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Awake Tracheal Intubation

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CONTENTS

Introduction

The practice of safe anaesthesia depends on the acquisition and mastery of many unique and specialised skills. Few inspire such consternation in trainees as endotracheal intubation. Fortunately, in routine practice, many of the factors that might complicate the process are carefully controlled. Anaesthesia removes the anxiety and discomfort associated with airway manipulation, and muscle relaxants provide optimal conditions for laryngoscopy and passage of the tracheal tube. In addition, the theatre environment is purposefully arranged to facilitate safe and repeatable performance, and modern airway equipment makes successful intubation a near certainty in most patients.

Successful intubation under these conditions depends upon our ability to oxygenate the patient after spontaneous breathing has been abolished. Bag-mask ventilation and sometimes the use of a supraglottic airway device therefore become the critical bridge between induction of anaesthesia and establishment of a definitive airway. In some patients, however, the very interventions that facilitate routine intubation may complicate our ability to achieve it. Loss of airway tone can result in airway obstruction, while anatomical or physiological factors may make bag-mask ventilation difficult or impossible. In these circumstances, the period between induction and securing the airway becomes one of significant risk.[1]

For such patients, preservation of spontaneous ventilation until a definitive airway has been established offers a safer alternative. Awake tracheal intubation allows airway instrumentation while maintaining respiratory drive and airway patency, thereby avoiding many of the hazards associated with induction of anaesthesia in the anticipated difficult airway. In experienced hands, it is among the safest methods of securing the airway, with a high success rate and relatively infrequent serious complications.[2,3] It can be performed with or without the help of sedation using only topical anaesthesia or a mix of local and regional techniques, thereby still ensuring maximal patient comfort and satisfaction.

The challenge facing trainees is that awake tracheal intubation remains an underutilised skill. According to the NAP4 audit, it accounts for fewer than 0.5% of all tracheal intubations in the UK[4]. Consequently, opportunities to acquire and maintain proficiency may be limited. Even experienced practitioners may perform the technique infrequently enough for familiarity and confidence to diminish over time.

The aim of this booklet is to provide a practical reference for the planning and performance of awake tracheal intubation, along with a rational framework for understanding their respective goals and the various means by which they may be achieved. It is intended primarily for trainees who are still developing a structured and safe approach to the technique, while also serving as a concise reference for more experienced practitioners.

Awake tracheal intubation is not a single formalised technique, nor a rigid sequence of steps. Rather, it is a strategy for maintaining airway control in patients for whom induction of anaesthesia is especially hazardous. As such, while there are many acceptable approaches to its performance, all have a shared aim and are built upon the same principles.

Indications & Decision-Making

The decision to perform awake tracheal intubation is based on how reliably a patient can be oxygenated between induction of anaesthesia and establishment of a definitive airway[2]. This can be framed as a series of concerns or questions to be considered during the pre-operative assessment of every patient:

- *Can this patient be adequately oxygenated?*
- *Can this patient be easily intubated after induction of anaesthesia?*
- *Can this patient tolerate a period of apnoea?*

In an effort to predict difficulty with oxygenation, laryngoscopy and tracheal intubation, numerous bedside assessments and scoring systems have been proposed. These range from focused history taking and physical examination to careful bedside measurements and, in selected cases, radiological investigations. No single assessment has emerged as a gold standard, largely because airway difficulty is multifactorial and the factors contributing to difficult airway management frequently overlap. Nevertheless, a structured airway assessment should form part of every pre-operative evaluation.[5]

History taking alone may provide sufficient grounds for deciding to perform awake tracheal intubation. Certain chronic diseases, such as rheumatoid arthritis, ankylosing spondylitis and long-standing diabetes mellitus, are associated with reduced cervical spine or temporomandibular joint mobility, making laryngoscopy more challenging. A history of obstructive sleep apnoea and snoring are well supported by the literature as predictive of difficult airway[2]. Existing or progressive airway pathology may further be signalled by symptoms like stridor, hoarseness or other vocal changes, dysphagia or discomfort on lying supine. The nature of the pathology itself—for example an airway tumour, extensive laryngeal papillomatosis, or anatomical distortion following trauma, radiotherapy or previous surgery—may also strongly favour an awake approach. Access to previous anaesthetic records tends to prove invaluable, with particular attention paid to documented difficulty with mask ventilation, supraglottic airway insertion, laryngoscopy or tracheal intubation, together with the techniques that ultimately resulted in successful airway management. This, in turn, highlights the importance of careful documentation of both airway difficulty and the methods by which it was successfully overcome.

Inspection of the head, mouth and neck should form part of every pre-operative assessment.[6] Obvious abnormalities, including scars, tumours or facial trauma, may sufficiently prompt the decision to intubate awake without the need for further testing. Obesity is consistently overrepresented in NAP audits of airway complications. More subtle predictors of airway difficulty can be identified using a few bedside examinations, each assessing one or more anatomical domains relevant to airway management: mouth opening, mandibular mobility, submandibular tissue compliance and cervical spine mobility.

The Mallampati classification remains one of the most widely recognised bedside assessments, grading the view of the oropharynx following maximal mouth opening and tongue protrusion. Higher grades (III and IV) are associated with an increased likelihood of difficult laryngoscopy and, to a lesser extent, difficult bag-mask ventilation, although high inter-observer variability makes this a poor indicator when used in isolation[1]. Inter-incisor distance, thyromental distance and sternomental distance provide quantitative estimates of mouth opening and the available space for displacement of the tongue during laryngoscopy. An inter-incisor distance of less than 3 cm, a thyromental distance of less than 6.5 cm and a sternomental distance of less than 12.5 cm should all prompt careful consideration of potential airway difficulty. Jaw protrusion and the upper lip bite test in particular assess temporomandibular joint function, while examination of neck movement provides valuable information regarding the likelihood of achieving the optimal sniffing position for laryngoscopy, mask ventilation and, if required, emergency front-of-neck access. The compliance of the submandibular tissues should also be assessed, as reduced displacement of these soft tissues may impair both bag-mask ventilation and direct visualisation of the glottis.

A few multivariable scoring systems, including the Simplified Airway Risk Index (SARI), Mallampati–Thyromental–Anatomical Abnormalities–Cervical Mobility (MTAC) score and Wilson score, combine varying elements of the above examinations into composite predictors of airway difficulty. While these systems offer a modest improvement in predictive value over any individual assessment, no scoring system can reliably identify every difficult airway. Most probably, their greatest value lies in promoting a structured and reproducible approach to airway assessment, ensuring that important anatomical and physiological considerations are recognised timeously.[7]

Radiological and other imaging modalities may offer further clarity in assessing airway risk. These are rarely performed solely for the purpose of airway assessment, but in selected patient groups they may nonetheless be useful. Computed tomography, point-of-care ultrasound and nasoendoscopy in particular may help to guide airway management, and the most recent Difficult Airway Society guidelines encourage airway practitioners to develop familiarity with these modalities[8].

An important caveat, however, is that these investigations provide a largely static representation of the airway and cannot account for the dynamic physiological response of the patient to anaesthesia, including the effects of induction, apnoea and positive-pressure ventilation.

A recent development reflected in the 2025 Difficult Airway Society (DAS) guidelines is the formal recognition of the physiologically difficult airway. This describes patients in whom the principal hazard of airway management arises not from technical difficulty, but from the physiological consequences of induction of anaesthesia, including loss of sympathetic tone, apnoea and the transition from negative- to positive-pressure ventilation. Severe hypoxaemia, profound metabolic acidosis, haemodynamic instability and right ventricular dysfunction are all examples of conditions associated with an increased risk of peri-intubation deterioration despite otherwise straightforward airway anatomy[8]. Similarly, patient groups such as the obese and parturients may have limited tolerance of even brief periods of apnoea.

Even in the absence of anatomical predictors—and more especially when they coexist—the third question, *Can this patient tolerate apnoea?*, warrants careful consideration and a sober assessment of the strategy most likely to minimise harm. The decision to perform awake tracheal intubation should therefore be guided not only by the anticipated technical difficulty of airway management, but also by the patient’s physiological reserve and their ability to tolerate the consequences of induction of anaesthesia.

Contraindications & Cautions

Because patient preparation and cooperation are pivotal to success in awake tracheal intubation, true absolute contraindications are limited to patient refusal despite appropriate counselling and explanation of the risks and benefits[1].

A few relative contraindications or cautionary factors may, however, increase the likelihood of failure or complication. These include local anaesthetic allergy, significant airway bleeding, an uncooperative patient, and selected airway tumours with a potential for sudden obstruction during instrumentation, so called ‘cork-in-bottle’ obstructions.

The presence of one or more of these factors does not necessitate the exclusion of awake tracheal intubation. They should however prompt a careful assessment of the risk-benefit profile, taking into account the urgency of airway control, the physiological reserve of the patient, and the experience of the operator. In many cases, awake tracheal intubation still represents the safest available option when weighed against the risks of induction of anaesthesia.

Consent & Patient Preparation

Patient preparation is arguably the most critical component of successful awake tracheal intubation, and much of the preparation and performance of the technique ultimately is about assisting the patient in their willingness and ability to cooperate. Unlike routine tracheal intubation, awake intubation designates the patient as an active participant in the procedure rather than a passive recipient. This requires a subtle reframing of the usual anaesthetist–patient relationship, such that the patient understands not only the rationale for the technique and the steps involved, but also their role in its success.

Patients should be informed, in practical terms, of the sequence of events they are likely to experience, including fasting, positioning, topicalisation, regional airway techniques where applicable, sedation, airway instrumentation and ultimately tracheal intubation. Although every effort is made to minimise discomfort and distress, some degree of physical or psychological discomfort may still occur. Establishing this understanding prior to entering the operating environment allows the patient time to process the information and improves cooperation during the procedure.

The plan should also include a discussion of options for topicalisation and sedation. Consent should extend beyond the awake technique itself to include the contingency plan in the event of failure, whether that involves emergency front-of-neck access, postponement of surgery, or high risk general anaesthesia. By the time consent for ATI is given, the patient should understand:

- *The nature of the procedure*
- *The benefits and risks of the procedure*
- *What to expect in terms of sensation*
- *What their role may be at various points in the procedure*

In addition to standard pre-procedural fasting, many guidelines highlight the value of antisialagogue adjuncts such as glycopyrrolate in reducing airway secretions and improving conditions for topicalisation. For best results, this should be given at least 20 minutes prior to the start of topicalisation[1].

Finally, optimisation extends beyond the patient alone. The operating environment and team should be well prepared, with clearly defined roles and an agreed sequence of events. A calm, organised setting with a shared understanding among all team members is a key determinant of success. A suggested procedural checklist from DAS as well as operating room layout for Awake Fibre-Optic or Awake Video-laryngoscopic procedures are attached in the appendix, adapted from Vora, Leslie and Stacey.

Airway topicalisation

The success of awake tracheal intubation depends as much upon effective airway topicalisation as it does upon sedation or technical airway skill. Moreover, inadequate airway anaesthesia, particularly failure to suppress gagging is often the main contributor to patient discomfort, excessive coughing, unnecessary escalation of sedation and procedural failure.[9]

Effective airway anaesthesia aims to accomplish four objectives:

- Minimise discomfort during airway instrumentation
- Suppress the gag reflex
- Blunt the cough reflex
- Facilitate patient cooperation

The distribution of local anaesthetic reflects the intended route of intubation. Nasal intubation requires anaesthesia of the nasal passages in addition to the oropharynx and larynx, whereas oral techniques principally require topicalisation of the oral cavity, pharynx and laryngeal inlet. Nasal analgesia is best achieved through application of a mixture of phenylephrine and lidocaine or through packing the nose with gauze soaked with 2% lidocaine and adrenaline. Another well attested method is to coat a nasopharyngeal airway with lidocaine jelly, and to insert it into the nasal cavity. A quick check of the efficacy of nasal anaesthesia can be done using a flexible suction catheter.

The 2025 Difficult Airway Society guidelines recommend lidocaine as the local anaesthetic of choice, along with a careful account of the cumulative dose administered. Total lidocaine dose should generally remain below **9 mg/kg lean body weight.** Although systemic toxicity is uncommon, fatal local anaesthetic toxicity has been reported following airway topicalisation alone, emphasising the importance of meticulous dose calculation.

Spray topicalisation

Lidocaine spray 10% remains the simplest and most widely employed agent. Each actuation or ‘pump’ delivers approximately 10 mg of lidocaine in 0.1ml and allows progressive topicalisation of the airway.

A typical sequence consists of:

- Tip and dorsum of tongue (1-2 sprays)
- Posterior tongue (1-2 sprays)
- Soft palate (1-2 sprays)
- Posterior tonsillar pillars bilaterally (4-6 sprays)
- Posterior pharyngeal wall (2-4 sprays)

Following several minutes to allow adequate onset, suppression of the gag reflex should be assessed gently using a tongue depressor or similar atraumatic instrument. Additional topicalisation may be administered where required before proceeding. Typical oral topicalisation requires approximately 20–30 sprays, although the exact requirement varies considerably between patients.

Spray-as-you-go (SAYGO)

Once satisfactory pharyngeal anaesthesia has been achieved, a flexible bronchoscope may be advanced towards the larynx. An epidural catheter inserted through the bronchoscope suction channel allows administration of 2% lidocaine directly onto the supraglottic structures, vocal cords and proximal trachea. Alternatively, a 10ml syringe containing 1ml of lidocaine and 9ml air can be injected forcefully through the working port to achieved aerosolisation.

Injection to the area immediately above the cords suppresses laryngeal sensation, while administration below the cords, combined with deep inspiration or coughing, distributes local anaesthetic throughout the infraglottic airway and markedly reduces coughing during tracheal tube insertion.

Alternative methods

Numerous alternative techniques have been described using other preparations of lidocaine, including mucosal atomisation devices, nebulised lidocaine and viscous lidocaine gargles or "lollipops." Each aims to achieve the same endpoint by differing methods of drug delivery. Regardless of the method employed, careful documentation of cumulative lidocaine dose is essential throughout the procedure, particularly where the operative site will require local anaesthetic administration after induction of anaesthesia .

Practical Pearls

- *Administer glycopyrrolate early to reduce secretions before topicalisation.*

- *Good topicalisation is more desirable than deeper sedation.*

- *Test airway anaesthesia before progressing.*

- *Keep a running total of administered lidocaine throughout the procedure.*

Regional airway anaesthesia

Although meticulous topicalisation alone is sufficient for most awake tracheal intubations, regional airway blocks remain valuable adjuncts for experienced practitioners. When performed successfully they provide dense airway anaesthesia, reduce coughing and gagging, improve patient comfort and reduce the overall requirement for topical local anaesthetic. They are also associated with shorter time to intubation and fewer perturbances to the haemodynamics of the patient.[10] In high volume centres where the relevant skills are well developed, these techniques may be more effective, more reliable and therefore preferred to topicalisation alone.

Where available, ultrasound guidance may improve anatomical identification, increase block success and reduce complications, particularly in patients with obesity or distorted neck anatomy.

Glossopharyngeal nerve block

Purpose

The glossopharyngeal nerve supplies sensation to the posterior third of the tongue, the tonsillar pillars, soft palate and upper pharynx. Bilateral blockade markedly suppresses the gag reflex and improves tolerance of oropharyngeal instrumentation. [9]

Technique

The intraoral approach is typically employed. Following adequate mouth opening, a tongue depressor or inverted laryngoscope blade is used to expose the posterior tonsillar pillar. Using a 22–25 gauge spinal needle, typically bent near its tip to facilitate manoeuvrability, 2–3 mL of 2% lidocaine is injected into the mucosa on each side after careful aspiration to exclude intravascular placement. Needle insertion should remain superficial (approximately 5 mm) because of the close proximity of the internal carotid artery and the vagus nerve. If the posterior tonsillar pillar is difficult to access, similar efficacy is achieved by injecting into the base of the anterior tonsillar pillar instead.[9]

Where mouth opening is limited, ultrasound-guided injection into the parapharyngeal space provides a useful alternative, called the peristyloid approach.

Following successful Glossopharyngeal nerve block, a patient may experience difficulty with swallowing salivary secretions. It can be helpful to give them a yankauer suction device so that they can suction their own airway in comfort.

Superior laryngeal nerve block

Purpose

The internal branch of the superior laryngeal nerve provides sensation above the vocal cords, including the epiglottis, aryepiglottic folds and supraglottic larynx. Bilateral blockade significantly improves tolerance of laryngoscopy and bronchoscopy. It is also useful in performing awake tracheostomy.

Technique

The block may be performed using either surface landmarks or ultrasound guidance. **1–2 mL of 2% lidocaine** is deposited bilaterally in the plane immediately superficial to the thyrohyoid membrane.

SLN blocks traditionally use landmark techniques- relying upon identification and palpation of the greater cornu of the hyoid, and the laryngeal prominence. While landmark techniques are often sufficient in cases without airway distortion, ultrasound greatly facilitates recognition of the thyrohyoid membrane and confirms appropriate needle placement, particularly in obese patients or those with distorted anatomy.

Recurrent laryngeal nerve block

Purpose

The recurrent laryngeal nerve supplies sensation below the vocal cords. While the nerve itself cannot readily be blocked directly, airway anaesthesia can be achieved by transtracheal injection of local anaesthetic via the cricothyroid membrane.

Technique

Following identification of the cricothyroid membrane using either palpation or ultrasound, a 25-gauge needle is advanced through the membrane into the tracheal lumen. Correct placement is confirmed by free aspiration of air. **Approximately 4 mL of 2% lidocaine** is then injected rapidly into the trachea. This predictably provokes coughing, which distributes the local anaesthetic across the infraglottic airway and inferior surface of the vocal cords.

This may be startling for the patient, but the brief coughing episode typically results in excellent airway anaesthesia.

Safety considerations

A complete set of bilateral glossopharyngeal, superior laryngeal and transtracheal blocks administers approximately **200 mg of lidocaine** before any additional topicalisation has been performed. Careful accounting of cumulative local anaesthetic dose is therefore essential to avoid local anaesthetic toxicity. For instance, performing both airway topicalisation and the full set of blocks amounts to approximately **500mg of lidocaine**, or over 7mg/kg for a 70kg adult.

The choice between topicalisation, regional airway blocks or a combination of both should be guided by patient anatomy, operator experience and procedural requirements. No single technique is universally superior. Rather, the objective should always be reliable airway anaesthesia achieved with the lowest effective dose of local anaesthetic while maintaining patient comfort and safety.

Practical Pearls

- *Ultrasound improves visualisation of block targets*
- *Aspirate before every injection*
- *Expect and warn patient of coughing after transtracheal injection*
- *Keep track of cumulative lidocaine dose before additional injections*

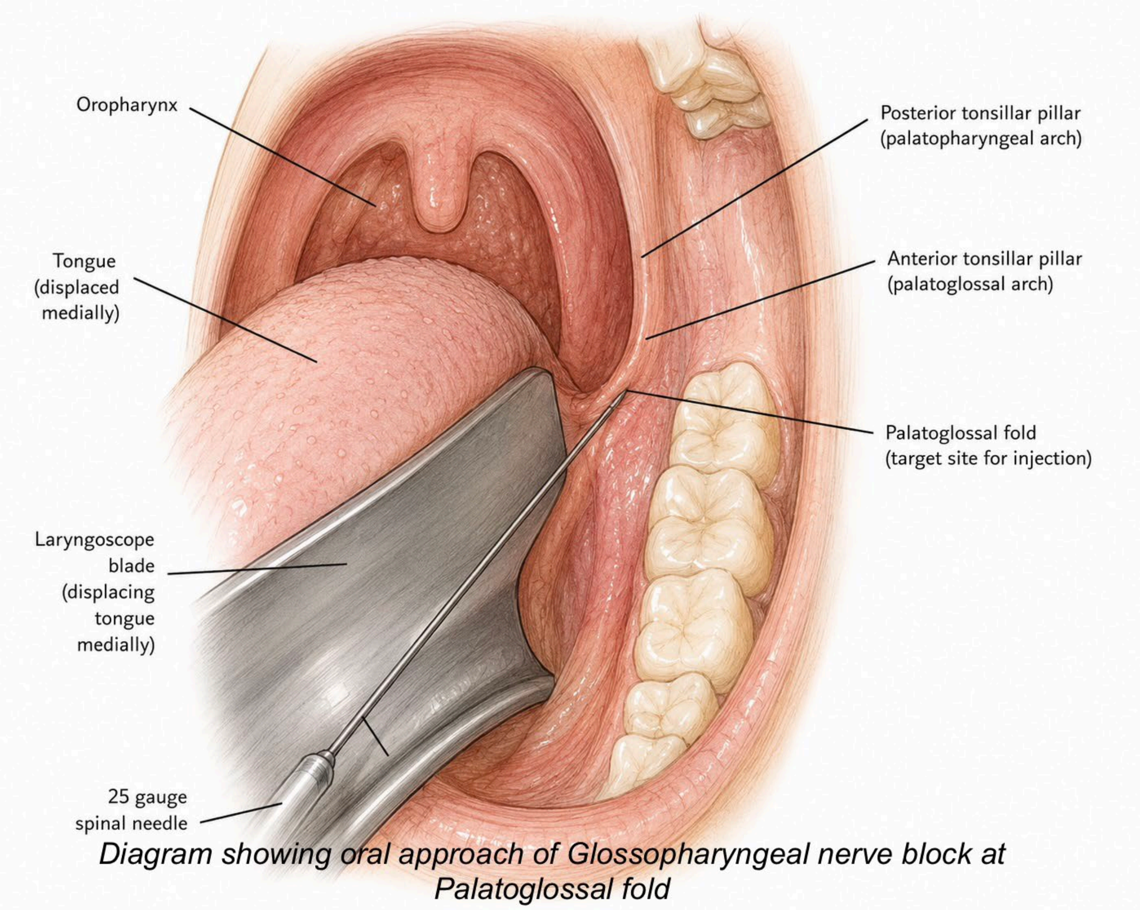


Diagram showing oral approach of Glossopharyngeal nerve block at Palatoglossal fold

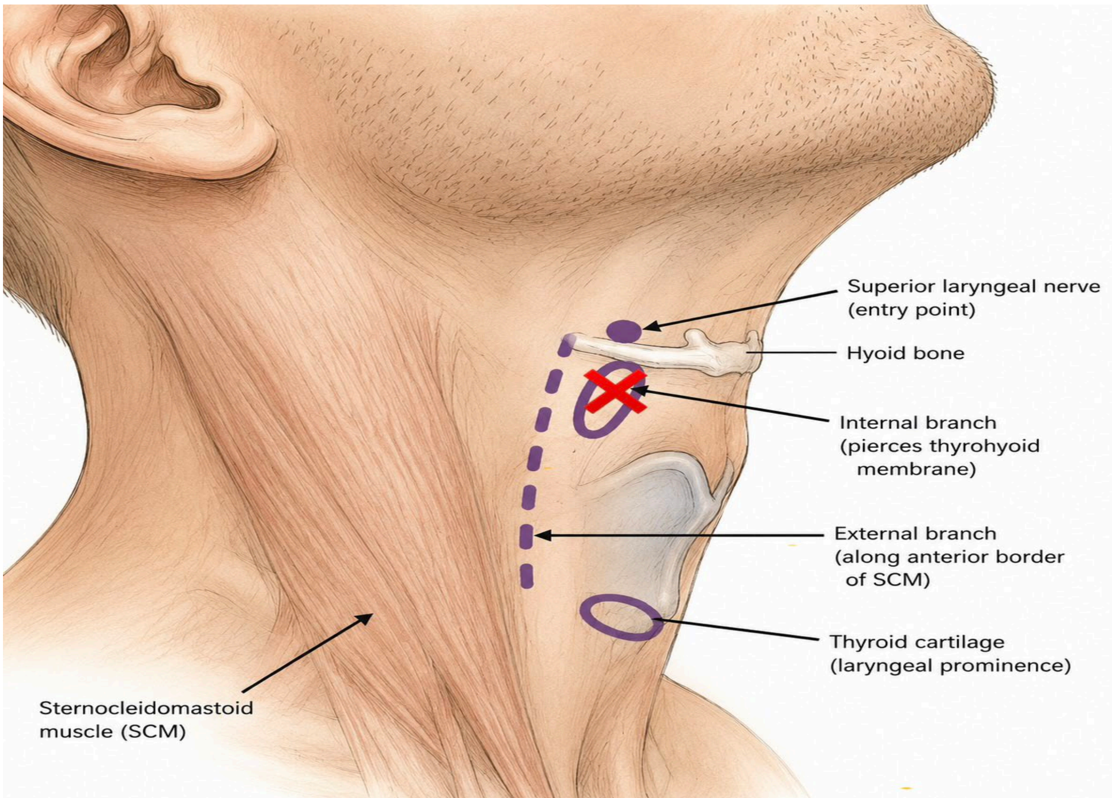
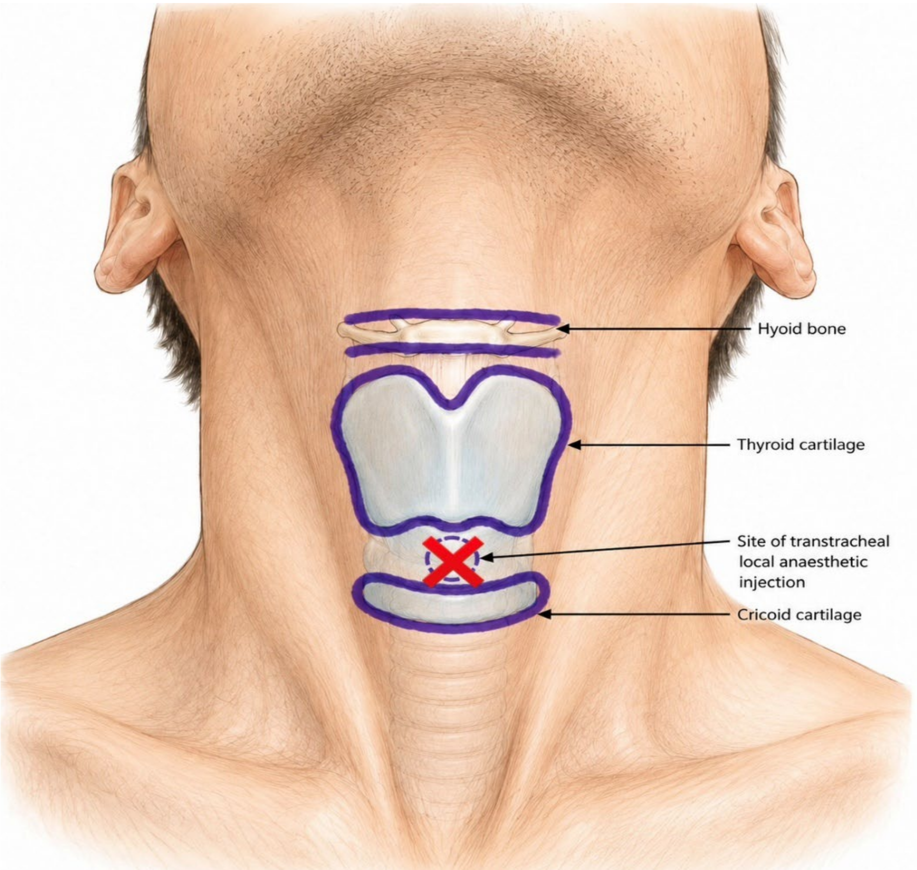


Diagram of lateral neck, showing landmarks and location of Internal branch of Superior Laryngeal Nerve, the target of the block



Anterior view of neck, showing site of transtracheal injection

Sedation

A sedation plan is an important consideration in the plan to perform Awake Tracheal Intubation, though it is best thought of as a useful adjunct to airway topicalisation or regional anaesthesia. While ATI can be performed using local anaesthesia alone, the addition of sedation, particularly by a dedicated sedationist improves both patient comfort and reduces the cognitive load on the procedurist whose main focus should be management of the scope[1 6]. The potential pitfalls are bimodal, with an under-sedated patient experiencing more discomfort than necessary, and an over-sedated patient at risk of respiratory depression, cardiovascular instability or airway obstruction. Both are to be avoided, as they will have a counter-productive effect on patient cooperation. A number of sedatives are used in awake intubation, both as sole agents or in combination, depending on the experience of the sedationist in question.

It is important to bear in mind that the objective of sedation during awake tracheal intubation is not unconsciousness, but rather the creation of a calm, cooperative patient in whom spontaneous ventilation, airway patency and meaningful communication are preserved. Excessive sedation defeats the purpose of the technique and remains one of the commonest causes of airway-related complications during ATI [6]. Consequently, the best sedative is often the least that is required. The choice of agent should be guided by patient physiology, operator familiarity and the anticipated complexity of the procedure.

Midazolam

A short-acting benzodiazepine, midazolam may be administered in small intravenous increments of 0.5–1.0 mg, typically not exceeding 0.05 mg/kg. It is familiar to most anaesthetists, simple to titrate, and produces both anxiolysis and anterograde amnesia—desirable qualities during ATI. It is also helpful in offsetting some of the agitation and delirium associated with ketamine sedation It has no intrinsic analgesic properties, however, and may produce respiratory depression and hypotension, particularly when combined with opioids or other sedative agents. In elderly patients, paradoxical agitation and disinhibition may occur, reducing rather than improving patient cooperation. Even so, the ease of administration, its familiarity, and the availability of flumazenil for reversal make midazolam a helpful adjunct if used in the right context.

Remifentanil

A potent synthetic μ-opioid receptor agonist, remifentanil has the advantage of an extremely short context-sensitive half-life owing to rapid metabolism by non-specific plasma and tissue esterases. It possesses excellent analgesic and antitussive properties and, when carefully titrated, provides excellent conditions for awake airway instrumentation. Although remifentanil has been described as the sole agent for awake fibreoptic intubation, contemporary practice strongly favours meticulous airway topicalisation in conjunction with sedation. [11]

Remifentanil is most commonly administered as a target-controlled infusion (TCI), allowing precise titration while minimising complications. Adverse effects include bradycardia, hypotension, respiratory depression, apnoea and chest wall rigidity, particularly at higher effect-site concentrations or with rapid dose escalation. When titrated to an effect-site concentration of approximately 1–3 ng/mL, these complications are considerably less common while maintaining adequate patient comfort and cooperation. At the time of writing, remifentanil remains the sedative of choice recommended by the Difficult Airway Society, with or without the addition of low-dose midazolam (0.5–1.0 mg). [6]

Dexmedetomidine

Dexmedetomidine is a highly selective α_2-adrenergic agonist that produces a markedly cooperative state of sedation and analgesia independent of opioid or GABA receptor activity. Patients typically remain calm, rousable and cooperative, while spontaneous ventilation and airway reflexes are largely preserved, making it an attractive agent for ATI. Unlike opioids or propofol, the risk of respiratory depression and apnoea is low, with some studies showing a risk reduction of 50% for desaturation during the procedure.[3]

Its principal disadvantages relate to sympatholysis, which may precipitate bradycardia, hypotension and, in susceptible patients, significant haemodynamic compromise. Nevertheless, numerous prospective studies and case reports have demonstrated excellent patient tolerance and favourable intubating conditions. Dexmedetomidine is commonly administered as a loading dose of 1 μg/kg over 10 minutes, followed by an infusion of 0.2–0.7 μg/kg/hour.

Propofol

Propofol is a potent hypnotic agent that may be administered in small boluses or as a target-controlled infusion. Although it reliably produces sedation and suppresses airway reflexes, it has a relatively narrow therapeutic window during ATI, with oversedation and apnoea occurring more readily than with dexmedetomidine or carefully titrated remifentanil. These risks are further increased when propofol is combined with benzodiazepines or opioids.

Propofol also produces dose-dependent hypotension, particularly in elderly or haemodynamically unstable patients. Consequently, its use during ATI is generally reserved for experienced practitioners using careful titration, often via TCI, with effect-site concentrations typically between 0.8–1.5 μg/mL using the Marsh or Eleveld models.[6]

Ketamine

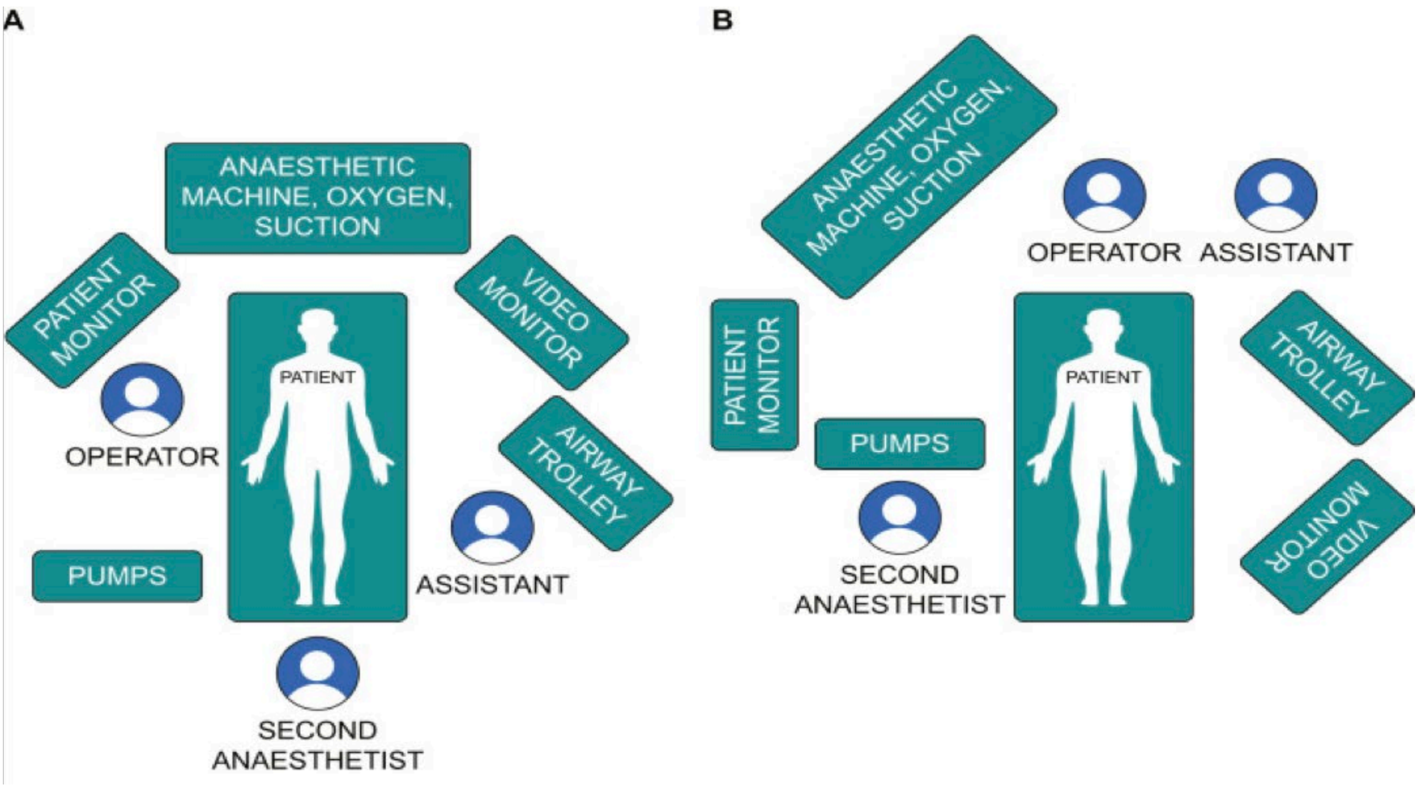
Although not specifically recommended as a primary sedative in the current Difficult Airway Society guidelines, ketamine remains a valuable adjunct, particularly in emergency department, trauma and prehospital practice. Through NMDA receptor antagonism it produces dissociative sedation with profound analgesia while generally preserving spontaneous ventilation, airway reflexes and cardiovascular stability.

Potential disadvantages include emergence reactions, hallucinations and delirium, especially in the absence of concomitant benzodiazepine administration. Anecdotal evidence has it that these adverse psychotropic effects are more common in adults than in children. Ketamine also increases salivary secretions, all but mandating the concurrent use of an antisialagogue such as glycopyrrolate. Current practice favours slow intravenous titration in small increments (approximately 20 mg at a time) to achieve light, cooperative sedation rather than full dissociation.

Table comparing common sedatives in Awake Tracheal Intubation

Agent	Analgesia	Amnesia	Respiratory Depression	Haemodynamic effects	Typical Role in ATI
Midazolam	Poor	Excellent	Moderate	Mild Hypotension	Adjunct for anxiolysis and amnesia at dose 0.5-1mg
Remifentanil	Excellent	Minimal	Moderate	Bradycardia, hypotension	Preferred first line agent when used with good topicalisation. Aim for 1-3ng/ml TCI.
Dexmedetomidine	Moderate	Limited	Minimal	Bradycardia, hypotension	Excellent first line alternative, maximal patient cooperation. Give 1ug/kg over 20 mins, then 0.2-0.7ug/kg/min
Propofol	None	Good	High	Hypotension	Expert practitioners with careful titration. Typically 0.7-1.5ng/ml TCI
Ketamine	Excellent	Variable	Minimal	Preserved, may cause tachycardia and hypertension	Useful adjunct in selected patients. 20mg Boluses titrated to light sedation.

Suggested operating room layout for performing awake intubation (DAS 2022)



Awake Fibreoptic Intubation

Flexible bronchoscopy remains the reference technique for awake tracheal intubation and is the method upon which most contemporary evidence and international guidelines are based. At the same time, many newer publications have suggested that videolaryngoscopy is at least as effective in most situations, and even superior in others.[6 8 12 13] While it does require a measure of technical ability by the operator, the quality of preparation that precedes it has even greater bearing on success. As has been stressed above, patient counselling, generous airway topicalisation, appropriate sedation and thoughtful ergonomic planning all contribute more to procedural success than technical skill alone.

Environment and monitoring

Whenever possible, awake fibreoptic intubation should be performed in a suitably equipped operating theatre with immediate access to difficult airway equipment, emergency drugs and experienced assistance. The setting and team should also be primed to perform full resuscitation in the event of cardiovascular collapse or airway emergency. When the procedure must be undertaken outside the operating theatre, equivalent standards of preparation should be observed, in recognition of the fact that airway complications are more common in non-operating room environments.

Patients should be monitored according to standard anaesthetic practice with pulse oximetry, electrocardiography and non-invasive blood pressure monitoring. Capnography is the gold standard for confirming successful tracheal intubation and should also be available.

A checklist prior to initiation is helpful, and an example developed by the DAS is attached in the appendix.

Oxygenation

Supplemental oxygen should be administered throughout the procedure. High-flow nasal oxygen (30–60 L/min) is preferred where available, prolonging safe apnoea time and providing continuous oxygen delivery while allowing access to the airway. During oral intubation the nasal cannulae remain in situ; for nasal intubation, oxygen may instead be directed via the oral cavity using appropriately positioned tubing or a facemask. Where high-flow systems are unavailable or unsuitable, conventional low-flow nasal oxygen should be administered.

Ergonomic preparation

Patient positioning aims to maximise patient and operator comfort while facilitating airway instrumentation. Most operators favour either the seated position with the patient facing the operator, or the supine sniffing position with the operator standing at the head of the table. Whichever position is selected, the patient should remain comfortable and able to cooperate throughout the procedure.

The operating room should be arranged to minimise unnecessary movement. The operator and sedationist should have an unobstructed view of both the patient and the monitors, while the bronchoscopy screen should be positioned directly within the operator's line of sight. The assistant should stand within comfortable reach of both the operator and the patient's airway. Two suggested theatre layouts are included in the page above.

Some authors advocate operating the bronchoscope with the dominant hand while advancing the insertion cord with the non-dominant hand, while others prefer the reverse. There is little to support one technique over another. Operator comfort and the ability to manipulate both the bronchoscope and tracheal tube smoothly are considerably more important than the choice of hand dominance.

Before beginning, the bronchoscope should be checked for correct white balance, image quality, suction function and full tip deflection. The appropriately sized tracheal tube should be internally lubricated, as well as at the external tip, loaded onto the bronchoscope and secured near the handle until required.

Throughout the procedure, the bronchoscope should be maintained in neutral sagittal alignment with the patient. This preserves intuitive scope steering and reduces operator disorientation. When the patient is seated facing the operator, it should be remembered that familiar airway landmarks will appear inverted on the monitor.

Oral fibreoptic intubation

Prior to insertion, estimating the distance from the angle of the mouth to the tragus of the ear provides a useful approximation of the depth to the hypopharynx. Anchoring the guiding hand gently against the patient's cheek improves stability and allows finer manipulation of the bronchoscope.

The bronchoscope is advanced under direct vision through the oral cavity, avoiding unnecessary contact with the tongue and pharyngeal walls. Gentle flexion of the tip allows identification of the epiglottis and subsequent visualisation of the glottic opening. Additional local anaesthetic may be administered using the spray-as-you-go technique if airway reflexes remain active.

Once satisfactory laryngeal anaesthesia has been achieved, the bronchoscope is advanced through the vocal cords into the trachea. Tracheal rings should be identified during advancement until the carina is clearly visualised. Many operators find it helpful to think of moving the glottis over the bronchoscope rather than steering the bronchoscope towards the glottis.

The tracheal tube is then advanced gently over the bronchoscope using slow rotational movements where necessary to facilitate passage through the vocal cords. Maintaining continuous visualisation of the carina during tube advancement confirms that the bronchoscope remains intratracheal. Patients should be warned immediately before tube passage that speech will no longer be possible once the tube traverses the vocal cords.

Nasal fibreoptic intubation

Following adequate vasoconstriction and topicalisation, the more patent nostril should be selected. The guiding hand is placed on the nasal bridge and the bronchoscope is advanced along the floor of the nasal cavity through the inferior meatus, avoiding unnecessary trauma to the turbinates or nasal septum. Progress is often facilitated by following the largest visible air space or “following the darkness” until the nasopharynx is entered.

The bronchoscope may encounter gentle resistance at the level of the soft palate before entering the oropharynx. Beyond this point, identification of the epiglottis, glottis and trachea is as described above for the oral technique.

Confirmation of tube placement

Once the tracheal tube has been advanced and the cuff inflated, the bronchoscope should be withdrawn until the distal tip of the tracheal tube is visualised. Ideally, the tube tip should lie approximately 3–5 cm above the carina before the bronchoscope is removed completely.

Correct placement should then be confirmed using continuous capnography, bilateral chest expansion and auscultation before induction of anaesthesia proceeds. The tube should then be carefully secured.

Troubleshooting

Difficulty during awake fibreoptic intubation usually arises from a limited number of recurring problems.

Poor visualisation may result from blood (“red out”), secretions (“white out”), fogging or loss of orientation. Gentle suction, withdrawal to familiar anatomical landmarks and careful cleaning of the bronchoscope tip usually restore the view.

Persistent gagging or coughing generally indicates inadequate airway anaesthesia. Additional topical local anaesthetic should be administered before escalating sedation or forcing the scope wherever possible.

Limited working space may be improved by optimising positioning with a ramp beneath the shoulders, an assistant performing a jaw thrust manoeuvre or by asking the patient to protrude the tongue.

Resistance during tracheal tube advancement is most commonly encountered at the vocal cords or arytenoids. Gentle rotation of the tube to 90°, slight withdrawal and readvancement, or selection of a smaller or microlaryngeal tube often overcomes this difficulty. Excessive force should never be applied to advance the tracheal tube.[9]

Throughout the procedure, deliberate, unhurried movements and maintenance of patient and team communication are more valuable than technical speed.

Procedural Summary: Awake Fibreoptic Intubation

Preparation

- Confirm indication & informed consent
- Monitors & Oxygen
- Prepare airway equipment & confirm rescue airway plan
- Complete airway topicalisation
- Sedation titrated to comfort & cooperation

Equipment

- Check bronchoscope image, white balance, suction & tip flection
- Lubricate and preload ETT

Bronchoscopy

- Advance under direct vision
- Identify glottis, epiglottis and cords
- Spray-as-you-go topicalisation

Intubation

- Advance bronchoscope to the carina
- Railroad the tracheal tube over the scope with rotational movement
- Inflate the cuff
- Confirm tube position with bronchoscope

Confirmation

- Capnography
- Bilateral chest movement
- Bilateral breath sounds
- Secure tracheal tube
- Proceed with induction

Common Problems

- Poor view → Suction, withdraw, clean the tip
- Coughing → Ensure good topicalisation before deepening sedation
- Limited space → Optimise position, jaw thrust, tongue protrusion
- Tube not passing → Rotate, withdraw, or smaller tube
- Lost orientation → Withdraw to familiar landmarks and begin again

Awake Videolaryngoscopy

Awake videolaryngoscopy has become an increasingly established technique for awake tracheal intubation and is now recognised by the Difficult Airway Society as an acceptable primary approach alongside flexible bronchoscopy. Although some view these as competing techniques, awake videolaryngoscopy and awake fibreoptic intubation are better viewed as complementary methods of achieving the same goal: securing the airway while maintaining spontaneous ventilation and patient cooperation. The choice between them depends upon patient anatomy, operator experience and the anticipated difficulties encountered during intubation.

For many anaesthetists, videolaryngoscopy offers a shorter learning curve than flexible bronchoscopy because it closely resembles conventional direct laryngoscopy. Operators already familiar with routine videolaryngoscopy often find the transition to the awake technique intuitive, and several studies suggest that proficiency is acquired more rapidly than with flexible bronchoscopy. [12 14]

Videolaryngoscope blades create a relatively spacious working corridor within the oropharynx, facilitating suction of blood and secretions and allowing straightforward atomisation of additional local anaesthetic where required. The camera provides a stable, wide-angle view of the larynx, making orientation easier for novice operators and reducing the effects of minor imprecision in blade movement. Unlike flexible bronchoscopy, tracheal tube advancement occurs under continuous direct vision, avoiding the partially blind railroading of the tracheal tube over a bronchoscope. An additional advantage is that the airway view is shared by the entire team, allowing assistants and supervisors to anticipate difficulties and provide real-time guidance throughout the procedure. A few studies have attempted to pit the techniques against one another, with the primary outcome being time taken to intubation. In most scenarios, it appears as though awake VL presents a modest reduction in time to intubation, along with a slightly lowered risk of 02 saturation dropping below 90%.[13]

These advantages must be balanced against several important limitations. Videolaryngoscope blades occupy substantially more space than flexible bronchoscopes and therefore require greater mouth opening. In patients with trismus or severely restricted mandibular movement, videolaryngoscopy may offer little advantage over conventional direct laryngoscopy. Likewise, the larger blade may produce greater patient discomfort, amplifying the importance of meticulous topicalisation and careful sedation.

Unlike flexible bronchoscopes, videolaryngoscopes possess no articulating tip. Fine adjustment of tracheal tube direction therefore relies upon the shape of the stylet, bougie or tracheal tube itself rather than active steering of the device. Although this is rarely problematic in routine airways, it may become significant in patients with distorted upper airway anatomy.

Most videolaryngoscopes are designed for use with the operator positioned at the head of a supine or partially reclined patient. Consequently, patients unable to tolerate this position—for example because of severe orthopnoea, airway obstruction or cardiorespiratory compromise—may be better managed using flexible bronchoscopy, which permits considerably greater freedom of patient and operator positioning.

Technique

Preparation for awake videolaryngoscopy is identical to that described for awake fibreoptic intubation. Careful patient counselling, meticulous airway topicalisation, appropriate sedation, supplemental oxygen and full physiological monitoring remain fundamental to procedural success.

Following insertion of the videolaryngoscope, the blade is advanced gently under direct vision until the epiglottis and glottic opening are identified. Additional topical local anaesthetic may be applied under vision where required. Once satisfactory airway anaesthesia has been achieved, the tracheal tube is advanced into the trachea under continuous visualisation, with the assistance of a preformed stylet, bougie or other introducer where necessary. Tube position is confirmed by continuous waveform capnography before induction of anaesthesia.

Procedural Summary: Awake Videolaryngoscopy

Preparation

- Complete patient counselling, topicalisation and sedation.
- Apply standard monitoring and continuous supplemental oxygen.
- Prepare videolaryngoscope, tracheal tube and adjuncts.

Laryngoscopy

- Insert the blade gently under direct vision.
- Identify the epiglottis and glottic opening.
- Apply additional topical anaesthetic if required.

Intubation

- Advance the tracheal tube under continuous vision.
- Use a stylet or bougie where necessary to optimise tube direction.
- Inflate the cuff and confirm tracheal placement with waveform capnography.

Common Problems

- Inadequate mouth opening, large tongue, fixed neck flection deformity → consider flexible bronchoscopy.
- Coughing or gagging → improve airway topicalisation before increasing sedation.
- Poor tube direction → reshape the stylet or utilise a bougie.
- Secretions or blood → suction under direct vision before proceeding.

Failure & Rescue

Failure of awake tracheal intubation should not be regarded as a procedural catastrophe, but rather as a decision point at which the airway strategy must be reconsidered. Unlike failed intubation following induction of anaesthesia, the patient undergoing awake tracheal intubation will usually continue to breathe spontaneously, maintain airway patency and remain adequately oxygenated. This is the whole aim of the technique- allowing the best chance of intubation success while leaving the way open to back down from a physiological point of no return. This preservation of physiology provides valuable time to pause, reassess and formulate the safest subsequent plan.

An unsuccessful attempt can be defined as any unplanned withdrawal of the flexible bronchoscope, videolaryngoscope or tracheal tube from the airway before successful tracheal intubation. Each additional attempt increases the likelihood of airway trauma, bleeding, oedema and progressive loss of patient cooperation. Experienced assistance should therefore be sought early whenever difficulty is encountered.[5 6]

Optimise before re-attempting

In the context of an awake patient, failure presents a unique opportunity. Before any subsequent attempt, the cause of failure should be identified and corrected wherever possible. Commonly it is the very factors which are addressed in patient and theatre preparation that are responsible for failed attempts. This should prompt a quick review of the sedation level, the adequacy of topicalisation and the operator ergonomics. Suboptimal patient positioning or equipment should also be easy to identify and correct. Time spent improving these factors is well spent and takes free advantage of the unique situation that an awake and spontaneously breathing patient allows.

As with other Difficult Airway Society recommendations, no more than three attempts should be undertaken by the same operator. A fourth attempt should only be made by a more experienced practitioner after optimisation of the identified problems. If intubation remains unsuccessful, a change in strategy is indicated rather than repeated instrumentation of the airway.

It is helpful to frame the next steps in a series of simple questions:

1. *Does the airway need to be secured now?*
2. *Does this procedure need to happen now?*
3. *If yes to either, can I safely induce this patient without a definitive airway?*

Does the airway need to be secured now?

Following failed awake tracheal intubation, the next decision is whether immediate airway intervention remains necessary.

Where surgery is non-urgent and the patient has no compromise of airway patency, oxygenation or neurological status, postponement of the procedure is often the safest option. This permits further investigation, optimisation of the airway strategy and appropriate planning before a subsequent attempt.

Urgent surgery, progressive airway compromise or anticipated clinical deterioration may preclude postponement and necessitate definitive airway management.

Choosing the next airway strategy

When awake tracheal intubation has failed but airway management remains necessary, the Difficult Airway Society recommends consideration of one of two rescue strategies: High-Risk General Anaesthesia (HRGA) or Awake Front-of-Neck Access (AFONA).

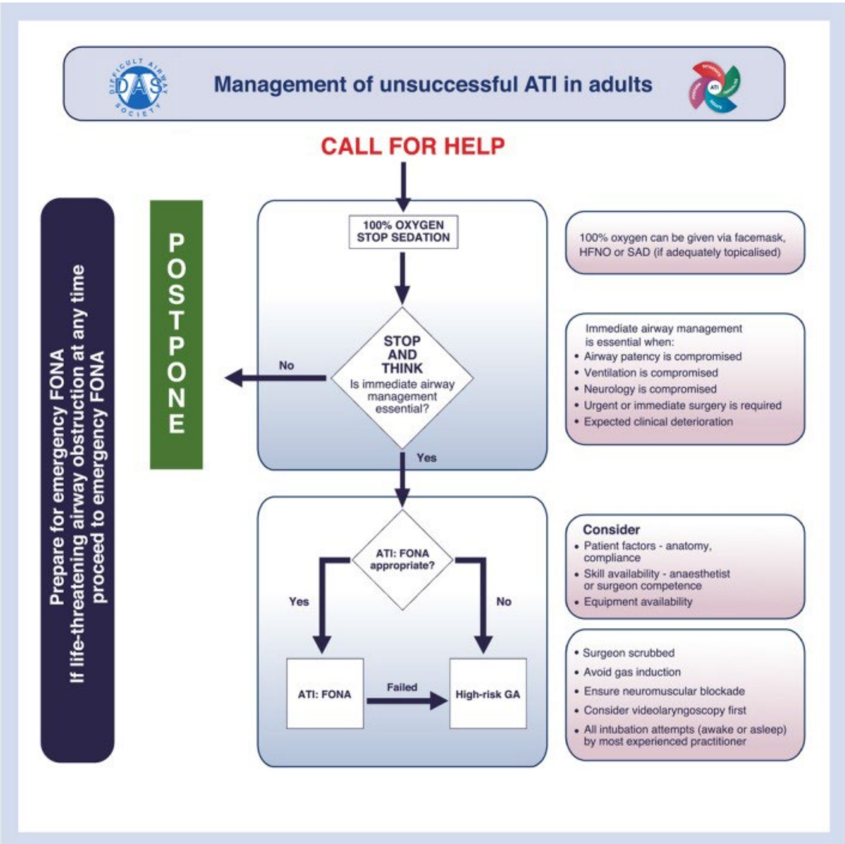
HRGA may be appropriate where induction of anaesthesia is considered acceptable because rescue oxygenation by facemask ventilation or supraglottic airway is expected to be achievable should tracheal intubation fail. Although this represents a departure from the original awake strategy, it may offer the safest overall course in carefully selected patients, particularly where immediate life-saving surgery is required.

AFONA should be reserved for patients in whom induction of anaesthesia is judged unsafe because rescue oxygenation is unlikely to succeed. In these circumstances, a definitive surgical airway is established under local anaesthesia before induction of general anaesthesia.

Neither strategy represents ideal airway management. Rather, each reflects a carefully considered compromise after failure of the preferred approach. The choice between them should be anticipated during pre-procedural planning and discussed with the airway team before the first attempt at awake intubation is made, rather than under the pressure of a failed procedure. A copy of the DAS guideline for failed ATI is attached in the appendix below.

Practical Pearls

- *Establish the whole plan early and verbalise this to the whole team*
- *Optimise the cause of failure before every subsequent attempt.*
- *Three attempts by one operator; a fourth only by a more experienced practitioner.*



Training

Awake tracheal intubation represents the coordinated application of multiple anaesthetic skills in a high-stakes clinical scenario. Many of these skills are developed gradually through routine clinical practice rather than during awake intubation itself. Airway assessment is refined during pre-operative visits, communication through countless patient encounters, judgement and team communication through experience gained alongside colleagues in theatre. Sedation, airway topicalisation and manual dexterity are practised repeatedly on high-turnover lists, while flexible bronchoscopy, although less frequently encountered, can be developed during routine bronchoscopic intubation under general anaesthesia.

By contrast, the truly challenging airway which leans on all of these skills at once is encountered only rarely. To be prepared for these occasions, trainees and supervisors alike must recognise the many preceding learning opportunities and approach them deliberately. Competence in awake intubation cannot be efficiently developed only during awake intubation, but instead emerges through the progressive integration of skills acquired over time.

Training should follow a stepwise progression of increasing technical complexity and clinical pressure. Simulation, mannequins, virtual reality and other educational adjuncts provide an opportunity to develop familiarity with equipment and fundamental bronchoscopic skills in a low-risk environment. Progression to bronchoscopic intubation in anaesthetised patients with normal airway anatomy allows refinement of ergonomics, scope handling and tube delivery, while introducing the trainee to the practical differences between simulation and clinical practice. Once these skills have been demonstrated consistently, awake intubation in patients with anticipated normal airway anatomy provides the opportunity to develop communication, sedation and topicalisation techniques under supervision. It is then that the trainee should progress to awake intubation in the anticipated difficult airway, where the integration of these individual skills can be applied to the patient who stands to benefit most.

Ultimately, proficiency in awake tracheal intubation is not acquired through repeated exposure to difficult airways alone, but through the deliberate practice of the many component skills upon which successful airway management depends.

CONCLUSION

Awake tracheal intubation sits at the intersection of judgement, preparation and precision. It is an airway strategy defined less by the instruments or methods used than by the simple decision to preserve a threatened physiology while establishing a definitive airway. When performed well, it reflects a responsible and measured approach to risk: selecting the appropriate patient, investing in preparation, executing deliberately, and resisting the urge to rush when difficulty is encountered. Once mastered, it is an invaluable tool to fall back on when the demands of safety and efficacy are highest. The success of ATI is therefore not measured solely by first-pass intubation nor speed in securing the airway, but by the maintenance of oxygenation, patient safety and patient comfort throughout the process. For the trainee, mastery begins not in technical perfection, but in the consistent application of these principles until they become instinctive.

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Appendix

Checklist for Awake Tracheal Intubation

1. Location .... ☐

2. Appropriate staff present

Anaesthetic assistant ☐

Second anaesthetist ☐
monitoring, sedation, anaesthesia

Other ....

3. Team briefed

Procedure outline ☐

Role allocation ☐

Plan for failure ☐

4. ATI device selected, prepared and checked

Tube *(type/size)* ....

Flexible bronchoscope ☐		**Videolaryngoscope** ☐
Route		**Device/blade**
Optional adjuncts		**Optional adjuncts**
Oral airway ☐	Suction ☐	Stylet ☐
		Suction ☐
SAD ☐	Mucosal atomiser ☐	Bougie ☐
Aintree catheter ☐	Epidural catheter ☐	Mucosal atomiser ☐
Device check		**Device check**
Focus ☐	Tube correctly loaded ☐	Lubricated ☐
White balance ☐	Image orientation ☐	Anti-fog/wiped ☐
Lubricated ☐		Tube correctly loaded ☐
Anti-fog/wiped ☐	Battery/power ☐	Battery/power ☐

5. Oxygenation ....

6. Sedation *(if required)* ....

7. Topicalisation

Nose .... Oropharynx .... Larynx .... Trachea ....

Vasoconstrictor *(if required)* .... Antisialogogue *(if used)* ....

Maximum lidocaine dose
___ kg × 9 mg.kg^{-1} = ___ mg

Planned lidocaine dose
___ sprays of 10% ___ mg
___ ml of 2% ___ mg
___ ml of 4% ___ mg

8. Setup position

Operator ☐ Patient ☐ Monitor ☐ Suction ☐

Pumps ☐ Step ☐ Airway Trolley ☐ Bed ☐