Clinical Practice Procedures: Airway management/ Small bore transtracheal ventilation

Policy code	CPP_AM_SBV_0120
Date	January, 2020
Purpose	To ensure a consistent procedural approach to small bore transtracheal ventilation.
Scope	Applies to Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless specifically mentioned.
Source of funding	Internal – 100%
Author	Clinical Quality & Patient Safety Unit, QAS
Review date	January, 2023
Information security	UNCLASSIFIED – Queensland Government Information Security Classification Framework.
URL	https://ambulance.qld.gov.au/clinical.html

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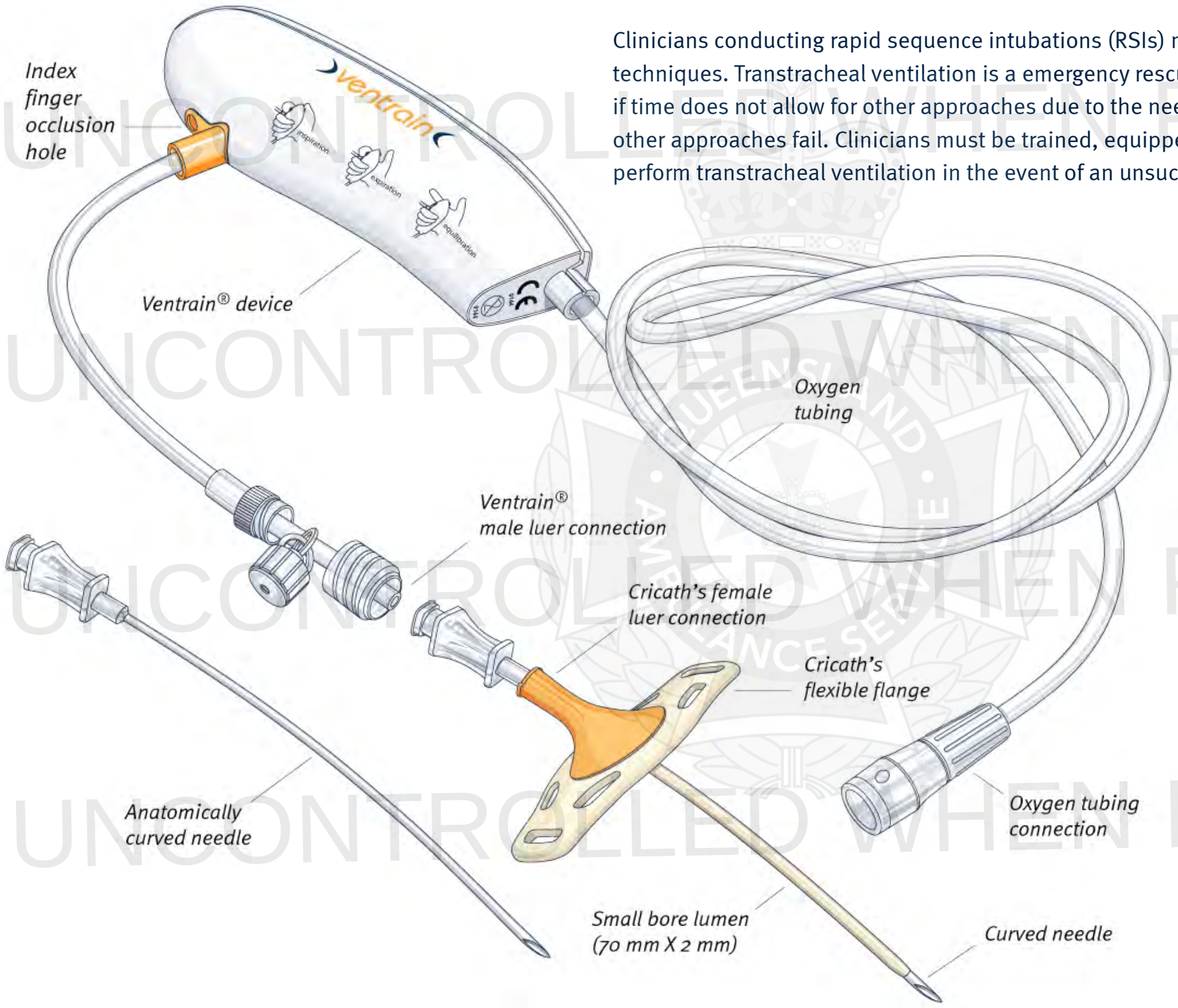
Small bore transtracheal ventilation



Clinicians conducting rapid sequence intubations (RSIs) must be skilled in failed airway techniques. Transtracheal ventilation is a emergency rescue technique for the failed airway if time does not allow for other approaches due to the need to preserve oxygenation, or if other approaches fail. Clinicians must be trained, equipped and mentally prepared to perform transtracheal ventilation in the event of an unsuccessful RSI.

The Ventrain® is a manually controlled, single-use ventilation device, specifically designed for difficult or obstructed airway situations. This handheld device is fitted with oxygen tubing for connection to a standard 15 l/min flow meter on one end and a male luer connector for the Cricath on the other end. Ventrain® not only insufflates oxygen, but also provides active removal of gas from the lungs using a venturi system. Once in place the clinician is easily able to control inspiration and expiration through the use of simple thumb and index finger controls on the device.

Indications

- ***Can't Intubate, Can't oxygenate*** (CICO) with decreasing SpO_2
- Primary airway attempt if ETT, LMA or BVM not feasible (e.g. massive facial trauma or burns)

Contraindications

- Open tracheal injury

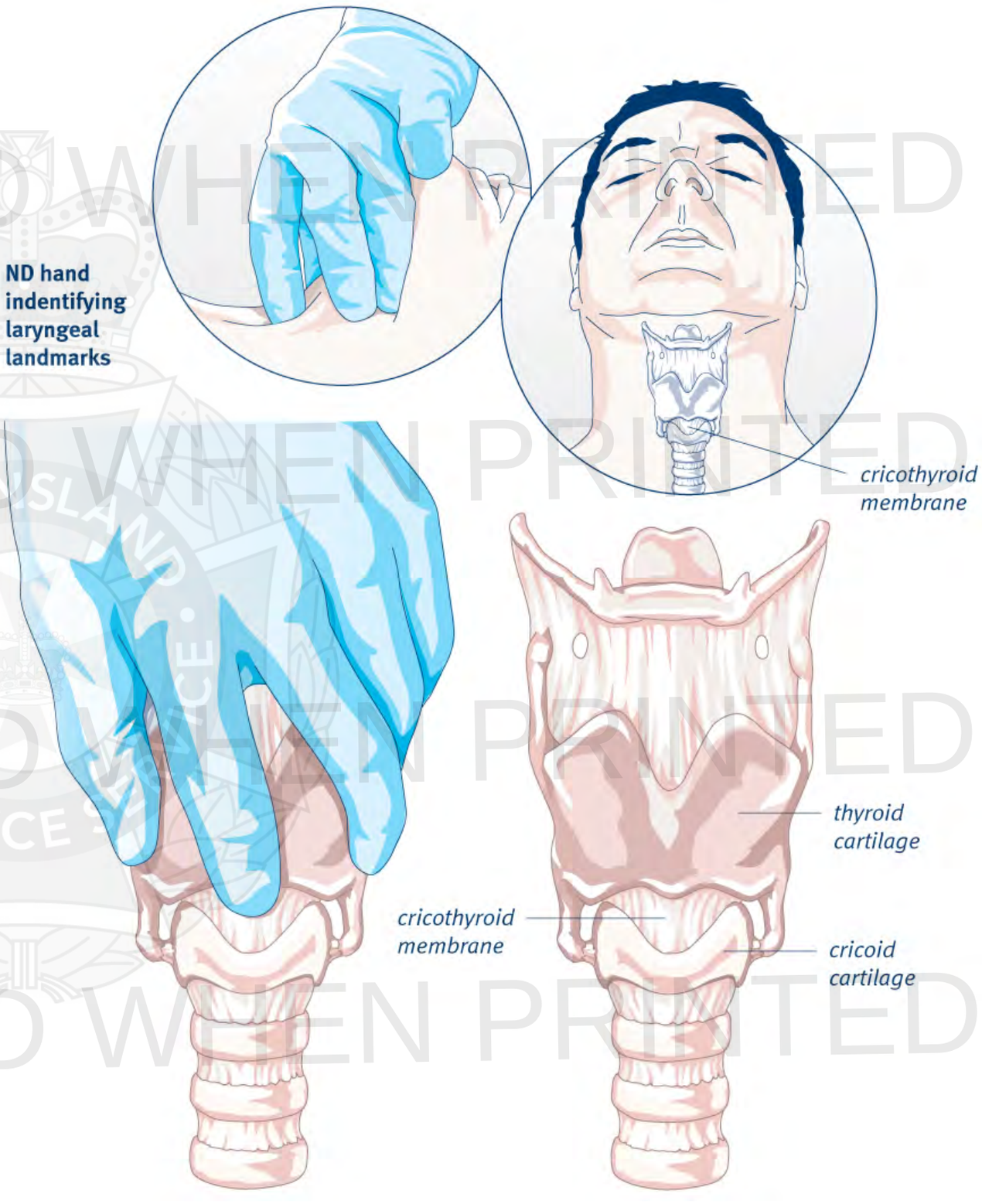
Complications

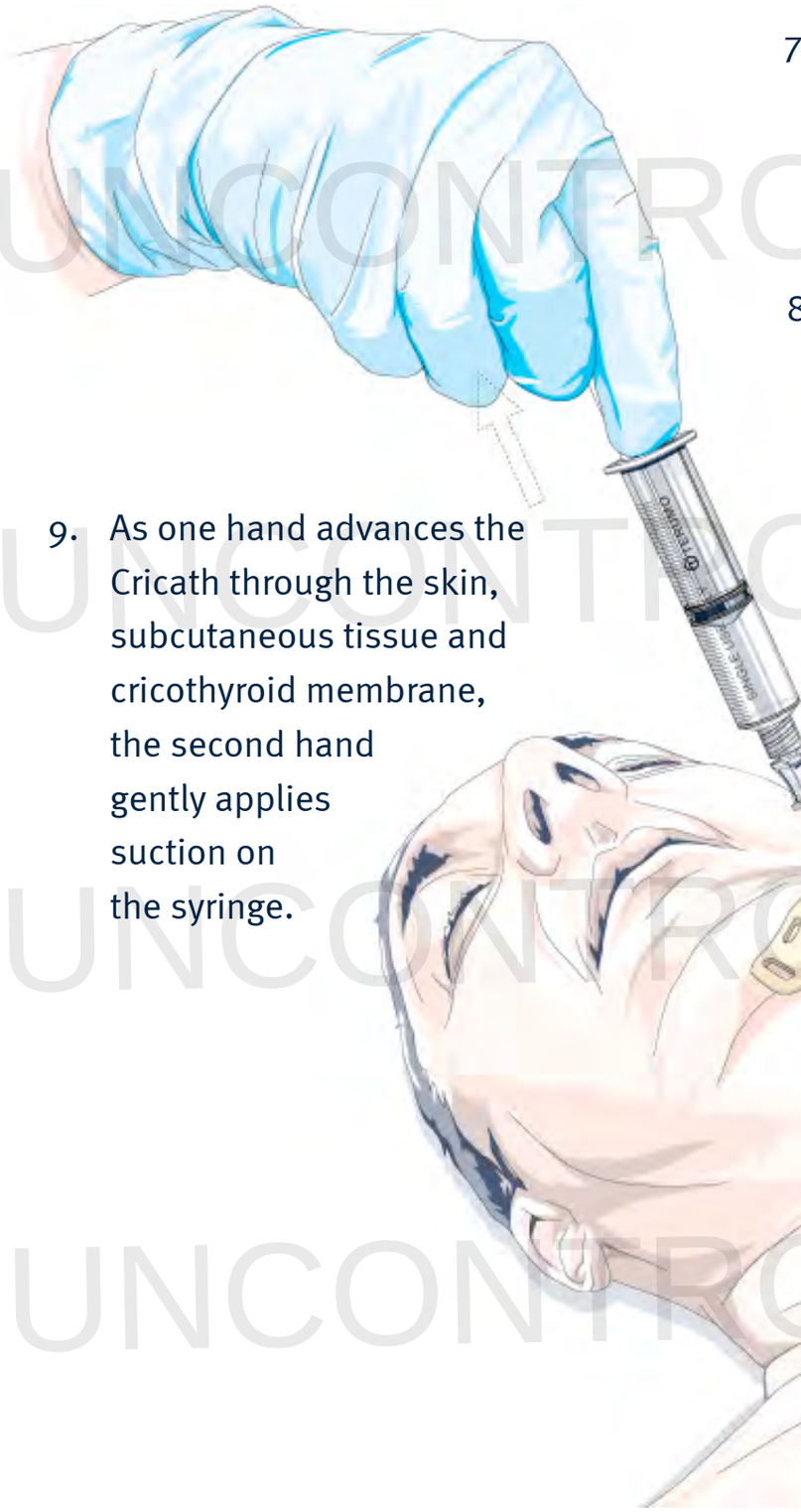
- Barotrauma
- Aspiration
- Pneumomediastinum
- Subcutaneous emphysema

PROCEDURE

1. Maintain ventilation with bag valve mask or supraglottic airway as best you can.
2. Prepare the neck with an appropriate antiseptic solution.
3. Place 5 mL of sodium chloride 0.9% in a 10 mL syringe.
4. Connect the syringe to the Cricath.
5. Remove the Cricath's protective sheath.

6. Identify the laryngeal landmarks (thyroid cartilage, cricoid cartilage and the cricothyroid membrane).

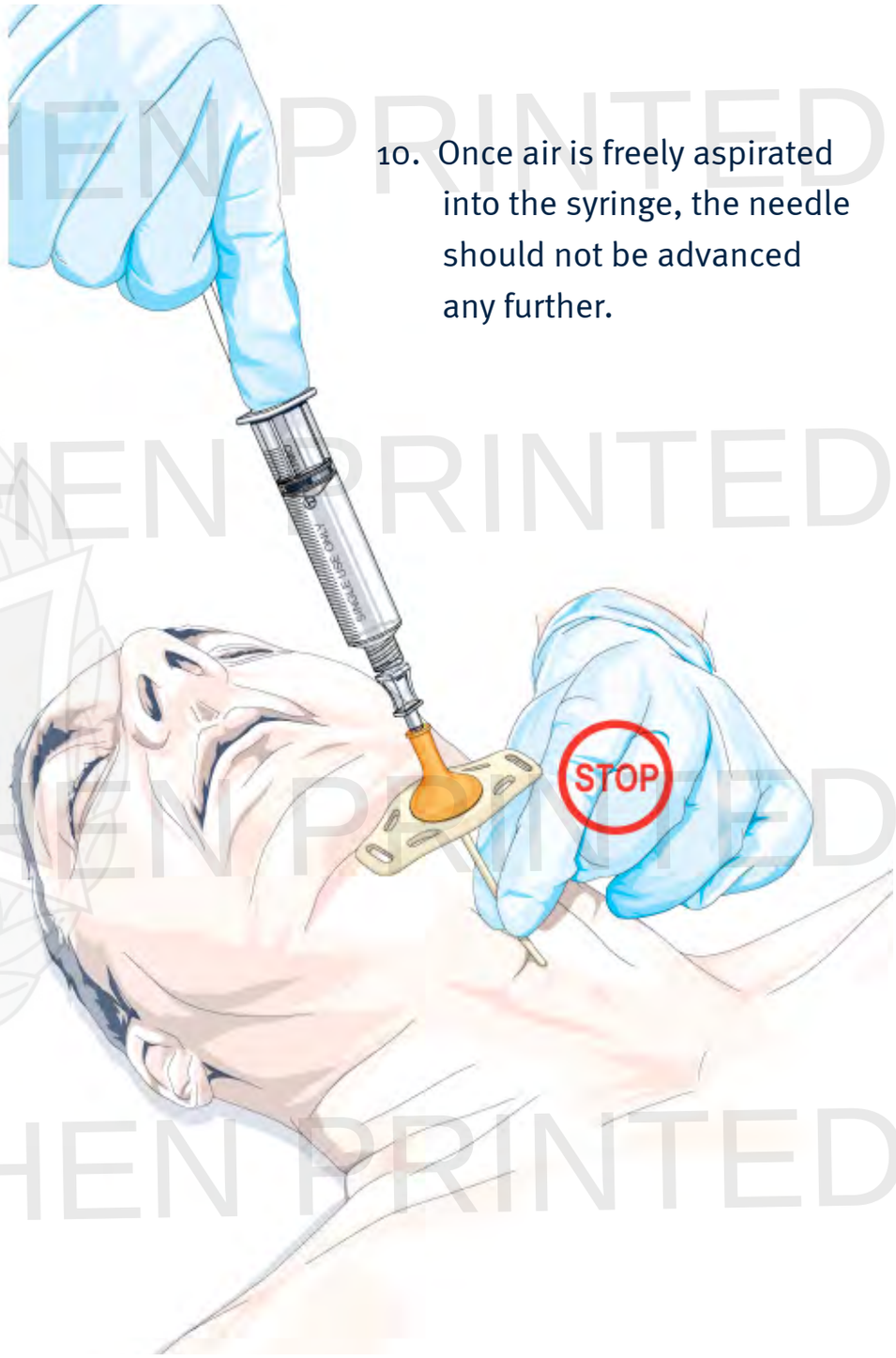




7. Using the sharp edge of the needle bevel, consider making a superficial skin incision (≤ 2 mm) at the incision site.

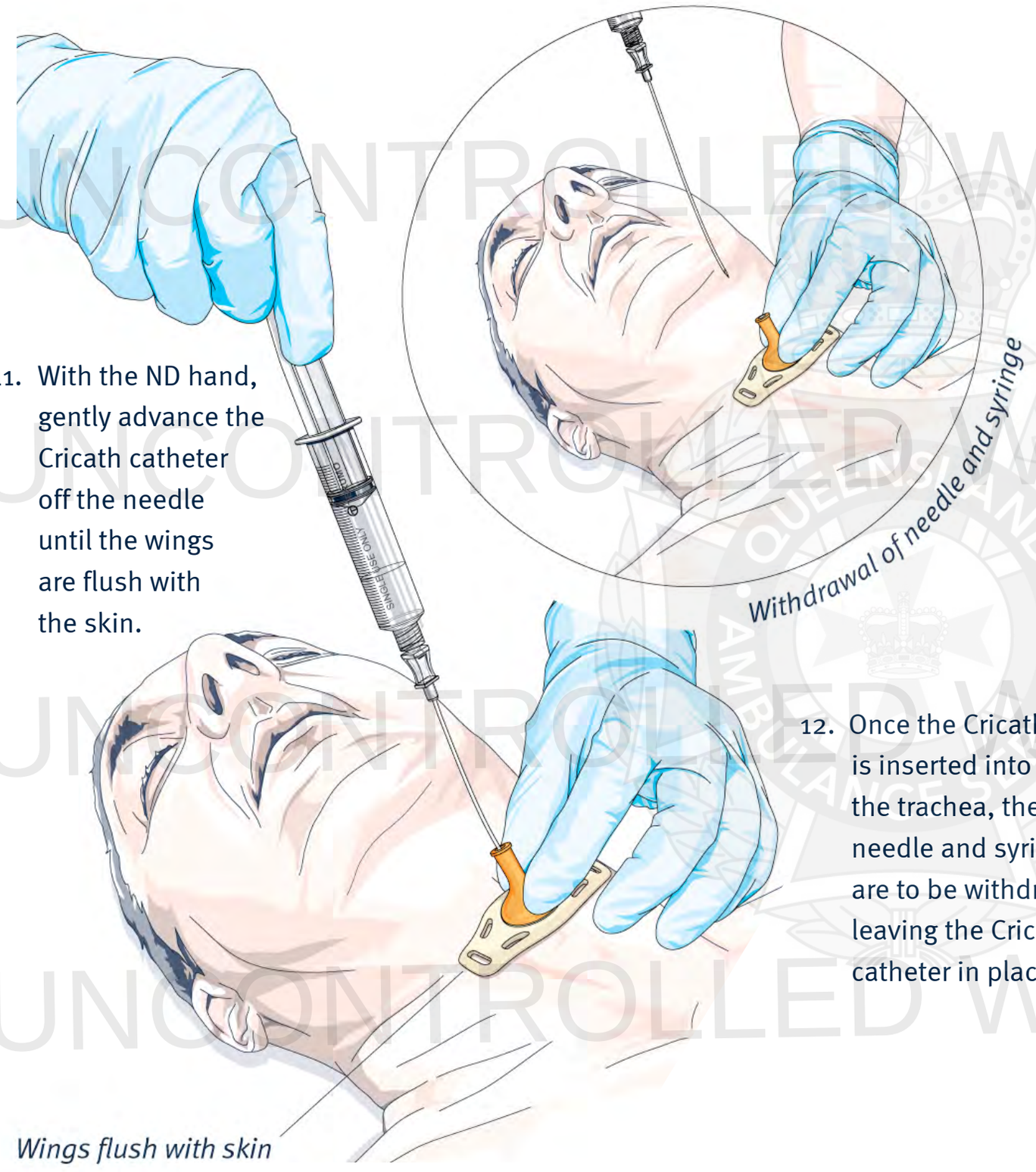
8. With the device supported (braced) by the non-dominant (ND) hand, gently insert the Cricath into the cricothyroid membrane.

9. As one hand advances the Cricath through the skin, subcutaneous tissue and cricothyroid membrane, the second hand gently applies suction on the syringe.



10. Once air is freely aspirated into the syringe, the needle should not be advanced any further.

11. With the ND hand, gently advance the Cricath catheter off the needle until the wings are flush with the skin.



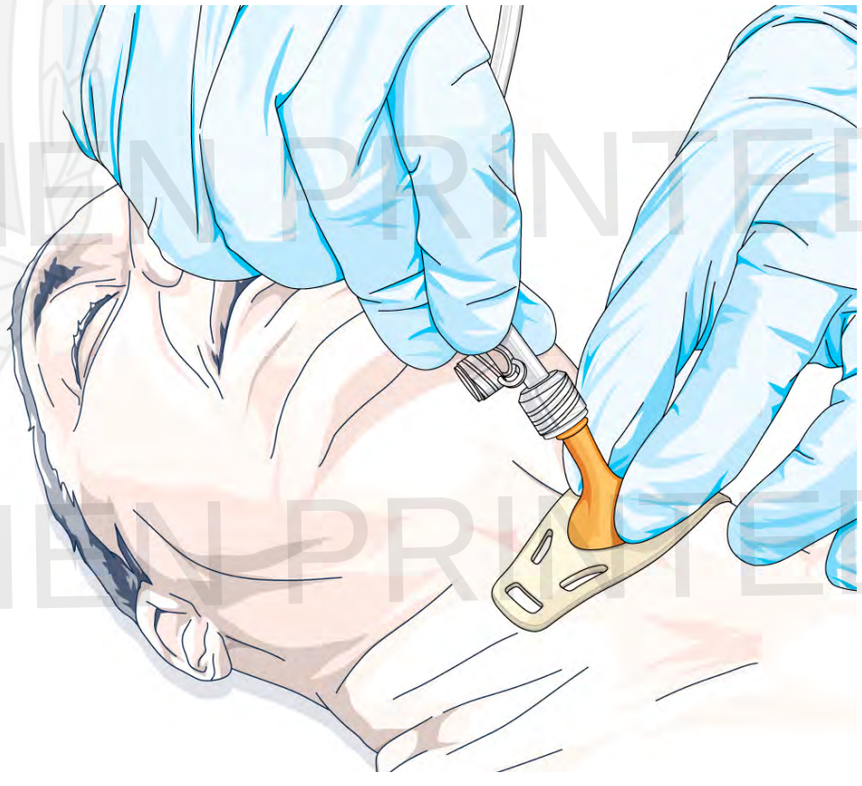
12. Once the Cricath is inserted into the trachea, the needle and syringe are to be withdrawn leaving the Cricath's catheter in place.

13. Dispose of the Cricath's needle immediately into a sharps container.

14. Connect the supplied oxygen tubing to a standard 15 L/min oxygen flow metre – ensure all holes on the Ventrain® device remain open.

15. Adjust oxygen flow rate:
    a. *Paediatric:* 1 L/year (min 2 L/min)
    b. *Adult:* 15 L/min (or 4 L/min with evidence of pneumothorax).

16. Attach the male luer connector of the Ventrain® tubing to the Cricath.

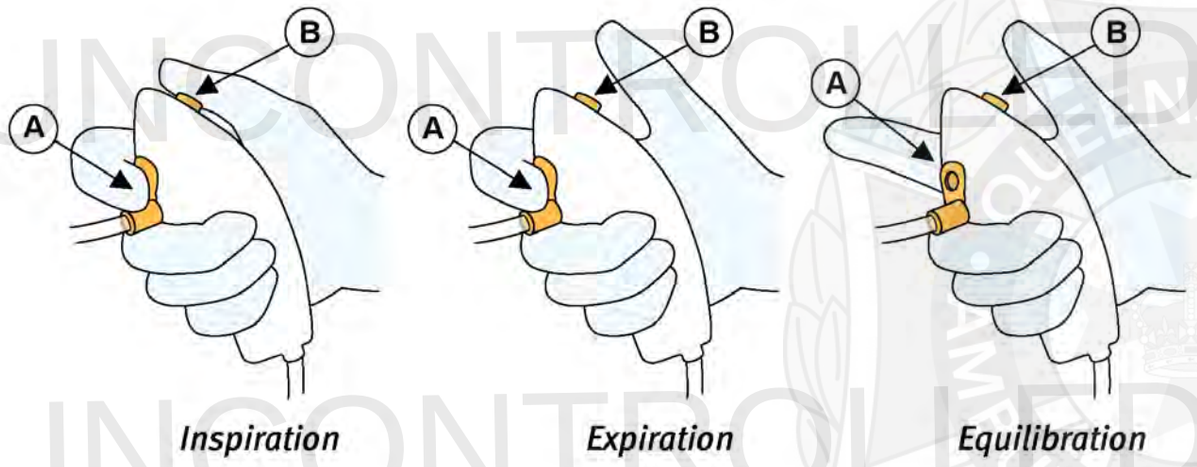


17. Depending on the patient's clinical presentation, decide on which cycle *(inspiration or expiration)* to activate Ventrain®.

    a. Inspiration is commenced by securely closing both the index finger hole **(A)** and the thumb hole **(B)**.

    b. Expiration is commenced by securely closing the index finger hole **(A)**.

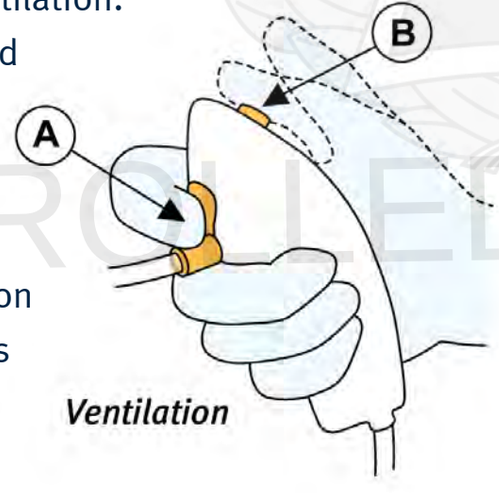
    c. Equilibration is commenced by opening the index finger hole **(A)** and thumb hole **(B)**.



Inspiration *Expiration* *Equilibration*

18. Whilst keeping the index finger hole **(A)** closed, alternate closing the thumb hole **(B)** to activate ventilation. Use an initial equal inspiration and expiration time of 1–2 seconds.

    For paediatric situations or ventilation with a suspected pneumothorax, an equal inspiration and expiration time of 0.5 seconds is suggested.

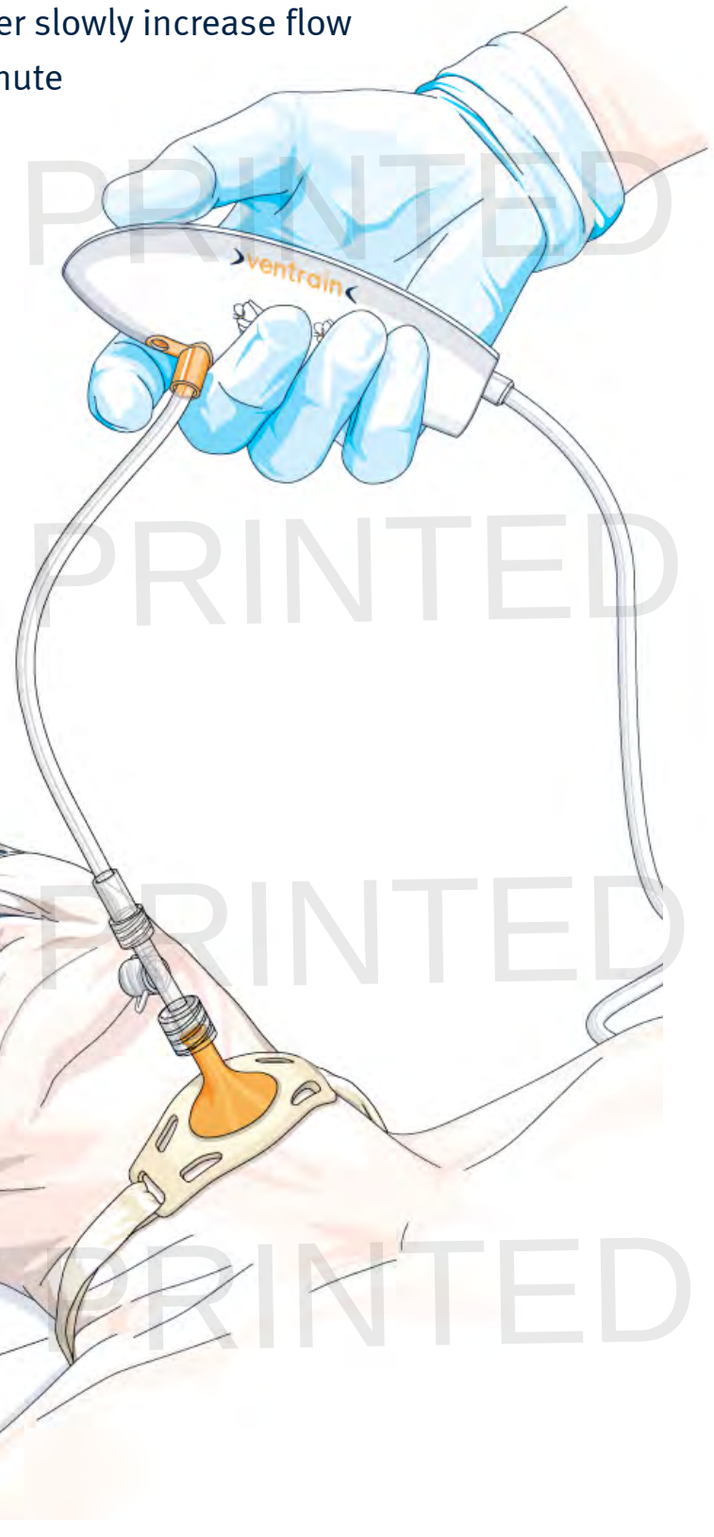


Ventilation

19. If necessary, consider slowly increase flow to obtain higher minute volumes.

20. If necessary, consider adjusting inspiration and expiration times based on chest movement.

21. Secure the Cricath's wings using cloth tape.



Secure with cloth tape

Additional information

- Small bore transtracheal ventilation is currently being piloted by ECCP (HARU) paramedics only.
- The potential for exposure to blood and body fluids is **HIGH**. All precautions that serve to minimise risk to the clinician and patient are to be applied.
- Ventrain® is suitable for all patients however, for patients with body mass < 40 kg (e.g. children, infants) Ventrain® should only be used for lifesaving measures.
- The Cricath is only suitable for use in adult patients – for paediatric patients a reduced sized catheter must be used.
- Ventrain® is designed for continuous manual control. Holding Ventrain® too long in the inspiration, expiration or equilibration position may lead respectively to overpressure, negative pressure or lack of ventilation, resulting in harm to the patient.
- If at any time officers are concerned with lung pressure, activate the equilibration position for at least 5 seconds.
- Tidal Volumes (TV) at different inspiratory flow setting are displayed below:

SPECIFICATIONS	
Flow setting (L/min)	**TV (mL) after 1 second inspiration**
2	33
4	67
6	100
10	167
12	200
15	250