, including antimicrobial prophylaxis and

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