Speech and language therapy endoscopy for voice disordered patients

POLICY STATEMENT

Royal College of Speech and Language Therapists

RCSLT October 2004
Acknowledgements

An expert panel convened by the Royal College of Speech and Language Therapists wrote this policy statement in May 2004. The panel members were Professor Paul Carding, Sue Jones, Valerie Morton, Fiona Robinson, Suzanne Slade and Claire Wells.

This final document is the result of extensive consultation with specialist SLTs (voice) and many other colleagues. The authors would like to acknowledge the contributions of:

RCSLT Clinical advisers (voice)
RCSLT policy lead Clare Coles
Special Interest Group chairpersons and members
Mr Tom Harris, Mr Meredydd Harries, Mr Phil Jones, Mr Tony Narula, Mr Julian McGlashan, Mr Mark Watson and Professor Janet Wilson.

The RCSLT are also grateful to the American Speech and Hearing Association for their generosity in allowing incorporation of sections of their own guidelines within this document. Where appropriate these sections are the copyright of the American Speech-Language-Hearing Association and are used with their permission.

Reference this document as:

Position Statement

Videolaryngeal endoscopy (VLE) is defined as an examination of laryngeal anatomy and physiology. VLE can be achieved using both rigid endoscopes introduced through the mouth and flexible endoscopes via the nose. Rigid endoscopy is particularly used when high quality images of the larynx and vocal folds are required while flexible endoscopy allows a more complete assessment of the entire vocal tract during a wider range of phonatory and non-phonatory laryngeal activities. Although much of the detailed laryngeal anatomy and function can be determined using a continuous light source with either endoscope, examination with a stroboscopic light source allows additional information about the vibratory patterns of the vocal folds to be obtained. The laryngeal images can be observed directly with the naked eye but more commonly are recorded using a camera attached via a lens coupler to the eyepiece of the endoscope onto a videotape or digital storage medium.

VLE (including rigid and flexible endoscopy and the use of stroboscopy) is a laryngeal imaging procedure that may be used by otolaryngologists and speech and language therapists (SLTs) as a diagnostic and therapeutic tool. Medical practitioners are the only professionals qualified to make medical diagnoses related to the identification of laryngeal pathology as it affects the voice. Consequently, when used for medical diagnostic purposes, a suitably trained otolaryngologist should interpret VLE examinations. The British Association of Otolaryngologists are responsible for specialist laryngological training including VLE. SLTs with expertise in voice disorders and with specialist training in VLE are professionals qualified to use this procedure for the purpose of assessing voice production and vocal function. Within multidisciplinary settings, these diagnostic and vocal function assessment procedures may be accomplished through the combined efforts of these related professionals. VLE may also be used as a therapeutic aid and biofeedback tool during the conduct of voice treatment.

It is the position of the Royal College of Speech and Language Therapists (RCSLT) that VLE examination is within the scope of practice for SLTs (voice) for the purpose of contributing to the diagnostic process and providing information about the function and status of the larynx and/or vocal tract during the treatment of patients with voice disorders. It is recognised that SLTs also use endoscopic examination techniques for other purposes, for example, swallowing disorders and cleft palate. The specific details of those applications are not covered in the document and are currently being addressed in separate RCSLT initiatives.

The practice of speech and language therapy is dynamic and changing. The scope of practice grows along with advances in technology enabling practitioners to provide new and improved methods of diagnosis and treatment. By identifying VLE as within the scope of practice, it is not intended to limit any other new or emerging areas from being developed by SLTs to help improve treatment and diagnosis of voice disorders. It is also recognised
that VLE applications by SLTs may result in a stronger evidence base for existing treatment practices. Some examples of these clinical developments are described within this document. If practitioners choose to perform these procedures, indicators should be developed to continuously monitor and evaluate their appropriateness, efficacy and safety.
**Context**

1. **The purpose of VLE by SLTs**

SLTs (voice) may carry out laryngeal and vocal tract assessment via an endoscope in order to:

- Identify and describe phonatory anatomical structures and their function
- Assess the effects of lesions, alteration of function or deformity on phonation and speech
- Assist in the interpretation of the above as part of the clinical discussion thereby contributing to the diagnostic process.
- Provide feedback regarding vocal tract function as part of the therapeutic process.
- Direct treatment and evaluate its effectiveness
- Provide visual biofeedback during therapy
- Improve patient understanding of their voice disorder and compliance with treatment
- Record phonatory behaviour and laryngeal structures for future reference

2. **Professional context**

SLTs should only perform VLE in the context of a multidisciplinary voice disorders service. This should include combined voice clinics with established access to specialist otolaryngologists (voice). SLTs should only perform VLE with the full support of their otolaryngology colleagues and with easy access to opinion and/or medical assistance from a specialist otolaryngologist (voice).

3. **Specialist SLT (voice)**

Following appropriate training, specialist SLTs (voice) may practice VLE independently (but within the professional boundaries described in this document). A specialist SLT (voice) has advanced postgraduate training and has demonstrable experience to assess, make an SLT diagnosis and to treat the full range of voice disorders. It is very unlikely that this level of expertise could be achieved in less than five years post-qualification (including three years of substantial experience in the management of patients with voice disorders).

VLE should be seen as a valuable assessment option for specialist SLTs and complementary to other voice assessment skills. VLE is not a compulsory skill for all specialist SLTs (voice).
4. **Local arrangements**

The SLT must ensure that approval has been given by his/her employer with recognition of competence to perform the procedure (see training and competence section). The employer should also approve the type of VLE service that is being offered (usually in consultation with the local ENT service). Use of the VLE procedure must be written in to the SLT’s individual job description in agreement with their head of department. It is good practice to inform other colleagues (ie referrers) as appropriate.

In order to obtain full clinical privileges to perform independent endoscopic evaluation of voice disorders (including serving as the endoscopist), the SLT clinician must have undertaken the appropriate training as set out in this policy statement.

5. **Training structure**

Practitioners should only engage in those aspects of the VLE procedure that are within the scope of their competence considering their level of education, training and experience.

Education and training for VLE may be obtained by a variety of means. Some of the training should take place in a clinical setting, allowing the SLT (voice) to work with more experienced professionals (ie specialist SLTs (voice) and specialist otolaryngologists (voice)) and with a wide variety of patients.

It is recognised that SLTs developing VLE skills will perform different roles within the clinical procedure. The purpose of the training is to acquire and develop skills to work towards autonomy as an independent and skilled practitioner.

6. **Facilities and equipment**

VLE should only be performed in an appropriate medical setting with specialist endoscopic imaging equipment. Access to appropriately trained medical and nursing staff, sterilisation and emergency/resuscitation equipment is essential. Ideally it should be performed in a multidisciplinary environment and always with the agreement of the team about the reasons for the endoscopic procedure. There must be immediate access to other suitably qualified practitioners in case any unforeseen circumstance or emergency arise (eg tissue trauma, epistaxis, vasovagal episode). See the procedural issues of this document.
7. Different types of VLE clinic

Three types of VLE currently exist. A brief description of each type is included here although it should be acknowledged that local variance of clinical practice is inevitable.

It is common practice in the UK for voice referrals to be triaged into an appropriate VLE assessment clinic. These voice patients are likely to be seen in either a combined voice clinic or a parallel SLT-led clinic.

a. Combined Voice Clinic.
The aim of this clinic is to provide patients with a multidisciplinary approach to evaluating a clinical voice disorder. The patients' problems often require both the surgeon's and the SLT's (voice) expertise in their diagnosis and management. Other professionals such as a clinical psychologist, an osteopath and/or a singing teacher may also be involved.

b. Parallel SLT-led Clinic.
This model often uses strict selection criteria in order to try and identify patients most likely to require speech and language therapy as their primary mode of treatment. The aim is to reduce the number of hospital visits and enable the patient to be seen by the voice specialist who is most likely to manage their voice problem. This SLT-led clinic runs 'in parallel' to a designated otolaryngology clinic. This arrangement facilitates ease of patient transfer to the primary otolaryngologist should the consultation require it. Detailed endoscopic assessment of the structure and physiology of the larynx (in conjunction with perceptual, instrumental and case history findings) enables the SLT to plan and deliver treatment more effectively and efficiently. Treatment and management decisions are made jointly following a review of the laryngeal image and case discussion of the pertinent assessment findings. This model of service delivery requires highly competent clinical practice and a philosophy of team working which is integral to a well developed voice disorders service. The ultimate medical and legal responsibility for these patients is the specialist otolaryngologist.

Patients who have already had an ENT examination and who are referred to voice therapy may also undergo additional VLE assessments by an SLT. This clinic is commonly called a 'Voice Therapy Clinic'.

c. Voice Therapy Clinic.
The aim of this clinic is to assist the SLT management of a voice-disordered patient. Patients may be endoscoped by an appropriate SLT in this clinic for reasons which may include:
- an additional voice therapy opinion
- more detailed understanding of the biomechanics of voice production
- trialling therapy techniques (under endoscopic view) and to increase patient compliance with treatment
- patient biofeedback (simultaneous or recorded)
- obtaining pre- and post-outcome measures post therapy/surgery (in conjunction with other tools) \textsuperscript{9,10,11}
Training and Competency

This is a statement of the:
1. Knowledge and skills required to perform VLE
2. Methods of acquisition of the knowledge and skills
3. Verification of competence attained
4. Maintenance of competence

1. Knowledge and Skills

**Communication and Professional Skills**
- Understanding of the complementary roles of the multidisciplinary team involved in the management of clinical voice disorders
- Compliance with the RCSLT position on video-laryngeal endoscopy (this document)
- Ability to communicate findings with patients and professional colleagues in a clear and appropriate manner.

**Specialist Skills**
- Advanced clinical knowledge of the normal and disordered anatomy, physiology and neurology of the vocal tract (see Appendix A)
- Ability to appropriately select patients for VLE
- Ability to select appropriate VLE techniques (e.g. fibreoptic v rigid examination, use of stroboscopy)
- Thorough knowledge of the current principles and techniques of voice therapy and the ability to trial as appropriate during VLE.
- Ability to interpret and describe VLE findings (see Appendix B)
- Ability to know when to request further medical/surgical opinion

**Facilities and Equipment**
- To be aware of local policies regarding the operation and maintenance of VLE equipment including data storage and retrieval, health and safety and risk management (also see procedural issues section)
- To understand the need for performing VLE within an environment with immediate access to medical/nursing support (also see context and procedural issues sections)

**Examination Technique**
- Ability to perform VLE in a way that minimises risk to patient
- Ability to perform VLE in a manner that yields best quality recordings
2. Acquisition of knowledge and skills

Competence in VLE may be acquired using a range of learning modalities including:

1. Didactic/Classroom teaching by both external and internal teachers
2. Mentoring
3. Supervised Clinical Experience, including observation and guided practice

A structured programme should include:

- Attendance at an appropriate VLE training course
- Structured reading of appropriate literature (suggested core reading is indicated in the reference list to this document)
- Observation of 10 voice endoscopy clinics (or tapes from the clinics)
- Assistance (eg setting up equipment, storing images, discussing interpretation) with 10 VLE procedures performed by specialist SLT (voice) or specialist otolaryngologist (voice)
- To successfully perform and interpret 10 VLE examinations under direct supervision
- To successfully perform and interpret 10 VLE examinations independently with supervision available

Professionals who may be involved in skill acquisition include:

- Specialist otolaryngologist
- Specialist SLTs in voice who have achieved competency in VLE
- Specialist ENT nurse (i.e. sterilisation/risk management)

3. Verification of competency

Competency should be verified by an experienced clinician:

- Specialist SLT in voice (competent in VLE)
- Specialist otolaryngologist (competent in VLE)

A competency checklist is included in Appendix C of this document.

Once competency has been verified and well established, the specialist SLT (voice) may practise the procedure independently but should be subjected to regular audit as part of standard clinical governance procedures. A variety of clinical models may be developed (eg see previous section – types of VLE clinic). The type of clinic and the experience of the SLT clinician will determine whether joint review of all VLE images is necessary and this practice is subject to local agreement.

4. Maintenance of competency

Specialist SLTs (voice) are responsible for maintaining their competency to perform VLE and to ensure the pre-requisites for practice are in place. It is anticipated this would involve regular practice (at least monthly). It is unlikely that maintenance could be achieved without performing at least 75-80 procedures per year. There is a professional responsibility to review competencies for VLE if the procedure has not been performed for one year.
**Procedural Issues**

1. **Detailed definition of the procedure.**
   It should be noted that flexible nasendoscopy and rigid endoscopy are complementary and not necessarily mutually exclusive.

**Flexible Nasendoscopy**

The fibreoptic laryngoscope is passed transnasally to the hypopharynx, where the larynx and surrounding structures can be viewed\(^3,7\). The moveable tip can be angled and rotated to view the full larynx. The tip of the scope is usually positioned slightly above the epiglottis, but can be moved closer to the vocal folds for more detailed visualisation (which is particularly necessary if used with stroboscopic light). The supra-glottic structures and the velo-pharyngeal function can also be assessed by withdrawing the endoscope into the nasopharynx. Laryngeal structure, function and posture are assessed during both speech and non-speech tasks, eg habitual speech behaviour, flexibility of pitch adjustments, adductory non-speech behaviour, resting state and any other behaviours of interest. At the end of the examination activities designed to elicit specific behaviours of interest or to attempt to change a laryngeal gesture may be added\(^2,3,7\). The professional undertaking this aspect of the fibreoptic examination must be skilled in 'reading' the image, in understanding the physiology, and knowing the types of vocal manoeuvres that might elicit the desired changes in behaviour. Advantages of this technique are an excellent image of the vocal folds and velo-pharyngeal structures during voicing, conversation and singing. Nasal discomfort may be a disadvantage together with triggering of the gag and swallow reflexes. A procedural protocol is outlined in Appendix D.

**Rigid Endoscopy**

At the start of the examination, the patient is asked to protrude his/her tongue, which is held by the examiner (or by the patient) outside the oral cavity with a gauze pad. The endoscope is then inserted into the mouth and oropharynx. The exact position of the endoscope needs to be altered as the examination progresses in order to bring the vocal folds into view\(^3,6,7\). Advantages of this technique are high illumination, wide field of view and excellent image quality. Disadvantages are interferences with normal speech production and examination is limited to a phonation on a sustained “ee” vowel and during respiration. The procedure can trigger a gag reflex and views may be limited if the tongue is backed and will not relax. A procedural protocol is outlined in Appendix E.

**Stroboscopy**

It is possible to carry out a stroboscopic examination using either a rigid endoscope or a flexible nasendoscope\(^6,7,10,11,12\) although superior views are
obtained with the rigid endoscope. A variety of methods are used to detect the voice signal from which the fundamental frequency is extracted and which is used to control the rate of triggering of the stroboscopic light. This allows the vibratory pattern of the vocal folds to be observed in apparent slow motion. The rigid or flexible scope is introduced, the stroboscopic light is switched on (usually by a foot pedal), and the patient is asked to sustain phonation of the vowel 'ee'. A number of samples will be produced varying the loudness and pitch because vocal fold vibratory behaviour will vary under these conditions.

Other imaging techniques are available and include high-speed photography and video–kymography. At the time of writing this document, these techniques are commonly used for research purposes only.

2. Health and safety

The SLT managing the clinic must be familiar and comply with any local department policies on health and safety. These should cover the following areas:

a) Use and care of substances hazardous to health (COSHH). Appropriate training needs to be undertaken in how these substances should be stored, used or disposed of within the department.

b) Control of infection. Disease transmission is possible via contact with equipment contaminated by saliva, blood and other body fluids. Sterilisation and storage of equipment should comply to current infection control procedures to avoid cross infection of both patients and staff involved in the clinic. SLTs should wear gloves during the examination procedure and in handling contaminated equipment. SLTs should therefore be familiar with and adhere to universal precautions, local and institutional policies regarding the cleaning, decontamination and sterilisation and storage of the equipment, and isolation precautions. The BAOLHNS are currently producing guidelines (July 2004) on endoscope sterilisation.

c) Topical anaesthetics (nasal and oropharynx) and nasal decongestants. SLTs should be aware of the indication, contraindication, and possible drug interactions with their use. This includes knowledge of correct dosage and possible pharmacological side effects.

SLTs can administer topical anaesthetic sprays and nasal decongestants under Patient Group Directions (Department of Health, April 2004 document MLX 294). This is subject to local agreement within each trust/health board.

However, SLTs can perform comfortable flexible VLE without administration of any substance to the nasal mucosa. It has also been shown that topical anaesthesia may alter vocal performance.
d) Basic first aid training is essential for all SLT’s involved in the performance of these invasive procedures.

e) Risk Management. The clinician should be aware of and minimise possible risks of passing the endoscope as well as adverse reactions to topical anaesthesia/nasal decongestants.

f) Incident reporting. If an adverse reaction occurs, appropriate local incident report procedures should be followed.

NB All of the above knowledge will be gained during the acquisition of knowledge and competency (see sections above and appendices).

3. Consent

The NHS Good Practice in Consent (NHS Executive 2001) states the need for changes in the way patients are consented. In most trusts/health boards it is routine practice to obtain verbal consent prior to VLE rather than written consent although this may vary between employing authorities. Recommendations are:
- Seek advice as to whether written or verbal consent is appropriate and consistent with the directorate
- Seek guidance from Department of Health/strategic health authority website
- Review consent policy in the light of regular national and local changes

4. Documentation

Documentation should be kept according to the RCSLT professional guidelines - see Communicating Quality 2. Also see Appendix B of this document for recommendations of details of reporting VLE findings.

Medico-Legal Issues

This document is the RCSLT’s official statement of professional practice for SLTs using VLE. Adherence to its content and recommendations are the professional responsibility of the individual therapist. Proof and assurance of this adherence will help ensure professional indemnity through the individual’s employer. Failure to comply with the details of this policy statement may amount to a breach of acceptable professional conduct.

The RCSLT acknowledges that professional practice continues to grow and develop. Members should contact the RCSLT for advice about any areas of practice out with this policy statement.
References

** Indicates suggested core reading as part of acquiring basic competency

APPENDIX A: KNOWLEDGE OF NORMAL AND DISORDERED LARYNGEAL ANATOMY AND PHYSIOLOGY

Core Competencies:
The practitioner should have advanced clinical knowledge of the anatomy, physiology and neurology of the larynx and vocal tract

Anatomy and physiology of the normal vocal tract

1. Vocal tract anatomy/physiology
2. Basic nasal anatomy/physiology
3. Laryngeal and respiratory anatomy/physiology
   a. Effect of air pressure and flow on vocal fold vibration
   b. Laryngeal anatomy
   c. Laryngeal physiology
      i. Mucosal wave
      ii. Frequency
      iii. Intensity
      iv. Timing
      v. Quality

Pathophysiology

1. Gross appearance, causes, mechanical properties, and principles of treatment
   a. Nodules
   b. Polyps/polypoid degeneration
   c. Granuloma
   d. Carcinoma/dysplasia/hyperkeratosis
   e. Reinke’s oedema
   f. Papilloma
   g. Trauma
   h. Acute and chronic laryngitis
      i. Leukoplakia
      j. Laryngopharyngeal reflux
      k. Vascular abnormalities
   l. Cysts
   m. Sulcus/vergeture/mucosal bridges
   n. Effects of drugs and systemic diseases

2. Neurogenic laryngeal disorders
   a. Upper motor neurone disorders (ie Parkinson disease, multiple sclerosis, stroke)
   b. Lower motor neurone disorders (ie recurrent laryngeal nerve paralysis/paresis, superior laryngeal nerve paralysis/paresis, myasthenia gravis)
   c. Spasmodic dysphonia (ie abductor and adductor types)
APPENDIX B: REPORTING VLE FINDINGS

When reporting VLE findings and interpretations, clinicians should include the following details and parameters:

Patient identification including hospital number

Patient history
- History of presenting problem
- Medical history
- Lifestyle issues
- Previous treatment
- Voice use summary

Current voice quality

Palpatory findings
- Observe thyro-hyoid membranes/muscles
- Observe crico-thyroid visor mechanism (at rest and with pitch changes)
- Not position of larynx (at rest and during phonation)

VLE examination
- Description of procedure
- Description of findings
  1. Laryngeal tissue abnormalities
     a. tissue appearance
     b. vocal fold edge
  2. Supraglottic features
     a. Ventricular fullness and appearance
  3. Gross laryngeal movement
     a. arytenoid movement
     b. supraglottic constriction
     c. testing for paresis and other neurolaryngological disorders
  4. Vibratory characteristics (as appropriate)
     a. The degree and pattern of glottal closure and opening
     b. Vibratory amplitude
     c. Vibratory symmetry
     d. Mucosal wave
     e. Expected changes with pitch and loudness
  5. Description of clinical impressions
     a. Appearance of laryngeal anatomy and physiology is consistent with that of ..........
     b. Description of vocal use
     c. Differential diagnosis
  6. Recommendations
     a. Medical/surgical investigation/treatment
     b. Voice conservation
     c. Vocal hygiene
     d. Voice treatment/therapy
     e. Repeat examination
**APPENDIX C: COMPETENCY DEVELOPMENT PROGRAMME**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Date achieved</th>
<th>Signed by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Read RCSLT position statement on VLE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquire advanced clinical knowledge of anatomy, physiology and neurology of the vocal tract</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Demonstration of knowledge of local policies / guidelines on</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Consent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Health and safety</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Risk management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acquire thorough knowledge of current principles and techniques of voice therapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observation of 10 voice clinics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assist with 10 VLE procedures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successfully perform and interpret 10 VLE examination under direct supervision (see additional competency assessment list)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Successfully perform and interpret 10 VLE examination with supervision available (see additional competency assessment list)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX C (CONT)

### DETAILED COMPETENCY ASSESSMENT FOR SLTs PERFORMING/INTERPRETING VLE

<table>
<thead>
<tr>
<th>Topic</th>
<th>Comments</th>
<th>Signed By</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scope introduced with minimal discomfort to patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfactory view obtained</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to select appropriate VLE tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to interpret and describe VLE findings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to make accurate SLT differential diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to trial appropriate therapy techniques</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to record data accurately</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to feedback to patient appropriately</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to retrieve data for reporting and discussion purposes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appropriate management decisions taken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to adhere to correct health and safety policies and procedures</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D: A PROTOCOL FOR FLEXIBLE NASENDOSCOPY

Taken from Understanding Voice Disorders – Colton & Casper, 1996.

1. Observe larynx at rest
   Instruction to patient: Just sit quietly for a moment.

2. Observe deep inspiration
   Instruction to patient: I want you to take a deep breath and release it. Then do it two more times.

2. Observe sustained vowel phonation at comfortable (modal) pitch (3x) repetitions
   Instruction to patient: I’d like you to say ‘ee’ at a pitch that is comfortable for you and hold onto it for a few seconds. (can be modelled). May be repeated saying ‘oo’.

3. Observe sustained vowel phonation at elevated (modal) pitch (3x) repetition
   Instruction to patient: Now I’d like you to do the same thing, hold on to that ‘ee’ but at a high pitch. (can be modelled) (may be repeated using ‘oo’).

4. Observe dynamics of pitch change
   Instruction to patient: I want you to start with that high sound and let your voice glide down to a deep sound, like this: model a downward glissando. (3x repetitions). Now let’s start at the bottom low note and let your voice glide upward, like this: model an upward glide (3x repetitions).

6. Observe speech
   Instruction to patient: Please repeat each of these sentences twice.
   a) See the busy bees, b) We eat green beans, c) Do queens eat honey?
   d) Who hoots at the moon? e) Do you chew your food?

7. Observe the non-phonatory laryngeal behaviour
   Instruction to patient: I’d like you to whistle for me like this: (model a few short interrupted bursts of whistle). Now I’d like you to whistle a little bit of Happy Birthday. If patient cannot whistle, a ‘pretend’ whistle is acceptable.

8. Period of diagnostic therapy
   Instruction to patient: The instructions to the patient will depend on the vocal manoeuvres you wish to elicit. It is appropriate at this time to follow-up on any of the above activities if behaviours of interest were noted, or if you wish to make another attempt to teach a task. If particular type of voice usage is of concern, for example, the high notes in singing or during lecturing, it is helpful to obtain a sample of that behaviour.
APPENDIX E: A PROTOCOL FOR RIGID ENDOSCOPY

The protocol is limited to sustained /i/ vowels because the tongue needs to be held.

When the larynx has been visualised ask the patient to

1. Phonate /i/ at normal pitch and loudness for at least two seconds.

2. Produce the same vocal starting at normal pitch and loudness and gradually get louder.

3. Produce the same vowel starting at normal pitch and loudness and gradually elevate the pitch. Take a breath, repeat the procedure lowering the pitch.

4. Produce a syllable chain of /i/ repetitions at a fast rate.

For most speakers the vowel /i/ provides the best image of the larynx. Occasionally an /ai/ or /ou/ is better.

The tasks are repeated as needed to ensure that the examiner has a representative sample of how the patient typically produces voice and what the patient is capable of producing with their current anatomy. For some patients extended observation of laryngeal dynamics is needed. It is also important to note the opening and closing patterns of the vocal folds, the position of the arytenoid cartilages, gross rotation or tilting of the larynx and the voice quality during the voice task.

Adapted from: Videostroboscopic Examination of the Larynx, Hirano M, Bless DM 1993
APPENDIX F: ESSENTIAL ENDOSCOPIC EQUIPMENT

1. Endoscope
   (a) Rigid and/or
   (b) Flexible
   A narrow bore scope should be available for paediatric examinations.

2. Light Sources
   (a) Continuous
   (b) Stroboscopic

3. Cameras/adapters/lenses

4. Video cassette recorders and tapes for purposes of retrieval and review

5. Printers (not essential)

6. Computer assisted systems – for purposes of retrieval and review

7. Sterilising equipment (or disposable sheaths if used)