Position paper: The role of speech and language therapy in upper airway disorders within adult respiratory services

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Contents

1. Key recommendations

I. To use the term upper airway disorders within adult respiratory services is to differentiate between upper and lower respiratory disorder and broader SLT clinical populations related to dysphagia.

II. RCSLT supports the adoption of the international consensus taxonomy 'inducible laryngeal obstruction' (ILO). Speech and language therapists (SLTs) working within the field of upper airway disorders should use 'ILO' routinely to describe inappropriate transient laryngeal closure leading to breathing problems.

III. Quality research is needed to provide further evidence of the added value of speech and language therapy provision in upper airway disorders.

IV. SLTs working in upper airway disorders should continually monitor and evaluate the impact of the SLT role, through audit/service evaluation/quality improvement projects.

V. SLTs should actively promote the role and contribution of speech and language therapy provision in upper airway disorders. Influencing and campaigning locally, regionally and nationally is recommended to support access to funding within respiratory services.

VI. Speech and language therapy for patients with upper airway disorders improves patient-reported quality of life and reduces healthcare use significantly; patients should have equitable access to appropriately trained SLTs.

VII. SLTs working in upper airway disorders are members of a specialised respiratory multidisciplinary team (MDT), and it is recommended they should be commissioned as such.

VIII. Dysphonia, in the absence of any respiratory symptom burden, should be managed according to RCSLT guidance on voice, and within the context of a MDT ENT setting.

IX. It is the position of the RCSLT that continuous laryngoscopy is within the scope of practice for SLTs with appropriate expertise and specialist training and performed as part of a respiratory MDT.

X. There is currently no national competency framework and training log for SLTs working in upper airway disorders. This paper details the minimum standards required to work with patients. However, further expansion to support SLTs throughout their working life span is recommended (ie guidance for level 1-4 practitioners).

2. Introduction

2.1 Context

This updated position paper follows on from the original publication in 2015 and reflects the development of speech and language therapy practice within UK respiratory services, specifically in upper airway disorders.

Significant changes within the field have occurred since the first paper. Most noticeably, the introduction of an international consensus taxonomy for ILO and inclusion of non-pharmacological (ie SLT) intervention for the treatment of chronic cough (CC) within European Respiratory Society guidelines (Morice et al, 2020).

To date the number of funded SLTs working in upper airway disorders within respiratory service is unknown. However, based on authorship awareness, feedback from relevant professional networks and liaison with RCSLT clinical advisors, there has been a marked expansion in speech and language therapy provision within the last decade. Further, there has been an increased recognition by other professionals of the value of SLTs to support patients with upper airway disorders. Specifically, collaborative links between the RCSLT and the British Thoracic Society (BTS) are now well established; the SLT workforce can now become members of the BTS and are actively encouraged to contribute to BTS professional activities.

Despite this progress, access to funding within the UK remains challenging and there is inequity of access to speech and language therapy provision for patients with upper airway disorders. More work is needed to highlight the benefits of speech and language therapy to help mitigate this. Support from respiratory colleagues is essential to improve business case proposals and service developments.

2.2 Scope

The purpose of this document is to identify the role and contribution the speech and language therapy workforce can make to support the care of patients with upper airway disorders and define best practice to achieve quality care.

It is not within the scope of this paper to provide a detailed appraisal of the characteristics of upper airway disorders. A summary is provided to give the paper context. Recommended reading lists to broaden understanding (with a particular focus on ILO and CC) are available on the upper airways section of the RCSLT website.

While the focus of this paper relates to adult service provision, it is acknowledged upper airway disorders can occur within the paediatric population. Paediatric SLTs may find this guidance useful to reflect on practice but unique paediatric specific considerations are not covered within the scope of this paper (eg CC in children presents in a markedly different fashion with different aetiology, Morice et al, 2020). Despite this, it is important adult and paediatric services form good working relationships to support patients who transition and aid smooth transfer of care

(especially in the context of exercise-induced laryngeal obstruction due to the predominant adolescent demographic).

2.3 COVID-19 considerations

Recommendations regarding the delivery of speech and language therapy in the context of COVID-19 (including infection prevention and control, service restoration and SLT-led endoscopy) rapidly evolves and changes. Therefore, providing guidance within the scope of this document is not indicated, as it is likely to become quickly outdated. UK consensus on the diagnosis of ILO in light of the COVID-19 pandemic and subsequent reduced access to laryngoscopy exists (Haines et al, 2020). Reference should be made to current RCSLT COVID-19 guidance to support the safe delivery of care (particularly *Guidance on voice and upper airway disorders in the context of COVID-19 in adult and paediatric services* and *Speech and language therapist-led endoscopic procedures in the COVID-19 pandemic*,; both can be found on the RCSLT's COVID-19 Hub). These resources are regularly reviewed and updated on the RCSLT website, to ensure contemporaneous advice.

3. Process

3.1 Scoping the evidence

It is not the remit of this position paper to include a critical appraisal or systematic review of the literature. However, a review of the current evidence base was undertaken to ensure relevant research papers were included as appropriate. The scoping of the evidence supported and informed this revision. However, in the absence of limited high-quality evidence within the field, the majority of recommendations are largely based on expert consensus opinion.

3.2 Writing

The revised position paper was updated by the lead author, following extensive collaboration with the supporting authors. Further, in preparing the paper, opinion was gained from respiratory physicians and MDT colleagues working in the clinical specialism. Suggested amendments from the consultation process shaped the final version of this paper.

3.3 Consultation

The RCSLT facilitated a wide consultation process. This included RCSLT membership, RCSLT clinical advisers and applicable RCSLT Clinical Excellence Networks (CENs), relevant international experts, wider stakeholder engagement (eg BTS) and service users. The authorship reviewed all comments received and revised the paper as appropriate; all inclusion/rejection decisions regarding comments were documented.

4. Key changes and updates

The key changes and updates from the last version of the position paper are summarised as follows:

- This revised position paper focuses on the role of speech and language therapy in upper airway disorders within respiratory services. This is in response to the new evidence base, membership feedback, collaborative working with relevant professional networks (eg RCSLT CENS) and a better understanding of this emerging SLT role.
- 'Dysphagia in respiratory care' has been removed from the scope of this paper, as in-depth dysphagia guidance is available and addressed in separate and specific RCSLT Dysphagia guidance.
- This paper update includes guidance on continuous laryngoscopy in the speech and language therapy professional clinical context. It provides procedural protocols that SLTs should observe, together with recommendation of the knowledge and skills required to perform.

Includes guidance on the minimum competency standard required to work with patients with upper airway disorders is provided.

5. Clinical population

5.1 Overview

Upper airway disorders represent abnormal laryngeal functions, which are thought to develop as a result of heightened laryngeal sensitivity and hyper-responsiveness (Famokunwa et al, 2019; Hull et al, 2016; Sundar et al, 2021). They include:

- inducible laryngeal obstruction
- chronic cough
- persistent throat clearing
- globus pharyngeus
- heightened laryngopharyngeal sensitivity symptoms (eg throat irritation, atypical throat sensations)
- dysphagia symptoms (without evidence of impaired swallow function)
- dysphonia

When patterns of abnormal laryngeal function occur a number of respiratory symptoms can develop (eg cough, breathlessness, wheeze). The umbrella term 'laryngeal dysfunction' captures these symptoms, which often appear refractory to treatment and incongruous with a clinical disease state (Hull et al, 2016).

Patients often present with an overlap of upper airway disorder symptoms (Vertigan et al, 2013), which suggests the manifestations of laryngeal dysfunction maybe mechanistically linked (Sundar et al, 2021). Evidence supports this theory as the clinical profiles of ILO and CC are markedly similar in terms of demographic and clinical attributes (Ryan et al, 2009).

5.2 Inducible laryngeal obstruction

ILO describes inappropriate transient laryngeal closure during respiration. In the absence of any structural or neurological abnormalities, airflow obstruction occurring at the glottic and/or supraglottic level leads to breathing difficulties (Halvorsen et al, 2017). Understanding of the condition remains limited as available evidence is largely retrospective. Patients present across various healthcare settings with differing levels of morbidity, ranging from mild dyspnoea to acute respiratory distress (Haines et al, 2018).

Symptoms are sudden in onset, often triggered by exposure to an external environmental trigger, and typically affect inspiration (with associated throat tightness and often noisy breathing) (Dunn et al, 2015; Halvorsen et al, 2017). Due to commonality in symptoms ILO is often misdiagnosed as asthma (Haines et al, 2018; Newman et al, 1994; Newman et al, 1995). To add to the complexity the two conditions are not mutually exclusive and can co-occur (Low et al, 2011; McDonald, 2019).

Historically, numerous terms (including vocal cord dysfunction and paradoxical vocal fold motion/disorder) have been applied to describe inappropriate laryngeal closure (Christensen et al, 2015; Haines et al, 2018), which has caused significant confusion and hindered research developments. The European Respiratory Society, European Laryngological Society, and the American College of Chest Physicians led an international task force in 2015 with an aim to standardise nomenclature (Christensen et al, 2015). International consensus was achieved, and the term ‘inducible laryngeal obstruction’ proposed with clear justification and explanation. The RCSLT supports the adoption of this taxonomy and recommends SLTs working within the field of upper airway disorders use it routinely.

5.3 Chronic cough

Cough is a protective reflex mechanism, which enables airway secretion clearance and prevents aspiration. The majority of cases of cough are acute or subacute and arise due to viral upper respiratory tract infections, usually lasting less than three weeks. However, when a cough persists for more than eight weeks it is defined as ‘chronic cough’ (Irwin et al, 2006).

CC patients classically describe a dry irritable cough, which triggers in response to environmental irritants and a subsequent urge to cough (Hilton et al, 2013). Due to research advances, it is now accepted CC represents a hyperresponsiveness of the neuronal pathways involved in the cough reflex (Satia et al, 2017), and an impairment in descending inhibitory controls (Ando et al, 2016; Farrell et al, 2012). More recently the phenomena have been referred to as cough hypersensitivity syndrome (Morice et al, 2014).

A systematic approach to diagnosis and treatment can be successful but cough can remain refractory in approximately 20% of cases (Pratter & Abouzgheib, 2006). Persistent cough causes significant physical, psychological and social morbidity. Many patients suffer from incontinence, vomiting and depression, thus negatively affecting quality of life (French et al, 1998).

6. The need for speech and language therapy provision

6.1 Healthcare utilisation and patient morbidity

Upper airway disorders are associated with high healthcare utilisation, which negatively impacts healthcare resource and patient morbidity. No robust data exists to quantify the economic impact, but the burden is likely significant. Speech and language therapy can improve outcomes on patient-recorded quality of life (Bassil et al, 2018; Chamberlain et al, 2017; Fowler et al, 2015; Patel et al, 2015; Pargeter & Mansur, 2016; Slinger et al, 2019; Vertigan et al, 2006) and significantly reduce healthcare usage (Murphy et al, 2020). Therefore, the need for speech and language therapy provision to support alleviation of symptoms is self-explanatory.

6.1.1 Inducible laryngeal obstruction

Data from the UK national ILO registry (Haines et al, 2020) identifies high healthcare utilisation within the population; 69% of individuals had visited emergency departments at least once in 12 months, with an average of five attendances. Critical care admission occurred in one in five patients, with 10% receiving intubation and ventilatory support. Patient morbidity was significant; over half were off work on long-term sickness due to their symptoms and 64% reported impaired functional capacity on the MRC breathlessness scale.

According to a recent systematic review, patients with asthma and co-existing ILO demonstrate greater healthcare use by more than a third, compared to those with asthma only (Murphy et al, 2020). Nearly 40% of patients suffering with ILO were misdiagnosed as asthmatic for an average 5.3 years, resulting in inappropriate pharmacological burden.

6.1.2 Chronic cough

CC affects between 5-10% of the adult population (Song et al, 2015), and is responsible for up to 40% of respiratory outpatient referrals (Pratter et al, 2006). The impact of CC on a patient is significant and includes physical complications (eg vomiting, incontinence, cracked ribs) as well as psychosocial problems (eg social isolation). When compared with other chronic medical conditions, CC sufferers have significantly higher levels of depression due to symptom burden (Adams et al, 2009).

6.2 Clinical guidelines

The need for speech and language therapy provision in upper airway disorders is identified within international professional guidelines (Gibson et al, 2010; Irwin et al, 2014). Specifically, recently published European Respiratory Society guidelines (Morice et al, 2020) on the diagnosis and treatment of CC state:

- in patients who report upper airway symptoms, fibreoptic laryngoscopy should be performed; and
- a trial of nonpharmacological cough control, speech and language therapy or physiotherapy intervention should occur (delivered by an experienced practitioner).

7. The role of the speech and language therapist

7.1 Workforce contribution

The remit of SLTs working in upper airway disorders within respiratory services is both broad and specialised. SLTs are required to manage patients with multiple and complex comorbidities and work across dedicated and disparate MDT teams. The SLT workforce has the skills to contribute across a patient's clinical journey; ie assessment, differential diagnosis, management planning, treatment and discharge.

SLTs play a key role in educating patients to be able to differentiate respiratory symptoms and therefore maximise effectiveness of medical interventions. Speech and language therapy is frequently referred to as the 'gold standard' beneficial treatment for ILO (Kenn & Balkissoon, 2011; Marcinow et al, 2015; Patel et al, 2015), despite the lack of prospective randomised control trials. In CC, better quality evidence exists and supports the role of SLT in managing CC patients; in two randomised control trials speech and language therapy reduced cough frequency and improved health-related quality of life (Chamberlain et al, 2017; Vertigan et al, 2006).

Workforce planning within organisations should occur to ensure SLTs are available to provide high-quality care for patients with upper airway disorders. SLTs working in upper airway disorders are members of a specialised respiratory MDT, and it is recommended they should be commissioned as such.

7.2 Multidisciplinary team working

MDT working is an integral role for SLTs working in upper airways disorders. During differential diagnosis, SLTs inform the MDT of the contribution upper airway function is playing on respiration and suggest appropriate strategies to maximise function when required. Regular

input to specialist airway MDT meetings is a common role. Core MDT colleagues include:

- SLTs
- respiratory physicians
- respiratory physiotherapists
- respiratory clinical nurse specialists
- lung physiologist
- mental health practitioners/clinical psychologists
- otolaryngologists

Wider MDT colleagues include:

- allergists
- cardiothoracic physicians
- critical care intensivists
- dietitians
- gastroenterologists
- oesophageal laboratory technicians
- pharmacists

7.3 Non-SLT roles

It is not the role of SLTs working with upper airway disorders to diagnose and manage concomitant respiratory or ENT conditions (eg asthma, organic changes in the larynx). SLTs may note abnormalities or exacerbations, but in such instances, consultation and liaison with relevant medical personnel should occur.

7.4 Extended scope of practice

Extended roles of practice to support SLT clinical management of upper airway disorders (eg performing and interpreting spirometry) are under development, but these should only be established in accordance with RCSLT, national and local policy and procedures.

8. Clinical management

8.1 Referral

When dysphonia is the primary presenting complaint, and in the absence of any respiratory symptom burden, patients should be managed according to RCSLT guidance on voice, and within the context of an MDT ENT setting.

Cough, breathlessness and other respiratory symptoms can arise as a symptom of a number of conditions (eg malignancy, airway stenosis, uncontrolled asthma, bronchiectasis). **It is therefore imperative, prior to any SLT intervention, that thorough assessment from a respiratory physician occurs.** This assessment may take place in an uni-professional respiratory clinic or as part of a dedicated upper airways MDT respiratory clinic. Referrals containing any red flag symptoms (eg haemoptysis, unintentional weight loss, persistent noisy breathing) should be managed in accordance with existing professional guidelines and re-directed onto relevant pathways.

Referral pathways will vary according to local services and commissioning. In specialist centres, initial referrals may be for MDT respiratory assessment rather than isolated SLT assessment, with subsequent referral for ongoing SLT management as a result of the MDT assessment process. SLTs may receive direct referrals from respiratory clinics once respiratory assessment has occurred (especially in CC populations). However, in all cases, referrals should provide as much existing data as possible on previous investigations to support assessment and ongoing management.

For SLTs working in upper airway disorders, the minimum recommended referral criteria include:

- respiratory medical review within the last six months
- ability to refer directly back for respiratory review (with a low threshold applied), if no longer under the care of a dedicated respiratory physician
- endoscopic evaluation of the larynx (continuous laryngoscopy in suspected ILO cases) within the last 6 months
- optimised management of associated conditions (eg asthma)
- patient is aware of diagnosis and consents to referral
- patient is appropriate for SLT intervention and is likely to benefit
- patient is aware of the role of speech and language therapy in managing upper airway disorders and is happy to engage

In the absence of any specific published guideline, these criteria are based on authorship consensus and are in line with RCSLT advice on voice referral requirements. Based on the above minimum criteria, SLTs are unlikely to regularly accept direct referrals from GPs (eg direct GP referral for CC management would be rejected if there had been no respiratory review in the previous six months). Similarly, self-referrals should be rejected.

8.2 Assessment

8.2.1 Clinical evaluation

Detailed clinical evaluation is essential. It is important to gain a comprehensive understanding of previous events, current status and patient expectations. The minimum case history data set should include:

- presenting complaint
- history of presenting complaint
- significant past medical history and diagnosed co-morbidities (eg reflux, nasal disease)
- drug history (particularly use of asthma medications and angiotensin-converting enzyme inhibitors)
- occupational history
- social history including smoking and employment status
- respiratory specific details (eg symptom onset, triggers – including any environmental, exacerbations, mucous burden, treatment trials and responses, previous intubations)

8.2.2 Investigations

Investigations will be tailored to the patient and directed by respiratory physicians. As a minimum, prior to SLT intervention, investigation should include:

- endoscopic evaluation of the larynx (and continuous laryngoscopy in suspected ILO cases, see section 9)
- imaging (chest x-ray)
- lung physiology (spirometry, ± reversibility, flow volume loops)

Other assessment investigations may include:

- breathing pattern disorder assessment
- bronchoscopy
- cardiac specific investigations (eg electrocardiogram)
- data related to allergy (immunoglobulin E, skin prick test) and inflammation (blood/sputum eosinophils, fractional exhaled nitric oxide)
- gastroenterology specific investigations (eg oesophageal manometry and 24-hour ph monitoring/barium swallow)
- imaging (high-resolution computed tomography)
- objective dysphagia assessments

8.2.3 Patient reported outcome measures

Initial assessment of patient symptom perception should occur routinely. Several symptom questionnaires exist to evaluate upper airway disorders, although none is robustly validated as a diagnostic tool. Key questionnaires include:

- Leicester Cough Questionnaire (Birring et al, 2003)

- Cough Severity Index (Shambel et al, 2013)
- VCDQ (Fowler et al, 2015)
- Newcastle laryngeal hypersensitivity questionnaire (Vertigan et al, 2014)
- Pittsburgh vocal cord dysfunction index (Traister et al, 2014)
- Dyspnoea index (Witek et al, 2003)

Supplementary questionnaires may include (not an exhaustive list):

- Reflux symptom index (Belafsky et al, 2002)
- Nijmegen Questionnaire (Van Doorn et al, 1982)
- Brompton Breathing Pattern Assessment Tool (Todd et al, 2018)
- EAT-10 (Belafsky et al, 2008)
- Voice Handicap Index (Rosen et al, 2004)
- Voice Symptom Score (Wilson et al, 2004)

The RCSLT has adopted Therapy Outcome Measures (TOMS) (Enderby et al, 2013) as the profession's outcome measurement tool. To support opt-in for SLTs working in upper airway disorders, a group of senior SLTs are developing a standardised TOMS framework for upper airway disorders. The final validation of the tool is underway and will be available on the upper airways section of the RCSLT website in due course.

8.3 Treatment

Therapy-based SLT management approaches are repeatedly suggested to treat upper airway disorder (Haines et al, 2018; Hull et al, 2016; Hull, 2019). Evidence is largely based on observational studies but two randomised control studies (Chamberlain et al, 2017; Vertigan et al, 2006) support the efficacy of SLT management for CC. Specific pharmacological treatments to target upper airway disorders are currently absent. Gefapixant (a P2X3 receptor agonist) significantly reduces daytime coughing by 75% (Smith et al, 2020), but is not yet licensed for use in clinical practice.

SLTs will take the lead in managing upper airway disorders and therapy will depend on the diagnosis and MDT treatment plan. Speech and language therapy interventions are typically multi-modal and may be combined with other treatments (eg joint working with respiratory physiotherapists when there is a co-existing breathing pattern disorder). Typically, speech and language therapy will be delivered via a one-to-one method to facilitate a high level of personalisation. However, group therapy for the management of CC has been reported effective (Selby et al, 2018).

Generally, strategies aim to facilitate reduction in laryngeal irritants/aggravating behaviours, behavioural modifications and distraction techniques. Specifically in ILO the primary role is to teach control of the laryngeal area and maintain an adequately open airway during respiration. In CC, there is usually a greater emphasis on cough suppression techniques.

It is not within the scope of this paper to provide detailed guidance on therapy components.

Further explanations of techniques are available on the upper airways section of the RCSLT website. However, common components used in SLT management of upper airway disorders include (not an exhaustive list):

- cough suppression
- diaphragmatic breathing
- differentiation of symptoms
- discussion of contributory and maintaining factors
- education and explanation
- laryngeal airway control exercises (including emergency 'release' breathing techniques)
- psychoeducational counselling (including goal setting)
- relaxation of head and neck extrinsic muscle tension
- release of inappropriate upper airway constriction
- supporting decision making for pharmacological interventions, as part of an MDT (eg biological therapy for severe asthma, reduction in inappropriate steroid use)
- upper airway health
- visual-bio feedback therapeutic laryngoscopy
- Controlling symptoms during purposeful trigger exposure

8.4 Monitoring

In line with the requirements of Health and Care Professions Council (HCPC), ongoing monitoring should occur. This will facilitate an understanding on progress and provide data on the effectiveness of SLT intervention to support ongoing management and appropriate discharge (together with patient therapy goals). Further, in the non-responding patient, it will provide useful information to understand poor progress. Re-administration of specific patient reported outcome measures (see section 8.2.3) is the recommended tool, together with ongoing MDT discussion and monitoring.

*For patients with known co-existing respiratory disease **it is essential** that if treatment response is not as expected, there is deterioration in respiratory symptoms or there are any other concerns, respiratory review should occur prior to continued SLT intervention, preferably within the MDT context.*

9. Continuous Laryngoscopy

9.1 Definition

Laryngoscopy enables endoscopic evaluation of the nasal cavities, pharyngeal space and laryngeal vestibule. It establishes if there are any structural, pathological, neurological or functional abnormalities. **However, in the context of ILO, it only provides a snapshot in time and in the absence of concurrent respiratory symptoms, the laryngopharynx functions normally.**

The frequently cited gold standard for ILO diagnosis is laryngoscopy during a symptomatic episode (Halvorsen et al, 2017). However, diagnostic confirmation is dependent on being able to perform laryngoscopy during a symptomatic attack. This is not always logistically possible and highly dependent on direct accessibility of equipment and appropriately trained clinicians. Therefore, in recent years provocation agents have been used on individuals who are baseline asymptomatic, with an aim to induce and replicate compatible clinical features within a controlled environment.

Continuous laryngoscopy during provocation (Hull et al, 2019) or exercise (Heimdal et al, 2006) provides a more targeted assessment as continuous monitoring occurs while symptom inducers are presented. It enables visualisation of any laryngeal reactions within the laryngeal vestibule in real time. Diagnostic yields in this context are reported to be more accurate and targeted (Halvorsen et al, 2017; Hull et al, 2019). However, despite efforts to provoke symptoms during continuous laryngoscopy, individuals may remain asymptomatic. It is therefore important to ensure false negative ILO diagnoses are not given; the confirmation of an ILO diagnosis during continuous laryngoscopy is only possible when the individual is symptomatic. When no symptoms are elicited during the procedure, the MDT should look to the presence or absence of other clinical signs to inform differential diagnosis (eg patient history/description of symptoms/truncation of inspiratory flow loops).

9.2 Scope of practice

It is the position of the RCSLT that endoscopic evaluation of the larynx is within the scope of practice for SLTs. The use of endoscopic examination techniques for ILO is acknowledged within current RCSLT SLT endoscopy position paper (Jones et al, 2020; Wallace et al, 2020). However, details regarding specific considerations for SLT endoscopy practice within the field of upper airway disorders are not detailed.

Within the context of upper airway disorders, SLTs plays a key role in the contribution of differential diagnosis (and treatment planning) and provide information about the function of the larynx during respiration. As such they are significant contributors in the delivery of continuous laryngoscopy within upper airway respiratory services.

It is not the role of SLTs to make medical diagnoses; the RCSLT acknowledges that medical practitioners are the primary professionals qualified to and licensed to offer medical diagnosis. However, it is inevitable that in the clinical evaluation and direct visualisation of the upper airway tract, SLTs may note abnormalities. In such instances, consultation and liaison with relevant medical personnel should occur to seek opinion and establish medical diagnoses.

SLTs incorporating continuous laryngoscopy within their practice must ensure appropriate approvals have been given by the employing organisation; a description of roles and responsibilities should be included within an individual's job description. Local policy and procedures should be agreed, adhered to and reviewed, within an MDT context. These should include clear indication of the scope and range of practice and be individualised to the context/clinical environment in which continuous laryngoscopy will be performed.

The specialist training required to acquire the underpinning knowledge and skills to perform continuous laryngoscopy need to be evidenced within an individual's continuous professional development logs. Evidence of ongoing maintenance of competency should be documented as part of an individual's annual performance review.

This position paper provides the professional clinical context within which SLTs should practice continuous laryngoscopy and is the RCSLT's official statement of professional practice for SLTs using it. It is the professional responsibility of individual SLTs to ensure adherence to its content; evidence of such adherence will help ensure professional indemnity.

9.3 Purpose

Appropriately trained and competent SLTs may perform continuous laryngoscopy within an MDT context, in order to:

- directly assess structure and function in the upper airway and rule out mimics or establish additional diagnoses (eg subglottic stenosis and airway stenosis)
- assess laryngopharyngeal movements during respiration
- assess relevant differential diagnosis
- assess laryngopharyngeal sensitivity
- visualise transient glottic and supraglottic movement/obstruction
- accurately confirm or refute ILO diagnosis
- inform treatment regimens specific to the individual patient
- provide visual-bio feedback and teaching (improving individual's understanding of their condition)
- monitor therapeutic response
- produce visual and auditory data of upper airway behaviour for clinical records and outcome measures

9.4 Commonalities in SLT-led endoscopy

There are a number of common procedural considerations and professional issues in the clinical application of SLT-led endoscopy, regardless of the purpose for performing. These include:

- medico-legal understanding and compliance – see section 4, RCSLT position paper (Jones et al, 2020)
- duty of care responsibilities – see section 4, RCSLT position paper (Jones et al, 2020)
- audit and research commitments– see section 4, RCSLT position paper (Jones et al, 2020)
- health, safety and data protection compliance- see section 5, RCSLT position paper (Jones et al, 2020); and
- full awareness of adverse effects and complications - see section 8.2, RCSLT position paper (Wallace et al, 2020) and also section 10.5.7 of this paper.

All SLTs involved in continuous laryngoscopy should ensure they are familiar with and adhere to

the above requirements, together with having a full awareness of the related general NHS policy and local procedures.

9.5 Procedure

9.5.1 Patient information and consent

Many patients requiring continuous laryngoscopy have laryngeal hypersensitivity and therefore reactions to the laryngoscope are often exaggerated. Anxiety levels maybe raised in anticipation of provoking respiratory symptoms associated with past negative experiences.

Patients should be fully briefed regarding the procedure, and where possible in advance. Pre-counselling to provide reassurance on acute exacerbation management should be routine practice. Patients should be reassured the examination can be stopped at any point, if requested.

Information should be provided in a personalised, accessible format, with an opportunity to discuss any patient concerns prior to examination. Such an approach supports informed consent.

Within existing UK centres that routinely perform continuous laryngoscopy, it is routine practice to gain written consent, due to the potential adverse effects of provocation and the clinical settings in which the procedures are typically performed (eg day case units). SLTs should seek guidance from the employing authority as to whether written or verbal consent is required, as consent is a legal requirement and may be subject to local variations in practice. In all circumstances compliance with national and local consent policy is essential.

It is unlikely continuous laryngoscopy will be performed on patients deemed to lack mental capacity to provide or withhold informed consent. However, if the procedure is deemed within the patient's best interest, a decision to proceed needs to be directed by appropriate mental capacity legislation and as part of the MDT.

Storage of any audio-visual material also needs to be kept in line with data protection legislation and local guidelines.

9.5.2 Equipment

It is essential that adequate, well-maintained, equipment is available to perform continuous laryngoscopy. Necessary requirements include:

- a good quality flexible laryngoscope (high resolution with a distal video chip)
- light source
- camera
- monitor
- audio and video recording

- appropriate personal protective equipment
- consumables (patient specific inducers and odour challenge agents)
- pulse oximetry
- resuscitation equipment
- equipment and consumables to manage acute asthma exacerbations and anaphylaxis
- if available within the employing organisation, access to Heliox and relevant related consumables
- decontamination resources, in line with local infection control policy and procedures

Visualisation of the larynx throughout continuous laryngoscopy procedure should be achieved via handheld or fixed laryngoscope placement. To date, specialist supporting headgear products to fix laryngoscope placement are unavailable commercially. This may change as continuous laryngoscopy becomes more clinically utilised. Handheld procedures may require SLTs to hold and manipulate the laryngoscope for lengthy time periods; consideration of the health and safety implications should be made in line with local policy.

A stroboscopic light facilitates detailed assessment of vocal fold vibration patterns for clinical voice disorders. The primary purpose of continuous laryngoscopy is to assess laryngeal movements during respiration. To achieve this, a continuous light source is needed to enable a good view of the laryngeal structures and assess function. Therefore, for the purposes of continuous laryngoscopy, stroboscopy examination is not required. Should a patient require detailed voice assessment they should be referred to an appropriate voice clinic.

For continuous laryngoscopy during exercise, appropriate exercise and monitoring equipment should be available. This may include a suitable treadmill or cycle ergometer.

9.5.3 Clinical settings and personnel

SLTs should only perform continuous laryngoscopy as part of a dedicated upper airways respiratory service and in clinical environments that are fully risk-assessed with appropriate medical support. SLTs performing continuous laryngoscopy should be trained and competent to the standard detailed in section 9.6.

Continuous laryngoscopy should NOT be performed by SLTs in community outpatient or domiciliary settings, due to the risk of unknown complications during provocation. However, the RCSLT recognises that SLTs roles are constantly evolving and developing, so members should contact the RCSLT for advice regarding extended practice outside of this recommendation (eg potential developments in field-testing for athletic populations).

Clinical settings where continuous laryngoscopy may be performed include (not an exhaustive list):

- bronchoscopy units
- day case units
- dedicated endoscopy suites
- environmental challenge chambers
- specialised exercise testing laboratories

A minimum of two persons is required to perform continuous laryngoscopy. For patients undergoing an initial provocation challenge, a respiratory medical professional, who has appropriate training and understanding of upper airway disorders, should be present. For any subsequent procedures, a healthcare professional competent in advanced life support should be readily available in close proximity.

9.5.4 Anaesthesia

A Cochrane Review demonstrates no evidence to support the use of topical anaesthesia prior to laryngoscopy (Sunkaraneni et al, 2011); it does not improve the comfort, pain or tolerance of the procedure. Further, there is evidence sensory aspects of swallowing are compromised when it is used (Fife et al 2015).

No evidence currently exists examining the effects of topical anaesthesia in patients with laryngeal hypersensitivity; however with evidence from other clinical applications it is reasonable to assume it may risk impeding assessment of upper airway sensitivity. Therefore, until further evidence is available, routine clinical use of topical anaesthesia for continuous laryngoscopy is discouraged.

For patients particularly anxious, or with significantly obstructed nasal passages, a non-anesthetising lubricating gel can aid passing the scope through the nose. Topical anaesthesia use should be reserved only in circumstances when this fails to assist. SLTs should only administer topical anaesthesia if they are fully aware of the associated risks and have the appropriate local Patient Group Directions in place (and are named individuals within the policy).

9.5.5 Provocation assessment protocols

There is very little evidence published regarding the methodology to provoke symptoms, and no standard challenge test yet exists to assess ILO. Clinicians often use Forrest's protocol (Forrest et al, 2012), or an adaptation of this, which guides through a systematic assessment. Patient investigation for ILO induced by exercise is more established and continuous laryngoscopy during exercise is widely reported in a variety of exercise settings (Hull et al, 2019), with a protocol of patients exercising to maximal exertion to induce symptoms.

To enable systematic evaluation of the upper airway structures and function from the nares to the subglottic shelf, together with detailed assessment of laryngeal function in relation to respiration, a continuous laryngoscopy provocation assessment protocol should be used. Local protocols are likely to be adopted to reflect the different clinical settings continuous laryngoscopy is performed (eg environmental chamber, day case endoscopy units or exercise clinics). However, a minimum assessment protocol dataset is recommended. These include:

1. evaluation of nasal cavities, post-nasal space, velum, oro and laryngo-pharynx
2. observe larynx at rest during tidal breathing
3. observe baseline abductor responses (eg sniff in)
4. observe larynx during sustained phonation (eg prolonged 'EE')

5. observe larynx during connected speech (eg counting, rainbow passage extract)
6. inducer (either exercise or non-exercise):

Continuous laryngoscopy during exercise (Heimdal et al, 2006)	Continuous laryngoscopy during provocation (Hull et al, 2019)
• Exercise mode and intensity tailored to individual • Exercise continues to exhaustion or when symptoms are intolerable	• Mechanical (e.g. counting 1-10 in increasing volume, repetitive 'sniff-EE', pursed lip breathing) • Scent challenge • Direct patient specific challenge

7. instigation of therapy techniques if symptoms triggered and monitoring of response

All continuous laryngoscopy procedures should be recorded to facilitate post-procedural analysis.

9.5.6 Observations and image interpretation

There is currently no validated scoring system to differentiate normal from abnormal, in relation to laryngeal obstruction during respiration. Therefore, interpretation remains highly subjective in the absence of any validated quantification of laryngeal closure. Obstruction maybe mild or severe and occur at differing levels within the laryngeal vestibule (ie glottic or supraglottic or mixed).

International consensus guidelines (Halvorsen et al, 2017) recommend a detailed description of laryngeal presentation during provocation (location of obstruction, phase of respiratory cycle, onset and resolution) but subjective scores to rate laryngeal obstruction have poor inter-rater and intra-rater variability. In many studies abnormal laryngeal closure is defined as a 50% reduction in either angle or cross-sectional area, but this remains an arbitrary selected threshold (Hull et al, 2019). Emerging work (Lin et al, 2018) reporting an automated and objective quantification of laryngeal movements shows promise and uses a convolutional neural networks-based algorithm. If proven effective in prospectively evaluated clinical conditions it will provide an invaluable endpoint in research, but in time, has potential to be utilised clinically.

A pragmatic approach for observations and image interpretation during continuous laryngoscopy should therefore prevail. This should include:

Assessment	Observations to note
Nasal	• sensitivity to laryngoscope • abnormal anatomical, pathological presentations
Oropharyngeal	• sensitivity to laryngoscope • abnormal anatomical, pathological, physiological

	presentations
Laryngeal	• sensitivity to laryngoscope • abnormalities in gross laryngeal movements • structural or pathological abnormalities • excessive endolaryngeal mucous • laryngopharyngeal movements in speech and tidal breathing

Provocation	• following each exposure to an inducer, observe laryngeal reactions during respiration to include (ref):
	  ○ inducer used
	  ○ location of obstruction (glottis, supraglottic, both)
	  ○ phase of respiratory cycle (inspiratory, expiratory, both)
	  ○ onset of obstruction following inducer exposure (fast – one breath to next, slow – over several breaths)
	  ○ resolution of obstruction (fast - <5 minutes, slow >5 minutes)
	• symptoms in keeping with those under investigation
	• changes in symptomatic presentation over time
	• oxygen saturation
	• associated breathing pattern disorder

Therapy trial	• response to intervention on laryngeal movements during respiration

9.5.7 Safety: adverse effects and complications

No adverse life-threatening events have been associated with continuous laryngoscopy in the current literature. Indeed it is reported as a safe and effective diagnostic tool (Hull et al, 2019). Despite this, SLTs performing the procedure should fully assess risk and have appropriate mitigations in place which are compliant to local policy and procedure.

The risks of passing the laryngoscope and any topical anaesthesia (although not routinely recommended for continuous laryngoscopy) needs to be understood and minimised. These are comprehensively outlined in existing RCSLT position papers relating to endoscopic evaluation of the larynx.

During provocation, the SLT clinician should be prepared for possible negative reactions and complications. Based on authorship experience, these may include:

- self-extubation of laryngoscope leading to mucosal trauma
- epistaxis
- vomiting
- vasovagal response

- laryngospasm
- severe ILO attack
- excessive coughing
- severe gagging
- panic attack
- bronchial reactivity (especially in known asthmatics)
- hyperventilation leading to respiratory alkalosis
- anaphylaxis
- seizures

It is therefore essential that the personnel conducting continuous laryngoscopy can respond to any adverse reactions as needed, and that the clinical environment supports this (as detailed in section 9.5.3). Continual monitoring of the patient throughout the examination is recommended. This should include oxygen saturation and close clinical observations as a minimum.

9.6 Competency and training

Continuous laryngoscopy is an invasive procedure designed to induce respiratory symptoms synonymous with those under investigation. As such, it carries some risk to the patient, and thus SLTs performing the examination must undertake appropriate training and be assessed as competent.

It is not within the scope of this paper to write a full competency framework and training log for SLT endoscopic evaluations for upper airway disorders. As services and UK SLT practice evolves within the clinical field, it is envisaged further professional guidance will be required and developed. However, to support the current SLT workforce the below guidance should be adhered to for SLTs performing continuous laryngoscopy.

9.6.1 Core prerequisite knowledge and skills

- Either a level 2 or level 3 recognised endoscopist, achieved through completion and ongoing maintenance of either the RCSLT EEL or FEES competency framework and training logs (Wallace et al, 2020; Jones et al, 2020).
- Established regular caseload of upper airway disorders within a MDT setting
- Understanding of complementary roles of the MDT involved in the management of upper airway disorders
- Advanced knowledge of a wide range of assessment methods for respiratory symptoms (eg spirometry, bronchial challenge tests, fractional exhaled nitric oxide)
- Advanced knowledge of commonly associated comorbidities (eg asthma, breathing pattern disorder)
- Advanced knowledge of a wide range of laryngeal airway control techniques
- Knowledge of relevant local and national guidelines and policies in respiratory
- Understanding of impact of symptoms on patient morbidity/exercise performance
- Knowledge of theory and purpose of continuous laryngoscopy

9.6.2 Additional knowledge and skills

- Ability to scope and maintain a quality image during provocation
- Respond and manipulate the scope, as appropriate, during patient ILO attacks to ensure continuation of image quality
- Expert knowledge and delivery of laryngeal airway control techniques, during scoping, and whilst the patient is symptomatic of symptoms
- Expert knowledge and interpretation of laryngeal obstruction and its contribution to concurrent symptoms
- Ability to remain calm and respond appropriately during escalation of patient respiratory distress
- Knowledge of when to refer for surgical opinion for exercise-induced laryngeal obstruction (in the context of continuous laryngoscopy during exercise)
- Knowledge of when to refer for otolaryngologist opinion

9.6.3 Acquisition of knowledge and skills

A mixture of learning modalities will likely be utilised, including self-directed learning, online resources, peer support, observations and supervised clinical experience. Currently there is a limited number of UK centres performing continuous laryngoscopy and therefore access to support knowledge and skill acquisition maybe challenging. However, several training courses are in development and the RCSLT respiratory CEN is aware of the need.

Training for performing and interpreting continuous laryngoscopy should include observation of 10 procedures, completing a minimum of 10 procedures under supervision and completing a minimum of 10 procedures independently (with access to supervision). SLTs undertaking regular continuous laryngoscopy, and respiratory physicians, are likely to support skill acquisition. Further, laryngologists with a specialised interest in upper airway respiratory disorders may provide invaluable support.

To achieve level 3 endoscopist status for the purposes of continuous laryngoscopy, all of the above should be achieved, together with the core prerequisite and additional knowledge and skills detailed. Further, in line with other RCSLT guidance on endoscopic evaluation of the larynx, SLTs should keep a written log of a minimum of 200 continuous laryngoscopy procedures. The log should demonstrate 95% agreement (with a respiratory physician with a specialist interest in upper airway respiratory disorders/level 3 SLT continuous laryngoscopy endoscopist) on the patient's diagnosis and management plan.

9.6.4 Verification and maintenance of competency

Competency in performing continuous laryngoscopy may be verified by:

- an expert SLT in upper airway respiratory disorders and level 3 continuous laryngoscopy endoscopist (as per above); and
- a respiratory physician/otolaryngologist/ thoracic surgeon with a specialist interest in upper airway respiratory disorders.

It is the responsibility of individual SLTs performing continuous laryngoscopy to maintain competency to perform and interpret findings. Inclusion within continuing professional development plans and annual appraisals is recommended. Interpretation competencies will be maintained through joint working with respiratory physicians, peer review with expert SLTs performing continuous laryngoscopy and awareness and understanding of emerging evidence-based practice. A minimum of one continuous laryngoscopy per month should be performed, in an MDT context.

10. Leadership and influencing

10.1 Research and innovation

Research relating to upper airway disorders remains in the embryonic state. Understanding on the mechanistic drivers, epidemiological profiles, optimal evaluation techniques and targeted treatment modalities remain largely unknown. Development of standardised assessment and treatment algorithms is therefore limited and based on clinical consensus rather than quality evidence.

The speech and language therapy workforce can make a significant contribution in developing a more robust evidence base and improve the quality of care provided. Collaborative working with MDT colleagues to support and lead research agendas is recommended. Research and innovation within the field should focus on the benefit speech and language therapy can make to the management of upper airway disorders.

SLTs should be active in continually appraising the impact of the role of speech and language therapy in upper airway disorders within respiratory services. Regular audits, service evaluation or quality improvement projects are recommended.

10.2 Resources

There is a wealth of information on the RCSLT website to support SLTs in developing services (eg sections on management and leadership, preparing business cases and local influencing). These resources will help guide how to progress SLT initiates/funding to work in upper airway disorders within respiratory services.

10.3 Promotional materials

The RCSLT Giving Voice campaign fact sheet on upper airway disorders (RCSLT, 2019) summarises the role and difference speech and language therapy makes to individuals with upper airway disorders. It helps support the message that timely access to SLT provision is needed and will support local influencing.

11. Training and education

11.1 Scope

It is not within the scope of this paper to provide a detailed training and competency framework for SLTs working with upper airway disorders; often local services develop their own. It is the responsibility of individual SLTs to ensure they only work within their scope of practice. Practitioners should engage only in those aspects of clinical care that are within the scope of their competence, considering their level of education, training and experience.

Practitioners with experience of working with acquired speech, voice and swallowing disorders have transferrable skills that can be applied to the assessment and management of upper airway disorders. Notably, SLTs who specialise in head and neck cancer, voice, dysphagia and critical care settings will have knowledge of normal and disordered laryngeal and respiratory function and understand the influence of medical co-morbidities and psychological factors.

11.2 Core requirements

In the absence of a developed training and competency framework, to support the current SLT workforce, it is recommended that as a minimum standard SLTs working in the field of upper airway disorders should have:

- knowledge of normal and disordered anatomy and physiology of the upper airway for voice, swallowing and upper airway function
- knowledge and understanding of normal and abnormal respiration
- detailed understanding of normal and abnormal laryngeal function in relation to respiration
- awareness of key predisposing, perpetuating and precipitating factors for upper airway disorders
- understanding of assessment methods for respiratory symptoms (e.g. spirometry, bronchial challenge tests, fractional exhaled nitric oxide)
- knowledge and understanding of commonly associated upper airway disorder comorbidities (e.g. asthma, breathing pattern disorder)
- knowledge and ability to perform or interpret upper airway disorder assessments (e.g. patient reported symptom questionnaires)
- knowledge, understanding and ability to deliver a wide range of therapeutic interventions for upper airway disorders (e.g. laryngeal deconstriction, laryngeal airway control, cough suppression)
- counselling skills and experience in supporting behavioural change
- understanding of the role of speech and language therapy in upper airway disorders, within the context of respiratory services and wider MDT
- understanding of complementary roles of the MDT involved in the management of upper airway disorders
- awareness of relevant local/national policies and guidelines

When working autonomously with patients with upper airway disorders, it is the professional responsibility of individual SLTs to recognise when further training is required.

11.3 Skill acquisition

Training and education may be obtained by a variety of means, including (not an exhaustive list):

- reading and appraisal of relevant literature
- online educational resources (see respiratory section of the RCSLT website)
- didactic teaching
- bespoke and specialist training courses/workshops
- mentoring
- clinical observations
- supervised clinical experience
- utilisation of virtual platforms for distant support

11.4 Supervision

Given the extended role of speech and language therapy practice in upper airway disorders within respiratory services, many SLTs may not have easy access to an appropriate SLT supervisor within their own organisation. However, developing general respiratory knowledge and skills can be supported by establishing close working relationships with local respiratory teams. Practitioners will need to be proactive in accessing appropriate professional SLT supervision. Examples may include negotiating support with external supervisors, group peer support opportunities and ensuring strong links with the respiratory RCSLT CEN and RCSLT advisors.

12. Future steps

There remains a unique opportunity for SLTs to develop the evidence base within the field of upper airway disorders. Collaborative, prospective, well-designed research is recommended to support the future development of care. SLTs are well placed to inform clinically relevant projects to drive evidence. Studies involving patient user experience would be beneficial.

During the preparation of this paper the authorship acknowledged a full competency framework and training log (from level 1 to 4 practitioners) for SLTs working in upper airway disorders would be beneficial. However, this was not within the scope of this paper. General training guidance, and the minimum standard required, is provided to support the current SLT workforce (see sections 9.6 and 11) but further development of a detailed framework is recommended.

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The Royal College of Speech and Language Therapists (RCSLT) is the professional body for speech and language therapists in the UK. As well as providing leadership and setting professional standards, the RCSLT facilitates and promotes research into the field of speech and language therapy, promotes better education and training of speech and language therapists, and provides its members and the public with information about speech and language therapy.

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