

Surgical Innovations

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KEYWORDS

- Transoral robotic surgery (TORS) • Transoral laser microsurgery (TLM)
- Robotic surgery • Minimally invasive surgery • Head and neck surgery

KEY POINTS

- In preliminary studies, minimally invasive approaches to the oropharynx, including transoral laser microsurgery and transoral robotic surgery, show improved functional outcomes and similar oncologic outcomes to primary radiation.
- The application of sentinel lymph node biopsy techniques to oral cavity cancer may reduce the need for elective neck dissection and its associated morbidity.

INTRODUCTION

In 2012, an estimated 40,250 people in the United States were diagnosed with oral cavity or oropharyngeal squamous cell carcinoma (SCC), and 7850 people died of these diseases.¹ Although the overall incidence of oral cavity SCC has been decreasing by approximately 1% per year, the incidence of oropharyngeal SCC is rising, particularly in middle-aged patients, likely because of the increasing incidence of human papilloma virus (HPV)-associated oropharyngeal SCC.² Treatment of oral cavity and oropharyngeal SCC is particularly challenging, as these sites are involved in many crucial functions, including breathing, deglutition, and speech, and impairment of any of these functions may significantly affect quality of life. Thus, both functional and oncologic outcomes are important considerations in the treatment of oral cavity and oropharyngeal SCC.

Although surgical excision has always been a mainstay of treatment for oral cavity SCC, the treatment of oropharyngeal SCC in recent decades has been notable for the use of primary nonsurgical approaches, namely radiation or chemoradiation. Publication of the Veterans Affairs study in 1991³ heralded an era of organ-preservation strategies that were extrapolated from the larynx to the oropharynx. Traditional surgical

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Abbreviations: Surgical innovations	
HPV	Human papilloma virus
SCC	Squamous cell carcinoma
SLNB	Sentinel lymph node biopsy
TLM	Transoral laser microsurgery
TORS	Transoral robotic surgery

approaches to the oropharynx (eg, mandibulotomy) entailed significant morbidity, thus making nonsurgical approaches the more attractive treatment option. However, recent technological advances, including transoral laser microsurgery (TLM) and transoral robotic surgery (TORS), have afforded improved access to pathology and the opportunity for decreased treatment-related morbidity. The application of sentinel lymph node biopsy (SLNB) for oral cavity and oropharyngeal SCC may also allow for more minimally invasive management of the neck. Here, we review the evidence behind these surgical innovations to examine how they may be integrated into modern management strategies for oral cavity and oropharyngeal SCC.

TRADITIONAL SURGICAL APPROACHES

Surgical resection has long been a mainstay of treatment for head and neck cancer, including oral cavity and oropharyngeal SCC. Given the complex 3-dimensional anatomy and functional roles of the oral cavity and oropharynx, a variety of surgical approaches have been explored.

Direct Transoral Surgery

A direct transoral approach provides the quickest and most direct route to the oral cavity and oropharynx with the least potential for morbidity. As such, transoral surgery remains important for the treatment of oral cavity SCC and many oropharyngeal SCCs. The primary disadvantage of this approach can be related to exposure. Most oral cavity cancers, and some oropharyngeal cancers, can be adequately visualized via a direct transoral approach; however, larger cancers may be difficult or impossible to reach through the mouth without specialized techniques and/or instrumentation. Patient factors (trismus, kyphosis, dental obstruction) and tumor characteristics (tumor size, location) can limit direct line-of-site visualization of areas in the oral cavity and oropharynx, thereby preventing a traditional direct transoral approach from being used.

Mandibulotomy/Mandibulectomy Approach

The mandible can represent a barrier to exposure for resection of oral cavity and oropharyngeal SCC. Several techniques have been developed to improve access to the posterior oral cavity and oropharynx. Using either a visor flap or lip-splitting approach, the mandible may be divided and retracted laterally to allow broad access to the oral cavity and oropharynx. Internal fixation may be used to restore the mandibular arch at completion of the procedure. Alternatively, a section of involved mandible may be removed during extirpation and then reconstructed with or without restoration of the entire mandibular arch. Although these approaches greatly expand the scope of tumors that may be resected, they also entail significant additional morbidity. Complications from mandibulotomy or mandibulectomy range from 10% to 60%,⁴ and include difficulty with speech and swallowing, malocclusion, temporomandibular joint pain, and cosmetic deformity.^{5,6}

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