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The role of speech and language therapy in critical care

The role of speech and language therapists (SLTs) in critical care can be unclear so this article sets out the scope of practice to increase awareness of the value of SLTs as part of the wider multidisciplinary team.

Speech and language therapists (SLT) are trained to deliver specialist clinical services to adults with a broad range of disorders, including hearing impairment, motor speech disorders (dysarthria, dyspraxia), acquired language disorders (dysphasia), voice problems (dysphonia), and swallowing problems (oropharyngeal dysphagia [OD]). These are often linked to an acquired neurological disorder, such as stroke, traumatic brain injury, Parkinson's disease and dementia, although other acute conditions may affect these functions, especially when linked to respiratory dysfunction requiring tracheostomy and ventilation. The role of SLT within critical care has increased as patients with complex impairments are sedated less and experience communication and swallowing impairments. These functions are frequently seen as a return to normality during the process of recovery and a measure of quality of life (Segaran 2006; Carroll 2007; Karlsson et al. 2012; Engstrom et al. 2013). There are few UK-based studies evaluating SLT interventions in critical care; however, as the number of National Institute for Health Research fellowships for Allied Health Professionals (AHP) increases it is hoped that this will generate the research needed to provide evidenced-based therapy.

Normal swallowing and speech functions

Swallowing employs the same range of muscles and nerves as those required for breathing and speaking, namely the pharynx, larynx, tongue and lips. The swallow is described in three phases (Groher and Crary 2015), although these are interlinked and dependent on each other to be effective (**Figure 1**). The oral phase requires volitional control of a bolus, either food or fluid, in preparation for swallowing; this includes chewing food using the full range of tongue and jaw movements and holding the food within the oral cavity using lip closure. The tongue then pushes this bolus posteriorly into the pharynx, triggering a series of reflexive movements to move the laryngeal structure vertically and anteriorly. These biomechanical movements are essential for a three-way closure of the glottis, to protect the airway from penetration—true and false vocal cords adduct and the epiglottis provides additional cover and redirection of the bolus towards the oesophageal entrance, which opens biomechanically with vertical and anterior laryngeal movement. It is for this reason that you may see an SLT assessing swallowing through midline palpation of the larynx to determine swallow timing and range of hyolaryngeal movement to indicate swallow completion. The adjacency of the airway next to the oesophageal entrance means that any mistiming or obstruction of the swallow movement can result in the entrance of food or fluid directly into the airway. The cough reflex is a strong airway-protective mechanism designed to expectorate foreign bodies. However, in patients who are intubated, these reflexes are often absent (Kallesen et al. 2016), increasing the risk of aspiration. If overt signs of coughing are absent, this is described as silent aspiration. To fully understand the breakdown and remediate the problem requires early recognition of risk factors and assessments sensitive to dysphagia. Bedside evaluation cannot always determine the effectiveness of pharyngeal clearance or airway protection.

> "the role of SLT within critical care has increased as patients with complex impairments are sedated less and experience communication and swallowing impairments"

Dysphagia management

Oropharyngeal dysphagia is often the primary reason for SLT referral in ICU, with its recognised link to increased risk of aspiration pneumonia and subsequent mortality (Altman et al. 2010). At the acute stage this is mainly related to effective oral secretion management, as patients who swallow infrequently or ineffectively risk aspirating saliva with a high bacterial load. This increases the risk of ventilator-associated pneumonia, so SLTs often deal with optimising oral hygiene and hydration in the early stages before fluid and food trials can be evaluated. Although early identification and management of dysphagia is recommended to reduce risk, access to SLT can be limited due to low staffing and lack of specialist skills. SLTs are often

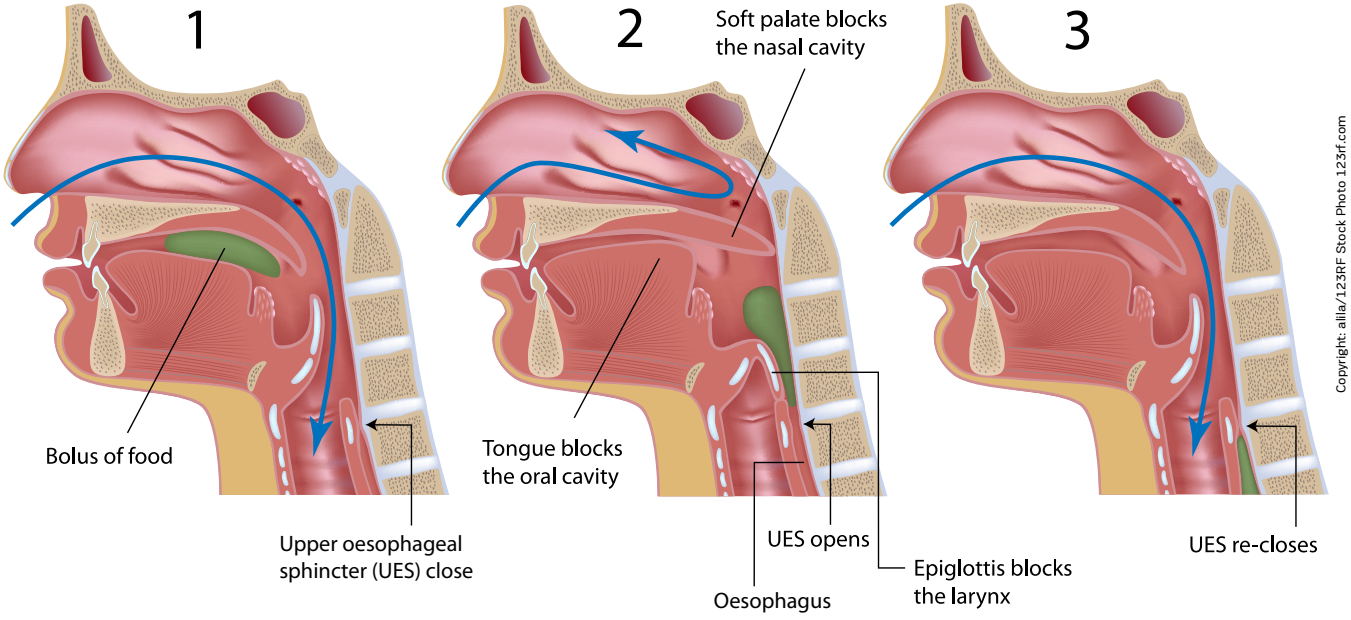

Figure 1. Three stages of swallowing 1. Oral stage involves the manipulation of the bolus whilst normal breathing continues; 2. Pharyngeal stage - the swallow triggers a series of movements to protect the airway whilst the bolus passes through the pharynx; 3. Oesophageal stage - the bolus travels through the oesophagus and normal breathing resumes.

viewed as peripatetic services to ICU with referrals made by the medical team following a process of screening for swallowing difficulties by nursing staff (Cichero et al. 2009). A swallow screen should include an evaluation of oral motor functions, such as lip and tongue movements, voice, cough and swallow trials with varied consistencies to evaluate timing of swallowing and abnormal responses to food and drink. Currently there are no validated swallow screening tools for ICU patients; existing tools have been developed for use with stroke patients (Trapl et al. 2007; Martino et al. 2009; Edmiaston et al. 2010) and may be unreliable.

For patients requiring tracheostomy and ventilation both motor and sensory laryngeal function can be altered following intubation (Skoretz et al. 2010; Macht et al. 2011; Moraes et al. 2013), and disruption to normal breath-swallow synchrony can affect timing of swallowing (Martin-Harris et al. 2005; Terzi et al. 2007; Nishino 2012), leading to an increased risk of silent aspiration. A number of studies have reported OD as a feature of non-neurological patient subgroups, such as sepsis (Zielske et al. 2014), acute lung injury (Brodsky et al. 2014), ARDS (Brodsky et al. 2016), cardiac surgery (Daly et al. 2016), critical illness polyneuropathy (Ponfick et al. 2015) and spinal cord injury (Shem et al. 2012), suggesting a respiratory link. These impairments cannot be easily detected by screening tools so instrumental assessments of swallowing are recommended, namely videofluoroscopy (VFS) and fibreoptic endoscopic evaluation of swallowing (FEES). These are employed by SLTs with specialist competency training (Royal College of Speech and Language Therapists 2013; 2015) and provide different information on swallowing functions.

The VFS examination takes place in a radiology department and requires transfer of the medically stable patient. During the examination, a patient is sat upright and required to eat and drink a range of food textures coated with barium sulphate contrast that are video x-rayed to identify timing, efficiency and safety of swallowing across all phases (Logemann 1993). Aspiration of this material can cause harm, so this examination may need to be modified for patients requiring ventilation and is not suitable for those who need to remain supine or are haemodynamically unstable. FEES is a more accessible assessment (Langmore 2001) that can be undertaken at the bedside within the ICU using a video-nasendoscope. It provides a direct view of the pharynx and larynx only and helps to identify structural impairments and physiological responses to secretions and food trials, in terms of swallow timing, pharyngeal clearance and airway protection. Although aspiration is the key indicator of swallow safety, the role of the SLT is to identify the cause of breakdown and to trial strategies aimed at reducing risk of aspiration in order to facilitate safe oral intake. A number of studies have employed FEES to identify OD in post-extubation patients (Leder et al. 1998; Hafner et al. 2008; Scheel et al. 2015). For scenarios where swallow safety is at high risk and airway protection is limited, a decision may

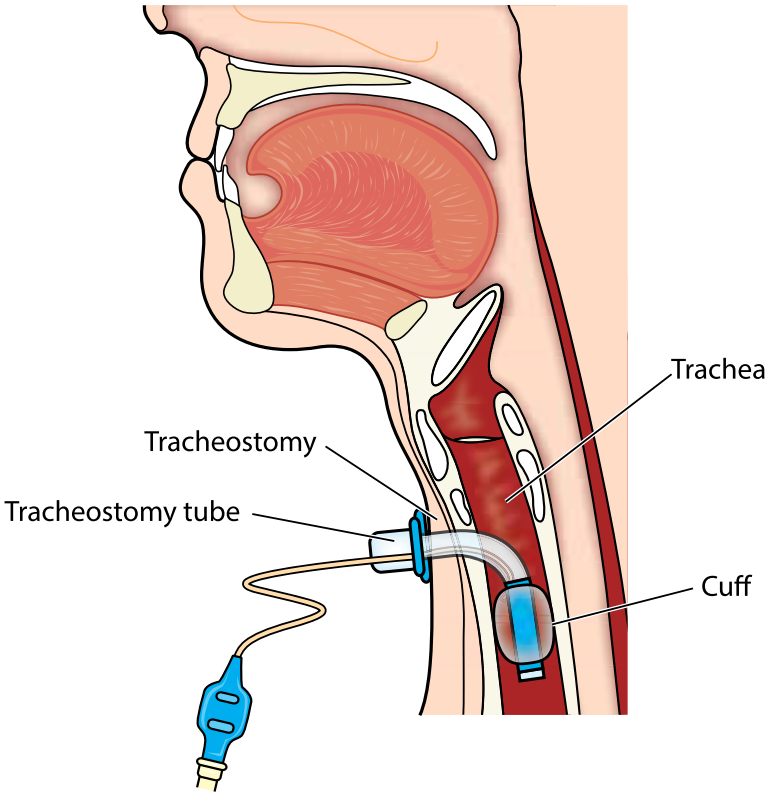

Figure 2. Cuffed tracheostomy within trachea directs airflow away from larynx and upper airway

be made to keep a patient nil by mouth and optimise nutrition through non-oral routes, after discussion with the wider team.

> **"voice work can be employed to increase laryngeal lift and vocal cord adduction"**

SLTs are trained to plan and deliver a number of therapeutic interventions to manage the impairments that cause OD (Martino and McCulloch 2016). These can target an identified impairment, such as reduced hyolaryngeal elevation, through strengthening exercises or strategies. Treatment approaches include exercises to increase range and strength of lip and tongue movements, including resistance exercises. Voice work can be employed to increase laryngeal lift and vocal cord adduction and a number of swallow strategies have been developed to target specific impairments (Logemann 2006), such as the Shaker, Masako and Mendelsohn manoeuvres, Effortful swallow and Facial Oral Tract Therapy (Hansen and Jakobsen 2010). Alternatively, the risk of aspiration can be reduced through compensatory approaches that do not remediate the swallow problem. This approach is suitable for patients with cognitive or language problems who are unable to comply with exercises. The use of thickened fluids can be employed for patients who are unable to control fluids in the mouth or have a delayed swallow initiation. These impairments have to be verified on instrumental assessment as inappropriate use of thickener can have negative consequences (Cichero 2013). Similarly, diet modifications, such as purée or soft mashed food have to be used in relation to the oral and pharyngeal swallow impairment and their use monitored.

Communication

The ability to communicate and interact with their environment is a key concern for many patients in critical care, especially during intubation and ventilation whilst awake (Karlsson et al. 2012; Guttormson et al. 2015). This poses challenges for staff interaction and the verification of capacity (Wojnicki-Johansson 2001). A number of alternative methods are available, which range from low-technology aids, such as picture or alphabet charts (Radtke et al. 2011) to high-technology systems such as eye-gaze systems, although individual assessment is required as one device may not be suitable for all patients (ten Hoorn et al. 2016). The most effective method of communication is speech, and for those being ventilated via a tracheostomy this can only be achieved when the cuff is deflated (**Figure 2**). This can be done gradually as part of a ventilator weaning process termed laryngeal weaning, using collaborative team-working to include SLTs and respiratory physiotherapists to evaluate respiratory and laryngeal functions. This differs from respiratory weaning whereby the cuff remains inflated whilst the patient is trained to self-ventilate. A short-term alternative is a method termed

Table 1. SLT involvement along the critical care pathway

SLT role	SLT action
Early interventions: Patient intubated or tracheostomy in situ	• Monitor oral mucosa for change and support regular oral hygiene and moisturisation • Maintain range of oral-motor and swallow movements • Review secretion control for either dry mouth or excess saliva • Consider early communication options
Patient starts weaning from ventilator	• Evaluate laryngeal function to anticipate barriers to weaning (using flexible nasendoscopy) • Support laryngeal wean through facilitation of cuff deflation • Monitor swallow for effective secretion management, consider swallow trials following FEES evaluation • Review communication and encourage use of voice with increased translaryngeal airflow
Post-decannulation	• Facilitate progress to full oral diet • Review voice, communication skills and intelligibility

above-cuff vocalisation (ACV) (McGrath et al. 2015), which uses an external air source through a subglottic suction port to achieve phonation whilst the tracheostomy cuff remains inflated. This has also been found to benefit laryngeal functions for swallowing (McGrath et al. 2018).

SLTs contribute to team decision-making and rehabilitation goals throughout the patient's pathway

Supporting tracheostomy weaning

Guidance set out by the Royal College of Speech and Language Therapists (2014) identified SLTs as being integral to the multidisciplinary environment of critical care and involved in the weaning process for tracheostomy and ventilator-dependent patients in addition to the rehabilitation of swallowing and communication difficulties. These needs were highlighted in the National Institute for Health and Care Excellence (NICE) guidance for rehabilitation after critical illness (2009), although a national audit of tracheostomy care (National Confidential Enquiry into Patient Outcomes and Death 2014) found delays to SLT referral for tracheostomy patients and a lack of access to FEES procedures to support clinical decision-making.

Conclusion

SLTs are considered a key member of many teams, linking up with physiotherapy, occupational therapy, nursing care, pharmacy and dietetics to deliver early therapeutic interventions for speech and swallowing. Early interventions will translate to prevention of complications and potential reduction in length of stay (**Table 1**). SLTs also add professional value by contributing to team decision-making and rehabilitation goals throughout the patient's pathway, in line with Quality Standard 158 (National Institute for Health and Care Excellence 2017), especially as they often work across wards and may follow the patient through their rehabilitation and into the community. A current challenge is the lack of directly-funded SLT services in ICU despite support from the guidelines for the provision of intensive care services (GPICS) (Faculty of Intensive Care Medicine and Intensive Care Society 2015). This limits both clinical involvement and professional development within teams that contribute to changing culture and practice.

There is currently no post-registration training programme for critical care skills so SLTs require clinical experience alongside other team members to develop their competencies, with a minimum banding level of band 7 with senior support or band 8a if sole clinician (nhsemployers.org/your-workforce/pay-and-reward/agenda-for-change/pay-scales). As this is a small professional group an online forum has been set up to provide support, share practice and problem-solve about situations specific to critical care. Education is provided through Clinical Excellence Networks (CEN) for tracheostomy, dysphagia and FEES/VFS. A new Twitter group, @CriticalCareSLTs links SLTs to the wider critical care world with responsive interactions, strategic discussions and an opportunity to share examples of practice which raise awareness of our role. ■

Conflict of interest

Jackie McRae declares that she has no conflict of interest.

Abbreviations

FEES fibreoptic endoscopic evaluation of swallowing
ICU intensive care unit
OD oropharyngeal dysphagia
SLT speech and language therapists
VFS videofluoroscopy

References

For full references, please email editorial@icu-management.org or visithttps://iii.hm/k6y