

INTUBATION

See also **Intubation – difficult** guideline and **Newborn Life Support guidelines 2021** – see <https://www.resus.org.uk/library/2021-resuscitation-guidelines/newborn-resuscitation-and-support-transition-infants-birth>

***This procedure must be undertaken or supervised by an experienced person
Do not attempt to carry out procedure unsupervised unless you have demonstrated your competence***

ELECTIVE ORAL INTUBATION

- Use premedication as appropriate for your unit
- Good practice to have team around the baby familiar with each other's names and assigned roles for the intubation procedure (e.g. team leader with oversight, medication, equipment)

Equipment

- Suction
- Oxygen with pressure limiting device and T-piece or 500 mL bag and appropriate size face mask
- Endotracheal tube (ETT); non cuffed; 3 sizes (diameter in mm):

Weight of baby (g)	ETT
<1000–1250	2.5
>1250–3000	3.0
>3000	3.5–4.0

- ETT introducer/stylet
- Syringe and needles for drawing up premedication
- Neonatal stethoscope
- Hat for baby to secure tube, ETT fixing device and scissors
- Laryngoscope handle and Miller blades sizes 0 and 00, stethoscope, oropharyngeal airway
- [Videolaryngoscope \(if available\)](#)
- Pedicap® end tidal CO₂ detector
- Oxygen blender

Preparation

- Ensure cannula in place and working
- Ensure laryngoscope is working, correct sized blades are available and T-piece system is working. Set pressure limits: 30 cm H₂O for term babies and 20–25 cm H₂O in preterm babies
- Check you have the correct ETT size and attachments to secure ETT
- Insert ETT introducer into ETT ensuring it does not protrude past end of ETT
- Ensure all drugs drawn up, checked, labelled and ready to give
- Check no contraindications to drugs
- Ensure monitoring equipment attached and working reliably
- If nasogastric tube (NGT) in place, aspirate stomach (particularly important if baby has been given enteral feeds)
- Check IV line working
- Ensure back-up plan in case intubation does not work (see **Intubation – difficult** guideline, [use of supraglottic airway devices \(LMA or i-gel\)](https://www.resus.org.uk/library/2021-resuscitation-guidelines/newborn-resuscitation-and-support-transition-infants-birth) and **Newborn Life Support guidelines 2021** (<https://www.resus.org.uk/library/2021-resuscitation-guidelines/newborn-resuscitation-and-support-transition-infants-birth>))

Premedication

- Use blended oxygen to pre-oxygenate **to optimise saturations** before drug administration
- start with room air and increase FiO₂ to get SpO₂ to target range appropriate for gestational age (see **Oxygen saturation targets guideline**). Avoid hyperoxia in preterm baby
- Continue to pre-oxygenate until laryngoscopy and between attempts if >1 attempt necessary

Drugs

Choice of drugs depends on local practice
Analgesia and muscle relaxation can improve likelihood of successful intubation

Muscle relaxants

Administer muscle relaxants only if you are confident that the team can intubate baby quickly, mask ventilation can be maintained, and the baby does not have a severely abnormal airway
Do not use a muscle relaxant unless adequate analgesia has been given
Do not use muscle relaxant for in-and-out surfactant replacement (INSURE)

PROCEDURE

- Give premedication
- Use mask ventilation in neutral position, a shoulder roll may help
- Place laryngoscope in right side of mouth, lift up tongue and jaw to view cords and larynx. Lift laryngoscope; do not tilt
- Avoid trauma to gums
- Cricoid pressure; by person intubating or an assistant
- Suction secretions only if they are blocking the view as this can stimulate the vagal nerve and cause bradycardia and vocal cord spasm
- Insert ETT
- Advance ETT to desired length at lips
- General recommendation is to advance ETT no further than end of black mark at end of tube (2.5 cm beyond cords), but this length is far too long for extremely preterm babies
- See **Table: Length of ETT** for where approximate markings of ETT should be at lips

Table: Length of ETT

Gestation of baby	Actual weight of baby (kg)	Length of ETT (cm) at lips
23–24	0.5–0.6	5.5
25–26	0.7–0.8	6.0
27–29	0.9–1.0	6.5
30–32	1.1–1.4	7.0
33–34	1.5–1.8	7.5
35–37	1.9–2.4	8.0
38–40	2.5–3.1	8.5
41–43	3.2–4.2	9.0

- Remove stylet if used and check to ensure intact before proceeding
- if stylet not intact, remove ETT immediately and prepare to reintubate

Confirming position of ETT

- View ETT passing through larynx
- Observe for chest movements with ventilation breaths
- Use an end tidal CO₂ detector attached to ETT for verification of correct tube placement

- may be of limited value in very small baby or in the presence of cardiovascular collapse. In these cases lack of colour change may not always mean tube is not in the correct position (colour change is dependent on circulation and adequate volume of gas exchange)
- Auscultate both axillae and stomach. Breath sounds should be similar on each side and not be heard over stomach. May be difficult to assess in very immature infants. In special circumstances (e.g. pneumothorax, diaphragmatic hernia) there may be asymmetrical breath sounds
- if breath sounds unequal and louder on right, withdraw ETT by 0.5 cm and listen again, repeat until breath sounds equal bilaterally
- If ETT tip in the trachea, and using a clear ETT, mist may condense on inside of tube during expiration

<i>Do not leave baby with unequal air entry</i>
--

- stabilise tube using ETT fixation method in accordance with unit practice
- reduce dead space by cutting ETT to shorten it
- request chest X-ray: adjust ETT length so tip is at level of T1–2 vertebrae and document on nursing chart and in baby's hospital notes

Intubation failure

Definition: Unable to intubate within 30 sec

- If intubation unsuccessful, seek help from someone more experienced
- If risk of aspiration, maintain cricoid pressure
- Continue mask ventilation until successful intubation achieved
- **Limit hypoxia by:**
 - limiting the intubation attempt to prevent excess fall in oxygen saturation and/or heart rate – supportive team member to be available to determine when attempt should cease and reoxygenation be implemented
 - providing appropriate ventilation before and between intubation attempts

Record keeping in BadgerNet

- Indication for intubation
- Mention oral endotracheal intubation as the procedure undertaken
- ETT size and position at cords and lips
- Radiological position of tip of ETT and any adjustments following X-ray
- Medication chart completed
- Baby's tolerance of procedure and any adverse events

COMMUNICATION

- Inform parents of procedure and events