

The Tubes, the Holes, and the Suction

Suction devices • tracheostomy and stoma variants • NG and OG tubes • nasotracheal intubation • retrograde intubation

Five skills that live at the edges of the airway chapter — and two of them you will use on almost every critical call.
Approx. 60 minutes with skills stations • Aligned to Region SOP

Five skills, ranked by how often you will actually use them

Skill	How often	Governing source
Suction devices and technique	Almost every critical airway	Textbook Ch 22 • Region SOP (10-second limit) • skill sheets
Gastric tubes — NG and OG	Most prolonged BVM or EGA ventilation	Textbook Ch 22 • Region SOP (i-gel gastric channel)
Tracheostomy and stoma variants	Less frequent, high stakes, often pediatric	Region SOP Functional Needs • textbook Ch 22
Nasotracheal intubation	Rare in modern practice	NREMT psychomotor portfolio — NOT a Region SOP procedure
Retrograde intubation	Rare — “only in rare cases would this be viable”	Textbook Ch 22 (brief) • general practice for technique

A skill sheet is not a scope of practice

Nasotracheal intubation has a scored sheet in your NREMT psychomotor portfolio — but it is not a procedure in the Region SOP, and the sixth edition of the textbook no longer teaches it. Being able to perform a skill in a lab does not authorise you to perform it on a patient.

When the portfolio, the textbook and the SOP disagree about whether you may do something, the SOP and your medical director decide. Check before you assume.

SKILL 1

Suction Devices

The single most useful piece of airway equipment you own — and the one most often packed away when it is needed.

Unit types · Catheters · Technique · Tracheobronchial

Four kinds of unit, and the standard every one must meet

Type	Advantages	Disadvantages	Fails you when...
Hand-powered	Lightweight, portable, inexpensive, simple to operate	Limited volume, manually powered, fluid-contact parts not disposable	Your hand tires — but it never runs out of battery. The right backup
Oxygen-powered	Small, lightweight	Limited suction power, uses a lot of oxygen	It drains the cylinder your patient is breathing from
Battery-operated	Lightweight, portable, excellent suction power, simple to troubleshoot	Battery memory decreases with time; more complex; some parts not disposable	Nobody checked the charge. The unit that most often lets crews down
Mounted	Strong suction, adjustable vacuum, disposable fluid-contact parts	Not portable, not field-serviceable, no substitute power source	You leave the ambulance. It does not come to the bedroom

Table 22-16 content, with a practical column added. Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

The standard every unit must meet

VACUUM of 300 mmHg · FLOW of 30 L/min · lightweight

Vacuum is how hard it pulls; flow is how much it moves. A unit can pull hard and still clear particulate vomit slowly if flow is poor — narrow tubing or a partly blocked catheter does exactly that.

Check it at the start of every shift

Power or charge · canister empty and seated · tubing connected · occlude the tubing with a gloved thumb and confirm vacuum builds.

The commonest suction failure in the field is not technique. It is equipment nobody checked.

Rigid versus soft catheters — two jobs, not two sizes

	RIGID — Yankauer, tonsil tip	SOFT — whistle tip, French
The job	VOLUME, in the mouth	REACH, through something
Build	Large tube, with or without multiple distal holes; standard size	Long, flexible, smaller diameter; various sizes
Clears	Large volumes rapidly, larger particles	Cannot remove large volumes rapidly
Goes into	The oropharynx only	Oropharynx, nasopharynx, or down an ET or trach tube
Control	Vent on the handle on some models	Side port — suction only when your thumb covers it

Table 22-17 content. Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

For large debris, drop the catheter

Suction tubing used with NO catheter has a wider bore than a Yankauer and clears food and clots the catheter cannot.

Sizing a soft catheter for a tube

Common bedside rule: double the tube ID in mm and use that French size or the next smaller — an 8.0 tube takes a 14 Fr. The catheter should fill no more than about half the lumen.

Lead with suction — the SALAD technique

Suction-Assisted Laryngoscopy and Airway Decontamination. A LARGE-BORE rigid catheter goes into the mouth BEFORE the laryngoscope, and is used continuously while you intubate — then parked in the left corner of the mouth or the hypopharynx to keep clearing.

The chapter names contaminated airways as one of the leading causes of failed intubation. SALAD treats the airway as a contaminated field to be cleared first, rather than an obstacle to suction around once you are already looking.

Technique, the 10-second limit, and the cost to the patient



Figure 22-128 Oropharyngeal suctioning.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

1 Precautions, then preoxygenate

Standard precautions, including eye protection. Oxygenate first — you are about to interrupt it.

2 Measure the depth

For the oropharynx, earlobe to lips. Too deep stimulates the vagus.

3 Insert with suction OFF

Suction on the way in grabs mucosa and clears nothing.

4 Suction on withdrawal, ≤ 10 sec

Thumb over the control port, suction while withdrawing. Then reoxygenate.

Complications — and the mechanism behind each

Hypoxemia

Suction removes air with the secretions, emptying the FRC. The chapter: suctioning must interrupt oxygen delivery.

Vagal stimulation

Bradycardia — especially in infants and with deep insertion.

Hypertension, tachycardia

The sympathetic response to airway stimulation.

Cough reflex

Raises intracranial pressure and cuts cerebral blood flow. In head injury, suction briefly and deliberately.

Turn the patient first. “Turning the patient, or just their head, to the side is faster and more effective than any suction device” — where the spine allows, gravity clears more than suction does.

REGION SOP “Suctions the patient for more than 10 seconds” is a CRITICAL CRITERION on your scored sheets, and the airway obstruction protocol writes the same limit into the ladder: suction ≤ 10 seconds.

Suctioning through a tube — endotracheal or tracheostomy

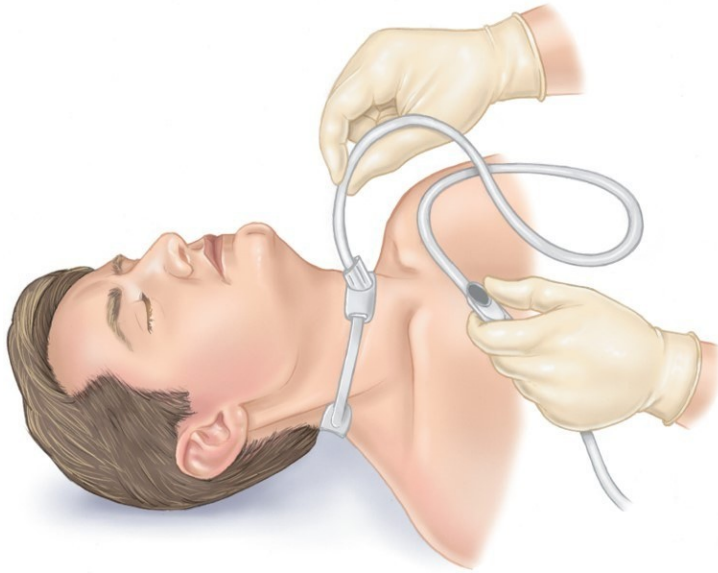


Figure 22-129 Tracheostomy suction technique.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

Lower vacuum for the trachea

General practice, from the AARC endotracheal suctioning guideline: keep pressure below 150 mmHg in adults and around 80–100 mmHg in neonates. That is why portable units have an adjustable regulator — oropharyngeal clearing and tracheal suctioning are not the same setting.

1 Recognise the need, select a FLEXIBLE catheter

Soft catheter, sterile. This is STERILE technique — anything passed into the trachea bypasses the body's filtering defences.

2 Insert with the port OPEN

No suction going in. For a stoma: preoxygenate, instil 3 mL sterile saline, insert gently until resistance.

3 Cover the port, withdraw, ≤ 10 seconds

Suction while withdrawing. Have a stoma patient exhale or cough as you do.

4 Rinse, ventilate, REAFFIRM placement

Flush with sterile water while ventilating. Suctioning is a patient movement — every movement means reconfirming the tube.

Depth — and who knows it best

The chapter says insert until you meet resistance. Many home and pediatric trach programmes teach a PRE-MEASURED depth instead — roughly the tube length plus a small margin — to avoid repeated trauma to the carina.

If the caregiver tells you the child's suction depth, use it. They do this several times a day.

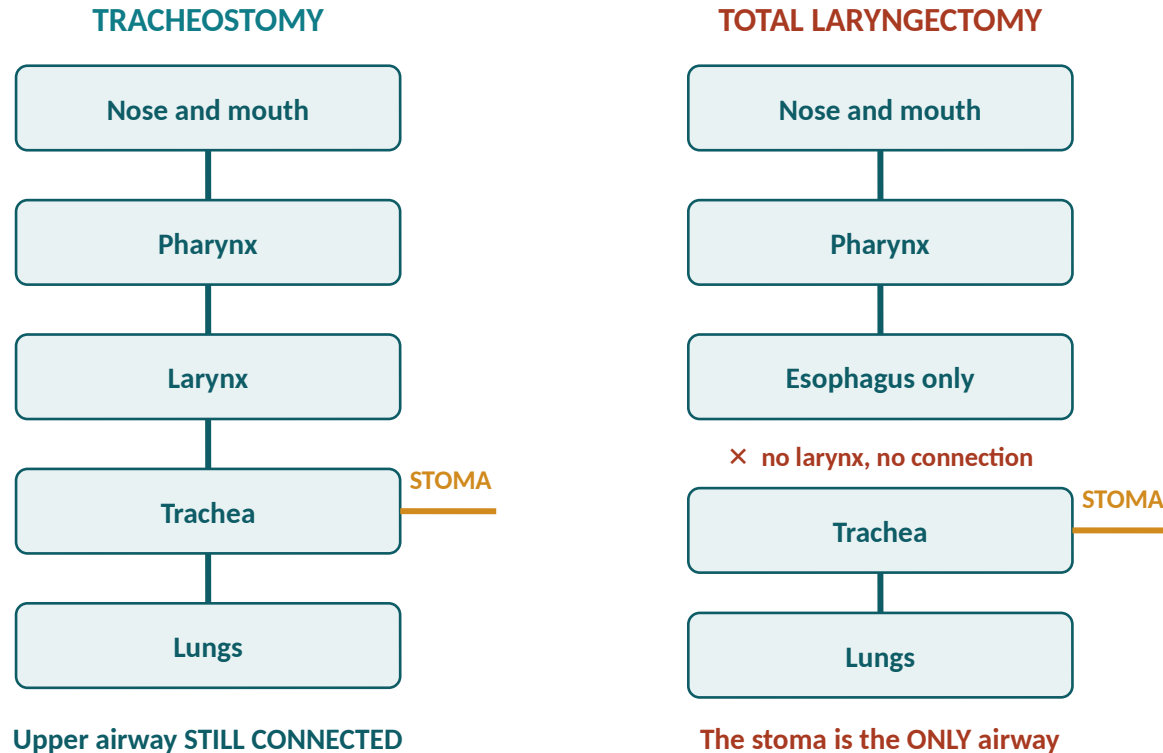
SKILL 2

Tracheostomy and Stoma Variants

Somebody else's airway — and the single anatomical question that decides whether you can bag the face.

Trach vs laryngectomy · Tube variants · Troubleshooting · Ventilating

Tracheostomy or laryngectomy — one question decides it



1 Tracheostomy

A surgical opening into the trachea, usually holding a tube. Larynx, pharynx, mouth and nose remain connected above it — so covering the stoma and ventilating from above can work.

2 Total laryngectomy

Larynx removed; trachea sutured to the neck; pharynx joined to the esophagus. NOTHING blown into the mouth reaches the lungs, and there is no larynx to intubate.

3 How to tell on scene

Ask — most patients and carers answer at once. Look in the stoma: short laryngectomy tube, silicone button, HME cover, voice prosthesis. Many carry a card or bracelet.

4 If you genuinely do not know

Assume the stoma is the only airway. Ventilating the stoma is never the wrong choice. Ventilating the face may be.

REGION SOP Functional Needs: “If unable to ventilate, cover opening and ventilate with BVM over nose and mouth.” Correct for a TRACHEOSTOMY — and futile in a total LARYNGECTOMY, where the upper airway no longer reaches the trachea.

Tracheostomy tube variants — and what each one changes for you



Figure 22-127 Tracheostomy set — cuffed.



Figure 22-127b Tracheostomy set — uncuffed.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

Each set: outer cannula with flange · inner cannula · obturator. The cuffed set adds a pilot balloon.

Three steps fix most trach emergencies

1. Remove anything on the end of the tube — valve, cap, HME filter.
2. Remove the inner cannula, if there is one.
3. Suction.

The speaking valve is the dangerous one: a valve on a tube with the cuff inflated lets the patient breathe IN and not OUT. Keep the OBTURATOR with the patient — you need it to reinsert a dislodged tube.

Variant	What it changes for you
Cuffed	Seals the trachea — positive pressure goes to the lungs
Uncuffed	Leaks around the tube — common in children. Cover mouth and nose to reduce the leak
Inner cannula	Blocked tube? REMOVE the inner cannula first. On some designs the 15 mm connector comes out with it
Fenestrated	Hole in the outer cannula for speech. Insert a NON-fenestrated inner cannula before ventilating
Speaking valve	One-way valve, cuff deflated. In distress, REMOVE THE VALVE FIRST
Cap or plug	Weaning — breathing through the upper airway. In distress, remove the cap
Metal tube	Older style; may need an adapter to take a bag

Variants beyond the cuffed and uncuffed sets reflect general clinical practice rather than the textbook.

Troubleshooting a patient in distress — the SOP's four questions

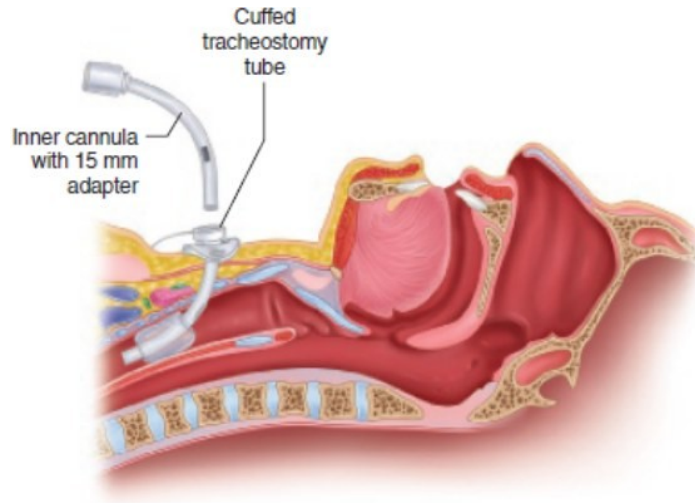


Figure 22-126 Tracheostomy tube in the stoma.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

D Displacement

Replace ASAP — same size with the obturator, or one size smaller. An ET tube can be used temporarily: advance it only just past the cuff, because the carina is close.

O Obstruction

Clogging is common. Remove the inner cannula, instil saline, suction. Secretions can cause trouble even without fully blocking the tube.

P Pulmonary problem

The tube may be fine and the lungs not — pneumonia, plugs beyond the tube, bronchospasm, pneumothorax. Assess like any respiratory patient.

E Equipment issue

Ventilator settings, disconnected circuit, empty oxygen, a valve left on a cuffed tube, a cap left in. Start at the patient and work outward.

Ventilating the stoma — Region SOP

BVM with a tracheostomy adapter, or a mask over the stoma. Consider an INFANT OR CHILD MASK over the stoma, sealing the mouth and nose if air escapes. Oxygen can be given by a mask over the stoma.

Bleeding — and the caregiver

Skin irritation around the stoma is usually minor; blood coming UP the tube is not. And ask the caregiver for the go-bag — spare tubes, the obturator, suction catheters. They are usually right beside you.

REGION SOP Functional Needs: evaluate for displacement, obstruction, pulmonary problem, equipment issue. “Communicate with caregiver/parent for information and to assist with care. Confirm patient’s baseline assessment with the caregiver.”

SKILL 3

Gastric Tubes — NG and OG

Gastric distention is inevitable with prolonged ventilation. This is how you take the air back out.

Why decompress · Measuring · Orogastric · Nasogastric

Why decompress, and which route



Figure 22-130 Nasogastric tube insertion.
 Anukool Manoton/Shutterstock, via Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.



Figure 22-62 i-gel — with gastric channel.

REGION SOP i-gel step 11: “If required, pass a lubricated NG or suction catheter down the gastric channel. Apply suction to decompress the stomach.”

	OROGASTRIC	NASOGASTRIC	THROUGH AN EGA
Route	Mouth	Nose	Gastric channel of the device
Chapter says	For UNCONSCIOUS patients	For AWAKE patients — rarely needed prehospital	An option with i-gel and LMA Supreme
Avoid when	Caution: esophageal disease, varices, caustic ingestion	Facial trauma · suspected basilar skull fracture · nasal obstruction	Device contraindications: intact gag, esophageal disease, caustic ingestion
Advantage	Avoids bleeding nasal mucosa and the cribriform plate	Tolerated better by an awake patient	No extra procedure — the route is already there

Decompression is a VENTILATION intervention
 A distended stomach elevates the diaphragm and reduces lung volume — chest rise falls as the abdomen rises, and in a child it happens fast. It also raises the risk of vomiting and regurgitation.

All three routes carry a risk of MISPLACEMENT INTO THE LUNGS. Everything about confirmation follows from that.

Measuring, and placing an orogastric tube

Measuring the length

NASAL — “NEX”

Nose → Earlobe → Xiphoid

ORAL

Corner of mouth → earlobe → xiphoid. The chapter describes the same distance measured epigastrium → angle of jaw → mouth, or to the end of the EGA.

Mark the tube at that point. Most adults: 16 Fr orally.

1 Precautions, head neutral

Keep ventilating via the ET tube or EGA throughout.

2 Size and measure

Select the correct size; mark the measured length.

3 Lubricate, insert midline

Generous lubricant on the tip; gently into the mouth at the midline.

4 Advance gently

Never force against resistance.

5 CHECK IT HAS NOT CURLED

A coiled tube still lets you inject air — and decompresses nothing. Look.

6 Confirm

Inject 30–50 mL of air while listening over the epigastrium.

7 Evacuate

Gentle suction to remove gastric fluid and gas.

8 Secure and document

Indication, size, technique, confirmation, complications, contents and volume, response.

The air-insufflation test is supportive, not proof

A whoosh over the epigastrium can be transmitted from a tube sitting in the esophagus or even the airway. Take it together with other signs: gastric contents returned on aspiration, a quiet patient with no new respiratory distress, no change in capnography or compliance. In hospital, placement is confirmed radiographically — tell the receiving team how you confirmed it.

Nasogastric placement in the awake patient

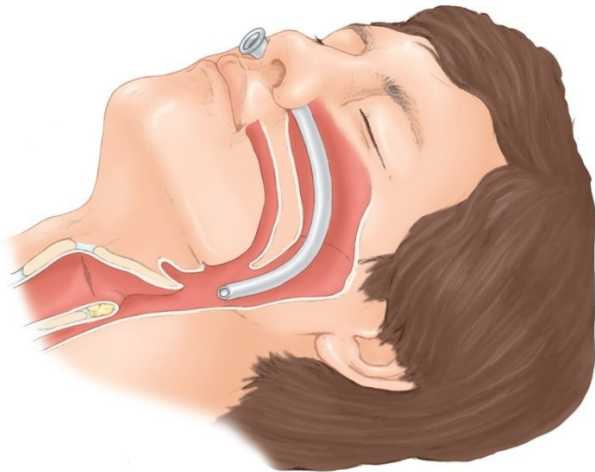


Figure 22-46 The nasal route.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

1 Upright, explain, choose

Sit upright. Explain — it is unpleasant. Pick the more patent nostril.

2 Measure NEX, lubricate

Nose → earlobe → xiphoid; mark the tube. Lubricate generously.

3 Straight BACK, not up

Along the nasal floor, parallel to the palate — the same error that makes nasal airways bleed.

4 Chin down, swallow, advance

At the nasopharynx: chin to chest to close the airway, then advance with each swallow to the mark.

WITHDRAW IMMEDIATELY if the tube is in the airway

Persistent coughing or choking • inability to speak or a voice change • respiratory distress • cyanosis or falling SpO₂. An awake patient usually tells you, loudly. An obtunded one will not — one more reason the oral route is preferred there.

When you would actually do this

Long transport or interfacility transfer, ongoing vomiting with high aspiration risk, or a medical control order. Many services never place one.

Complications

Epistaxis • gagging and vomiting (suction ready) • coiling in the pharynx • airway misplacement • rarely, intracranial passage with facial trauma or basilar skull fracture.

What the patient remembers

Agree a stop signal. Talk them through it. Advance only as fast as they swallow.

SKILL 4

Nasotracheal Intubation

A blind technique that follows the patient's own breathing — largely replaced, still on your portfolio.

Indications · Equipment · Following breath sounds · Complications

Who it is for, who it is not for, and what you need



Figure 22-74 Endotrol tube — O-ring flexes the tip anteriorly.

Source: Paramedic Care: Principles & Practice, 6th ed. © Pearson Education.

Designed for

A BREATHING patient who needs a definitive airway and cannot be intubated orally: clenched jaw or trismus, cannot open the mouth, cannot lie flat — the upright CHF patient — or oral trauma.

The absolute requirement

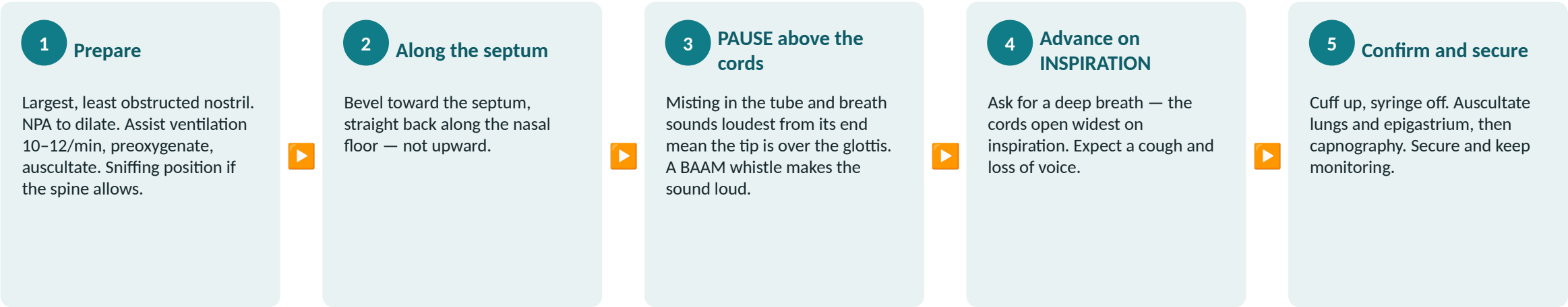
The patient MUST be breathing. You are guided by airflow at the end of the tube. An apneic patient gives you nothing to follow.

Contraindications

APNEA · significant midface trauma or suspected BASILAR SKULL FRACTURE · coagulopathy or anticoagulants · nasal obstruction, polyps, recent nasal surgery · epiglottitis or upper airway obstruction — blind instrumentation can precipitate complete obstruction · young children, with large adenoids, an anterior larynx and small nares.

Equipment — portfolio skill sheet	Why it is there
Nasal spray (vasoconstrictor)	Shrinks the mucosa — opens the passage and reduces bleeding
Viscous lidocaine, water-soluble jelly	Topical anaesthesia; lubrication
Nasopharyngeal airway	Finds the patent side, dilates the passage, spreads the anaesthetic
ET tube, usually one size smaller	Commonly 6.5–7.0 in adults. Warming it softens it and spares the turbinates
Suction, BVM, oxygen, capnography	Epistaxis is likely; confirmation is still capnography

The procedure — following the sound of the patient’s breathing



The whole technique in one idea

You are steering by SOUND. Breath sounds heard at the end of the tube are loudest when the tip sits directly over the glottis, and fade when it drifts into a pyriform fossa or the esophagus.

That is why the patient must be breathing, why you pause rather than push, and why you advance on inspiration — the moment the cords are widest.

If breath sounds...	The tube is probably...	So...
Disappear, and the neck bulges to one side	In a pyriform fossa	Withdraw, rotate toward midline, re-advance
Disappear with no bulge, epigastric sounds	In the ESOPHAGUS	Withdraw; flex the tip anteriorly — Endotrol ring, or extend the head slightly
Stay loud but the tube will not pass	Against the anterior commissure	Withdraw slightly; flex the neck a little
Become loud and constant, patient coughs	In the TRACHEA	Cuff up, confirm with capnography

Complications, and why the technique fell out of use

1 Epistaxis

The most common complication, often significant — and it contaminates the airway you are securing. The nasal mucosa's rich blood supply is why.

2 Turbinate and mucosal injury

A tube catching a turbinate can fracture it. Floor of the nose, bevel to septum, and a warmed tube all reduce the risk.

3 Esophageal placement

Common with a blind technique. Recognised the same way as always — capnography.

4 Laryngospasm and vomiting

Stimulating an awake airway provokes both. Suction must be ready before you start.

5 Retropharyngeal injury

Rarely, the tip perforates the posterior pharyngeal mucosa.

6 Intracranial passage

Rare and catastrophic — the reason basilar skull fracture and midface trauma are contraindications.

Why it fell out of use

Lower first-pass success than drug-assisted oral intubation • slower • bleeding that makes the next attempt harder • and it works only in a BREATHING patient — the very group for whom drug-assisted oral intubation and extraglottic devices now offer a better route.

What survives from it

Nasal anatomy — used every time you place a nasal airway or an NG tube.

Advancing on INSPIRATION, when the cords are widest.

Using the patient's own airflow as a guide — a close cousin of how waveform capnography confirms you are in the right place.

SKILL 5

Retrograde Intubation

A wire in through the neck and out through the mouth — and a tube that follows it back down.

Concept · Indications · Procedure · Limitations

The concept, the indication, and where it sits in your plan

“Only in rare cases would this be a viable approach ... this procedure is being replaced by newer technology and simpler techniques.”

1 Needle IN

Through the cricothyroid membrane, from outside, directed toward the head.



2 Wire UP

Guidewire passed through the needle, up through the larynx.



3 Wire OUT

Retrieved in the mouth and withdrawn through it.



4 Tube DOWN

ET tube passed over the wire into the trachea.

Might be considered when

Intubation has failed or the cords cannot be seen — blood, distorted anatomy, limited mouth opening, a fixed neck — BUT the patient can still be oxygenated, and there is time. The membrane must be palpable.

Contraindications

Landmarks cannot be identified · laryngotracheal injury or a mass over the membrane · infection at the site · significant coagulopathy · NO TIME.

Where it does NOT belong

Can't-intubate, can't-ventilate. Retrograde is SLOW. A patient who cannot be oxygenated needs a cricothyrotomy — which your SOP makes the rescue for exactly that.

REGION SOP The same membrane, the other direction: directed upward it leads a wire out through the mouth; directed downward it is the route for a cricothyrotomy — which the SOP indicates when the airway cannot be secured by non-surgical methods.

The procedure, step by step

1 Keep oxygenating

BVM or EGA throughout. The procedure is only acceptable because oxygenation continues.

2 Landmark and prep

Neck extended if the spine allows; stabilise the larynx; prep the skin — as for a needle cric.

3 Needle CEPHALAD

18 G through the membrane, angled toward the HEAD at about 30–45° — the opposite of a needle cric. Aspirate air.

4 Wire up and out

J-tip first, up through the cords. Retrieve from the mouth with Magill forceps.

5 Clamp at the neck

Hemostat on the wire at the skin so it cannot migrate.

6 Tube over the wire

From the mouth, often through the Murphy eye. Advance until it stops at the puncture site.

7 Release and advance

Unclamp, withdraw the wire up through the mouth while advancing the tube a few more cm.

8 Confirm and close

Cuff up, confirm with capnography. Remove the needle; pressure on the site.

Complications

Bleeding at the puncture • subcutaneous emphysema • the wire kinking or failing to pass • the tube catching at the cords or epiglottis • esophageal placement if the wire is pulled too early • and above all, TIME.

The one direction that matters

Retrograde: needle angled toward the HEAD, so the wire travels up and out of the mouth.
Needle cricothyrotomy: 45° toward the FEET, so the catheter follows the trachea down.

Same membrane, opposite directions. Getting it backwards is the characteristic error.

What to carry out of this session

1 Suction: check, lead, limit

Check the unit every shift — 300 mmHg, 30 L/min. Lead with suction (SALAD). Never more than 10 seconds, and sterile technique down a tube.

2 Rigid for volume, soft for reach

Yankauer for the mouth. Soft catheter through a nasal airway, ET tube or trach. For big debris, drop the catheter entirely.

3 One question before you bag a stoma

Is the upper airway still connected? Tracheostomy — usually yes. Total laryngectomy — no. Unsure? Ventilate the stoma.

4 Three steps fix most trach emergencies

Remove the valve, cap or HME. Remove the inner cannula. Suction. Then displacement, obstruction, pulmonary problem, equipment.

5 A coiled gastric tube decompresses nothing

OG for the unconscious, NG for the awake. Check the mouth, and confirm with more than one whoosh.

6 Rare skills, honestly labelled

Nasotracheal steers by the patient's breath sounds. Retrograde runs the needle toward the head. Both are largely replaced — and nasotracheal is not in your SOP.

A skill sheet is not a scope of practice.

When the portfolio, the textbook and the SOP disagree about whether you may do something, the SOP and your medical director decide.

Check your understanding

- 1 Name the four types of suction unit, and the two performance numbers every unit must meet.
- 2 Which unit most often fails in the field, and which one cannot come to the bedside?
- 3 Contrast rigid and soft catheters by job. What clears large debris better than either?
- 4 What is SALAD, and why does the chapter tell you to lead with suction?
- 5 Give the four technique steps for oropharyngeal suction, and explain the 10-second limit.
- 6 List four complications of suctioning and the mechanism behind one of them.
- 7 How does suctioning through a trach differ from oropharyngeal suctioning?
- 8 Why does covering the stoma and bagging the face fail in a total laryngectomy?
- 9 A trach patient with a speaking valve is in distress. What do you do first, and why?
- 10 Name the three steps that fix most tracheostomy emergencies.
- 11 State the Region SOP's four-item differential for a trach patient in distress.
- 12 A trach is dislodged. What are your replacement options, and what is the caution with an ET tube?
- 13 Which gastric route suits an unconscious patient, and which an awake one? Name two NG contraindications.
- 14 How do you measure an NG tube?
- 15 Why must you check that an OG tube has not curled in the mouth?
- 16 During NG placement in an awake patient, which signs mean it is in the airway?
- 17 What is the absolute requirement for nasotracheal intubation, and when do you advance through the cords?
- 18 Why must you check scope before performing nasotracheal intubation on a patient?
- 19 In retrograde intubation, which direction does the needle point — and how does that differ from a needle cric?
- 20 Which patient should never receive a retrograde intubation, and what do they need instead?

Answer these before the session and again after — that gap is the measure of what you learned.