



This month's top papers: July 2025

Welcome to the latest blog in the literature podcast from the NTSP. We try to bring you a quick roundup of what is hot in the world of tracheostomy and laryngectomy publications by scouring internationally recognised journals and media and bringing you the highlights.

The papers we will discuss this month are detailed below, along with an automated transcript of the podcast. Please note that the transcript is generated by AI and so may not be totally accurate.

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This month's top papers

- Effects of active cycle of breathing techniques combined with external diaphragm pacing on respiratory function recovery in severe stroke patients with tracheotomy.
- Development and acceptability testing of a tracheostomy decision support video for parents.
- Ultrasonography of the process of esophageal speech in three laryngectomy cases.
- Biofilm Formation on Endotracheal and Tracheostomy Tubing: A Systematic Review and Meta-Analysis of Culture Data and Sampling Method.

Effects of active cycle of breathing techniques combined with external diaphragm pacing on respiratory function recovery in severe stroke patients with tracheotomy.

Lay Summary:

This study analyzed a large national database of over 5,200 surgical records to identify the risks and complications associated with Accidental Tracheostomy Decannulation (ATD)—a life-threatening event where a child's breathing tube is accidentally dislodged. The core objective was to determine how often ATD occurs and what factors put pediatric patients at the highest risk.



The analysis found that ATD occurred in 1.8% of patients, but the timing of the risk was critically concentrated: nearly half of all events (42%) happened in the highly vulnerable first two days after the original surgery. The study identified two key patient factors independently associated with a higher risk of ATD: female patients and children with an underlying structural abnormality in their lungs or airway.

When ATD occurred, the consequences were severe, contributing to major complications. It was associated with a higher risk of needing an unplanned second surgery and an increased incidence of developing pneumonia. The study concludes that ATD is a serious postoperative risk. Identifying patients at high risk—especially in the crucial first 48 hours—is essential for implementing targeted safety measures and quality improvement initiatives to mitigate patient harm.

Summary for Healthcare Professionals:

This retrospective cohort study utilized the National Surgical Quality Improvement Program Pediatric (NSQIP-P) dataset (2012–2021) to quantify the incidence and identify independent prognostic risk factors for Accidental Tracheostomy Decannulation (ATD) in 5,229 pediatric patients. The analysis found an overall ATD incidence of 1.8% (n=93).



A critical finding regarding timing was that 42% of ATD events occurred within the first two postoperative days, highlighting the acute, high-risk period. Multivariable logistic regression analysis, validated by propensity score matching, identified two independent patient characteristics associated with increased risk of ATD: female gender ($P=0.002$) and structural pulmonary/airway abnormality ($P=0.016$).

Furthermore, ATD was independently associated with significant morbidity, increasing the likelihood of an unplanned reoperation ($P < 0.001$) and postoperative pneumonia ($P=0.024$). The authors conclude that ATD is a serious and preventable postoperative adverse event. Identifying the highest-risk demographic and clinical factors, coupled with intensified monitoring during the critical 48-hour period, is essential for guiding targeted quality improvement initiatives and mitigating the associated morbidity.

Development and acceptability testing of a tracheostomy decision support video for parents.

Lay Summary:

This study focused on developing a clinical video intervention to help parents facing the difficult decision of whether to place a tracheostomy tube in their critically ill child. The decision is complex and high-stakes, requiring parents to weigh options such as prolonged life support, lifelong technology dependence, or prioritizing comfort care. Since parents are often not provided education on the process of shared decision-making (SDM), they can feel unprepared to participate fully in the decision.



The result of the project is a 17-minute video that uses a unique approach: it features the personal narratives of eight real parents who had faced a tracheostomy decision for their child. The video intentionally included parents who chose the tracheostomy and those who did not, as well as parents whose children survived and whose children died, to provide a balanced and diverse set of experiences.

When 18 other parents reviewed the video, the feedback was largely favorable. They found the video "helpful," appreciated the diversity of cases, and felt it would empower them to ask questions and voice their opinions to the medical team. Crucially, many parents noted feeling a connection to the emotions expressed by the peers in the video, saying it would help parents facing the decision feel less alone during an isolating experience. The authors conclude that video education featuring parents' perspectives is a valuable tool to support and enhance parental engagement in the difficult pediatric tracheostomy decision-making process.

Summary for Healthcare Professionals:

This study outlines the development and acceptability testing of a clinical, bedside decision support video featuring peer parent narratives, intended to enhance Shared Decision-Making (SDM) for pediatric tracheostomy. The rationale addresses the complexity of pediatric tracheostomy decisions—which range from anatomical to neurological indications—that make standard, outcome-specific decision aids impractical. The intervention, a 17-minute video, was structured around core SDM elements, integrating physician narration to explain the process with emotionally resonant parent narratives showcasing diverse experiences, decisions, and outcomes.



Acceptability testing was performed with 18 parents who had previously faced the decision. The qualitative analysis yielded generally favorable feedback. Parents consistently reported that the video would have been helpful in their own decision process and explicitly appreciated the diversity of cases represented.

The key finding is the video's potential to empower parents to actively engage. Parents felt the video would encourage them to ask questions and voice opinions to the medical team. Furthermore, the peer narratives offered a significant emotional support benefit, helping parents feel less isolated and connecting with shared experiences of worry and apprehension. The authors conclude that this parent-focused, SDM education tool is a feasible, acceptable, and highly complementary strategy to support parent engagement in high-stakes pediatric decision-making.

Ultrasonography of the process of esophageal speech in three laryngectomy cases.

Lay Summary:

This pioneering study used a specialized ultrasound technique to visually demonstrate how patients who have had their voice box surgically removed (laryngectomy) are able to produce speech. This form of communication, known as esophageal speech, involves swallowing air and then releasing it to create a sound vibration in the throat area. Understanding this process visually is a major step forward, as traditional methods cannot easily capture the motion of the internal organs.



The researchers tracked three different patients with highly varied surgical reconstructions: one using the natural esophagus, one using a gastric tube, and one using a jejunal graft (part of the intestine) to reconstruct their throat. Using a portable ultrasound probe placed on the neck, the team was able to successfully visualize and measure the movement of these reconstructed organs during the three critical phases of speech production: rest, air swallowing, and phonation (sound creation).

The findings provided concrete measurements of these internal changes. For instance, air swallowing caused the reconstructed organ to adopt an oval shape. During the final phase of speech production, the width of the organ significantly shortened. This technique provides clinicians and speech therapists with a valuable, non-invasive tool to better understand, evaluate, and guide the complex voice rehabilitation process for survivors of head and neck cancer.

Summary for Healthcare Professionals:

This single-center case series evaluated the feasibility and utility of diagnostic ultrasonography in visualizing and quantifying the biomechanical process of esophageal speech (ES) in patients with total laryngectomy (TL) and diverse pharyngeal reconstruction. The sample comprised three patients who had undergone distinct surgical techniques: reconstruction using the native esophagus, a gastric tube reconstruction, and a free jejunal graft reconstruction.



The methodology involved using a linear ultrasound probe to observe organ vibration and dimensions at the C5-C7 cervical vertebrae during three phases: rest, air swallowing, and phonation (sound production). The primary finding confirmed that ultrasonography successfully visualized the dynamic anatomical changes associated with ES across all reconstruction types. Quantitative results demonstrated measurable changes in the cross-sectional lateral and anteroposterior diameters of the reconstructed segment. Specifically, air swallowing was consistently observed to induce an oval organ shape, and the lateral diameters significantly shortened during sound production. For the jejunal graft, longitudinal motion coinciding with villi movement was also noted.

The study concludes that diagnostic ultrasound is a feasible, non-invasive tool that provides unique visualization and quantification of the underlying biomechanics of ES following various complex head and neck surgical procedures. This novel application offers valuable objective data that can inform and refine individualized speech rehabilitation strategies guided by speech-language pathologists.

Biofilm Formation on Endotracheal and Tracheostomy Tubing: A Systematic Review and Meta-Analysis of Culture Data and Sampling Method.

Lay Summary:

This study is a systematic review of clinical research on the invisible but dangerous layer of bacteria, known as biofilm, that forms inside breathing tubes, such as endotracheal tubes and tracheostomy tubes. This biofilm is a major public health concern because it acts like a sticky, protective shield for microorganisms, allowing them to thrive and cause or spread severe lung infections like ventilator-associated pneumonia (VAP).



Researchers analyzed nearly 50 clinical microbiology studies from the last two decades to identify which types of germs are most common and how doctors can best test for them. The analysis identified 30 different types of bacteria, confirming that the microbial profiles found on both endotracheal tubes and tracheostomy tubes are essentially comparable. The most prevalent colonizer found on all tubes was *Pseudomonas*, followed by *Klebsiella*, *Staphylococcus*, and *Acinetobacter*.

The study also investigated the best way to monitor this infection risk without having to remove the tube. The findings showed that simply taking a sample of tracheal aspiration (suctioning a liquid sample from the airway) can effectively identify the bacteria living in the biofilm. This is a crucial finding because it means doctors can monitor for infection risk using existing, non-invasive procedures. The clear conclusion is that *Pseudomonas* is the most common threat, and tracheal aspiration should be routinely used to track and manage this significant infection reservoir.

Summary for Healthcare Professionals:

This systematic review and meta-analysis synthesized data from 49 clinical microbiology studies (2000–2024) to characterize the biofilm microbiome associated with both endotracheal tubes (ETTs) and tracheostomy tubes and to assess the impact of various sampling methods. The objective addresses the known function of biofilm as a reservoir contributing to the development and relapse of Ventilator-Associated Pneumonia (VAP).



The analysis identified 30 distinct microbial genera. The findings confirm that the microbial profiles of ETTs and tracheostomy tubes are comparable, with a strong correlation observed between the two device types. *Pseudomonas* emerged as the most prevalent colonizer overall, followed by *Klebsiella*, *Staphylococcus*, and *Acinetobacter*. Specifically, *Pseudomonas* was found to be more prevalent in tracheostomy tubes. The comparison of sampling methodologies revealed that tracheal aspiration effectively identifies the constituents of the biofilm, showing a correlation with direct tube cultures. While coagulase-positive *Staphylococci* were more common in aspirates, and coagulase-negative *Staphylococci* in direct cultures, the overall data supports the clinical utility of aspiration. The authors conclude that given the comparable microbial profiles and the prevalence of *Pseudomonas*, tracheal aspiration provides a valuable and viable clinical tool for monitoring and analyzing biofilms without necessitating device removal. This informs strategies for VAP prevention and management using existing microbiology protocols.

Scientific abstracts and references



Top Stroke Rehabil. 2025 Jul 24:1-10. doi: 10.1080/10749357.2025.2502723. Online ahead of print.

Effects of active cycle of breathing techniques combined with external diaphragm pacing on respiratory function recovery in severe stroke patients with tracheotomy.

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BACKGROUND: Stroke causes a variety of dysfunctions, and thus the rehabilitation of such patients is important. The respiratory rehabilitation is necessary for stroke patients undergoing tracheotomy. The aim of this study was to provide evidences for a new rehabilitation program of the combination of active cycle of breathing technique (ACBT) with external diaphragm pacing (EDP) for the improvement of respiratory rehabilitation in severe stroke patients with tracheotomy. **METHODS:** Data were collected from 50 patients, who received conventional therapy and ACBT. Among these patients, 25 cases additionally received EDP therapy. The therapeutic effects of the treatment were evaluated by assessing diaphragmatic ultrasound, arterial blood gas analysis, chest CT examinations and rehabilitation scale scores at 3 time points of prior treatment, 3 weeks and 6 weeks after treatment. **RESULTS:** The data analyzed in this study showed that after the treatment, the diaphragmatic excursion and thickening rate, PaO₂ showed increased, PaCO₂, Borg and VAS scores were decreased compared to the data before the treatment, in both ACBT and ACBT+EDP groups. What is noteworthy is that the data above showed more improved in ACBT combined with EDP group than that in ACBT alone group. **CONCLUSION:** The combination method of ACBT plus EDP improves the respiratory function more significantly compared to the application of ACBT alone. Severe stroke patients can try to use this method, so as to improve the respiratory function and promote functional recovery.

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Development and acceptability testing of a tracheostomy decision support video for parents.

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OBJECTIVE: To develop a clinical, bedside intervention with peer parent narratives to help parents understand the shared decision-making (SDM) process, their role in the decision, and other parents' considerations in this context. **PATIENT INVOLVEMENT:** To ensure that the intervention reflected parents' needs, we identified eight parents who had faced a tracheostomy decision for their child and were willing to talk about their experiences on a video recording. Half of the parents had chosen tracheostomy; some children of parents making either choice had died. We included parents of diverse racial backgrounds whose children had different diagnoses. Parent interviews, along with an explanation of SDM for parents, were edited into a 17-min video guided by iterative feedback from parents and clinicians. Additional parents of children with tracheostomies then viewed the video and shared perceptions about acceptability. **METHODS:** After an iterative process of developing the video in partnership with parents, we piloted the video with 18 parents in 16 online interviews (two were couples) who were not part of video development but had faced a tracheostomy decision for their child within the last three years. Participants were asked about their experiences, viewed the video, and provided verbal feedback and reflection on the acceptability of the video and its anticipated clinical use. Interviews were transcribed and qualitatively analyzed, focusing on feedback. **RESULTS:** Parents who viewed the video provided generally favorable feedback, describing the video as "helpful," and appreciating the diversity of the cases represented and the perspectives offered. They felt that it could empower parents to ask questions and voice their opinions to the medical team. Parents noted feeling a connection to the emotions expressed by the parents in the video and felt it would help parents facing these decisions to feel less alone. **DISCUSSION/PRACTICAL VALUE:** Video education focusing on parents' perspectives may help support the SDM process for pediatric tracheostomy and complement other strategies to support parent engagement. Similar approaches may be valuable in explaining SDM to patients or families facing other serious decisions.

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Ultrasonography of the process of esophageal speech in three laryngectomy cases.

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AIMS: To visualize the process of esophageal speech in patients who underwent laryngectomy using diagnostic ultrasound. **MATERIAL AND METHODS:** Three patients with different surgical reconstructions (total laryngectomy, pharyngo-laryngo-esophagectomy with gastric tube reconstruction, and pharyngo-laryngo-cervical-esophagectomy with free jejunal reconstruction) were studied. Ultrasound with a linear probe observed organ vibration and dimensions at the 5th-7th cervical vertebrae during rest, air swallowing, and phonation. Cross-sectional lateral and anteroposterior diameters were measured. **RESULTS:** Lateral diameters (mm) during rest, air swallowing, and sound production were 15, 18, and 15 for the esophagus; 24, 27, and 23 for the gastric tube; and 19, 32, and 20 for the jejunal graft, respectively. Longitudinal motion of the esophagus and gastric tube lumen coincided with artifact, while jejunal villi movements were noted. Air swallowing induced an oval organ shape, and lateral diameters shortened during sound production. **CONCLUSIONS:** Vibratory activity spanning over 4 cm was observed at the 5th-7th cervical vertebrae. Each organ displayed distinct vibration patterns, with luminal shape changes during sound production. These findings offer new insights into the biomechanics of esophageal speech and understanding of postoperative rehabilitation.

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Biofilm Formation on Endotracheal and Tracheostomy Tubing: A Systematic Review and Meta-Analysis of Culture Data and Sampling Method.

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Biofilm formation on tracheal tubing is a key risk factor for ventilator-associated pneumonia. Endotracheal tube microbiology has been systematically reviewed, but tracheostomy tube profiles have not. Analysis of the tube-associated microbiome is not standardised, and sampling methods are varied. We compared the reported microbiomes of endotracheal and tracheostomy tubes and examined the impact of sampling by tracheal aspiration or direct culture. We searched PubMed, SCOPUS, and Web of Knowledge for clinical microbiology studies from 2000-2024, extracting tubing type, sampling method, and the most prevalent genera identified. Genera were compared by Spearman's rank correlation and pairwise analyses by Šidák's test. Extraction from 49 studies identified 30 genera. *Pseudomonas* was the most prevalent in all conditions followed by *Klebsiella*, *Staphylococcus*, and *Acinetobacter*. 25 studies performed tracheal aspiration, and 22, direct culture. Two studies used both methods. Correlation was observed between endotracheal and tracheostomy tubes, and aspirates and direct cultures (Spearman's $\rho = 0.69$; 0.59). *Pseudomonas* were more prevalent in tracheostomy tubes ($p < 0.0001$). Coagulase-positive *Staphylococci* were more common in tracheal aspirates, and coagulase-negative *Staphylococci* in direct culture. The microbial profiles of endotracheal and tracheostomy tubes are comparable, with *Pseudomonas* being the most common coloniser. Our analyses suggest that tracheal aspiration can effectively identify the constituents of biofilms without requiring tube removal, making it a valuable tool for clinical researchers to analyse or monitor biofilms before extubation or device failure using existing microbiology procedures.

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