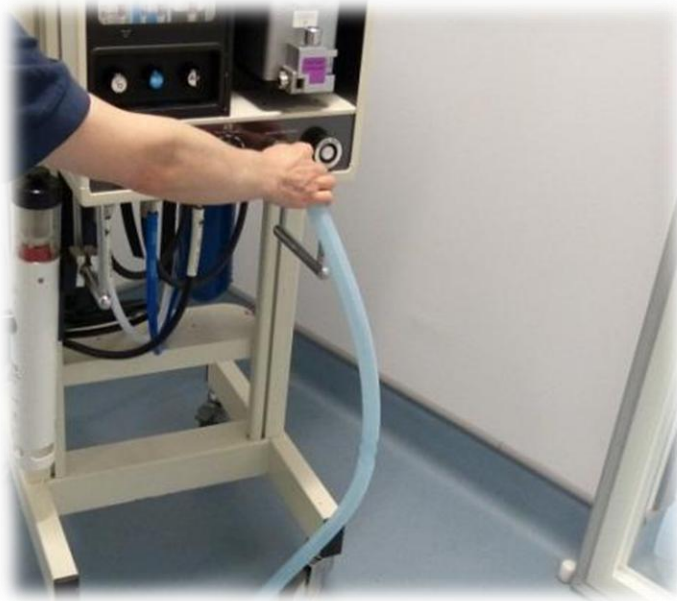


Checking an Anaesthetic Machine in the Clinical Skills Lab and in Clinical Practice



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:

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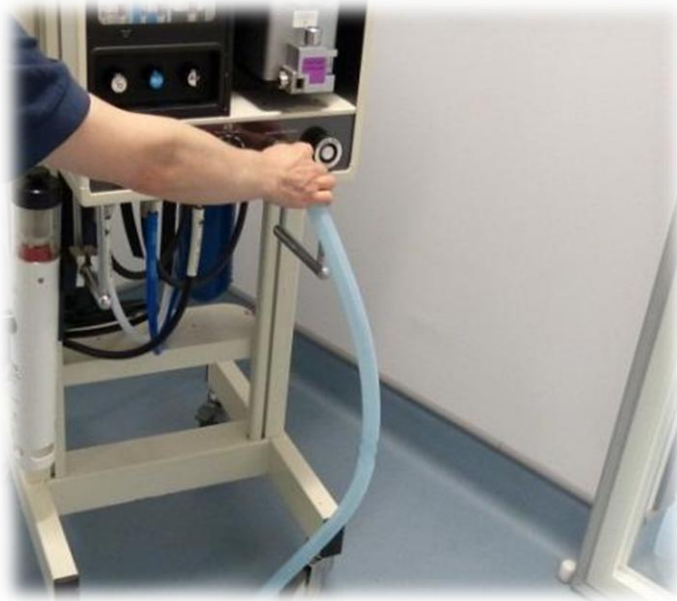
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Checking an Anaesthetic Machine in the Clinical Skills Lab and in Clinical Practice

Note: This booklet contains 2 versions for performing this task, based on the equipment that is available in the Clinical Skills Lab and checking a machine in clinical practice. These are described in the following sections:

- Checking an Anaesthetic Machine in the Clinical Skills Lab
- Checking an Anaesthetic Machine Clinical Practice

Checking an Anaesthetic Machine in the Clinical Skills Lab



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Equipment list: Checking an Anaesthetic Machine in the Clinical Skills Lab

Equipment for this station:

- Anaesthetic machine
- Use the anaesthetic machine in the CSL to identify components, but do NOT use the machine unsupervised
- Consult booklet 'CSL_A00 Anaesthetic Machine Anatomy' as a reminder of all the parts on an anaesthetic machine
-

Considerations for this station:

- This booklet is a reference guide; it should be used to become familiar with the steps to check a machine within the Clinical Skills Lab.

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.

Clinical Skills:

Checking an Anaesthetic Machine in the Clinical Skills Lab

Please note, this is the simplified version of this skill, which can be performed on the machines within the Clinical Skills Lab. For the full version of this skill, please refer to the section later in this booklet: **Checking an Anaesthetic Machine in Practice.**



1: Check the scavenging

The machines in the Clinical Skills Lab use passive scavenging. Examine the flurosorb and ensure it sits on the shelf under the machine.



Attach the scavenging hose to the common gas outlet.

3



2: Check the oxygen supply

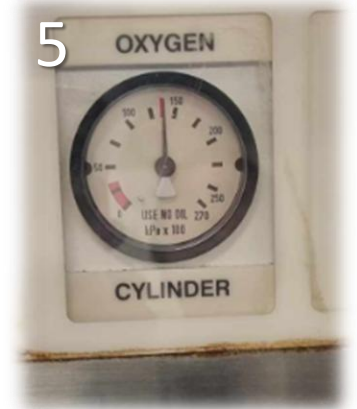
Check that the oxygen cylinder is firmly attached.

4



Using the valve spindle key with the "ON" side upwards, open the oxygen cylinder. Open it slowly using two twists with the key. Make sure oxygen isn't hissing out of the back of the cylinder.

5



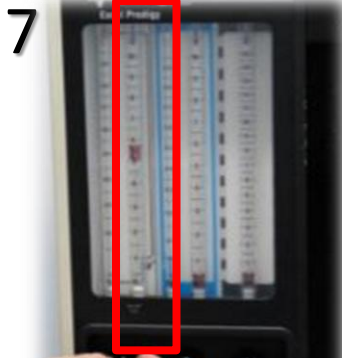
Check the contents gauge to ensure that the oxygen cylinder isn't empty (or nearly empty).

Clinical Skills:

Checking an Anaesthetic Machine in the Clinical Skills Lab



6
On some machines there is an On/Off switch. If there is one then switch the machine to On. The oxygen alarm will sound but will turn itself off.



7
Turn the oxygen flow meter on and check that the bobbin moves all the way to the top, then set it to 4 litres per minute (4L/min).



8
3: Check the oxygen fail-safes
Turn the oxygen cylinder off by using the key in the off position.



9
The oxygen (O₂) gauge will drop to zero and the oxygen alarm should sound.



10
As can be seen from the flow meter, the oxygen flow has fallen to zero.



11
Turn the oxygen cylinder back on by using the spindle key (see step X)

Clinical Skills:

Checking an Anaesthetic Machine in the Clinical Skills Lab



12
Check that the pipeline oxygen gauge and the oxygen flow have been restored.



13
4: Check the vaporiser.
Check that the vaporiser(s) is locked into position and is seated properly on the back bar. Check this by feeling that it is straight and in place. Do not wiggle the vaporiser up and down as this can bend things!



14
Check that the vaporiser turns properly and isn't stuck, leave it in the 'off' position.
Check the level of anaesthetic agent in the vaporiser.



15
5: Check for leaks in the system.
Check the machine for leaks by covering the common gas outlet with your thumb.
DO NOT maintain the pressure for long (as this may cause damage).



16
The oxygen flow will drop from 4L/min and there should be an audible hiss from the high-pressure relief valve. If there is a leak in the system, the oxygen flow will not fall and the hiss may not be heard.

Replace the scavenging pipe to the common gas outlet



17
In machines with a separate on/off switch:
Observe that there is a residual flow of oxygen on this machine even if the flow meter is switched off. Once the whole machine is switched off the residual flow will drop.

Clinical Skills:

Checking an Anaesthetic Machine in the Clinical Skills Lab



Press the oxygen flush button to ensure it is functional.



Place an 'in use' tag around the collar of the oxygen cylinder



Switch the machine off (if it has a switch).

Resetting the station:

Checking an Anaesthetic Machine in the Clinical Skills Lab

1. Check that the anaesthetic machine, vaporiser and oxygen cylinders are all turned off
2. Check that the oxygen flow meter has been turned off, and reads zero
3. Leave the work-space clean and tidy

Station ready for the next person:



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



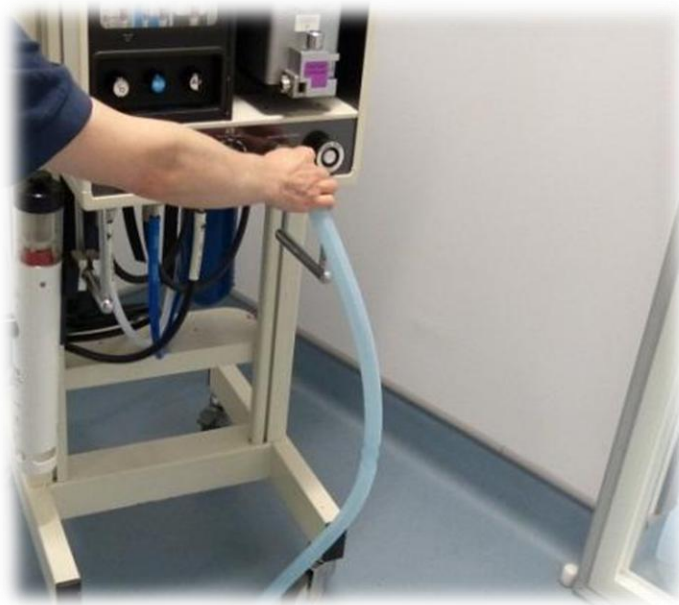
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I wish I'd known:

Checking an Anaesthetic Machine

- It is essential that you know how an anaesthetic machine works – if something goes wrong during a general anaesthetic, you won't have much time to figure it out!
- Different machines will have slight differences, make sure that you are familiar with the machine you are using, before starting the anaesthetic.

Checking an Anaesthetic Machine in Clinical Practice



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Equipment list:

Checking an Anaesthetic Machine in Clinical Practice

Equipment for this station:

- Anaesthetic machine

Considerations for this station:

- This booklet is a reference guide; it should be used to become familiar with the steps to check a machine in clinical practice
- Use the anaesthetic machine in the CSL to identify components, but do NOT use the machine unsupervised
- Consult booklet 'CSL_A00 Anaesthetic Machine Anatomy' as a reminder of all the parts on an anaesthetic machine

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.

Clinical Skills:

Checking an Anaesthetic Machine in Clinical Practice



1: Check the scavenging

Check that there is an air break and that it is connected to the scavenging system.



Ensure that the scavenging system is attached to an outlet. In some practices this may be Fluosorber and in others it may be a wall socket. It may be a push fit or screw in clockwise.

NEVER use Nitrous Oxide with a Fluosorber.



Attach the scavenging hose to the common gas outlet.



2: Check the oxygen supply

Check that the oxygen cylinder is firmly attached. If there is no cylinder, connect the pipeline (as shown in photos 16 & 17 later in this booklet).



Using the valve spindle key with the "ON" side upwards, open the oxygen cylinder. Open it slowly using two twists with the key. Make sure oxygen isn't hissing out of the back of the cylinder.



Check the contents gauge to ensure that the oxygen cylinder isn't empty (or nearly empty).

Clinical Skills:

Checking an Anaesthetic Machine in Clinical Practice



On some machines there is an On/Off switch. If there is one then switch the machine to On. The oxygen alarm will sound but will turn itself off.



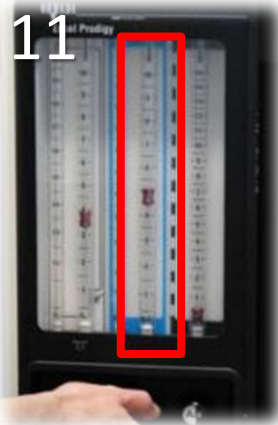
Turn the oxygen flow meter on and check that the bobbin moves all the way to the top, then set it to 4 litres per minute (4L/min).



3: Check the nitrous oxide supply. *Nitrous oxide is not available in the CSL, but check you know how to perform the steps marked **
** Turn the nitrous oxide cylinder on in the same way as the oxygen cylinder.*



** Check the nitrous oxide cylinder gauge.*



** Turn on the nitrous oxide flow meter and check it turns smoothly then set it to 4 litres per minute (4L/min).*



** Both flowmeters should now be on 4L/min.*

** Steps not currently available to practise in the CSL*

Clinical Skills:

Checking an Anaesthetic Machine in Clinical Practice

13



4: Check the oxygen fail-safes.
Turn the oxygen cylinder off by using the key in the off position. If using a pipeline only machine, disconnect the pipeline.

14



The oxygen (O_2) gauge will drop to zero and the oxygen alarm should sound.

15



As can be seen from the flow meter, both the oxygen flow and the nitrous oxide flow have fallen to zero. This is a safety measure to prevent delivery of only nitrous oxide if the oxygen supply fails.

16



Connecting pipeline gas:
If pipeline gas is available, plug the oxygen pipeline into a wall socket; this will make the alarm sound briefly.

N.B. Alternatively if no pipeline gas is available, the oxygen cylinder should be turned back on at this point in the checking process.

17



Holding the wall socket with one hand, tug on the oxygen pipeline to ensure that it is firmly attached. Don't pull too hard, and do brace the wall socket with your other hand.

18



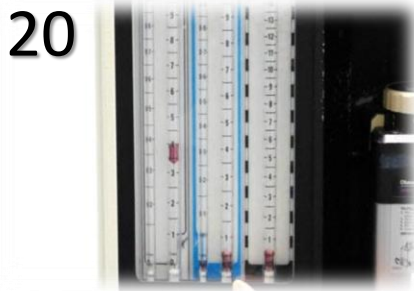
Check that the pipeline oxygen gauge and both the oxygen and nitrous oxide flow have been restored.

Clinical Skills:

Checking an Anaesthetic Machine in Clinical Practice



* Turn the nitrous oxide flow off in the same way as previously described.



* Check that the pipeline nitrous oxide gauge is now reading zero, however the oxygen flow remains unaffected.



* The nitrous oxide (N₂O) gauge will fall to zero.



* Plug the nitrous oxide pipeline into the wall and tug again in the same way as before (i.e. as for the oxygen pipeline).



* Check that the pipeline pressure gauge is reading and flow has been restored, then switch off the nitrous oxide flow meter.



5: Check the vaporiser.

Check that the vaporiser(s) is locked into position and is seated properly on the back bar. Check this by feeling that it is straight and in place. Do not wiggle the vaporiser up and down as this can bend things!

* Steps not currently available to practise in the CSL

Clinical Skills:

Checking an Anaesthetic Machine in Clinical Practice

25



Check that the vaporiser turns properly and isn't stuck, leave it in the 'off' position.

Check the level of anaesthetic agent in the vaporiser.

26



6: Check for leaks in the system.

Check the machine for leaks by covering the common gas outlet with your thumb.

DO NOT maintain the pressure for long (as this may cause damage).

27



The oxygen flow will drop from 4L/min and there should be an audible hiss from the high-pressure relief valve. If there is a leak in the system, the oxygen flow will not fall and the hiss may not be heard.

28



In machines with a separate on/off switch:

Observe that there is a residual flow of oxygen on this machine even if the flow meter is switched off. Once the whole machine is switched off the residual flow will drop.

29



Switch the machine off (if it has a switch).

30



To detach pipelines, push the circular piece (ring) of metal and grip the pipe. Grip the pipe firmly as it can come out rapidly due to the pressure release when the white ring of metal is pushed.

Resetting the station:

Checking an Anaesthetic Machine in Clinical Practice

1. Check that the anaesthetic machine, vaporiser(s), oxygen and nitrous oxide* cylinders are all turned off
2. Check that the oxygen and nitrous oxide* flow meters have all been turned off, and read zero
3. Unplug the oxygen & nitrous oxide pipeline*
4. Leave the work-space clean and tidy

* N.B. Nitrous oxide and pipeline gases are **not** currently available in the CSL

Station ready for the next person:



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



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I wish I'd known:

Checking an Anaesthetic Machine

- It is essential that you know how an anaesthetic machine works – if something goes wrong during a general anaesthetic, you won't have much time to figure it out!
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