VOLUME 1 · CHAPTER 22 · PART 4

The Difficult Airway, and Everything Afterward

Difficult airways, medication-assisted intubation, cricothyrotomy, and additional issues

What you do when the plan fails — and the parts of airway care that happen after the tube is in.
115 minutes · Aligned to Region SOPs

SESSION PLAN

115 minutes — a ladder of failure, then everything afterward

15 The difficult airway

Predicting it — LEMONS, HEAVEN, Mallampati, Cormack–Lehane, POGO — and the effects of obesity.

15 Medication-assisted

RSI, RSA and DSI, plus your system's own ketamine pathway and RASS targets.

20 Cricothyrotomy

Needle and surgical, with the landmarks, both procedures, and the age threshold that decides between them.

45 Additional airway issues

Stoma sites, suctioning, gastric decompression, and transport ventilators — the ongoing work of airway care.

20 Closing the chapter

Documentation, chapter summary, the Part 1 case study, and review.

The first half is a ladder — and every rung exists because the one before it was not enough

PREDICT it → PREPARE differently → use DRUGS → CUT.

Taken in the other direction you would meet the scalpel before the reason for it. This way each block is a response to the failure of the last — and the whole purpose of the first rung is to make the final one rare.

And the second half is a different kind of material entirely

Stomas, suctioning, gastric decompression and mechanical ventilation are not emergencies — they are the ongoing work of airway care, and they occupy far more of a transport than the thirty seconds of laryngoscopy ever did. Signal the change of gear so nobody reads the drop in drama as a drop in importance.

The Difficult Airway

Four different difficulties, several scoring systems, and one warning about all of them.

Four difficulties · LEMONS · HEAVEN · Obesity

Four difficulties, not one

1 Difficult BVM ventilation

Predicted by the things that break a mask seal or obstruct: facial hair, facial trauma, no teeth, obesity. This is the one that kills fastest, because it is the fallback for everything else.

2 Difficult EGA placement and ventilation

Poor mouth opening, distorted upper airway anatomy, and — from Part 3 — high airway pressures that exceed the device's seal.

3 Difficult intubation

Poor mouth opening, limited neck mobility, short thyromental and sternomental distance, high Mallampati class, anterior larynx.

4 Difficult cricothyrotomy

Obesity, a short neck, prior surgery or radiation, haematoma — and simple difficulty finding the cricothyroid membrane.

A backup plan is only useful if it fails for DIFFERENT reasons than the primary

A patient with a short thyromental distance and limited neck mobility is difficult to intubate AND difficult to cricothyrotomise, because both depend on the same anatomy. That patient needs a genuinely different plan from one who is simply obese with a large tongue.

Group the predictors by what they actually break

Breaks the seal

Facial hair · facial trauma · lack of teeth

Limits access

Poor mouth opening · limited neck mobility

Shortens the geometry

Short thyromental and sternomental distance · increased Mallampati class

Affects everything

Obesity — anatomy, physiology and equipment all at once

Breaks the RESCUE plan

Difficulty finding the cricothyroid membrane — act on this one before you commit

Cannot find the cricothyroid membrane on a calm patient in good light? You will not find it in a stairwell.

LEMONS — and the 3-3-2 rule inside it

Figure 22-125 The 3-3-2 rule.

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

L — Look externally

The gestalt. Facial trauma, unusual anatomy, a beard, a short neck, a large tongue, blood or vomit. Experienced providers do this without naming it — the acronym makes it deliberate.

E — Evaluate 3-3-2

3 fingers between the incisors (mouth opening) · 3 from mentum to hyoid (room to displace the tongue) · 2 from hyoid to thyroid notch (how high and anterior the larynx sits).

M — Mallampati score

How much of the posterior pharynx you can see with the mouth open and tongue out — the next slide.

O — Obstruction

Foreign body, tumour, abscess, angioedema, expanding haematoma, epiglottitis. The clue is often a SOUND rather than a sight.

N — Neck mobility

Can the head extend and the neck flex? Collars, arthritis, ankylosing spondylitis and prior fusion remove it — and alignment is what makes intubation possible.

S — Saturations

An already-hypoxic patient has no reserve, which means no time. From Part 1: 92% on high-flow oxygen is a patient standing at the edge of the curve.

Use the PATIENT'S fingers, not yours — the measurement is proportional to them. And learn what each number TESTS, not the numbers themselves — memorise "three three two" and you will forget which is which; know what each one measures and you will not.

Three scoring systems — and what each one actually scores

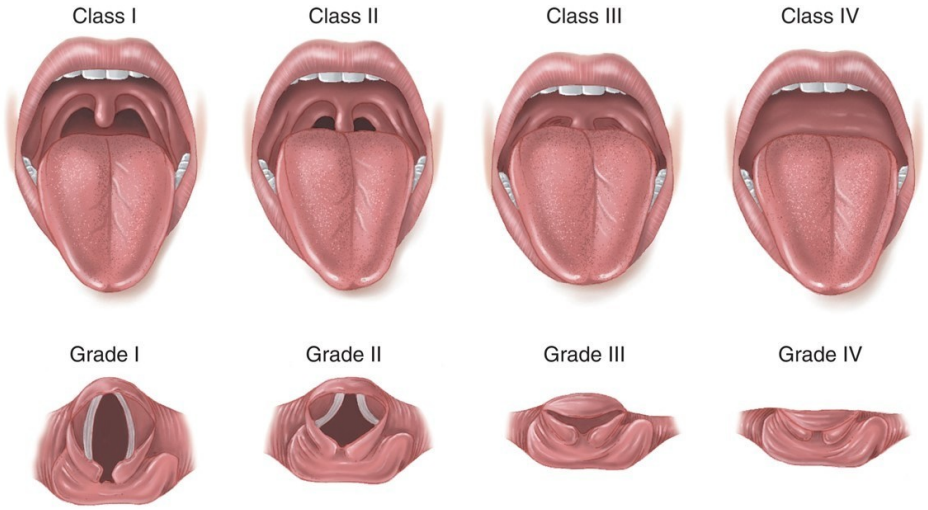

Figure 22-123 Mallampati classes and Cormack–Lehane grades.

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

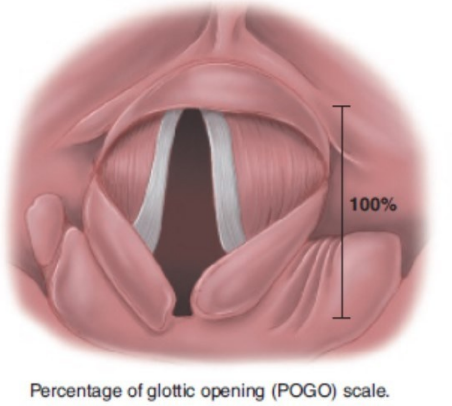

Figure 22-124 Percentage of glottic opening (POGO).

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

Prediction vs description

MALLAMPATI is a prediction, made before you touch the patient.

CORMACK–LEHANE and POGO are descriptions, made during laryngoscopy when you already know.

One tells you what to expect. The other two tell you what you got. They are constantly conflated.

Mallampati I–IV

Upright, mouth wide, tongue out, no phonation. I: palate, uvula, fauces, pillars. II: palate, uvula, fauces. III: palate and uvula base. IV: hard palate only. Higher = a larger tongue in a smaller space.

Its honest limitation

It needs a cooperative, sitting, awake patient — which is precisely the patient least likely to need emergency intubation. This is one of the weaknesses HEAVEN was built to address.

Cormack–Lehane I–IV

I: full glottis. II: partial glottis or arytenoids. III: EPIGLOTTIS ONLY. IV: neither. Grade III is the hinge — it is the bougie's indication from Part 3.

POGO 0–100%

Continuous rather than categorical, so it captures IMPROVEMENT: "20% to 60% with external laryngeal manipulation" is precise. A Cormack–Lehane grade cannot say that.

REGION SOP This is the vocabulary of airway documentation. "Cormack–Lehane 3, POGO 15% improving to 50% with ELM, first-pass success with bougie" is something a receiving physician and a QI reviewer can both actually use.

HEAVEN, obesity, and one warning about all of it

H — Hypoxemia
Physiologic

E — Extremes of size
Anatomic

A — Anatomic disruption
Or obstruction

V — Vomit, blood, fluid
In the airway

E — Exsanguination
Or anemia — physiologic

N — Neck mobility
Anatomic

— Rapid desaturation
Physiologic

Why HEAVEN exists — three clauses that carry the whole argument

It was built to address weaknesses in LEMONS and Mallampati. It was developed and VALIDATED IN PREHOSPITAL EMERGENCY PATIENTS, not in fasted, upright, cooperative surgical ones. And it scores PHYSIOLOGIC factors alongside anatomic ones — hypoxemia, exsanguination and rapid desaturation are statements about how much TIME you have, not about how good the view will be.

1 Anatomy — fixable

Much of the anatomic problem in the morbidly obese can be OVERCOME WITH PROPER POSITIONING. Part 2's ramp, and a genuinely encouraging finding.

2 Physiology — not fixable

Reduced functional residual capacity plus increased oxygen demand. A smaller tank and a bigger engine. No amount of positioning changes it.

3 Equipment — has a ceiling

Some extraglottic devices cannot generate enough airway pressure to lift a very heavy chest. Part 3's seal limit, arriving as a difficult-airway problem.

A perfect Grade I view is worthless if the patient desaturates to 60% before the tube passes. And do not let the ABSENCE of predicted difficulty create complacency — any patient may prove difficult or impossible to intubate. Every plan needs a backup regardless of what the score said.

Medication-Assisted Intubation

Sedating your way past the problem — and one important difference between the textbook and your protocol.

RSI · Your ketamine pathway · RSA · DSI

The concept, the drug classes, and the sequence

1 Premedication

Given early in the course, to mitigate anticipated complications.

2 Induction agents

Render the patient unaware during the procedure.

3 Neuromuscular blockers

Temporarily stop SKELETAL muscle function without affecting cardiac or smooth muscle. The heart beats on; the diaphragm does not.

4 Sedatives and analgesics

ESSENTIAL to keep the patient comfortable AFTER intubation. Not optional, and not an afterthought.

The sequence — and the step that is deliberately placed in the middle

Preoxygenate

Nitrogen washout, oxygen reserve, goal 100%

Protect the c-spine

If indicated

Position optimally

Plus external laryngeal manipulation as needed

PONDER

Is intubation really necessary?

Premedicate

If time permits and protocol allows

Prepare

Equipment, using a checklist

Sedate

And paralyse, where a paralytic is carried

Pass the tube

Direct, indirect, or over an introducer

"Ponder whether intubation is really necessary" sits in the MIDDLE of the sequence

It comes AFTER you have positioned and preoxygenated, not before. That is deliberate: it is the last moment at which the decision is still free, and a well-positioned, well-preoxygenated patient may no longer need the tube at all.

The whole procedure exists to minimise aspiration risk in a high-risk population — which is also why you avoid positive pressure ventilation until absolutely necessary. Bagging an unprotected airway inflates the stomach and raises the risk of the very thing you are preventing.

YOUR PROTOCOL

Ketamine alone — and why that is not classic RSI

The textbook says induction agent PLUS neuromuscular blocker. Your protocol uses KETAMINE ALONE.

There is no paralytic in your pathway. Properly, this is sedation-facilitated intubation: it shares preparation, preoxygenation, positioning and post-intubation sedation with RSI, and it does not share paralysis. Reflexes are blunted rather than abolished — so conditions are less perfect, and a failed attempt is far more survivable.

Step	Adult drug-assisted intubation
Prepare	Routine medical/trauma care. ECG, capnography, 12-lead as able
Pre-oxygenate	100% OXYGEN for 3 minutes, goal SpO_2 100%. Assess for a positive gag reflex
Induce	KETAMINE initial induction dose IVP/IO slowly over 1 min — max single dose 300 mg
Reassess at 1 min	If sedation inadequate: KETAMINE second induction dose — max TOTAL 450 mg
Intubate	Verify with capnography and monitor throughout. If unable — consider alternative airway devices
Secure	Secure the tube and place a C-COLLAR to maintain position. Support BP to MAP > 65
Sedate after	KETAMINE post-intubation dose, may repeat at 5 min, NO maximum — titrate to RASS −2 to −3

REGION SOP PEDIATRIC differs twice: post-intubation sedation is 0.5 mg/kg given 15 min after induction with NO REPEAT DOSING — unlike the adult pathway, which has no maximum. And you must CALL OLMC for orders before pediatric drug-assisted airway placement.

RASS	What it looks like
0	Alert and calm
−1	Drowsy — sustained awakening to voice
−2	LIGHT sedation — briefly awakens with eye contact < 10 sec
−3	MODERATE sedation — movement or eye opening to voice, no eye contact
−4	Deep sedation — movement only to physical stimulation
−5	Cannot be aroused

Dosing, and the shortage pathway

By IDEAL body weight from a height chart, not actual weight — roughly 2 mg/kg, then 1, then 0.5. Ketamine 500 mg/10 mL, onset 1 min, duration 10–20 min.
No ketamine → ETOMIDATE 0.3 mg/kg (max 40 mg), then MIDAZOLAM 2 mg + FENTANYL 50 mcg q15 min to RASS −2.

VARIATIONS

Rapid sequence airway, and delayed sequence intubation

1 Rapid sequence airway — RSA

The preparation and pharmacology of RSI, paired with INTENTIONAL placement of an extraglottic device, with NO prior attempt at direct laryngoscopy, in selected patients.

2 “Intentional” is the word that matters

This is not a failed intubation followed by a rescue device. It is a decision made in advance that the EGA is the right airway for this patient — and then giving the drugs to place it well.

3 Delayed sequence intubation — DSI

A modification of RSI for AGITATED patients in whom you cannot achieve adequate preoxygenation. It is RSI with a DELAY between the sedative and the paralytic, to allow proper preoxygenation.

4 It breaks a loop

Hypoxia causes agitation; agitation prevents the preoxygenation that would fix the hypoxia. Pushing harder on the mask does not break that loop. Sedation does.

DSI treats sedation as a procedure with its own goal

And the goal is PREOXYGENATION, not intubation. Sedate, the patient stops fighting, preoxygenate properly for three minutes — then proceed.

Sometimes the preoxygenation works well enough that the intubation is no longer needed, which connects straight back to “ponder whether intubation is really necessary.”

Why ketamine makes this available to you

At dissociative doses ketamine preserves respiratory drive and airway reflexes. A benzodiazepine or an opioid used to break the same loop would suppress respiration in a patient with no reserve.

And your pediatric pathway is already RSA in practice — i-gel and endotracheal tube are listed as parallel options at the same step, after the same ketamine.

Cricothyrotomy

The bottom of the ladder — an infrequent skill requiring great accuracy, on the worst call of someone's career.

Indications · Landmarks · Needle · Surgical

When, where, and the age that decides which one

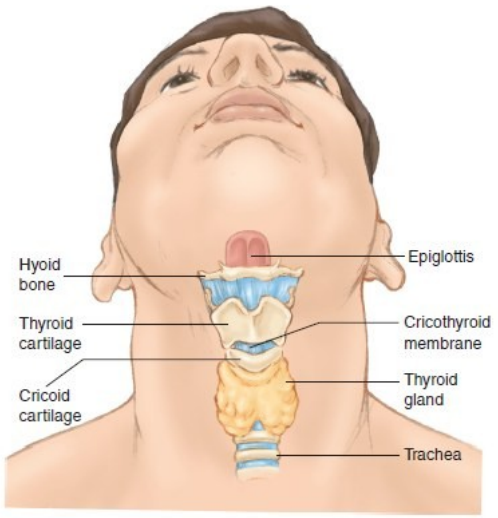

Figure 22-108 Landmarks of the neck.

Figure 22-109 Palpating the cricothyroid membrane.

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

	Your SOP's position
Indicated when	The airway cannot be secured by non-surgical methods · other devices or rescue techniques have failed or are unavailable · (needle) failure to intubate AND failure to ventilate with a BVM
Contraindicated when	You can secure the airway less invasively · airway trauma makes membrane access futile (laryngeal fracture, tracheal transection) · SURGICAL only: patient under 10 years old
Which one, by age	Under 10 years → NEEDLE. Ten and above → SURGICAL. Stated in exactly those terms in your airway obstruction protocol

This is a can't-intubate-can't-ventilate protocol — read the bar carefully

A failed intubation in a patient you can still bag is NOT a cricothyrotomy. The bar is failure of oxygenation by every other available route — which is why the needle indication reads "failure to intubate, failure to ventilate with a BVM," with both halves required.

Find the membrane on yourself, then on a partner, then on a manikin — in that order. If it was hard to find on a partner with a short neck, that is the difficult-cricothyrotomy predictor from the last section, felt rather than read.

The pediatric route — and a temporary one

Figure 22-110 Inserting the catheter.

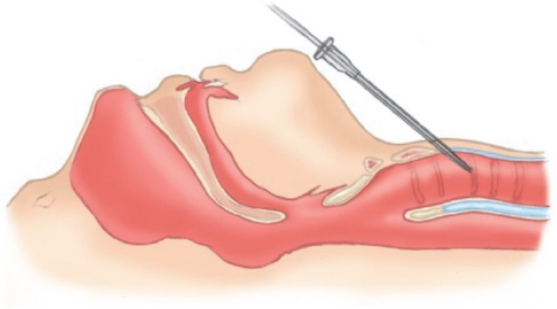

Figure 22-112 Through the membrane, angled caudally.

Figure 22-113 Ventilating through the cannula.

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

1 Position and locate

Supine, neck hyperextended — consider a towel roll. Stabilise the larynx with thumb and middle finger; palpate the membrane between thyroid and cricoid. Prep with betadine.

2 Insert at 45° CAUDALLY

10–14 G IV catheter on a 10 mL syringe, angled toward the FEET. The instinct is to aim perpendicular or cephalad — caudal follows the trachea and keeps the tip off the posterior wall.

3 Aspirate to confirm

Air returns → you are in the trachea. Fill the syringe with saline first if time permits, so the air BUBBLES visibly. Blood, or resistance to aspiration → reevaluate the placement.

4 Advance, adapt, ventilate

Slide the cannula forward until flush against the neck. Remove needle and syringe. Attach the 3.0 ETT adapter, connect the BVM, confirm with $EtCO_2$, and secure the hub to the neck.

Be honest about what a needle airway does and does not do

OXYGENATION through a 14 gauge catheter works reasonably well. VENTILATION through one does not — carbon dioxide accumulates, and bagging through that lumen is hard work. Which is exactly why the textbook says to anticipate an alternative means of oxygenation and ventilation within approximately 30 MINUTES. A needle cricothyrotomy is a bridge, not a destination — and under 10 years old, it is the ONLY cricothyrotomy available to you.

REGION SOP Equipment, in full: a 10–14 gauge IV catheter, a 10 mL syringe, and a 3.0 ETT adapter — three items, and you should be able to name all of them without prompting. Confirmation: capnography is the gold standard; auscultation, bilateral chest rise, fogging and pulse oximetry are secondary.

Ten and above — twelve steps, and four notes that matter

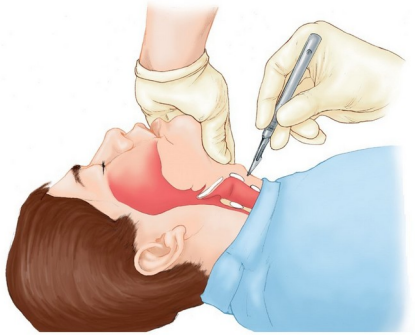

Figure 22-115 Vertical skin incision.

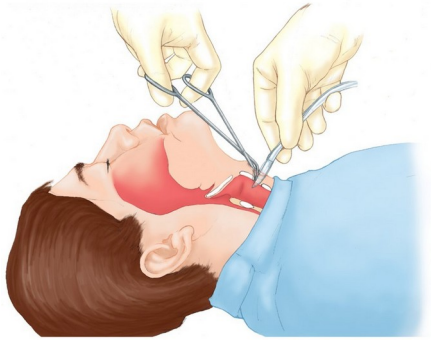

Figure 22-117 Opening the membrane.

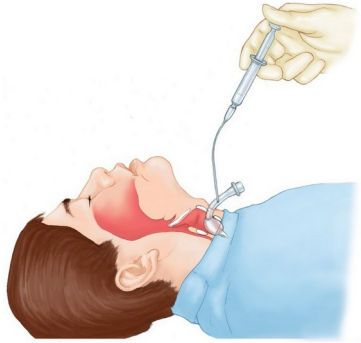

Figure 22-119 Passing the tube.

Figure 22-121 Inflating and ventilating.

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

1 Position, locate, prep

Supine, neck extended. Stabilise the larynx with thumb and middle finger, palpate the membrane, prep with betadine.

2 VERTICAL skin incision

0.5–1 inch, midline, exposing the membrane — and do NOT puncture through it yet. Vertical avoids the laterally running vessels and can be extended if your landmark was off.

3 Re-palpate, then HORIZONTAL

Find the membrane again with the index finger, then cut horizontally through its centre, extending to each interior edge of the cricoid cartilage — along the membrane's own fibres.

4 Place a tool, remove the scalpel

Magill forceps, curved hemostat, bougie, tracheal hook, or your own finger. Confirm it is in the tracheal lumen — not a false lumen, not through the posterior wall.

5 Pass the tube, confirm, secure

5.5–6.0 ETT, over the bougie if using. Remove the bougie, connect the BVM with $EtCO_2$, verify, inflate the balloon, secure with a commercial device, monitor with capnography throughout.

IGNORE the bleeding until the tube is in

Placement typically has a tamponade effect. This is counterintuitive and it is important — providers stop to control bleeding and lose the airway. And do not penetrate the posterior wall on either incision: the tracheal rings are C-shaped and open posteriorly.

The bougie gives you a measurement

Insert it AIMING TOWARD THE FEET, verify it is not in a false lumen, and it should stop at the carina LESS THAN FOUR INCHES from the incision — that distance is itself a confirmation. On percutaneous kits the textbook is blunt: no advantage over open technique.

Additional Airway Issues

A secured airway is not a finished job — and this is where most of a transport is actually spent.

Stomas · Suctioning · Gastric decompression · Ventilators

STOMA SITES

Somebody else's airway, which you have just inherited

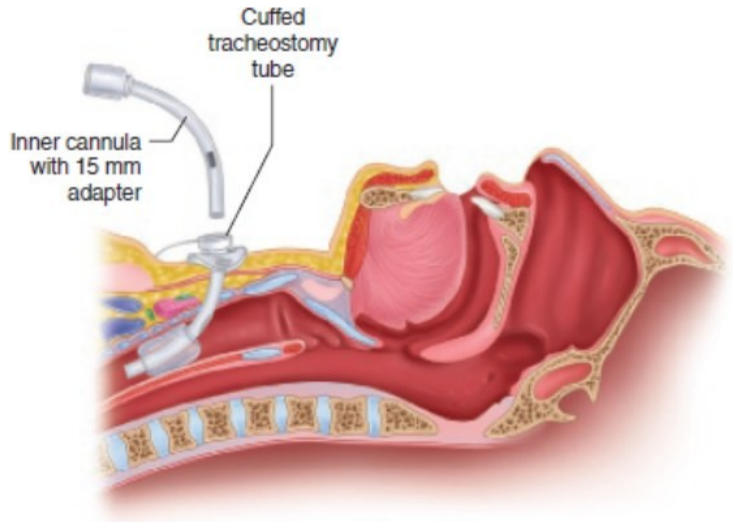

Figure 22-126 Tracheostomy tube in the airway.

Figure 22-127 Tracheostomy tube components.

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

1 Start with a four-item differential

Your functional needs protocol: evaluate for DISPLACEMENT, OBSTRUCTION, PULMONARY PROBLEM, or EQUIPMENT ISSUE. Four items, and they cover essentially everything.

2 Dislodged → replace immediately

An endotracheal tube may be used short term. Excessive secretions get suctioned — and 3 mL of sterile saline injected into the stoma first will loosen them.

3 Ventilate through the stoma

BVM with a tracheostomy adapter, or a mask over the stoma. For a small neck use an INFANT mask — an adult one will not seal.

4 And ask the caregiver

Confirm the patient's BASELINE with them. These families know the equipment far better than you do.

"If unable to ventilate, cover the opening and ventilate over the nose and mouth" — with one critical caveat

That works only if the upper airway is still CONNECTED to the trachea — a patient with a tracheostomy. Someone who has had a total LARYNGECTOMY has no connection at all between mouth and trachea: the stoma is the only airway there is, and bagging their face achieves precisely nothing. How do you tell in the field? Ask the patient or the caregiver, look at the tube, and note whether they can phonate or occlude the stoma to speak.

Ten seconds, and the two catheters

Figure 22-128 Suctioning the oropharynx.

Figure 22-130 Suctioning through the tube.

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

1 Two catheters, two jobs

RIGID (Yankauer) for volume in the oropharynx. SOFT (whistle-tip) for where rigid cannot go — an NPA, an ET tube, a tracheostomy.

2 Measure, then insert with suction OFF

Depth is earlobe to lips. Suction on the way IN grabs mucosa; on the way OUT is what works. Too deep stimulates the vagus.

3 Ten seconds, and oxygen either side

Preoxygenate, suction ≤ 10 seconds while withdrawing (rotating a whistle-tip), then hyperoxygenate with 100% again.

4 Through a tube, it is STERILE

Tracheobronchial suctioning uses sterile technique; oropharyngeal is merely clean. Practise donning sterile gloves.

Why ten seconds — give the mechanism, not the rule

Suction removes AIR with the secretions — negative pressure applied to a patient who is often already hypoxic and apneic, emptying the very reservoir (FRC, from Part 1) that is keeping them alive. And “suctions for more than 10 seconds” is a listed CRITICAL CRITERION on your scored sheets.

The problem Part 2 promised you

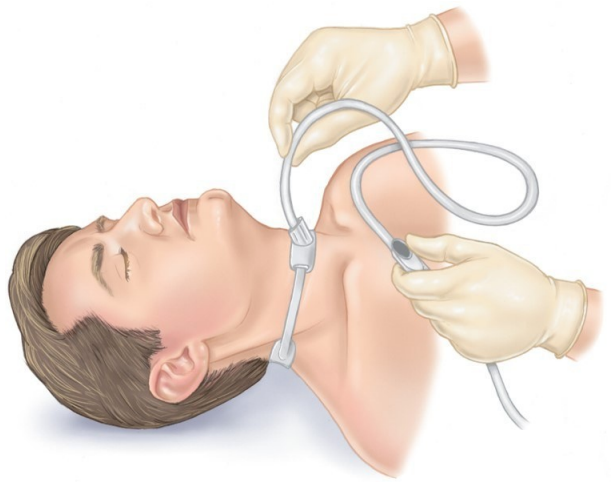

Figure 22-129 Orogastric tube placement.

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

A VENTILATION intervention, not a comfort measure

A distended stomach pushes the diaphragm up, cuts the volume available to the lungs, and makes every subsequent breath harder to deliver — while raising the risk of regurgitation and aspiration. In a child, all of that happens much faster.

Seven documentation elements

The indication · the tube size · the technique · the means of confirmation · any complications · the type and volume of contents evacuated · the clinical response. That is the standard for everything in this chapter, not just for this.

REGION SOP Most current extraglottic devices — your i-gel included — have a gastric channel built in, so decompression happens through the airway you already placed. It is step 11 of your i-gel procedure.

1 Head neutral, keep ventilating

Position the head neutrally while continuing to ventilate via the ET tube or extraglottic device.

2 Size and measure

Most adults take a 16 French orally. Measure from the EPIGASTRIUM to the ANGLE OF THE JAW, then to the mouth — or to the proximal end of the EGA.

3 Lubricate, insert midline, advance

Generous lubricant on the distal tip. Gently, at the midline, to the length you measured.

4 Check it has not curled in the mouth

A coiled tube will still let you inject air and hear something, and it decompresses nothing. This step gets skipped.

5 Confirm, suction, secure

Inject 30–50 mL of air while listening over the epigastrium. Apply gentle suction to evacuate fluid and gas. Secure the tube.

Precise control — and seven ways it goes wrong

Figure 22-131 Transport ventilator.

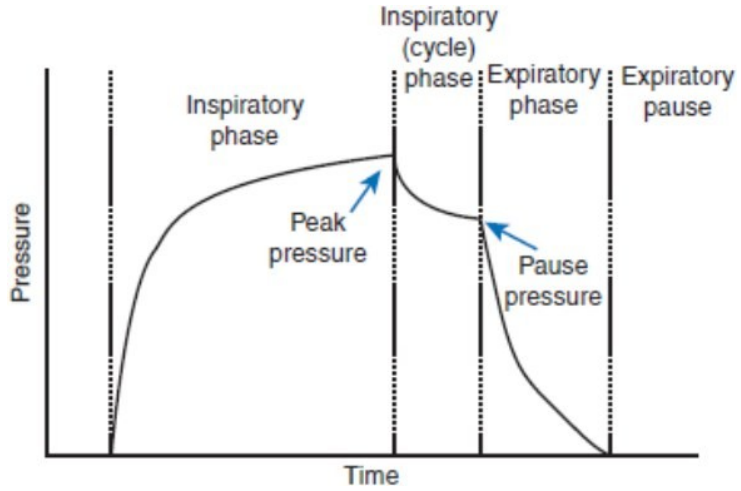

Figure 22-132 The pressure–time waveform.

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

Two varieties

SIMPLE out-of-hospital units — convenience, fixed oxygen concentration, few options. CRITICAL CARE transport units — several features, some able to deliver mask CPAP as well.

Why they beat a hand on a bag

A set volume at a set rate, every time, indefinitely — without fatiguing and without speeding up when the provider is stressed. From Part 2, almost every bagging error is too fast or too hard.

Reading the waveform

PEAK pressure reflects resistance AND compliance. PAUSE pressure reflects compliance alone. Peak rising with a normal pause = a RESISTANCE problem. Both rising = a COMPLIANCE problem.

Intubation complications

All of Part 3 still applies

VILI

Volumes or pressures injuring alveoli

Oxygen toxicity

Prolonged high concentrations

AUTO-PEEP

Breath stacking → pressure up, venous return down, BP down. Worst in obstructive disease

Infection

Circuit and airway contamination

Cardiovascular

Raised intrathoracic pressure cutting preload

Oxygen depletion

The machine uses gas to drive itself too

When a ventilated patient deteriorates: DISCONNECT and bag by hand. That single action separates the machine from the patient — easy bagging with improvement means the ventilator or circuit; hard bagging means the patient or the tube. Then work displacement, obstruction, pneumothorax, equipment.

DOCUMENTATION

Why airway documentation is held to a higher standard

1 What was done

Devices attempted in order, number of attempts, tube size and depth at the teeth, adjuncts used, confirmation method and capnography value.

2 Why it was done

The unusual requirement. Most prehospital documentation records ACTIONS; this asks for REASONING. Why an i-gel over a tube? Why commit to a cricothyrotomy then? Why not intubate a patient who arguably needed it?

3 And any complications

Hypoxia during attempts, esophageal placement recognised and corrected, dental trauma, hypotension after induction, dislodgement during movement. Recorded, not omitted.

The justification, in the textbook's own words

"Because patients who require prehospital airway management are at HIGH RISK FOR A BAD OUTCOME FROM THE ONSET, and because airway management LITERALLY DETERMINES WHETHER THE PATIENT LIVES OR DOES NOT, the greatest emphasis should be placed on detailed documentation of these issues."

That is saying two things: these patients often do badly regardless, so the record must distinguish a bad outcome from bad care — and the intervention is consequential enough that it will be scrutinised.

What a good airway narrative actually contains — drawn from all four parts

The decision
Indication, and the reasoning that led there

The preparation
Preoxygenation and positioning performed

The attempts
Devices in order, number of attempts

The view
Cormack–Lehane grade and POGO percentage

The tube
Size, depth at the teeth, adjuncts used

The confirmation
Method, capnography value and waveform

And afterward
Sedation given, RASS achieved, every reconfirmation

REGION SOP Your protocol requires SEVEN separate documentation elements for a gastric tube. If that is the standard for a gastric tube, the standard for an airway is not lower.

CHAPTER SUMMARY

Four parts, 275 minutes, and what actually matters

1 Oxygenation ≠ ventilation

Different problems, different solutions, different monitors. Every device across all 275 minutes serves one or the other, and knowing which is the whole skill.

2 Climb only as far as you must

Position, oxygenate, hands, plastic, then breathe for them — and stop the moment the patient is adequately oxygenated and ventilated.

3 Predict before you struggle

Four different difficulties, not one. LEMONS and Mallampati score anatomy; HEAVEN adds the physiology, which is what usually kills in the field.

4 The drugs buy conditions, not skill

Your pathway is ketamine alone — sedation-facilitated, not classic RSI. Reflexes blunted rather than abolished, and a failed attempt far more survivable.

5 The knife is a decision, not a technique

The commonest failure in cricothyrotomy is committing too late. Under 10 years: needle. Ten and above: surgical. Find the membrane on every patient you touch.

6 And a secured airway is not a finished job

Stomas, suctioning, gastric decompression and ventilation occupy far more of a transport than the thirty seconds of laryngoscopy ever did.

“You must maintain proficiency in all airway skills — especially the more advanced techniques.”

That is the only sentence in the chapter placing an obligation on you that extends past this classroom, and it is the most important one. Competency here decays. Intubation decays fastest, cricothyrotomy is barely ever performed, and the day you need either is the worst day of somebody’s life.

Most patients in this chapter are saved by Part 2: position, oxygen, a jaw thrust, an adjunct, a good seal, and a slow hand on the bag.

CASE STUDY

Your 61-year-old at 0240 — the whole chapter, applied

Part 1 — what was actually wrong

40 × 200 mL = 8,000 mL/min, which reads as more than adequate. But dead space is charged on every breath, so alveolar minute volume is 50 × 40 = 2,000 against a normal of ~4,200. Moving air vigorously, ventilating at under half of normal. And the quiet chest was the ominous finding.

Part 2 — what actually treats it

Position of comfort. Oxygen titrated to > 94%, not flooded. Then CPAP at 5 cm PEEP rising to a max of 10, with DuoNeb delivered THROUGH the circuit, repeatable × 2. Continuous waveform capnography — expect a shark fin with a rising number.

Parts 3 and 4 — the plan if she fails

Deteriorates on CPAP → remove it and consider an advanced airway. SpO_2 ≤ 92% on 100% O_2, RR > 40, and shallow laboured effort are all listed indications. HR 128 against a systolic of 154 is reassuring on the shock index.

And the counterfactual

Nobody does the arithmetic. She gets a nonrebreather, her saturation climbs to 96%, everybody relaxes — and she arrests from hypercarbia twenty minutes later with a perfect pulse oximeter reading. That is the failure this chapter exists to prevent.

Nothing about this patient required a laryngoscope. The intervention that helped her most was a mask with a pressure valve — which is the whole chapter's argument, in one patient.

REVIEW

Check your understanding

1. Name the four difficult airways and explain why treating them as one concept is dangerous.
2. Give LEMONS in full, and say what each of the three measurements in 3-3-2 is actually testing.
3. Distinguish Mallampati from Cormack–Lehane and POGO. What can POGO express that a grade cannot?
4. Give the three reasons HEAVEN was developed, and say what kind of factor it adds.
5. Name the three separate problems obesity creates, and say which one positioning fixes.
6. Name the four drug classes in RSI, and define precisely what a neuromuscular blocker does.
7. Why does “ponder whether intubation is really necessary” sit in the middle of the sequence, not at the start?
8. How does your protocol’s drug pathway differ from textbook RSI — and what is the trade-off?
9. Give the three ketamine dose limits in the adult pathway and the RASS target for maintenance.
10. Ketamine is unavailable. What does your shortage pathway substitute, for induction and for maintenance?
11. Distinguish rapid sequence airway from delayed sequence intubation, and say what loop DSI breaks.
12. State your SOP’s indications for cricothyrotomy. Why is a failed intubation alone not sufficient?
13. Which cricothyrotomy for a 7-year-old? For a 14-year-old? Where is that written?
14. Why vertical then horizontal — and why do you not cut through the membrane on the first pass?
15. What does your SOP tell you to do about bleeding during a surgical cricothyrotomy, and why?
16. Why might covering a stoma and bagging the face achieve nothing at all?
17. Explain the mechanism behind the 10-second suction limit, and name the two steps people skip.
18. What is auto-PEEP, what does it do to the blood pressure, and which patients are worst affected?
19. A ventilated patient deteriorates. What is your first action, and what does the result tell you?
20. Name the three things airway documentation must contain, and say which one is unusual and why.

Twenty questions closing 275 minutes. Answer them before the session and again after — that gap is the measure of the whole chapter.