

Canine Endotracheal Intubation



Disclaimer

A series of booklets has been developed by the Clinical Skills Lab team (staff, recent graduates and students) from the School of Veterinary Sciences, University of Bristol, UK.

Please note:

- Each booklet illustrates one way to perform a skill and it is acknowledged that there are often other approaches. Before using the booklets students should check with their university or college whether the approach illustrated is acceptable in their context or whether an alternative method should be used.
- The booklets are made available in good faith and may be subject to changes.
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Equipment list:

Canine Endotracheal Intubation

Equipment for this station:

- Soft dog model
- Laryngoscope with appropriate size head
- Appropriate size of endotracheal (ET) tube
- An empty syringe
- A length of bandage to 'tie in' the ET tube
- Ventilation (Ambu) bag
- An assistant

Considerations for this station:

- In the live animal, anaesthesia is induced prior to placing the ET tube, usually via intravenous (IV) injection
- You would also need:
 - The correct breathing system for the case (see booklet 'CSL_A03 Selecting & Connecting Breathing Systems')
 - An anaesthetic machine
- When using the model assume that anaesthesia has already been induced and the animal's trachea is ready to be intubated

Anyone working in the Clinical Skills Lab must read the 'CSL_I01 Induction' and agree to abide by the 'CSL_I00 House Rules' & 'CSL_I02 Lab Area Rules'

Please inform a member of staff if equipment is damaged or about to run out.

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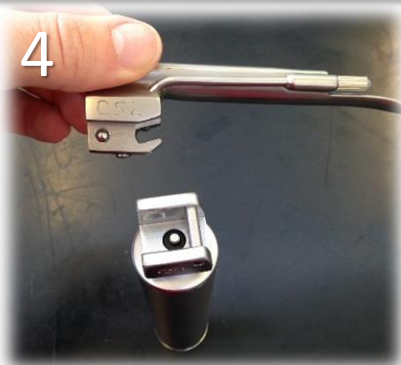
1 Choose the appropriate size of endotracheal (ET) tube. The length of tube required can be estimated by measuring it against the dog. The tip should lie at the point of the shoulder and the connector at the incisor arcade.



2 Choose an appropriately sized laryngoscope head. Notice the 'slot' in the articulating section of the head into which the 'bar' on the top of the base (handle) of the laryngoscope fits.



3 As seen above, at the top of the base (handle) there is a cradle into which the head fits. Note that at one end of this cradle there is a bar, over which the head fits and clips. In the centre is a contact point for the head, which completes the circuit for the bulb; the light will come on when the head and body are correctly aligned.



4 Attach the head to the base by hooking the slot in the head under the bar in the base. Ensure the articulating surface of the base and head line up (it is possible to clip the head on the wrong way round so the surfaces don't line up and the head overhangs the base/handle).



5 'Snap' the head upwards and check that the light comes on.



6 In a live animal, you would now check that the depth of anaesthesia is appropriate by assessing jaw tone. Once satisfied that the jaws are sufficiently relaxed, ask your assistant to hold the upper jaw with the head up and slightly back.

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7 Hold the tip of the tongue with your dominant hand and gently pull it forward, out of the mouth. If the tongue is very wet, a gauze swab may help with the grip. Lay the tongue over the fingers of your non-dominant hand and secure in place with your thumb.



8 Take the laryngoscope in your dominant hand and place the tip on the back of the tongue, just cranial to the base of the epiglottis. By exerting gentle pressure, the epiglottis will lower and move forward slightly (like a drawbridge), exposing the entrance to the trachea. DO NOT press on the epiglottis itself as this can cause damage.



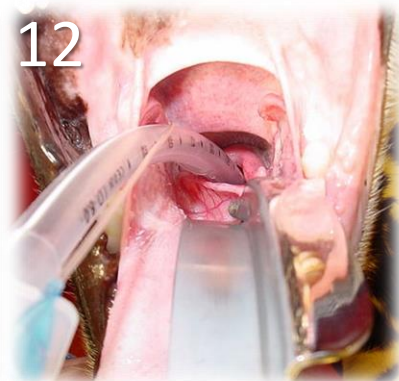
9 Transfer the laryngoscope to your non-dominant hand. Pick up the ET tube with your dominant hand, holding it at approximately the mid point. Insert the bevelled end into the mouth.



10 Visualise the entrances to the trachea and oesophagus. Pass the ET tube over the laryngoscope, aiming for the trachea. Guide the tip of the tube over the dorsal surface of the epiglottis, and gently slide it forward. It sometimes helps to slightly rotate the tube as it enters the trachea.



11 Insert the ET tube to a suitable distance, some of the tube should remain outside the mouth (about 3cm). N.B. In the photos a slightly longer tube has been used so it is easier to see what is happening in the mouth. Therefore more tube than usual is protruding from the mouth.



12 In the live dog, the position of the ET tube in the trachea is confirmed by: visualising the tube between the vocal folds, presence of CO₂ on the capnograph, condensation appearing inside the ET tube with each breath, auscultation of breath sounds on both sides of the thorax, movement of the thoracic wall when the reservoir bag is squeezed.

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With the model, use an Ambu bag to determine whether air is being supplied to the 'lungs' through the ET tube. Attach the Ambu bag to the end of the ET tube and use one hand (or ask your assistant) to squeeze gently on the bag several times. If the ET tube is in the trachea, the chest will move as if the dog is breathing.

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In the live dog, once you are satisfied the ET tube is in the correct place, connect it to the anaesthetic machine. The ET tube would be secured in place with a piece of bandage. Tie one loop over and one under the butterfly connector at the end of the ET tube.

15



Pass the ends of the bandage around the back of the head (or in long nosed breeds, over the top of the muzzle), and tie in a secure bow at the back of the head. It is important that the bandage bow can be easily undone in case the ET tube needs to be removed in a hurry.

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Inflate the cuff by drawing air into the syringe and inserting it into the valve at the end of the pilot balloon. Ask your assistant to gently squeeze the reservoir bag as you slowly press the syringe plunger. With your face close to the dog's mouth, continue to inflate the cuff until no breath is heard escaping around the ET tube. The dog should now only be breathing through the tube.

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Be careful not to overinflate the cuff. It can expand enormously (see above right) and if overinflated can cause pressure on the trachea which may cause long term damage. Therefore as soon breath is no longer heard escaping around the ET tube, stop inflating the cuff. It can always be inflated more later if necessary. In the live dog, the volatile anaesthetic agent would now be turned on.

Resetting the station:

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1. Uncuff the ET tube (draw back on the empty syringe when inserted into the pilot balloon access point)
2. Disconnect the ventilation (Ambu) bag from the ET tube
3. Gently remove the ET tube from the model
4. Remove the laryngoscope head from the base (handle)
5. Position all equipment ready for the next person

Station ready for the next person:



Please inform a member of staff if equipment is damaged or about to run out.

I wish I'd known:

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- The way that the assistant positions the head and neck is crucially important for visualising the larynx.
- Selecting the correct laryngoscope and ET tube takes practice. As an approximate guide, a 10mm tube fits the trachea of an average 20kg dog and an 8mm tube fits a 10 kg dog. Select the size you think you will need plus one smaller and one larger (i.e. a total of three ET tubes).
- Brachycephalic dogs can require smaller diameter tubes than you anticipate.
- Some ET tube cuffs have a valve on the end so air cannot escape after the syringe is removed. Others have a cap (plug) that needs to be inserted to keep the air in.
- It is possible to perform ET intubation in most dogs and cats without a laryngoscope. However, a laryngoscope is helpful and may be essential in cases of difficult intubation (e.g. brachycephalics). Therefore, it is worth practising the technique with a laryngoscope in straightforward cases so that you develop the dexterity required to use one for challenging cases.
- The normal sequence is: insert ET tube; confirm placement; tie tube in place; attach breathing system; and inflate cuff. However, in selected cases priorities change e.g. if the dog becomes cyanotic connect and supply O₂ before tying the tube in place and ask your assistant to hold the breathing system; if the dog is predisposed to regurgitation prioritise cuffing the tube.