



ASSOCIATION OF PAEDIATRIC CHARTERED PHYSIOTHERAPISTS

GUIDELINES FOR NASOPHARYNGEAL SUCTION OF A CHILD OR YOUNG ADULT

APCP RESPIRATORY GROUP



Guideline for Nasopharyngeal Suction of a Child or Young Adult

Throughout this guideline the term child / children can be taken to represent child / young person / young adult.

Introduction

This guideline has been produced to give those people undertaking nasopharyngeal suction in children an up-to-date evidence based guide, to ensure a safe and effective technique. Where evidence is lacking, consensus has been reached by specialist respiratory paediatric physiotherapists across the UK. It is intended that this is used as a template; additions may be needed to fit in with local policies.

Background

The aim of suctioning is to clear secretions, thus maintaining a patent airway, improving ventilation and oxygenation, and reducing the work of breathing. Suctioning is, however, an invasive procedure and adverse physiological effects can occur. These effects can be both immediate and long term; a sound knowledge of the procedure is therefore required.^{10, 17, 14, 18}

The procedure of suctioning is a common practice in the treatment of children with a variety of conditions. It is undertaken to remove excessive or retained secretions from a child's respiratory tract. This could be due to:

- Respiratory dysfunction/disease, causing an alteration in the type or quantity of secretions or disruption of the normal mucociliary clearance process
- Neurological disorders which inhibit or depress normal cough reflex
- An artificial airway in situ (suctioning via an artificial airway is not covered in this guideline, except a nasopharyngeal airway)

The general principles of suctioning are the same, whether the child requires suction of the mouth, pharynx or via an artificial airway.^{4, 5}

Indications for Nasopharyngeal Suctioning

Suctioning is a potentially hazardous procedure and should only be performed when there are clear indications that excessive pulmonary secretions are affecting the patency of the child's airway or the effective ventilation of the patient.⁸

Suctioning should maximise removal of secretions with minimal tissue damage and hypoxia. It is an essential procedure that is determined by the child's clinical condition and not

predetermined intervals. The frequency of suctioning should be assessed for each child on an individual basis and should only be carried out when the child is unable to clear its own airway effectively. It should not be performed as a matter of routine.¹²

An appropriate assessment must be undertaken to establish the need for suction. Evidence of retained secretions will be shown by one or more of the following:

- Visible, audible or palpable secretions
- Decreased oxygen saturation levels
- Increased oxygen requirements
- Coughing
- Poor cough / inability to generate effective spontaneous cough
- Reduced movement / breath sounds of the chest
- Signs of distress due to retained secretions i.e. increased work of breathing (nasal flaring / tracheal tug / costal recession), increased respiratory rate, tachycardia / bradycardia, change of colour.^{10, 14, 18}

Nasopharyngeal suction is indicated when there is evidence of retained secretions but the child is not able to clear the secretions independently and secretions are too low down in the airway for oral suction.

Verbal Information Given to Child / Parent / Carer

This must be obtained prior to this procedure being carried out. If the child is unable to give consent verbally, other ways of obtaining it must be explored, e.g. blinking, squeezing of the hand.

If the child is unable to give any form of consent and not carrying out the procedure would be detrimental to their health, it is acceptable to proceed, providing the person performing the procedure is not aware of any documented evidence that the client has refused the procedure should the need arise.

Guidance – for patients who may not be competent to give informed consent, e.g. unconscious patients, some children, patients with severe mental health problems, confused patients and some patients with learning difficulties, consent is obtained whenever possible from parents, guardians, carers or others designated to act on the patients behalf.

Verbal information given to children prior to consent to suctioning procedures

1. Reason for the selected suctioning procedure
2. Explanation of the equipment involved
3. Explanation of the practical procedure proposed

4. Explanation of any techniques used in conjunction with the suctioning procedure, e.g. postural drainage, vibrations, etc.
5. Discussion of relevant precautions / contraindications
6. Explanation of cleaning and equipment maintenance (may not need to be discussed before obtaining consent but will be covered by the end of the first treatment session, see individual procedures)
7. Informed consent will be obtained in initial assessment

Important - The child should be made aware that they have a right to withdraw their consent at any point during the treatment.

Contra-indications of Nasopharyngeal Suctioning ^{18, 13}

- Unexplained haemoptysis (the coughing up of blood from the lungs or bronchi) or known clotting disorder
- Laryngospasm (stridor)
- Bronchospasm
- Basal skull fractures and other causes of cerebrospinal fluid leakage via the ear
- Pneumothorax
- Recent oesophageal or tracheal anastomoses (the joining of the branches of two blood vessels) and other forms of tracheobronchial trauma
- Occluded nasal passages
- Unexplained nasal bleeding
- Severe hypoxaemia / hypoxia
- Raised intracranial pressure
- Acute hypo or hypertension

Suctioning should not be carried out if any of the above contra-indications are present unless assessed on an individual basis and with the agreement of the medical team.

Equipment

1. An adequate supply of sterile suction catheters of the correct size and type:
 - A diameter of less than half that of the diameter of the airway
 - Multi-eyed catheters with 1 distal and 2 lateral ports with rounded ends and lateral ports that are smaller than the distal port
 - It is preferable to use suction catheters with graduations and integrated valve for vacuum control

- Selected suction catheter size should be documented in the child / young person's record

2. Suction unit with variable vacuum control:

- A vacuum pump with filter and clean tubing. Check the charge by switching it on and looking for charge levels.
- Look at machine to ensure all parts of the equipment are clean and intact.
- Check a charger is available.
- Check the pressure by switching it on; bend the tubing from the machine to the catheter to cut off air from the machine/ or place a finger over the end of the suction tubing -this will show the maximum pressure the machine can give. N.B. Maximum pressure is age appropriate and is essential to good care of the children.

3. Non-sterile gloves

4. Tap water for flushing.

5. Bag for waste.

6. Pulse Oximeter

Pre-oxygenation / Post-oxygen Indications

Suctioning removes oxygen from the airways and in some cases can cause hypoxia. Pre-oxygenation and/or post-oxygenation can minimise this risk but the need for this should be assessed on an individual basis in line with hospital / community policy, and documented within the child's health record.^{19, 20}

Children particularly at risk of hypoxia as a result of suctioning are:

- Those requiring oxygen therapy
- Those who have previously demonstrated desaturations during suctioning as confirmed by pulse oximetry
- Those with impaired respiratory or cardiac function

NB. If, following clinical assessment, suction is indicated on an ongoing basis and oxygen is required, it will be necessary to liaise with the GP regarding oxygen provision if this isn't already available.

Nasopharyngeal Suction Pressure Guide

Age	Suction pressure	
	mmHg	Kpa
Neonates	60-75	8-10
0-3 years	75-90	10-12
3-13 years	90-150	12-20
13 years +	150	20

18

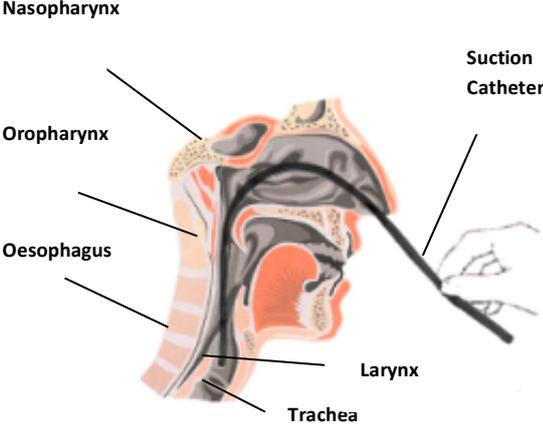
It is important that the lowest effective suction pressure is used, especially when secretions are loose. If secretions are not clearing with the above pressures, higher pressures can be used with caution up to a maximum of 150mmHg / 20Kpa.¹⁸

Consideration should also be given to secretion mobilisation and other clearance techniques. These techniques must only be performed by those that have been taught by, and signed off as competent by, a respiratory physiotherapist.

Procedure	Rationale / Evidence
<p>1) Assess the need for nasopharyngeal suction (see indications above):</p> <ul style="list-style-type: none"> Whenever possible the child should be encouraged to clear their airway by coughing or other clearance techniques. If the child is able to clear their secretions independently, do not use suction. Suction should not be carried out as a matter of routine, only when there is evidence of retained secretions. 	<p>Suction is an invasive and potentially dangerous procedure that may be traumatic to the child. It should therefore be used with care and thorough assessment, and when less invasive procedures are in-effective.^{16, 10, 17}</p> <p>The major concerns are the possibility of:</p> <ul style="list-style-type: none"> Respiratory distress Hypoxia Vomiting and risk of aspiration Tracheobronchial trauma and granulation or ulcer formation Pneumothorax in infants Raised intracranial pressure or arrhythmias if carina touched Intraventricular haemorrhages in premature infants Hypo or hypertension <p>17, 18, 13</p>

<p>2) Check all equipment is available and in working order.</p> <p>NB. Safety goggles are advised if there is a risk of contamination to the person who is undertaking the procedure.</p>	<p>Suction equipment needs to be prepared and ready to use.</p> <p>To maintain safety of the person undertaking the procedure.</p> <p style="text-align: right;">13, 18</p>
<p>3) Explain and discuss the procedure with the child and family if possible. Gain consent (as above).</p>	<p>To ensure understanding and consent is given.</p> <p>Encourage cooperation and reduce anxiety.</p> <p style="text-align: right;">6, 10</p>
<p>4) Assessment – observe the child’s respiratory status and baseline values, e.g. heart rate, blood pressure, work of breathing and colour. Note the child’s normal and accepted level of oxygen saturation level pre-suction.</p>	<p>Maintain child’s safety. To enable assessment of the effectiveness of treatment.</p> <p style="text-align: right;">13</p>
<p>5) Prepare the child for the procedure.</p> <p>If able, position the child on their side, with their head turned to the side.</p>	<p>Prevents the child’s tongue from obstructing the airway. This is the preferred and safer position to reduce the risk of aspiration.</p> <p style="text-align: right;">17, 18, 13</p>
<p>6) Wash hands using soap and water. Dry hands thoroughly.</p>	<p>Reduces transmission of micro-organisms.</p> <p style="text-align: right;">7</p>
<p>7) Choose an appropriate sized, graduated suction catheter, with side port suction control:</p> <ul style="list-style-type: none"> • Size of the suction catheter should be half the diameter of the smallest nostril. • Depth of suction - with the child facing forward, measure from the nostril to the mid part of the ear lobe and down to the base of the neck. • Record all details in the care plan. <p>NB. If the child has a kyphoscoliosis measure both sides, add measurements together and divide by 2.</p>	<p>Suction can cause mucosal trauma and arrhythmias (abnormal heart rhythm).¹⁸</p> <p>Measured suction depth with multi eye catheters cause less trauma and arrhythmias.¹⁸</p> <p>The catheter tip will reach the nasopharynx when measured as described.¹³</p> <p>A kyphoscoliosis is a abnormal curvature of the spine in which there is forward and sideways displacement.</p>

<p>8) Switch on the suction machine. With a gloved hand, test the suction equipment by placing the thumb over the end of the suction tubing for 5-10 seconds.</p> <p>Observe the pressure on the manometer of the suction machine and adjust as required.</p>	<p>There is a risk of atelectasis (partial lung collapse) and hypoxia if the suction pressure is too high. 2, 4, 17</p> <p>To minimise the risk of atelectasis and hypoxia. 12, 13</p>
<p>9) Attach a suction catheter to the suction tubing:</p> <ul style="list-style-type: none"> • peel back the catheter to expose the hard plastic connector • leave the rest of the catheter in the protective cover 	<p>To ensure sterility of the suction catheter. 13</p>
<p>10) Put a clean glove on the dominant hand. Do not touch anything EXCEPT the sterile part of the catheter.</p>	<p>This gloved hand will be used to insert the sterile catheter into the nasopharyngeal airway.</p> <p>To maintain a clean technique. 13, 21</p>
<p>11) Remove the suction catheter with gloved hand.</p>	<p>To maintain a clean technique. 13</p>
<p>12) Hold the end of the suction catheter with gloved hand and the plastic connector with the ungloved hand.</p>	<p>To maintain a clean technique. 13</p>
<p>13) Check the child's observations and breathing pattern immediately prior to inserting the suction catheter</p>	<p>To enable early recognition of any potential complications.</p> <p>To maintain the child's safety. 13</p>
<p>14) If identified on an individual basis, pre-oxygenate the child (if O₂ prescribed).</p>	<p>To prevent hypoxia. 13</p>

<p>15) If required moisten the tip of the suction catheter in cooled, boiled water or apply a thin layer of sterile Aqua Gel to the tip of the suction catheter if required.</p>	<p>Lubricate the tip of the suction catheter for easier insertion. 17</p>
<p>16) With no suction pressure applied insert the suction catheter diagonally into the nostril until the desired depth is reached.</p>  <p>If resistance is felt DO NOT FORCE THE SUCTION CATHETER, pull back and gently re-insert the suction catheter.</p> <p>NB. The suction catheter must not be passed any further than the suprasternal notch, which is the dip at the front base of the neck.</p>	<p>To avoid hitting the top of the nasal passage with the suction catheter and causing trauma. 13</p>
<p>17) At the desired depth apply constant suction for around 2 seconds (depending on the child), and then withdraw the suction catheter slowly. Suctioning should be quick and effective, i.e. 5-10 seconds for infants and 15 seconds for older children. The procedure should take no longer than 15-20 seconds. The person suctioning must use their judgement to assess if a child can only tolerate shorter duration of suction based on their clinical symptoms</p> <p>Do not rotate, stir or trombone the catheter.</p>	<p>To allow optimal secretion clearance and reduce the need for a second attempt. 8, 18</p> <p>If the technique is too quick there is a risk that not all the secretions will be cleared.</p> <p>If it is too slow the child may become breathless and develop hypoxia. Prolonged suctioning or repeated insertion of the suction catheter may produce vagal stimulation, which can cause profound bradycardia. 18</p> <p>To prevent tissue damage and to enhance the child's comfort. 11, 12</p>

<p>18) Monitor the child during and after the procedure using pre-suction baseline observations as a guideline.</p> <p>NB. If the child deteriorates during the procedure, stop suction immediately and reassess. Supply O₂ as indicated.</p>	
<p>19) Assess the need for further suction.</p> <p>NB. Allow 20-30 seconds before re-inserting a new suction catheter.</p>	<p>To evaluate the effectiveness of suction and to determine if the procedure needs repeating.</p> <p>Allows for re-oxygenation. 12</p>
<p>20) Each suction catheter can be used more than once but for one episode of care only.</p> <p>There is no limitation on how many times the child is suctioned - it is decided on clinical need.</p> <p>Signs of successful suctioning:</p> <ul style="list-style-type: none"> • Child appears more comfortable • Ensure the respiratory status is normal • Ensure the observations have returned to the baseline values • Removal of pulmonary secretions • Improved oxygenation, saturations and/or colour • Improved breath sounds and/or chest movement • Auscultation may be used if trained in the skill • Audible secretions have gone 	<p>To minimise the risk of infection to the child and person performing the procedure.</p> <p>Frequency of use of suction catheters, differ with local policy. 4, 13, 15, 18</p>
<p>21) Once the procedure is completed, discard the suction catheter by wrapping it around the gloved hand, disconnect from the suction tubing and pull the glove off, inside out.</p>	<p>Safe disposal of equipment and prevention of cross infection. 13</p>

<p>22) Flush the suction tubing with water (from the container).</p> <p>NB. The container of water must be washed in hot soapy water, rinsed thoroughly, dried and re-filled with tap water.</p> <p>Turn off the suction machine.</p>	<p>Secretions left in the suction tubing may decrease suction and provide an environment for growth of micro-organisms.</p> <p>To prevent growth of micro-organisms. ^{7, 13}</p>
<p>23) Wean down the oxygen to the prescribed amount, to maintain oxygen saturations within normal limits for the child (if applicable).</p>	<p>Normal oxygen delivery should resume after the procedure. ¹³</p>
<p>24) Ensure the suction machine is set up for the next episode of suction.</p>	<p>To maintain the child's safety. ^{3, 5, 12}</p> <p>To ensure sterility of the suction catheter. ¹²</p>
<p>25) Wash hands using soap and water. Dry hands thoroughly.</p>	<p>Reduces transmission of microorganisms. ⁷</p>
<p>26) Ensure the child has recovered from the procedure and he/she is left in a comfortable position.</p>	<p>Promotes comfort and reduces anxiety. To influence future suction practice. ⁵</p>

Modifications of Technique

If retained secretions not being cleared consider:

- increasing pressure
- increasing size of catheter

If getting trauma or if repeated suction needed:

- use aqua gel
- may need nasopharyngeal airway - discuss with medical team
- decrease size of catheter
- try other nostril
- use cool boiled water
- change type of catheter

Difficult to get down airway:

- change nostril
- change position of child

If nasogastric tube in place:

- recommend testing after suction to ensure it hasn't moved into the lungs to reduce the risk of aspiration
- use opposite nostril to the one with the nasogastric tube. ¹⁸

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