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ORIGINAL ARTICLE

Elective Tracheostomy Decannulation Practices in Head and Neck Cancer Patients Undergoing Major Oral Cavity Resection: A Global Survey

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Abstract

Elective tracheostomy is commonly performed after major oral cavity resection (OCR) to secure the airway. However, tracheostomy tube decannulation (TTD) practices vary widely, with limited head and neck cancer (HNC)-specific guidelines. This study surveyed global TTD practices to identify safe and effective approaches. A 16-item online questionnaire was distributed to head and neck surgeons and speech-language pathologists (SLPs), yielding 252 responses. Data on TTD timing, methods, monitoring, and guideline preferences were analyzed using descriptive statistics and chi-square tests. Respondents (87% India, 13% international) included qualified head and neck surgeons (74%), otolaryngologists (11%), and SLPs (7%). Most (93%) supported dedicated TTD guidelines, but only 47% used institutional protocols. Decannulation trials began 3–7 days post-OCR for 68%, with occlusion/spigotting preferred (71%) over endoscopy (28%). Post-TTD monitoring occurred in general wards (44%) or postoperative wards (24%), with 53% using pulse oximetry and 85% keeping spare tracheostomy equipment bedside. Practice variability was significant, with differences by country and experience level. Heterogeneous TTD practices highlight the need for evidence-based, HNC-specific protocols to optimize safety and timing. This first-of-its-kind survey identifies consensus areas and gaps in current practice.

Level of evidence: Level 4 (Crosssectional survey).

Keywords Tracheostomy · Decannulation · Oral cavity resection · Head and neck cancer · Protocol

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Introduction

Elective tracheostomy is a cornerstone intervention performed concurrently with major oral cavity resection (OCR) in patients with head and neck cancer (HNC) to proactively mitigate the substantial risks of postoperative airway obstruction. These risks arise predominantly from reconstructive flaps, extensive tissue edema, bleeding, or other perioperative complications that can compromise the upper airway [1]. The procedure establishes a secure airway, facilitates intraoperative ventilation, and provides a safeguard during the critical early recovery phase when swelling peaks and flap viability is closely monitored [2]. Tracheostomy tube decannulation (TTD), the deliberate removal of the tracheostomy cannula, marks a pivotal milestone in the patient's rehabilitation trajectory. Successful TTD restores physiologic breathing through the natural upper airway, reinstates effective phonation for communication, and

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normalizes swallowing mechanics, thereby significantly enhancing quality of life and reducing long-term dependency on artificial airways [3].

Although well-established guidelines govern TTD in contexts such as chronic tracheostomy management or prolonged mechanical ventilation in intensive care settings [4–6], the evidence base specific to HNC patients following OCR remains notably sparse and fragmented [7–9]. This patient cohort presents unique anatomical and functional challenges, including distorted laryngeal and pharyngeal anatomy due to tumor extirpation, heightened vulnerability to aspiration secondary to sensory-motor deficits, and variable reconstructive outcomes that influence airway patency [10]. Consequently, TTD strategies must be meticulously tailored to accommodate these complexities, balancing the urgency for decannulation against the imperative for airway safety.

This global cross-sectional survey was designed to comprehensively characterize contemporary TTD practices among clinicians actively managing HNC patients with tracheostomy after OCR. The primary objectives were to delineate prevailing approaches to timing, assessment, and monitoring; to identify domains of consensus and divergence; and to quantitatively evaluate the perceived demand for standardized, evidence-based protocols. To the best of our knowledge, this represents the inaugural study dedicated exclusively to elucidating TTD practices within this specialized oncological subpopulation, addressing a critical gap in the literature and laying the groundwork for future guideline development.

Materials and Methods

Study Design

This investigation adopted a cross-sectional survey methodology, targeting a multidisciplinary cohort of clinicians directly involved in the perioperative and postoperative management of HNC patients requiring tracheostomy subsequent to OCR. The survey instrument, comprising 16 items, was meticulously crafted through an iterative process by a multidisciplinary expert panel. This panel included qualified head and neck surgeons, otolaryngologists, reconstructive microsurgeons, and speech-language pathologists (SLPs) affiliated with a high-volume regional cancer hospital. The questionnaire underwent pilot testing for clarity, face validity, and completeness prior to dissemination. Institutional ethical approval was waived by the reviewing committee, as the study entailed no collection, storage, or analysis of identifiable patient data, focusing solely on anonymized clinician-reported practices.

Data Collection

Distribution of the survey occurred over an eight-month period from February to October 2025. Multiple channels were leveraged to maximize reach and representativeness, including targeted email invitations to members of international and national head and neck oncology societies, as well as strategic posting on professional social media platforms and online forums frequented by HNC specialists. Emphasis was placed on recruiting respondents from tertiary care academic medical centers and high-volume HNC surgical practices across diverse geographical regions to capture global variations in resource availability and clinical workflows.

Survey Content

The questionnaire was structured into three principal domains: clinician demographics, TTD clinical practices, and perspectives on protocol standardization. Demographic items elicited detailed information on country of practice, primary subspecialty, years of clinical experience, and monthly OCR caseload to enable subgroup analyses. The practice-oriented section probed specific TTD parameters, including:

- Timing of TTD trial initiation, categorized as < 3 days, 3–5 days, 5–7 days, or > 7 days post-OCR;
- Airway patency assessment modalities, encompassing occlusion or spigotting trials, flexible nasopharyngolaryngoscopy (endoscopy), and Functional Endoscopic Evaluation of Swallowing (FEES);
- Post-decannulation monitoring strategies, such as ward allocation (general ward, postoperative recovery ward, high-dependency unit, or intensive care unit), continuous pulse oximetry, bedside availability of spare tracheostomy equipment, and retention of rescue maturation stitches;
- Institutional adoption of formal TTD protocols and the perceived necessity for broader clinical guidelines.

Data Analysis

Responses were aggregated in real-time using Google Forms, with data subsequently exported to Microsoft Excel for initial cleaning and organization. Statistical analyses were conducted using SPSS version 31.0 (IBM Corp, Armonk, NY, USA). Categorical variables were summarized as absolute frequencies and percentages. Bivariate associations between clinician characteristics (experience level, geographic region, caseload volume) and TTD practices were evaluated using chi-square tests for larger contingency tables or Fisher's exact tests when expected cell counts fell below 5. A two-tailed P-value threshold of <0.05 was predefined for statistical significance. Missing data were handled via listwise deletion, with sensitivity checks performed to assess potential bias.

Results

Demographics

A total of 252 clinicians completed the survey, yielding a robust dataset for analysis. The geographic distribution was heavily skewed toward India, with 219 respondents (87%) practicing domestically, while 33 (13%) were international contributors (Singapore, $n=18$; Australia, $n=4$; UK, $n=3$; USA, $n=3$; and miscellaneous others, $n=5$). Subspecialty representation was dominated by qualified head and neck surgeons (74%), followed by otolaryngologists (11%), SLPs (7%), and oral and maxillofacial surgeons (6%). Clinical experience was stratified as >10 years (48%), 5–10 years (26%), and <5 years (26%). Monthly OCR caseloads, a proxy for institutional volume and expertise, were reported as <5 cases (37%), 5–10 cases (34%), and >10 cases (30%) (Table 1).

Table 1 Clinician demographics and TTD practices ($N=252$)

Parameter	Response	*n* (%)
Country	India	219 (87.0)
	Overseas	33 (13.0)
Subspecialty	HN Surgeons	187 (74.2)
	Otolaryngologist	28 (11.1)
	Speech-Language Pathologist	18 (7.1)
	Maxillofacial Surgeon	16 (6.3)
	Reconstructive Surgeon	3 (1.2)
Years of Practice	<5	65 (25.8)
	5–10	66 (26.2)
	>10	121 (48.0)
Monthly OCR Volume	<5	92 (36.5)
	5–10	85 (33.7)
	>10	75 (29.8)
TTD Protocol	Yes	119 (47.2)
	No	133 (52.8)
TTD Initiation	<3 days	18 (7.1)
	3–5 days	85 (33.7)
	5–7 days	87 (34.5)
	>7 days	62 (24.6)
Occlusion/Spigot	Yes	177 (70.2)
	No	75 (29.8)
Endoscopy	Yes	70 (27.8)
	No	182 (72.2)
FEES	Yes	48 (19.0)
	No	204 (81.0)
Monitoring Ward	General Ward	110 (43.7)
	Postoperative Ward	60 (23.8)
	High-Dependency Unit	37 (14.7)
	ICU	31 (12.3)
	Individual Room	14 (5.6)
Pulse Oximetry	Yes	133 (52.8)
	No	119 (47.2)
Spare Tube/Dilator	Yes	214 (84.9)
	No	38 (15.1)
Rescue Stitch	Yes	98 (38.9)
	No	154 (61.1)
Need for Protocol	Yes	235 (93.3)
	No	17 (6.7)

TTD Practices

Institutional TTD protocols were employed by only 47% of respondents ($n=119$), highlighting a notable implementation gap. Despite this, an overwhelming 93% ($n=235$) expressed strong support for the development and adoption of standardized guidelines tailored to HNC post-OCR scenarios. Initiation of decannulation trials occurred within 3–5 days for 41% of clinicians and within 5–7 days for 35%, reflecting a preference for relatively early attempts contingent on clinical stability. The occlusion or spigotting method emerged as the predominant assessment technique, utilized by 71% ($n=177$), with 61% of these practitioners maintaining occlusion for 1–2 days to evaluate tolerance. Flexible endoscopy was incorporated by 28% ($n=70$), offering direct visualization of the upper airway, while FEES was employed by 19% ($n=48$) to concurrently assess swallowing integrity and aspiration risk.

Post-TTD monitoring was most frequently conducted in general wards (44%), followed by dedicated postoperative recovery wards (24%) and high-dependency units (15%), with only a minority opting for intensive care settings. Safety precautions were variably implemented: continuous pulse oximetry monitoring was used by 53% ($n=133$), bedside spare tracheostomy equipment was universally prioritized by 85% ($n=214$), and rescue maturation stitch retention was practiced by 39% ($n=98$) to facilitate emergency re-cannulation if needed (Table 1).

Variations by Experience and Region

Subgroup analyses revealed experience-dependent differences. Clinicians with <5 years of experience were significantly more likely to retain rescue stitches (51% vs. 29% for those with >10 years; $P=0.035$), suggesting a more cautious approach among early-career practitioners, although protocol utilization rates did not differ meaningfully across experience strata (Table 2). Regional comparisons demonstrated that international respondents more frequently incorporated flexible endoscopy (42% vs. 26%

Table 2 TTD practices by years of practice

Parameter (Yes)	< 5 Years (*n* = 65)	5–10 Years (*n* = 66)	> 10 Years (*n* = 121)	*P*-value
TTD Protocol	38 (58.5%)	28 (42.4%)	53 (43.8%)	0.259
Endoscopy	19 (29.2%)	19 (28.8%)	32 (26.4%)	0.909
Occlusion/Spigot	49 (75.4%)	44 (66.7%)	84 (69.4%)	0.551
FEES	11 (16.9%)	13 (19.7%)	24 (19.8%)	0.905
Pulse Oximetry	41 (63.1%)	28 (42.4%)	64 (52.9%)	0.182
Spare Tube/Dilator	55 (84.6%)	54 (81.8%)	105 (86.8%)	0.675
Rescue Stitch	33 (50.8%)	25 (37.9%)	40 (33.1%)	0.035
Need for Protocol	61 (93.8%)	58 (87.9%)	116 (95.9%)	0.327

Table 3 TTD practices by country

Parameter (Yes)	India (*n* = 219)	Overseas (*n* = 33)	*P*-value
TTD Protocol	109 (49.8%)	10 (30.3%)	**0.037**
Endoscopy	56 (25.6%)	14 (42.4%)	**0.044**
Occlusion/Spigot	152 (69.4%)	25 (75.8%)	0.457
FEES	43 (19.6%)	5 (15.2%)	0.541
Pulse Oximetry	111 (50.7%)	22 (66.7%)	0.086
Spare Tube/Dilator	184 (84.0%)	30 (90.9%)	0.302
Rescue Stitch	80 (36.5%)	18 (54.5%)	**0.048**
Need for Protocol	211 (96.3%)	24 (72.7%)	**< 0.001**

Bold values indicate statistically significant differences ($P < 0.05$)

Table 4 TTD practices by monthly OCR volume

Parameter (Yes)	< 5 (*n* = 92)	5–10 (*n* = 85)	> 10 (*n* = 75)	*P*-value
TTD Protocol	44 (47.8%)	40 (47.1%)	35 (46.7%)	0.970
Endoscopy	31 (33.7%)	20 (23.5%)	19 (25.3%)	0.215
Occlusion/Spigot	66 (71.7%)	57 (67.1%)	54 (72.0%)	0.767
FEES	16 (17.4%)	15 (17.6%)	17 (22.7%)	0.448
Pulse Oximetry	60 (65.2%)	43 (50.6%)	30 (40.0%)	**< 0.001**
Spare Tube/Dilator	81 (88.0%)	75 (88.2%)	58 (77.3%)	0.166
Rescue Stitch	27 (29.3%)	38 (44.7%)	33 (44.0%)	0.060
Need for Protocol	81 (88.0%)	82 (96.5%)	72 (96.0%)	**0.028**

Bold values indicate statistically significant differences ($P < 0.05$)

for Indian respondents; $P = 0.044$) and rescue stitches (55% vs. 37%; $P = 0.048$), potentially reflecting enhanced access to advanced diagnostic tools. Conversely, international clinicians reported lower rates of formal institutional protocols (30% vs. 50%; $P = 0.037$), which may indicate greater reliance on individualized judgment in resource-rich settings (Table 3).

High-volume centers performing > 10 OCRs per month exhibited distinct monitoring patterns, with significantly reduced reliance on pulse oximetry (27% vs. 65% in centers with < 5 OCRs; $P < 0.001$), possibly attributable to heightened confidence in clinical assessment and streamlined workflows in specialized environments (Table 4).

Discussion

The findings of this global survey illuminate profound heterogeneity in TTD practices among clinicians managing HNC patients after major OCR, with formal institutional protocols in place for fewer than half of respondents despite near-universal recognition (93%) of the need for standardized, HNC-specific guidelines [1, 2]. This discordance underscores a critical translational gap between perceived clinical necessity and actual implementation, likely influenced by institutional resource constraints, varying levels of multidisciplinary coordination, and the absence of high-quality, context-specific evidence [3–6].

The occlusion or spigotting technique, favored by 71% of respondents, offers a pragmatic, low-resource method for assessing airway tolerance by temporarily restoring upper airway airflow. However, this approach inherently increases inspiratory and expiratory resistance, often necessitating the use of fenestrated tracheostomy cannulas to minimize work of breathing and prevent patient discomfort [11, 12]. In contrast, flexible endoscopy, adopted by 28%, provides an objective, real-time evaluation of glottic patency, subglottic stenosis, and vocal cord mobility, potentially enabling earlier and safer decannulation in anatomically complex cases [13]. The underutilization of FEES (19%) is particularly noteworthy, given its established role in quantifying aspiration risk and guiding swallowing rehabilitation—functions of paramount importance in HNC patients with compromised aerodigestive coordination [14].

Post-decannulation monitoring predominantly in general or postoperative wards (67% combined) rather than intensive care units (12%) reflects a pragmatic balance between patient safety and efficient resource utilization, especially in high-volume settings where bed turnover is prioritized. Bedside spare tracheostomy equipment (85%) emerged as the most consistent safety measure, underscoring universal acknowledgment of the need for immediate re-cannulation capability [15]. Pulse oximetry (53%) and rescue stitch retention (39%) displayed greater variability, with the latter more prevalent among less experienced clinicians and international respondents, possibly reflecting differing thresholds for risk aversion and emergency preparedness [7–10].

Experience- and region-based disparities further highlight the influence of training paradigms and infrastructure. Novice clinicians' preference for rescue stitches aligns with a conservative, protocol-driven mindset honed during residency, whereas seasoned practitioners may rely more on clinical acumen [16]. International adoption of endoscopy likely stems from superior equipment availability and reimbursement structures, while the paradoxically lower protocol usage abroad suggests that advanced settings may favor flexible, case-by-case decision-making over rigid algorithms [17]. High-volume centers' reduced dependence on pulse oximetry may indicate streamlined triage protocols and multidisciplinary confidence, though this warrants validation to ensure safety is not compromised.

These observations resonate with prior literature documenting elevated TTD failure rates in extensive resections (e.g., total glossectomy with bulky flap reconstruction) and the salutary effects of interdisciplinary collaboration involving surgeons, SLPs, and intensivists [16, 17]. The survey's limitations merit acknowledgment: its concise format may have omitted granular details such as cuff deflation trials, cough peak flow measurements, or progressive tube downsizing strategies. Further, the survey did not collect or stratify data according to surgical variables, including type/extent of resection (partial vs. composite), presence/extent of mandibular resection, involvement of oropharynx vs. pure oral cavity, reconstructive technique (local/regional vs. free flap, flap bulk/volume), or operative duration—all of which can substantially influence postoperative airway edema, flap viability monitoring needs, and TTD timing. Similarly, patient-specific functional parameters such as aspiration risk, FEES findings, cough strength, secretion management, and postoperative feeding modality (e.g., Ryle's tube vs. early oral) were not captured, despite their established role in safe decannulation decision-making. These omissions reflect the survey's focus on clinician practices rather than individual patient outcomes or predictors of TTD success/failure.

Finally, while the questionnaire was iteratively developed and pilot-tested by a multidisciplinary expert panel for clarity, face validity, and completeness, it was not formally validated against an external standard or subjected to test-retest reliability assessment, which could introduce variability in response interpretation. The modest international sample ($n=33$) limits extrapolation to non-Indian contexts, and self-reported data are susceptible to recall and social desirability biases. Finally, targeted distribution channels may have underrepresented clinicians in low-resource or non-academic environments.

Conclusion

Tracheostomy tube decannulation following major oral cavity resection for head and neck cancer is characterized by marked practice variation, with only 47% of surveyed clinicians employing institutional protocols despite 93% advocating for standardized, HNC-specific guidelines. Occlusion-based assessment predominates, yet advanced modalities like endoscopy and FEES remain underutilized, and post-TTD monitoring strategies reflect resource-driven compromises. Subgroup differences by experience, region, and caseload underscore the need for adaptable yet evidence-based frameworks. Future initiatives should prioritize prospective validation of multidisciplinary TTD protocols that integrate patient-specific risk stratification, objective airway and swallowing assessments, and scalable safety measures to optimize outcomes while accommodating diverse healthcare settings.

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Data availability Data are available upon reasonable request from the corresponding author, subject to institutional restrictions.

Declarations

Conflict of interest None declared.

Ethical approval Ethical approval was waived, as no patient data were collected.

IRB approval This study was a survey of clinicians and did not involve patient data or human subjects, so an institutional review board (IRB) waiver was obtained.

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