

Feline Intermittent Positive Pressure Ventilation (IPPV)



Disclaimer

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

Please note:

- Each flipped classroom booklet includes ways to prepare for learning a skill in class; it is acknowledged that there are often other approaches. Before using the booklets, students should check with their university or college to determine whether the approaches illustrated are acceptable in their context or whether an alternative resources should be used.
- The booklets are made available in good faith and may be subject to changes.
- In using these booklets, you must adopt safe working procedures and take your own risk assessments (as and when appropriate), checked by your university, college etc. The University of Bristol will not be liable for any loss or damage resulting from failure to adhere to such practices.

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Equipment list:

Feline Intermittent Positive Pressure Ventilation (IPPV)

Equipment for this station:

- Feline IPPV model
- Endotracheal tube (4mm) – already in place in model
- Anaesthetic machine with oxygen supply
- Ayres T-piece with in-circuit manometer

Note: The model is based (with permission) on one developed by Christina Maden at the Royal Veterinary College, UK

An in-circuit manometer is inserted into a non-rebreathing circuit, between the Reservoir bag and expiratory limb, when administering IPPV.



Considerations for this station:

- Do not perform this task without being supervised by a member of staff.
- Refer to booklet 'CSL_A01 Checking an Anaesthetic Machine' as a reminder of the safe use of the equipment.
- Refer to booklet 'CSL_A03 Selecting and Connecting Breathing Systems'.
- This station demonstrates IPPV for cats. The technique also applies to dogs, although a different breathing system may be needed.

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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Turn oxygen cylinder on and ensure adequate oxygen pressure (see booklet 'CSL_A02 Inserting an Oxygen Cylinder' which describes how to turn on a cylinder).



Select pre-connected Ayres T-piece with in-circuit manometer and attach to the anaesthetic machine and scavenging.



Attach breathing system to patient's endotracheal tube.
Note: The feline model used in this IPPV station has lungs (red balloons) on the outside of the thorax. This is so that the effect of IPPV on the lungs can be seen. The balloons have a similar tidal volume to the lungs of a cat the size of the model.



Turn oxygen flow rate to between 2-3 litres / minute. Remember: Flow rate is the reading at the top of the bobbin.



Hold breathing system as shown in the image above. With non-dominant hand holding the APL valve and dominant hand holding the reservoir bag.



Temporarily and partially close APL valve* (APL = adjustable pressure-limiting).

*Do not leave the APL valve shut for more than 1-2 seconds.



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Gently squeeze reservoir bag. This will inflate the patient's lungs.

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Whilst squeezing reservoir bag watch manometer and aim for a pressure between 8-15cmH₂O*.

Watch the red balloons inflate to see the effect of IPPV on the expansion of the lungs.

** Inspiratory pressures should be between 8-15cmH₂O, and must not exceed 20cmH₂O, (patient dependent)*

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Immediately open APL valve. This process has delivered one breath. Repeat steps 5-9 as required.

Resetting the station:

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1. Disconnect the Ayres T-piece from endotracheal tube and anaesthetic machine.
2. Turn oxygen flow rate as low as it will go and turn anaesthetic machine off using the '*on/off*' switch (*a feature specific to the machine used with the model*).
3. Ensure oxygen cylinder is closed (turned off) using the spindle key.

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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- It is important to calculate the patient's tidal volume (and fresh gas flow) prior to attempting IPPV (see 'CSL_A03 Selecting and Connecting Breathing Systems')
- Remember that the approximate tidal volume is 10ml/kg for dogs and cats.
- Use a ventilation rate that is as close to the patient's normal (or expected) respiratory rate, for a cat, a rate of 12-16 breaths per minute may be appropriate. In practice, capnography can guide the rate of ventilation.
- An inspiratory: expiratory (I:E) ratio of 1:2 – 1:3 should be used to ensure adequate time for exhalation.