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·专家论坛·

加速康复外科在口腔颌面肿瘤手术中的应用

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【摘要】 口腔颌面肿瘤手术因解剖结构复杂、创伤范围大及术后功能重建需求高，其围手术期并发症和功能障碍影响患者的康复进程、生活质量及长期预后。加速康复外科（ERAS）基于循证医学证据，通过多学科协作优化围手术期管理流程，在口腔颌面外科领域具有重要应用潜力。多项前瞻性研究证实，通过标准化气道管理、体液与体温管理及专业化病房管理等策略，可缩短患者住院时间，促进早期肠内营养与下床活动，降低重症监护室入住率和术后并发症发生率。然而，现有ERAS研究多聚焦传统临床结局，对口腔颌面肿瘤患者术后的语言、吞咽、咀嚼、表情及心理社会功能关注不足。本文基于结构-过程-结果质量评价模型，梳理了ERAS在口腔颌面肿瘤手术中的应用路径与评价框架。同时，结合国内外研究进展及作者团队关于游离皮瓣移植患者延迟拔管策略的大样本队列研究，证实契合ERAS理念的围手术期管理可在保证安全性的前提下显著缩短住院时间、降低并发症发生率并减少医疗成本。未来应加强口腔颌面外科专科路径制定、长期功能与生活质量随访，探索数字化与精准康复工具，以推动ERAS向促进功能恢复与社会回归的综合康复模式转变。

【关键词】 加速康复外科；　口腔颌面肿瘤；　结构-过程-结果质量评价模型；　围手术期管理；　多学科协作；　循证医学；　延迟拔管；　气道管理；　功能恢复；　生活质量
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Application of enhanced recovery after surgery in oral and maxillofacial tumor surgery

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【Abstract】 Oral and maxillofacial tumor surgery is characterized by complex anatomical structures, extensive surgical trauma, and high demands for postoperative functional reconstruction. Perioperative complications and functional impairments significantly affect patients' recovery process, quality of life, and long-term prognosis. Enhanced recovery after surgery (ERAS), grounded in evidence-based medicine, optimizes perioperative management through multidisciplinary collaboration and demonstrates substantial application potential in oral and maxillofacial surgery. Multiple prospective studies have confirmed that standardized airway management, goal-directed fluid and temperature management, and specialized ward-based care can shorten hospital stays, facilitate early enteral nutrition and ambulation, and reduce intensive care unit admission rates and postoperative complications. However, existing ERAS studies mainly focus on traditional clinical outcomes, with insufficient attention paid to functional recovery specific to patients with oral and maxillofacial tumors after surgery, including speech, swallowing, mastication, facial expression, and psychosocial function. Based on the structure-process-outcome quality evaluation model, this review summarizes the implementation pathways and evaluation framework of ERAS in oral and maxillofacial tumor surgery. Furthermore, integrating current international evidence and a large cohort study from our team evaluating a delayed extubation strategy in patients

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undergoing free flap reconstruction, we demonstrate that perioperative management aligned with ERAS principles can significantly shorten hospital stays, reduce postoperative complications, and decrease medical costs while maintaining safety. Future efforts should focus on specialized pathways for oral and maxillofacial surgery, strengthening long-term functional and quality-of-life follow-up, and exploring digital and precision rehabilitation tools to promote the transition of ERAS toward a comprehensive recovery model emphasizing functional restoration and social reintegration.

【Key words】 enhanced recovery after surgery; oral and maxillofacial tumor; structure-process-outcome quality evaluation model; perioperative management; multidisciplinary collaboration; evidence-based medicine; delayed extubation; airway management; functional recovery; quality of life

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口腔颌面肿瘤是头颈部恶性肿瘤的重要组成部分，因解剖结构复杂、手术创伤范围大、涉及复杂软硬组织重建及重要神经血管保护，其术后并发症显著影响患者的康复进程、生存质量和长期预后[1]。肿瘤部位与语言、吞咽、咀嚼、呼吸及面部表情等关键功能密切相关，患者在术后不仅面临生理创伤，还常伴有明显的心理压力和社会功能受限[2]。因此，优化患者的围手术期管理至关重要。

加速康复外科（enhanced recovery after surgery，ERAS）是基于多学科协作模式和循证医学证据，通过优化围手术期管理流程，减少手术应激、缩短康复时间、降低围手术期风险和改善患者预后[3]。作为一种积极和安全的治疗策略，ERAS在解剖复杂、创伤较大、术后功能恢复需求高的口腔颌面外科中展现出巨大潜力，深入探讨ERAS的临床实践具有重要价值[4-6]。然而，现有ERAS研究多聚焦于胃肠外科、骨科等领域，评价终点主要集中于住院时间、并发症及费用等指标[7-9]，对口腔颌面肿瘤患者术后尤为重要的功能与生活质量指标关注不足。因此，有必要在现有ERAS理论与质量评价框架基础上，结合口腔颌面肿瘤学科特点，对其应用路径和评价体系进行系统梳理与专科化拓展。

1　ERAS的核心理念与质量评价基础：结构-过程-结果模型

ERAS理念最早由丹麦学者Kehlet[10]在结直肠手术领域提出，其围手术期管理整合了患者教育、疼痛控制、体温与容量维持、早期经口喂养及术后当日强制活动等核心要素。目前，ERAS已从择期结直肠手术延伸至多学科复杂手术的围手术期管理优化[11]，多学科协作进一步推动了ERAS的规范化进程[12-19]。ERAS并非单一干预措施，而是一套系统工程，其实施效果依赖于组织结构、管理过程及最终结局的协同优化。1966年美国医疗质量管理之父Donabedian[20]首次提出医院管理质量评价的三维理念：基本结构（structure）、实施过程（process）和医疗效果（outcome），该模型逐渐发展成为全球沿用至今的医疗质量评估经典范式——结构-过程-结果（structure-process-outcome，SPO）模型。SPO模型完美契合了ERAS质量评价体系，为ERAS质量评估提供了清晰的逻辑框架，已被用于ERAS质量控制与效果评估[21]。

在口腔颌面肿瘤手术的ERAS应用中，结构指标应反映ERAS在口腔颌面肿瘤围手术期及术后康复实施中的组织保障与资源配置；过程指标应反映围手术期各阶段干预措施的执行质量；结果指标不仅要包括传统临床结局，更应突出口腔颌面肿瘤患者功能恢复和心理社会适应。

2　ERAS在口腔颌面肿瘤手术中的应用

2.1　结构指标：多学科协作与专科资源配置

口腔颌面肿瘤ERAS的实施高度依赖多学科团队（multidisciplinary team，MDT）协作[22]。除口腔颌面外科、麻醉科与专科护理团队外，还需将营养、康复、语言治疗及心理干预纳入常规管理体系：①口腔颌面外科医师作为ERAS实施的主导者，不仅负责肿瘤切除与重建决策，还应在术式选择中贯彻功能保护理念；②麻醉科医师参与制定多模式镇痛方案、优化气道管理并减少阿片类药物使用，以降低术后恶心、谵妄及呼吸道并发症发生率[23]；③专科护理团队承担“协调枢纽”作用，负责患者宣教、路径执行监督及多学科沟通；④营养、康复和心理干预专业人员参与围手术期营养

支持方案制定、术后语言、吞咽、咀嚼功能评估与训练及心理评估与干预，这是口腔颌面肿瘤ERAS区别于其他外科的重要结构支撑，也是提升整体康复质量的重要保障。

除人员配置外，制度化和流程化是结构指标的重要组成部分[24]。研究表明，缺乏统一规范的ERAS实施往往导致干预措施执行不一致，从而削弱整体效果。在口腔颌面肿瘤领域，应开展制度性结构建设：①制定口腔颌面肿瘤ERAS操作规范，明确术前、术中及术后各阶段关键干预节点和责任分工。②ERAS质量控制与反馈机制：定期评估ERAS执行率和达标率，及时调整流程。③专科ERAS培训体系：对医师、护士及康复人员开展持续培训，提高ERAS理念认知与执行能力。

2.2　过程指标：围手术期功能导向的精准干预

过程指标是ERAS理念在临床实践中的具体体现，反映围手术期各阶段干预措施的执行质量与规范程度。与以缩短住院时间为主要目标的传统ERAS不同，口腔颌面肿瘤手术的ERAS过程管理更强调功能保护、功能替代及功能重建的连续性与前瞻性。围绕术前、术中和术后3个阶段，实施以语言、吞咽、咀嚼、表情及心理社会功能为导向的精准干预，是评价ERAS质量的核心内容。

2.2.1　术前准备阶段　术前管理强调患者教育、营养优化及功能基线评估[25-27]，通过规范宣教降低患者焦虑水平，避免不必要的术前禁食[28-29]，并对语言、吞咽、咀嚼及进食功能进行系统评估，为手术顺利进行和术后康复奠定基础[30-31]。

吸烟与酗酒是口腔癌的主要致病因素，同时也是术后并发症（如肺部感染、咳嗽、伤口愈合不良）发生的重要诱因[29]。对于口腔颌面部肿瘤切除联合游离皮瓣重建等大型手术，患者应在术前至少3~4周完全戒烟戒酒[32-33]，以最大程度降低术后风险。同时，口腔颌面外科患者因其特殊的解剖及病理生理特点，在麻醉管理上具有显著的挑战性。术前麻醉评估应围绕气道管理安全和围手术期风险优化两大核心目标展开，评估患者张口受限（颞下颌关节病变、肿瘤侵犯、口腔黏膜下纤维化）、气道解剖异常（肿瘤压迫、放射后纤维化）和气道高反应性（长期吸烟、饮酒）等影响气道管理的风险因素。对预计困难气道的患者，制定清醒纤维支气管镜插管或气管切开备用的应急方案。对高风险手术（如下颌骨切除、游离皮瓣重建等），应进行术前MDT讨论，为患者制定科学、个体化的麻醉计划。此外，口腔颌面肿瘤患者常因疼痛、张口受限或吞咽困难而存在潜在营养风险[34]。通过NRS-2002[35]等工具进行术前筛查，并在必要时实施营养干预，可显著降低术后并发症发生率并促进功能恢复。

2.2.2　术中精准管理　术中ERAS管理以减少应激和保护功能为核心，是ERAS过程管理中技术依赖性最强的环节，其干预质量直接影响术后功能恢复潜力。其主要包括预防感染[36]、多模式麻醉[37-39]、手术微创[40]、体液管理[41]及神经与功能结构保护等。在满足肿瘤根治原则的前提下，应优先选择有利于功能保留和重建的手术方式[42]。

肿瘤切除联合游离皮瓣重建是口腔颌面缺损修复的常规术式，但患者常伴营养不良、多重基础疾病和术后并发症，对围手术期管理提出严峻挑战[43-45]。国际研究已逐步验证ERAS价值：2017年，Dort等[46]发布了针对游离皮瓣重建的头颈癌手术ERAS专家共识；此外，MD安德森癌症中心设计的头颈重建外科ERAS方案（head and neck-reconstructive surgery enhanced recovery, HNRS-ERAS）整合术前教育和评估、目标导向液体管理、早期拔管及活动等要素，为临床实践提供范本（表1）[47]。

2.2.3　术后康复阶段　术后康复是口腔颌面肿瘤ERAS管理体系中最具学科特色，也是决定长期生活质量的关键环节[48-49]。通过优化气道管理[50]、早期肠内营养[6, 51]、镇痛优化[52-54]、尽早下床活动及功能康复介入[55]，可显著加快患者恢复速度。尤其应强调早期语言、吞咽和表情肌训练，以避免长期功能障碍。与其他外科手术主要关注生理恢复不同，口腔颌面肿瘤患者术后常面临语言交流受限、进食障碍、面部表情异常及心理社会功能下降等多重问题。因此，术后康复不应被视为单一阶段干预，而应构建以功能恢复和社会回归为目标的管理模式。

针对口腔颌面部解剖特性，同步实施专科化功能干预：在吞咽安全评估基础上进行吞咽训练[56-57]；对舌腭功能损伤者开展系统性发声训练[56]；针对咀嚼肌创伤或下颌骨术后者，术后采用阶梯式张口器与咬合板实施主被动张口训练，预防颞下颌关节强直[58]；面神经麻痹患者行表情肌阻抗训练等[59]。

2.3　结果指标：功能恢复与社会回归

结果指标是ERAS管理模式成效的最终体现，

表1　头颈重建外科加速康复方案围手术期管理流程[47]

Table 1　Perioperative management protocol of the head and neck reconstructive surgery enhanced recovery after surgery program[47]

Perioperative period	Management measure	Concrete content
Pre-operative	Patient education	Performed during a pre-operative visit by clinic nurse educator, patient education document
	Pre-medication	Celecoxib 400 mg, tramadol extended release 300 mg, and gabapentin 300 mg administered in the pre-operative holding area
Intra-operative	Goal directed fluid therapy	Based on arterial line stroke volume assessments, urine output, non-invasive hemodynamic monitoring and use of vasopressors as required
	Opioid-sparing anesthesia	Opioid-sparing anesthesia
	Normothermia and increased FiO_2	-
	Meticulous hemostasis, transfusion protocol	-
Post-operative	ICU only for medical necessity	-
	Fluid restriction	Total intravenous fluids and tube feed rate capped at maximum 100 mL/h (or lower depending on the patient)
	Early mobilization (POD1)	Physical and occupational therapy consultations (POD1)
	Early removal of urinary catheter (POD1)	-
	Scheduled multimodal analgesia	Celecoxib 200 mg every 12 h, gabapentin 100 mg three times daily and tramadol 50 mg every 6 h
	Enteral tube feeds (POD1)	Started at 10 mL/h and increased by 10 mL every 8 h till goal rate, then converted to bolus

FiO_2: fraction of inspired oxygen; ICU: intensive care unit; POD1: postoperative day 1. "-" indicates not applicable

也是评价其临床价值和推广意义的关键依据。传统ERAS研究多以住院时间、并发症发生率及再入院率等"硬终点"为主要评价指标,但在口腔颌面肿瘤手术中,仅依赖此类指标难以全面反映患者真实康复状况。由于该类手术直接影响语言交流、进食功能、面部外观及心理社会适应,功能结局与生活质量应成为ERAS结果评价的核心组成部分(表2)。

2.3.1　传统临床结局指标　传统结局指标主要反映ERAS在降低围手术期风险和优化医疗效率方面的作用,仍是结果评价的重要基础。包括住院时间与恢复速度、并发症发生率、再入院率与再手术率等。

2.3.2　功能结局指标　功能恢复是口腔颌面肿瘤患者最直接、最敏感的康复结局,也是ERAS与传统围手术期管理模式的本质差异所在。包括语言、吞咽、咀嚼、面神经与表情功能结局。

2.3.3　心理与社会结局指标　心理与社会结局是ERAS评价中不可忽视的高阶指标。包括心理结局、社会功能与角色回归等。

表2　口腔颌面肿瘤患者功能结局与生活质量相关评价指标及评估工具

Table 2　Assessment indicators and evaluation tools for functional outcomes and quality of life in patients with oral and maxillofacial tumors

Number	Outcome measure	Assessment tool
1	Clinical complications	Clavien-Dindo classification[60]
2	Speech function	Speech Handicap Index[61], Voice Handicap Index[62]
3	Swallowing function	Functional Oral Intake Scale (FOIS)[63], Eating Assessment Tool-10 (EAT-10)[64]
4	Masticatory function	Masticatory efficiency[65-66], Mixing Ability Test (MAT)[67]
5	Facial nerve function	House-Brackmann facial nerve grading system[68]
6	Psychological status	Hospital Anxiety and Depression Scale (HADS)[69], Patient Health Questionnaire-9 (PHQ-9)[70]
7	Social function	European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire - Head and Neck Module (EORTC QLQ-H&N35)[71]

基于上述理论与实践基础，本文依托SPO模型系统构建了口腔颌面肿瘤ERAS实施与质量评价框架（表3）。

3　ERAS在口腔颌面部肿瘤手术中的应用进展

3.1　围手术期综合管理策略的循证依据

根据牛津循证医学中心（Oxford Centre for

表3　基于SPO模型的口腔颌面肿瘤加速康复外科实施与质量评价框架

Table 3　Framework for implementation and quality evaluation of enhanced recovery after surgery in oral and maxillofacial tumor surgery based on the structure-process-outcome model

Dimension	Evaluation content	Assessable indicators	Recommended tools/standards
Structure	MDT team establishment	MDT discussion rate	MDT records
	ERAS pathway development	Availability of standardized ERAS protocol	ERAS pathway documents
	Multidisciplinary support	Participation rate of nutrition/rehabilitation/speech therapy	Consultation records
	Team training	Number of ERAS training sessions	Training records
	Resource allocation	Dedicated wards or ERAS units	Hospital administrative records
	Quality feedback mechanism	ERAS audit system implementation	Quality control meeting records
Process	Preoperative education	Completion rate of ERAS education	Education records
	Nutritional screening	Nutritional risk assessment	NRS-2002 scale[35]
	Psychological assessment	Anxiety and depression evaluation	HADS scale[69]
	Airway assessment	Prediction of difficult airway	Mallampati score[72]
	Antibiotic prophylaxis	Administration within 60 min before incision	Surgical records
	Anesthesia management	Opioid consumption	Anesthesia records
	Fluid management	Intraoperative fluid volume	Anesthesia and surgical records
	Temperature management	Incidence of hypothermia	Anesthesia monitoring
	Early extubation	Time to extubation	ICU records
	Optimized analgesia	Pain control	VAS score[73]
	Early mobilization	Ambulation rate on postoperative day 1	Nursing records
	Early enteral nutrition	Time to initiation	Nutrition records
	Urinary catheter management	Catheter removal rate on postoperative day 1	Nursing records
	Functional rehabilitation intervention	Initiation time of swallowing/speech training	Rehabilitation records
Outcome	Hospital efficiency	Length of hospital stay	EMR data
	ICU utilization	ICU admission rate	Medical record system
	Complications	Clavien-Dindo classification[60]	Complication registry
	Readmission	30-day readmission rate	Follow-up
	Medical cost	Total cost	Financial system
	Swallowing function	Swallowing recovery	FOIS / EAT-10[63-64]
	Speech function	Speech intelligibility	Speech Handicap Index[61], Voice Handicap Index[62]
	Masticatory function	Masticatory efficiency	Masticatory efficiency[65-66], Mixing Ability Test (MAT)[67]
	Facial nerve function	Facial expression recovery	House-Brackmann grading[68]
	Quality of life（QoL）	Overall quality of life	EORTC QLQ-C30[74]
	Head & neck-specific QoL	Disease-specific QoL	EORTC QLQ-H&N35[71]
	Psychological recovery	Anxiety/depression	HADS / PHQ-9[69-70]
	Social reintegration	Time to return to work	Follow-up

MDT: multidisciplinary team; ERAS: enhanced recovery after surgery; SPO: structure-process-outcome; NRS-2002: Nutritional Risk Screening 2002; HADS: Hospital Anxiety and Depression Scale; PHQ-9: Patient Health Questionnaire-9; VAS: Visual Analogue Scale; ICU: intensive care unit; EMR: electronic medical record; FOIS: Functional Oral Intake Scale; EAT-10: Eating Assessment Tool-10; EORTC QLQ-C30: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire-Core 30; EORTC QLQ-H&N35: European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire - Head and Neck Module

Evidence-Based Medicine，OCEBM）证据等级标准，多项研究验证ERAS对口腔颌面外科围手术期指标的改善作用：①Bertazzoni等[5]通过前瞻性匹配队列研究（OCEBM Ⅱ级），评估了预防性使用抗生素、体液体温管理、气道管理等一系列ERAS措施在头颈鳞状细胞癌Ⅲ/Ⅳ期手术患者中的应用效果。结果显示，Ⅲ/Ⅳ期头颈鳞状细胞癌患者应用ERAS后，术后住院中位数缩短，肠内营养启动与早期活动时间显著提前[5]；②Kiong等[47]的病例对照研究（OCEBM Ⅲ级）则显示，HNRS-ERAS方案可以使患者的计划性ICU入住率显著降低，平均住院时间缩短，并发症发生率下降，且72 h内阿片类药物的使用量显著减少，验证了ERAS在减少阿片类药物使用和加速康复中的有效性；③一项关于104例头颈肿瘤切除联合游离皮瓣重建患者的前瞻性研究（OCEBM Ⅱ级）表明，ERAS组在导尿管早期拔除、早期活动等围手术期核心指标上均优于对照组。研究同时证实，通过专业化头颈病房替代传统ICU监护、制定电子病历标准化医嘱套餐等系统优化措施，可有效支持ERAS实施[26]。

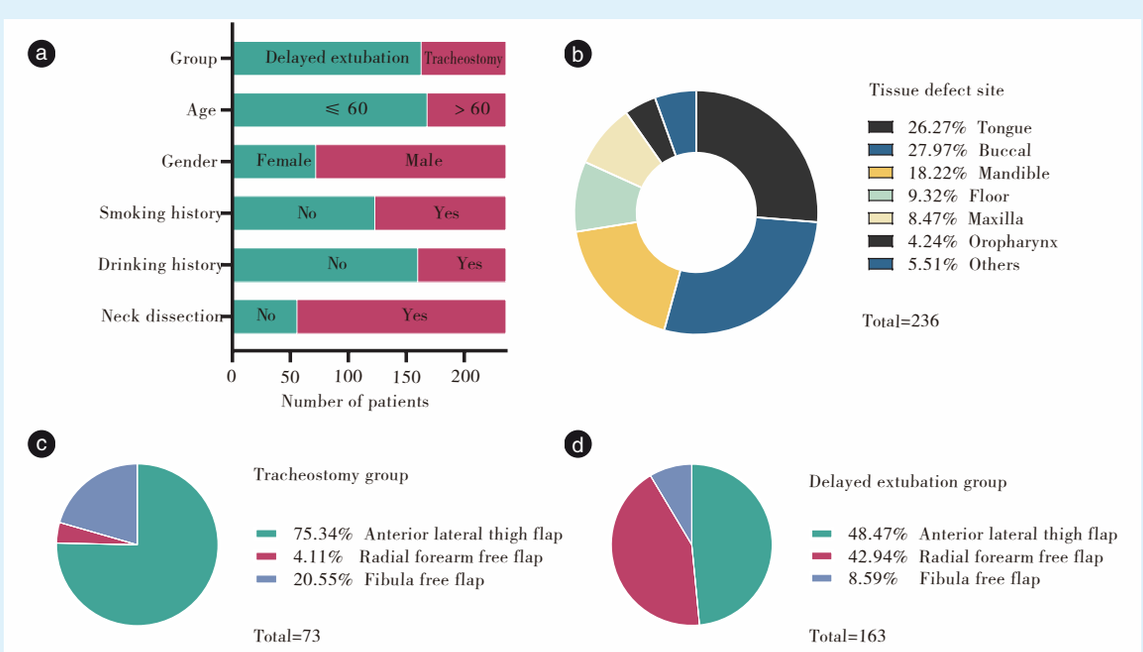
3.2　气道管理优化与延迟拔管策略

口腔颌面部肿瘤解剖区域毗邻气道，针对该区域大型手术，传统预防性气管切开术虽可保障气道安全，但相关并发症发生率较高[75-76]。近年来，延迟拔除气管插管策略逐渐受到关注，即术后保留气管插管并维持镇静状态，将患者转入ICU严密监测，并按照标准化流程实施延迟拔管。该策略可减少额外手术创伤，符合ERAS微创与快速康复理念，被认为是部分患者替代气管切开术的安全有效方案。但对于高气道风险病例，仍需基于个体化评估选择最适合的气道管理方式[50]。

3.3　延迟拔管策略的临床实践与效果评价

本课题组近年来开展了关于口腔颌面部游离皮瓣移植患者延迟拔管的回顾性队列研究（OCEBM Ⅲ级），共纳入2017年9月至2024年4月在中山大学附属第一医院口腔颌面外科治疗的符合纳入标准的患者236例，随访时间为手术后至患者出院。患者基本信息及缺损部位统计见图1a~1b。在236例患者中，有73例患者行气管切开术，163例患者延迟拔管；其中，气管切开组中腓骨瓣的使用比例高于延迟拔管组，而延迟拔管组中前臂皮瓣的使用比例高于气管切开组（图1c~1d）。

进一步统计结果显示：契合ERAS理念的延迟拔管策略（术后12~48 h拔管），较传统气管切开显



a: patient grouping and baseline characteristics (age, gender, smoking history, alcohol consumption, neck dissection status); b: distribution of defect sites; c: distribution of flap types in the tracheostomy group; d: distribution of flap types in the delayed extubation group

Figure 1　Comparison of baseline characteristics, defect locations, and flap types between the tracheostomy and delayed extubation groups in 236 patients undergoing oral and maxillofacial free flap reconstruction

图1　236例口腔颌面部游离皮瓣移植患者的气管切开组与延迟拔管组基线特征、缺损部位及皮瓣类型比较

著缩短手术时间(6.34 h *vs.* 7.48 h)、ICU住院时间(1.26 d *vs.* 2.16 d)、住院总时长(16.72 d *vs.* 28.79 d)、鼻饲周期(8.00 d *vs.* 15.60 d)及降低住院费用(93 356元 *vs.* 101 422元,表4)。总术后并发症(9.2% *vs.* 23.3%)、血肿(0.6% *vs.* 5.5%)等亦减少,体现其安全性及成本效益优势(表5)。

值得注意的是,由于延迟拔管策略的实施依赖于术中评估及术者的临床经验判断,因此在患者选择过程中可能存在与术者经验及风险偏好相关的选择偏倚。手术复杂度和气道风险相对较低的患者更倾向于实施延迟拔管策略,一定程度上导致了较短的手术时间及更快的ICU转出。其次,在本临床中心,传统气管切开术患者通常因气道管理及术后护理需要而倾向于常规转入ICU进行监护,这一决策可能导致ICU住院时间的延长。因此,未来仍需前瞻性、多中心研究进一步验证延迟拔管策略在ERAS理念下的真实获益。

表4　236例口腔颌面部游离皮瓣移植患者延迟拔管组与气管切开组的围手术期特征比较

Table 4　Comparison of perioperative characteristics between the delayed extubation and tracheostomy groups in 236 patients undergoing oral and maxillofacial free flap reconstruction　$\bar{x}\pm s$ or *n* (%)

Perioperative characteristics	Delayed extubation (*n* = 163)	Tracheostomy (*n* = 73)	t/χ^2	*P*
Postoperative complications	15 (9.2%)	17 (23.3%)	8.54	0.003
Reoperation	9 (5.5%)	8 (11.0%)	2.23	0.135
Operative time /h	6.34±1.61	7.48±1.77	−4.87	<0.001
ICU length of stay/days	1.26±0.82	2.16±3.59	−3.04	0.003
Duration of artificial nutrition /days	8.00±3.38	15.60±9.55	−8.99	<0.001
Length of hospital stay /days	16.72±6.19	28.79±10.48	−11.03	<0.001
Hospital costs /CNY	93 356±23 725	101 422±34 623	−2.05	0.042

Continuous variables were analyzed using the unpaired t-test, and categorical variables were analyzed using the chi-square test.ICU: intensive care unit. CNY: Chinese yuan

表5　236例口腔颌面部游离皮瓣移植患者延迟拔管组与气管切开组的术后并发症比较

Table 5　Comparison of postoperative complications between the delayed extubation and tracheostomy groups in 236 patients undergoing oral and maxillofacial free flap reconstruction　*n* (%)

Postoperative complications	Delayed extubation group (*n* = 163)	Tracheostomy group (*n* = 73)	*P*
Flap-related complications	6 (3.7)	4 (5.5)	0.740
Wound infection	7 (4.3)	7 (9.6)	0.360
Salivary fistula	1 (0.6)	2 (2.7)	0.310
Hematoma	1 (0.6)	4 (5.5)	0.045
Total complications	15 (9.2)	17 (23.3)	0.003

Comparisons of postoperative complications between groups were performed using Fisher's exact test

4　面临的挑战与未来发展

口腔颌面外科在推进ERAS的实践中仍面临诸多挑战,如在个体化与标准化之间的平衡难题,由于口腔颌面外科涉及的病种广泛、解剖区域特殊以及手术类型差异大,需要为不同亚专业制定具有灵活性的具体ERAS路径,尤其是复杂手术的路径制定更具挑战性;此外,器官功能障碍或多种合并症患者的管理、多学科协作的执行力、传统诊疗观念的转变以及有效康复资源的匹配等问题也亟待解决。

在未来的发展探索中,可以聚焦于开发基于人工智能或数字化的评估和决策支持工具以优化个体化路径,开展更加精准的营养评估和干预策略研究,针对高难度、特殊患者群体(如高龄、伴多重疾病)优化ERAS方案,加强心理健康管理在ERAS路径中的应用,并深入研究ERAS对包括患者功能恢复与心理健康等生存质量的长期影响[77]。针对口腔颌面肿瘤手术,在现有ERAS质量评价框架基础上,整合语言、吞咽、咀嚼、表情及心理社会功能指标,形成简明、可操作的专科化评价

体系。

总体而言，口腔颌面肿瘤ERAS仍处于发展阶段，其推广应用既面临挑战，也蕴含机遇。通过加强循证研究、完善评价体系并深化多学科协作，ERAS有望从围手术期管理策略进一步发展为促进功能恢复和社会回归的综合康复模式，为口腔颌面肿瘤患者带来更高质量的长期获益。

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官网

【通信作者简介】 王安训，主任医师，博士，1993年毕业于中山医科大学口腔系，2001年毕业于中山医科大学肿瘤学专业，获博士学位，现任中山大学附属第一医院口腔颌面外科教授、博士生导师；兼任广东省口腔医学会口腔颌面外科专业委员会副主任委员、中国抗癌协会肿瘤微创外科治疗专业委员会副主任委员。主要从事口腔颌面部肿瘤的临床及基础研究，致力于提高早期预测口腔鳞状细胞癌的侵袭转移能力以及提高口腔鳞状细胞癌疗效的研究。目前已公开发表学术论文170余篇，其中SCI论文70余篇。培养的多名研究生获得广东省优秀研究生称号和优秀研究生论文。负责多项国家级及省部级基金资助项目研究，包括教育部新世纪优秀人才支持计划、国家自然科学基金面上项目、广东省自然科学基金重点项目等。主编多本口腔医学专业著作，包括《口腔疾病》（副主编，科学技术文献出版社）、《牙槽外科手术视听教材》（主编，人民卫生电子音像出版社，“十五”国家重点音像出版规划）等。获教育部提名国家科技进步奖二等奖。