

7.6 Oropharyngeal, tracheal, and endotracheal suctioning

This is an advanced skill. You *must* check whether you can assist with or undertake this skill, in line with local policy.

Definition

Oropharyngeal, tracheal, and endotracheal suction are methods of clearing secretions by the application of negative pressure via either a Yankauer sucker (oropharyngeal) or an appropriately sized tracheal suction catheter (tracheal/endotracheal). This procedure may be required in an emergency situation or as part of a patient's planned care.

It is important to remember that:

- The purpose of performing oral suction is to maintain oral hygiene and comfort for the patient or to remove blood and vomit in an emergency situation.
- The purpose of tracheal/endotracheal suction is to remove pulmonary secretions in patients who are unable to cough and clear their own secretions effectively. The patient may be fully conscious or have an impaired conscious level.
- Secretions are cleared from these patients' airways in order to maintain airway patency, to prevent **atelectasis** secondary to blockage of smaller airways (Royal Free Hampstead NHS Trust 1999), and to ensure that adequate gas exchange (particularly oxygenation) occurs.

Prior knowledge

Before undertaking suction, make sure that you are familiar with:

- 1 Respiratory anatomy and physiology.
- 2 Cardiovascular physiology.

- 3 The reasons that patients may require an artificial airway (e.g. a patient may need a tracheostomy if they have been intubated for a long time and may arrive in the ward with it still *in situ*. They may require an endotracheal tube after an emergency situation such as a cardiac arrest, or during surgery).
- 4 Causes for an impaired conscious level/cough.
- 5 Oral anatomy.
- 6 Your employer's infection control policy with regard to tracheal suction.

Background

Patients will require suction to be performed for a number of reasons:

- Oropharyngeal suction may be required for a patient who has undergone head and neck surgery, or whose conscious level is impaired and/or has an absent or impaired swallow reflex. Care should be taken to avoid trauma to the oral mucosa, particularly in patients with clotting disorders.
- Tracheal suction may be indicated in patients who are unable to clear their secretions themselves and will be required in those patients who need an artificial, secure airway (tracheostomy, endotracheal tube). An artificial airway may be needed after surgery or in order to provide mechanical ventilation, for example in an intensive care unit.

The purpose of performing suction is to clear vomit, blood, or secretions from the oropharynx or trachea in patients who are unable to do so independently, due either to their underlying illness, following surgery, or because of an impaired conscious level. Lower airway secretions that are not cleared may provide a medium for bacterial growth (Woodrow 2000). Suction may be performed using a yankauer sucker to clear oral secretions from the mouth and oropharynx, or by passing a suction catheter into the upper airway in order to clear tracheal secretions (see Figure 7.8).

Suctioning has been identified by patients as causing anxiety and discomfort (Puntillo 1990). It may be useful to liaise with other health care professionals, such as your ward physiotherapist, for help and advice regarding suctioning.

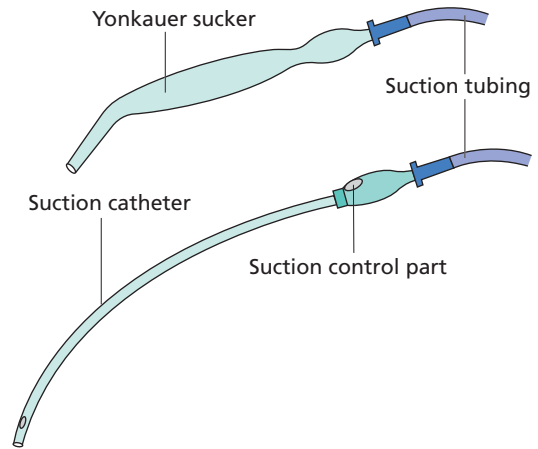


Figure 7.8 Yankauer sucker and suction catheter.

Tracheal suction can be performed via a variety of routes:

- Orally, using an oropharyngeal airway (unlikely to be tolerated by a conscious patient).
- Nasally, using a nasopharyngeal airway (contraindicated if the patient has clotting abnormalities or a fractured base of skull).
- Via a mini-tracheostomy tube.
- Via a tracheostomy tube.
- Via an endotracheal tube.

When suction is performed, an assessment should be made of the type of secretions obtained and any changes noted. Secretions may be:

- Copious
- Minimal
- Mucopurulent (green or yellow) if infection is present
- Frothy (possibly seen if the patient has pulmonary oedema)
- Bloodstained (possibly from trauma to the tracheal mucosa)
- Thick
- Watery

A sputum sample may be requested for microbiological investigation. A sputum trap should be used to collect a sputum sample; if you are unsure how to add this to a suction circuit, seek further advice/assistance from senior colleagues.

While tracheal/endotracheal suctioning may be a necessary procedure, it can be associated with some potentially harmful effects. These may include:

- Hypoxaemia (Bersten *et al.* 2003), as oxygen as well as secretions may be removed from the lungs when suctioning (Woodrow 2000).
- Vasovagal response causing arrhythmias and hypotension (Wainright and Gould 1996, Bersten *et al.* 2003).
- Mucosal trauma (Moore 2003). Suction should only be applied when withdrawing the catheter, *never* when inserting it.
- Cross-infection (Woodrow 2000, Moore 2003).

Suction procedures should therefore be as brief as possible, lasting approximately 15 seconds (Woodrow 2000). The instilling of 0.9% saline via a tracheostomy or endotracheal tube prior to suctioning is sometimes performed; however, there is little evidence to support this practice and it could potentially cause harm (Akgul and Akyolcu 2002, Ridling *et al.* 2003).

Choosing the right sized suction catheter

The suction catheter diameter should be half the diameter (or less) of the tracheal tube. This prevents occlusion of the airway and avoids the generation of large negative intra-thoracic pressures (Bersten *et al.* 2003). A method of calculating the correct size of suction catheter is shown in **Box 7.4**.

Setting the correct pressure

The negative pressure set on the suction machine needs to be sufficiently high to clear secretions while avoiding

Box 7.4 Sizing a suction catheter (Fg – French gauge)

$$\frac{\text{Diameter of tracheal tube (mm)} \times 3}{2}$$

Example:

For a size 8 tracheostomy:

$$8 \times 3 = 24$$

$24/2 = 12$ (Fg) suction catheter.

trauma to the bronchial mucosa. Ashurst (1997) recommends a setting of 120 mmHg (16 kPa). In practice, it is sometimes necessary to apply higher levels of negative pressure to clear thick, tenacious secretions; this should be done cautiously, and advice should be sought regarding therapies to help loosen secretions, such as ensuring adequate patient hydration (Akgul and Akyolcu 2002), mucolytic agents, and sufficient airway humidity (Blackwood 1999).

Context

When to perform suction and in whom

Potential indications for tracheal or endotracheal suctioning (Woodrow 2000) include:

- Raised respiratory rate.
- Inability to clear secretions effectively.
- Reduced air entry on auscultation.
- Audible secretions.
- Spontaneous but ineffective cough.
- Reduced oxygen saturation levels.

However, the need for suction should be assessed on an individual basis rather than as a 'ritualized' activity, meaning that patients should only receive suctioning when they need it, not because a certain length of time has elapsed since it was last performed (Royal Free Hampstead NHS Trust 1999, St. James's Hospital/Royal Victoria Eye and Ear Hospital 2000, Moore 2003, Redditch and Bromsgrove PCT 2004).

When not to perform suction

Oral suctioning can cause trauma if the oral mucosa is damaged; it should also be undertaken with extreme caution in patients with clotting disorders. Suction should never be applied during insertion of the suction catheter.

Alternative interventions

A fine gauge suction catheter is preferable to a yankauer sucker for oral suction in patients with damaged oral mucosa. In patients who are fully awake, suction is less likely to be tolerated. With assistance or advice from a

physiotherapist, encourage the patient to clear their airways by coughing if possible. Appropriate positioning of the patient is essential.

Indications for assistance

Seek assistance from a more senior colleague if you experience any difficulty at any stage of the procedure.

Procedure

Preparation

Prepare yourself

Ensure that you understand how the equipment works, how to assemble it, and the reason you need to perform suction. Wash your hands.

Prepare the patient

The procedure should be fully explained to the patient (see Discussing the procedure box).

Prepare the equipment

Assemble the correctly sized catheter, gloves (sterile or non-sterile depending on your employer's infection control policy), and other equipment. Ensure that the suction machine works.

Discussing the procedure with the patient and family

- Explain what you are going to do and why it is necessary/important.
- Explain that the procedure is likely to be uncomfortable, but will be brief.
- Explain that the procedure may need to be done more than once.
- Depending on the conscious level of the patient, explain that the patient may cough for a short while after the procedure.

Step-by-step guide to performing tracheal suction

Step	Rationale
1 Introduce yourself, confirm the patient's identity, explain the procedure, and obtain consent.	To identify the patient correctly and gain informed consent.
2 Assess the patient to ensure that suction is necessary (including the effectiveness of their cough).	To reduce potential complications from endotracheal suction and avoid unnecessary interventions.
3 Assist the patient into an upright position (if possible).	To allow optimum lung expansion and effective cough.
4 Apply an oxygen saturation (SpO ₂) probe.	To enable evaluation of patient's oxygenation prior to and following the suction procedure (see Section 7.2).
5 Wash hands.	To reduce the risk of cross-infection.
6 Put on disposable apron and protective visor/eye wear, according to local policy.	To reduce risk of cross-infection and to protect yourself from droplets/sputum contamination.
7 Connect suction catheter to suction tubing and turn suction machine on.	To allow suction to begin.

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|-----------|---|---|
| 8 | Use sterile/clean non-sterile glove* on the hand manipulating the catheter and clean non-sterile glove on other hand. | To reduce risk of cross-infection to the patient and to yourself. |
| 9 | Withdraw suction catheter from sleeve with clean gloved hand and grasp catheter with sterile/clean non-sterile gloved* hand away from catheter tip. | To reduce risk of cross-infection. |
| 10 | Advance catheter gently until a cough is stimulated or resistance is felt. <i>Do not apply suction during catheter insertion.</i> | To minimize risk of mucosal trauma. |
| 11 | When a cough is initiated or resistance is felt, withdraw the catheter approximately 1 cm and apply suction by occluding suction control port on catheter with thumb. Withdraw gently. <i>Procedure should last no more than 15 seconds.</i> | To reduce potential complications from suctioning. |
| 12 | Dispose of suction catheter and gloves in clinical waste disposal bin. | To reduce risk of cross-infection and ensure clinical waste is correctly disposed of. |
| 13 | Rinse suction tubing with sterile/non-sterile* water. | To ensure sputum is removed from suction tubing. |
| 14 | Clear patient's oral secretions if required. | To maintain patient comfort. |
| 15 | Dry the container used for rinsing and wash hands. | To reduce risk of cross-infection to the patient and to yourself. |
| 16 | Repeat procedure if required, having checked the patient's SpO₂. Seek assistance from a more experienced colleague. Allow the patient to rest/recover between each suction procedure. | If the patient has a sustained lower SpO ₂ compared to before the procedure, they may require oxygen for a period of time. |

*Refer to your local infection control policy.

Following the procedure

Ensure the patient is comfortable and has everything they require within reach. Document any problems with the procedure in the patient records, noting the amount, colour, and consistency of the secretions.

Reflection and evaluation

After you have performed tracheal suction on a patient, think about the following questions:

- 1 What made you decide that the patient required suction?

- 2 Did you explain the procedure so that the patient understood what was going to happen?
- 3 Was there an improvement in the patient's respiratory condition after the procedure had been performed?
- 4 Did you observe and record the volume, colour, and consistency of the patient's secretions?

Further learning opportunities

Suctioning is a delicate art, and requires practice and patience to perfect. Watch how experienced staff do it. Note what they do well or badly. Ask to have practice, under supervision, when it is appropriate to do so. It may

be possible to organize a practice placement with your employer's intensive care unit or head and neck surgical ward to gain further experience.

Reminders

Don't forget to:

- Use the correct size of suction catheter.
- Explain the procedure to the patient.
- Only apply suction when withdrawing the catheter.

Q Patient scenarios

Consider what you should do in the following situations, then turn to the end of this skill to check your answers.

- 1 For what reasons might a patient require tracheal suctioning?
- 2 You are caring for a patient with a tracheostomy. You notice when undertaking suction that his secretions are very thick and difficult to clear. What interventions/therapies might you consider to alleviate this?
- 3 You are asked by a junior student what complications might occur when you perform a suction procedure. What will you include in your response?

Website

 <http://www.oxfordtextbooks.co.uk/orc/encadott>

You may find it helpful to work through our short online quiz and additional scenarios intended to help you to develop and apply the skills in this chapter.

References

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A Answers to patient scenarios

- 1 Patients with an artificial airway or those with an ineffective cough.
- 2 Adequate humidification, patient hydration, or mucolytic agents.
- 3 Your answer should include: hypoxia, cardiac arrhythmias, hypotension, mucosal trauma, and cross-infection.