Guideline

Insertion and Management of Nasogastric and Orogastric Tubes in Adults

Summary This guideline provides direction to clinicians who are appropriately trained or under appropriate supervision, on safe practices for the insertion and management of intragastric tubes, such as nasogastric or orogastric tubes, in conscious patients. It also covers tube insertion and management including pre-insertion, insertion, confirmation of placement, tube care and maintenance, and removal.

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NSW Health

GUIDELINE

Insertion and Management of Nasogastric and Orogastric Tubes in Adults

GUIDELINE SUMMARY

This Guideline provides direction to clinicians who are responsible for the insertion and/or management of intragastric tubes, such as nasogastric or orogastric tubes, in conscious adult patients. Clinicians performing the insertion / management are expected to be appropriately trained, or under appropriate supervision, to perform the procedures.

The Guideline covers strategies for each stage of tube insertion and management including pre-insertion of the tube, insertion of the tube, confirmation of placement of the tube (both radiologically and non-radiologically) tube care and maintenance, and removal of the tube.

It also guides on the health record documentation requirements, and incident reporting.

The insertion and management of post pyloric tubes, and the insertion and management of nasogastric and orogastric tubes in children are out of scope of this document.

KEY PRINCIPLES

NSW Health organisations are responsible for the implementation of this Guideline within their services / facilities to ensure local protocols or operating procedures are in place and aligned and consistent with this Guideline. This includes where education and training may be required to improve skill and competency, and a process for monitoring practice.

Decisions to insert an intragastric tube are the responsibility of a medical officer. This decision making must consider the indications for use of an intragastric tube, and the complexity of the presenting clinical condition. Some complex clinical presentations require senior medical officer / medical consultant assessment.

Nasogastric tube insertion is commonly performed at the ward level by a nurse or medical officer. The clinician responsible for tube insertion must have relevant training, and recency of practice in tube insertion. Where experience is limited, the insertion should be supported by a more experienced clinician.

Orogastric tube insertion however is a specialised procedure not routinely performed in a ward, but more likely a critical care unit. The insertion must be completed by, or under the supervision of, a clinician experienced in orogastric tube insertion. As this procedure may require use of a laryngoscope, insertion may be completed at the time of intubation, and usually in a critical care setting.

There are risks associated with incorrect intragastric tube insertion. This risk could include death. Use of an incorrectly positioned naso- or oro-gastric tube resulting in serious harm or death is classified as an Australian Sentinel Event. The patient should be monitored for early warning signs of deterioration and if recognised the local clinical emergency response system must be initiated.

Before an inserted tube can be used for any enteric intake (feeding formula, medication or fluids), confirmation of correct tube placement must be actioned and documented. Confirmation of tube placement can be done radiologically (via chest x-ray), or via pH testing of aspirates. Radiological confirmation also requires that the chest x-ray is reported by a radiologist, or reviewed by an experienced medical officer, who can exclude insertion complications and can confirm the anatomical position of the tip of the tube below the diaphragm and in the stomach.

Radiological confirmation must be ordered by a medical officer to confirm safe placement of a tube if:

- there was difficulty experienced when inserting the tube
- the patient had a clinical presentation which may have increased the risk of tube misplacement during the insertion
- there is any concern about potential tube misplacement
- an aspirate cannot be obtained
- the pH testing of the aspirate is greater than five.

pH testing can be performed in other instances. It requires attainment of an aspirate via the tube, and testing of the pH level on pH indicator strips with clear gradation markings, with a result of five or less (Litmus paper must not to be used).

Tube care and maintenance is important to maintain effectiveness of the tube and prevent the need for removal and replacement. It involves monitoring for tube migration, monitoring tube condition and patient skin integrity, maintenance of tube patency and safe and appropriate management of tube blockages.

Although an orogastric tube may not be inserted on a ward, management of an orogastric tube may be occasionally required on a ward, e.g., if a patient is transferred from critical care. The ongoing care and maintenance of orogastric tubes is similar to a nasogastric tube with differences in management in tube measurement guidance and securement, and dislodgement and reinsertion protocols.

REVISION HISTORY

Version	Approved By	Amendment Notes
GL2023_001 January-2023	Chief Health Officer and Deputy Secretary, Population and Public Health	Guideline developed following review of PD2009_019. Guideline targets all nasogastric and orogastric feeding tubes, not just fine bore feeding tubes. Includes guidance on tube insertion including pre-insertion, confirmation of placement, when to use the tube, tube care and maintenance, and tube removal. It also guides on the minimum health record documentation requirements, and the requirement for incident reporting.
PD2009_019 April 2009	Deputy Director-General, Health System Quality, Performance and Innovation Division	New Policy

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1. BACKGROUND

1.1. About this document

This Guideline may not extend to advanced practice or skills used in critical care (including emergency) or specialist clinical settings, such as interventional radiology, endoscopy units and operating theatres. It targets the minimum requirements for completing tube insertion and management safely at a patient bedside.

In any clinical situation there may be factors which cannot be covered by a single set of guidelines. The principles of infection prevention and control (which includes the five moments of hand hygiene and personal protective equipment) and maintenance of privacy and dignity of an adequately informed patient must be adhered to.

It is important to acknowledge that nasogastric or orogastric tube insertion is an invasive procedure and may cause patient distress. Clinicians are to be aware that cultural differences, low health literacy, and language differences may impact a patient's ability to communicate distress. Incorrectly placed nasogastric tubes are associated with patient deaths.

Note: This Guideline does not apply to post pyloric tube insertion and management, and insertion and management of nasogastric and orogastric tubes in children.

1.2. Key definitions

Activated partial thromboplastin time (APTT)	This is a functional measure of the intrinsic and common pathways of the coagulation cascade.
Australian sentinel event	Australian Sentinel Events are a subset of adverse patient safety events that are wholly preventable and result in serious harm to, or death of, a patient. They are the most serious incidents reported through state and territory incident reporting system.
Decompression	Method which relieves the pressure caused by gastrointestinal contents and gases that remain in the stomach.
ENFit	A global patient safety initiative, designed to ensure that feeding tube connectors are incompatible with the connectors for unrelated delivery systems such as tracheostomy tubes, intravenous lines, and catheters. The enteral feeding device connector design complies with the International Standard (ISO 80369-3).
Enteral feeding	Method of giving the patient fluids and nutrients via a tube directly into the gastrointestinal tract.

Fr	French unit in relation to tube sizing. Tubes are measured in French units where 1 French unit (Fr) equates to an external tube diameter of 0.33mm.
Gastric lavage	Process of rinsing out the contents of the stomach. This is commonly used for the purpose of eliminating ingested toxins. It may also be known as stomach pumping.
International Normalised Ratio (INR)	The INR is the ratio of the prothrombin time to a normal (control) sample. It is used to monitor the effects of warfarin.
Medical Device Related Pressure Injury (MDRPI)	A localised injury to the skin or underlying tissue resulting from sustained pressure caused by a medical device such as tubing and straps.
Migration	Tube position at nose has changed.
Nasogastric Tube (NGT)	A tube that is passed via the nose and down through the nasopharynx and oesophagus into the stomach.
Orogastric tube (OGT)	A tube that is passed through the mouth and down through the oesophagus into the stomach.
Recombinant Tissue Plasminogen Activator (rTPA)	It is a type of systemic thrombolytic agent. A form of tissue plasminogen activator that is made in the laboratory. It helps dissolve blood clots and is used to treat heart attacks, strokes, and clots in the lungs. Also called Activase, Alteplase, and recombinant tissue plasminogen activator. It can potentially place the patient at higher risk of bleeding.
Vented nasogastric tube	A tube passed into the stomach via the nose, enabling access to the stomach for purposes including decompression, gastric analysis, enteral feeding, and administration of medications. It includes a vented lumen, e.g., Salem sump.
Xiphoid process	The cartilaginous section at the lower end of the sternum, which is not attached to any ribs.

2. INSERTION AND MANAGEMENT OF NASOGASTRIC TUBES IN ADULTS

2.1. Indications for insertion of nasogastric tubes

Nasogastric tubes are used for two main purposes:

1. Nutrition and hydration support and medication administration in circumstances such as:
    - dysphagia / unsafe swallow
    - inadequate oral intake where nutrition support via enteral feeding is required.
2. Gastric decompression and/or drainage of the upper gastrointestinal tract.

(Refer to Appendix 1, Figures 1 and 2 *Nasogastric tube types*).

2.2. Precautions for insertion of nasogastric tubes

Nasogastric tube insertions are to be performed by a clinician with relevant training and recency of practice [1,2]. Where the clinician has limited experience with nasogastric tube insertion, or lacks confidence in this skill, they must seek support from experienced staff for assistance. A medical officer must be available to assist in the case of complications.

2.2.1. Special conditions requiring review by a senior medical officer / medical consultant

A senior medical officer / medical consultant responsible for the patient's care must be consulted prior to insertion or replacement of a nasogastric tube in patients with some specific conditions.

The senior medical officer / medical consultant needs to assess and define any timeframes which must be observed before a tube can be inserted. Insertion can only progress if directed and documented by a senior medical officer / medical consultant.

Some specific conditions requiring consideration by a medical officer are listed below [3]. This is not a comprehensive list. Clinical judgement and decision making is required when considering other conditions.

- Decreased level of consciousness or impaired airway protection (e.g., gag, cough, and swallow reflexes).
- Suspected cervical spinal cord injury – tube insertion may require hyperflexion of the neck which may lead to permanent damage.
- Severe facio-maxillary trauma / nasal injuries / possible base of skull fractures – tube may be incorrectly inserted into other anatomical structures (e.g., intracranial or tracheopulmonary). These injuries / surgeries may be historical but still impose added risk.
- Active upper gastrointestinal bleeding, regardless of aetiology.

- Known oesophageal varices or recently banded/ligated (clipped) oesophageal varices, or clinical features or diagnosis of chronic liver disease / cirrhosis regardless of aetiology (e.g., acute alcoholic hepatitis).
- Upper gastrointestinal stricture / obstruction – perforation of the gastrointestinal tract may occur by the tube being pushed through the walls.
- Post oesophageal / gastric / head and neck surgery – may cause trauma to the surgery site.
- Recent head and neck radiation treatment.
- Plastics reconstruction to mouth, nose, or oesophagus due to changes in the anatomy.
- Mucosal damage because of desquamation disorders, including pharmacological / caustic solution induced mucositis, toxic epidermal necrolysis, Stevens Johnson syndrome, inhalation, or ingestion burn injury.
- Facial and/or airway damage from burns.
- Bleeding diathesis.
- An artificial airway (i.e., endotracheal or tracheostomy tube) because of the risk of inadvertent tracheal intubation – caution is required with patients who have an uncuffed tracheostomy.
- Recent endoscopically diagnosed peptic ulceration of stomach, oesophageal ulceration, or severe reflux oesophagitis.
- Patients who have received thrombolysis (such as Recombinant Tissue Plasminogen Activator) within 24 hours or as per local practice.
- Patients receiving anticoagulant medications or who have impaired blood clotting. International normalised ratio / activated partial thromboplastin time must be checked prior to insertion.

2.3. Risks associated with incorrect insertion and placement of nasogastric tubes

The following risks can be associated with incorrect insertion and placement of nasogastric tubes:

- Haemorrhage
- Trauma to surrounding tissues
- Pneumothorax
- Aspiration associated with tube dislodgement
- Pneumonitis from nasogastric feeds being deposited into the lungs
- Misplacement of the tube into the lungs, or rarely in patients with cribriform plate disruption, intracranial insertion.

2.4. Pre-insertion requirements

The clinician must adhere to the principles outlined in NSW Health Policy Directive *Infection Prevention and Control Policy* (PD2017_013).

A treating medical officer must order and document in the health record for the insertion of a nasogastric tube, including the reason the nasogastric tube is needed.

Prior to tube insertion, ensure completion of Level 1 Procedures safety check, as outlined in the NSW Health Policy Directive *Clinical Procedure Safety* (PD2017_032).

Ensure the procedure is clinically indicated and that assessment has been carried out to exclude contraindications or potential complications.

Routine and non-essential placements must not occur after hours.

Explain procedure to patient and obtain consent, as per the NSW Health *Consent to Medical and Healthcare Treatment Manual* (Consent Manual).

Any tube inserted into a patient must be radio-opaque throughout their length and have external visible length markings [3].

When using an enteral tube for administration of enteral feeds or medications, an enteral-specific system (e.g., ENFit) must be used.

Nasogastric or orogastric tube insertion must be performed in an area where high pressure suction is available.

Collect all required equipment for the procedure prior to commencing the procedure. Refer to Appendix 2 *Pre-insertion and post-insertion checklist for nasogastric and orogastric tubes*.

Follow the product information prior to insertion (e.g., do not reinsert a guide wire and do not refrigerate feeding tubes prior to insertion).

Consider larger bore tubes for drainage/decompression.

2.5. Procedure – Insertion of nasogastric tubes

It is not uncommon for patients to exhibit early warning signs before deteriorating. These warning signs must be recognised followed by an appropriate and timely response. In the event of any clinical deterioration, initiate your organisations local Clinical Emergency Response System (CERS) [4].

Step 1: Preparation and pre-procedure

- Explain procedure to patient, obtain verbal consent and document in the health record.
- Ensure the desired tube insertion length has been measured from the tip of the nose → earlobe → midpoint between the xiphoid process and the umbilicus [5,6] (refer to Appendix 3 *Tube measurement technique*). The measurements must be documented in the health record.
- Position the patient upright, as appropriate, and sitting comfortably.
- Lubricate the end of the tube with water-based gel and according to product information.

Step 2: Examination

- Ask the patient if they have had any issues with either side of their nose.
- Determine which nostril has the best airflow by gently occluding each nostril.
- Insert the tube into the nostril with the best airflow.

Step 3: Tube Insertion

- Explain each step to the patient as tube is being inserted.
- **NEVER** force the nasogastric tube. Gently insert into one nostril and advance tube posteriorly, aiming the tube parallel to nasal septum and superior surface of hard palate (i.e., towards the spine, not the top of the head).
- Advance to just past the nasopharynx and stop.
- Tilt chin down slightly and ask patient to swallow (provide a sip of water of appropriate thickness, if safe and not contraindicated). Advance tube during the swallow. Allow tip of tube to seek its own passage into oesophagus and stomach until the desired measured marking is reached, unless complications arise.
- Stop and retract tube if patient coughs.
- If resistance is met, do NOT force the tube, withdraw the tube 1-2cm and then with slow downward advancement rotate directly toward the closest ear.
- Observe for clinical indication of concern during or after insertion of the nasogastric tube. e.g., excessive gagging, coughing, apnoea, dyspnoea, vomiting, aspiration, change in facial skin colour or decrease in oxygen saturation, or any deterioration following nasogastric tube placement [8]. This may indicate passage of tube into trachea. If suspected, remove the tube and initiate your organisations local Clinical Emergency Response System (CERS) [4].

Note: Two failed attempts must be escalated to an experienced nursing staff member for support. If tube insertion remains unsuccessful following escalation to the experienced nurse, referral to a medical officer must occur to consider nasogastric tube insertion with radiological intervention.

Step 4: Securement

- Secure the tube to nose using a technique that avoids medical device-related pressure injury (MDRPI) refer to Appendix 4 *Nasogastric tube securement techniques*).
- Document in the health record the exit-point centimetre mark at insertion point. If not present, measure and document the external length of tube to the base of the distal port.

Step 5: Tube placement confirmation (is it safe to use?)

- Confirm tube placement before using. **NEVER** feed / administer medication until a direction to commence use of the tube is confirmed and appropriately documented in the health record (refer to section 2.6 *Confirmation of correct placement of nasogastric tubes on insertion*).
- If the tube has a guidewire, it must be removed and discarded before using the tube. **NEVER** reinsert a guidewire back into the tube of a patient.

2.6. Confirmation of correct placement of nasogastric tubes on insertion

Correct tube placement can be confirmed by either non-radiological and / or radiological methods [3].

2.6.1. Non-radiological confirmation on insertion

Test pH of aspirate using pH indicator strips where the pH gradations are clearly marked. Litmus paper is not the alternative to pH indicator strips [7,8,9].

A gastric pH of less than or equal to five indicates correct gastric placement [7,8,9,10].

For initial placement, if the pH is greater than five, a chest x-ray must be ordered [9,10].

If unable to obtain a gastric aspirate, radiological confirmation must be ordered. Some soft feeding tubes may be difficult to obtain a gastric aspirate especially if the guidewire is in situ.

Alert

Never use auscultation as a form of tube position confirmation [1,2,7,8,9,10].

Never use litmus paper to confirm pH [7,8,9].

Note: While pH testing is helpful in evaluating tube placement on initial placement or before intermittent feeding, pH testing can be limited in continuous feeding or when using acid-suppression therapy as this may have a neutralising effect on gastrointestinal pH [9,10,11]. This may see a pH greater than 5 which would indicate the need to proceed to x-ray confirmation.

2.6.2. Radiological confirmation (x-ray) on insertion

A chest x-ray must be ordered to confirm the safe placement of a nasogastric tube for those patients for whom an aspirate is unable to be obtained, or where the aspirate pH is greater than five [3].

A chest x-ray must be ordered when there is any concern that nasogastric tube placement cannot be done correctly. Some of these scenarios include:

- Difficulty placing the nasogastric tube.
- Nasogastric tube placement in any patient at high risk of misplacement. This includes those with known history of facial fractures, neurologic injury / insult / baseline abnormality, respiratory concerns, or decreased or absent gag reflex; and those who are critically ill.

The x-ray request must specify that the reason for the request is to confirm the position of the nasogastric tube [3]. The request must also stipulate that the x-ray image must include localisation of the tube tip.

The x-ray must be reported by a radiologist or reviewed by an experienced medical officer who excludes insertion complications and confirms the anatomical position of the tip of the tube below the diaphragm and in the stomach, and then documents this confirmation in the health record including whether the tube is safe to use for feeding [7,10,11].

If the tube needs to be advanced, retracted or removed, the specific advice must be documented in the health record by the medical officer.

Do not use the tube for feeding or enteric intake if there is doubt that the tube placement is not correct. A review must be sought from a medical officer.

Note: There are limitations of using a chest x-ray to confirm safe nasogastric tube placement. These include [3]:

- Risk of misinterpretation of the tube position on x-ray.
- The placement is indicative at the time of the x-ray only. The risk of tube migration needs to be monitored.
- Radiation exposure must be considered where repeated and frequent x-rays are being performed e.g., for patients requiring frequent reinsertions.
- Loss of feeding time (whilst awaiting the x-ray or x-ray reporting).
- Access to radiology services. Access to chest x-rays is more limited in the community setting.

Refer to Appendix 5 *Flowchart for the confirmation of correct placement of nasogastric tubes*.

2.6.3. Enhanced insertion technologies

As new technology is developed, has clinical efficacy, and becomes accepted practice, the clinicians must follow the product information e.g., electromagnetic tip placement and camera visualisation.

2.7. When to commence using the nasogastric tube

2.7.1. Gastric drainage / decompression

A direction to commence use of the tube must be documented in the health record by the medical officer.

An appropriate tube (i.e., with a sump port) must be used. Please refer to local procedures related to gastric lavage practice.

2.7.2. Feeding or administration of medications

A direction to commence use of the tube must be documented in the health record by the medical officer.

Tube placement must be confirmed prior to commencing and administering enteral feed or medications.

Use equipment specified for the purpose of enteral feeding / administration of medications, and ensure it complies with the product information for use, unless otherwise clinically contraindicated.

Directions for enteral feeding administration must be documented by a dietitian. This requires a referral to the dietitian to enable completion of a feeding assessment and documentation of the prescribed feeding regime.

In the absence of a dietetic service (and thus assessment and feeding prescription), feeding may be commenced, as per local procedures.

Ensure patient is positioned with upper body (head and shoulders) elevated to at least 30 degrees, unless otherwise documented by the medical team.

Patients must be regularly observed for correct position of tube and tolerance of enteral feed / medications (e.g., vomiting, nausea, coughing).

Feeds must be ceased immediately, and medical officer notified, if aspiration is suspected.

Directions for medication administration must be documented on the medication order by a pharmacist or medical officer.

Medication and enteral feed compatibility, drug solubility and stability is to be confirmed by pharmacists [12,15]. Medications in liquid forms are preferred over crushed medications. For information about medication compatibility refer to *About enteral feeding tubes* in MIMS Online: Australian Don't Rush to Crush, 4th Edition [12].

Infection prevention and control standards must be maintained during preparation and administration of enteral feeds / medication.

2.8. Tube care and maintenance for nasogastric tubes

2.8.1. Ongoing tube placement monitoring

The position of the exit-point centimetre mark on an existing nasogastric tube must be checked by nursing staff to ensure that there has been no migration. If there is any indication that there has been tube migration, the tube must not be used until the position of the tube in the stomach has been reconfirmed by testing the pH of the gastric aspirate or x-ray confirmation, refer to section 2.6 *Confirmation of correct placement of nasogastric tubes on insertion*.

How to assess for tube migration:

- Check exit-point centimetre mark at nose for signs of any tube migration [10].
- Measure from the nasogastric tube exit point at the nostril to the proximal end of the nasogastric tube (connection point). If present, note the centimetre marking at the nostril. Document both measurements in the health record.
- Compare these measurements to the measurements documented at the time of insertion confirmation. If there is a difference, this indicates migration has occurred.
- Visually checking that the tube is not coiled in the patient's mouth.

Points in care when tube placement is to be checked

- At commencement of the shift during handover, when attending to regular observations; or whenever there is doubt regarding correct position.
- If patient describes discomfort with the tube.
- Before administering enteral feeds, water and/or medication / contrast agent.
- When the patient is repositioned.

- If the patient has been transferred from one clinical area to another.
- Following episodes of respiratory distress, vomiting, retching, or coughing.

  Note: the absence of coughing does not rule out misplacement or migration.
- If there is suspicion of tube displacement indicated by prompts, such as loose tape, visible tube appears long, poor tolerance to feed, reflux of feed into throat, discomfort in the throat or patient pulling at the tube.
- If the securement method is no longer effective, resecure as required.

Actions to take if the tube shows sign of migration

- Stop feeds and immediately consult a senior nurse or medical officer for advice about whether feeds should remain ceased and if repositioning of the tube is required.
- Escalate appropriately if any signs of clinical deterioration.

2.8.2. Ongoing tube condition assessment

Assess and clean the nostrils and check the condition of the nose regularly to monitor and minimise medical device-related pressure injury (MDRPI).

Reposition the tube and tape to prevent a pressure injury developing.

Confirm that the tube is adequately secured.

If adhesive tape is being used, change tape each 24-48 hours or more frequently if required. When changing tape, observe for signs of MDRPI, and reposition tube to ensure it is not against the mucosa.

Nasal tube retaining system or devices must be changed according to product information.

All nasogastric tubes must be evaluated on an ongoing basis to determine their clinical requirement and changed if indicated.

Vented nasogastric tubes can be used as a transition tube for feeding. It is recommended that if a patient requires ongoing feeding, and it is not contraindicated, the vented nasogastric tube must be changed to a designated feeding tube [8].

Due to the ongoing risk or MDRPI, venting tubes must be assessed for changing after seven days. Discuss with the medical team to guide decision.

Where an ongoing enteral feeding device is needed long term, consideration should be given for an alternate feeding device, e.g., gastrostomy [13].

2.8.3. Maintenance of tube patency

For feeding tube

Flush at a minimum every four hours with a minimum 30 mL water [14], irrespective of whether feeds are in progress, to reduce risk of blockage [8]. Exceptions to this may be made if the patient is on a fluid restriction. A documented feeding regime may also include alternative flush volumes or timings.

Manually flush the tube before and after medications [8,14,15].

Manually flush the tube before and after completion of nasogastric feeds, or if nasogastric feeds are being paused or ceased [8,14,15].

It is recommended to use the ENFit system for feeding and flushing. Do not exert excessive force. Flushing enteral pumps must not be relied on for clearing a tube.

Good quality drinking water can be used for most patient groups. Sterile water must only be used for immunocompromised patients, post pyloric feeding tubes or if documented by the medical officer [16].

If patency is compromised, seek advice from a senior staff member.

For gastric drainage tube with vent lumen

Aspirate suction port every four hours, or as ordered by the medical team. This may include an order for the tube to be flushed.

If vent lumen is present, this is for air displacement only and must not be used for the instillation or aspiration of any fluids and medications.

If vent lumen is present, it should be maintained at a level high enough so that fluid does not backflow. Alternatively use of an anti-reflux valve should be considered.

2.8.4. Managing tube blockages

If unsure about how to manage the tube blockage, seek advice from a clinician experienced in managing enteral feeding tubes about strategies to manage.

Don appropriate personal protective equipment. Be aware that splash back can occur when attempting the following techniques.

Good quality drinking water is suitable for the prevention and treatment of tube blockages. [8,17].

Using warm water, attempt to flush the tube. Try alternating aspirations and flushing, using a syringe size no less than 20–30 mL to unblock the tube [8]. Do not use excessive force when pushing the plunger of the syringe. If unsure, seek advice from a senior staff member about the amount of force that is appropriate.

If it is a soft tube, attempt to gently massage the external portion of the tube using your fingertips, in the direction from the nose to the port [8].

If using water was unsuccessful, discuss with a medical officer about ordering and using pancreatic enzymes. The use of pancreatic enzymes dissolved in a bicarbonate solution that are left to dwell within the nasogastric tube can be effective [8,18]. After 30 minutes, the enzymes are flushed out with water. One example of this would be to prescribe one uncoated pancreatic enzyme tablet crushed with a 325 mg bicarbonate tablet. This is then mixed with 5 mL warm water in a syringe and instilled into the tube [8]. Administration of pancreatic enzymes for this use is considered off-label medicine use and will require approval by the local Drug and Therapeutics Committee.

Never use cola, other carbonated drinks, or juice [8,17,18].

Never insert an object, guidewire or brush into a tube that is in a patient.

If the above techniques do not work, discuss with the medical officer whether removal and replacement of the tube is appropriate.

Any blockages and attempts to unblock, including the strategies used, must be documented in the health record.

Review possible causes of the blockage and implement strategies to prevent further blockages, e.g., ensure adequate flushing with water before and after feeds or medication administration, consider the tube size, ensure compatibility of any administered medication [12].

2.9. Removal of nasogastric tubes

Confirm need for removal of the nasogastric tube. This must be documented in the health record by a treating medical officer before the tube is removed.

Ensure feeds are turned off and that nothing is connected to the tube. This is to decrease the risk of aspiration.

Removal of the tube must be performed safely by trained and competent health professionals, adhering to standard precautions.

Explain the procedure and equipment to the patient.

Position patient upright with the patient's head supported on pillows, where possible.

Note: spinal and some neurological patients must be positioned according to the treating medical team instructions throughout the procedure.

Ensure the patient is provided with equipment to make the process more comfortable, e.g., an emesis bag, tissues.

Position yourself to the side of the patient.

Spigot or cap the nasogastric tube, using either the cap provided or a spigot to prevent backflow and aspiration.

Remove the securing device. An adhesive remover may be required to promote patient comfort when removing tape.

Remove the tube in a slow continuous movement to promote patient comfort and prevent trauma. If resistance is met, stop the procedure, and seek medical advice. Observe that the tip of tube is intact on removal. If it is not, seek advice from a senior staff member.

Dispose of equipment as outlined in the NSW Health Policy Directive *Infection Prevention and Control Policy* (PD2017_013).

Document the removal and reason for tube removal in the patient's health record.

Continue to observe the patient for any changes in condition or vital signs post tube removal. Escalate as appropriate.

2.10. Incident reporting

All incidents, including near misses and adverse events involving gastric tubes must be reported to the appropriate management team and documented in the ims+ system.

Use of an incorrectly positioned naso- or oro-gastric tube resulting in serious harm or death is classified as an Australian Sentinel Event and requires a serious adverse event review in accordance with the NSW Health Policy Directive *Incident Management* (PD2020_047).

2.11. Minimum documentation requirements

There are minimum documentation requirements for all health professionals involved in the patient's care. These are listed below.

2.11.1. Pre-insertion of tube

Prior to insertion of a tube, the following key details must be documented in the health record:

- Medical order for tube insertion, including indication (e.g., for feeding, medication administration, decompression).
- Patient consent (noting not obtained if an emergency).
- Risk assessment outcomes. Include considerations if the patient is confused, agitated or uncooperative.
- Minimum set of baseline vital sign observations – including respiratory rate, oxygen saturation, heart rate, blood pressure, temperature, level of consciousness, new onset confusion or behaviour change and pain score, as outlined in the NSW Health Policy Directive *Recognition and management of patients who are deteriorating* (PD2020_018).

2.11.2. Tube insertion

When a tube is inserted, any attempt at tube insertion must be documented, including unsuccessful attempts and reasons for failure. Two failed attempts require escalation to a senior nurse or medical officer.

The following key details must also be documented in the health record:

- Type and size of tube
- Nostril used (not applicable for orogastric tube insertion)
- The exit-point centimetre mark at insertion point – if not present, document external length of tube to the base of the distal port
- Technique used to secure the tube
- Nature and amount of gastric aspirate, including the pH
- Any complications or issues
- Any failed attempts – include details of staff who were consulted during escalation process
- Minimum set of vital sign observations – including respiratory rate, oxygen saturation, heart rate, blood pressure, temperature, level of consciousness, new onset confusion or behaviour change and pain score as outlined in the NSW Health Policy Directive *Recognition and management of patients who are deteriorating* (PD2020_018)

- Record of escalation to the treating medical team or medical officer on call if there is significant deviation from baseline observations or if there is a change in condition. Initiate your organisation's local Clinical Emergency Response System (CERS) [4].
- Outcome following escalation pathway
- Medical order for x-ray, if required, specifying that the reason for the request is to confirm the position of the nasogastric tube.

2.11.3. Post-insertion

Post insertion of a tube, the following key details must be documented in the health record:

- If confirmation of tube position was via x-ray, the anatomical tip position must be documented by a radiologist or an experienced medical officer who has viewed and interpreted the most recent chest x-ray. This documentation is to include if the tube is safe to be used (refer to section 2.6.2 *Radiological confirmation (x-ray) on insertion*)
- If confirmation of tube position was via pH, the pH value must be documented.
- Document the centimetre mark at insertion point immediately after insertion, and when the correct position is confirmed. If centimetre markings are not present, document external length of tube to the base of the distal port.

2.11.4. Tube use, maintenance, and care

At least once per shift, the following key details must be assessed and documented:

- Tube position; either it is correct or a reposition action carried out. If repositioned, placement is reconfirmed.
- Any complications or issues, such as tube blockages and methods used to unblock the tube.
- All care and management of tube must be documented (refer to section 2.8 *Tube care and maintenance for nasogastric tubes*).

As indicated, directions for use of the tube must be documented in the health record:

- Directions for medication administration must be documented on the medication order by a pharmacist or medical officer.
- Directions for enteral feeding administration must be documented by a dietitian. In the absence of a dietetic service, feeding may be commenced, as per local procedures.

2.11.5. Tube removal

Prior to removal of a tube, the following key details must be documented in the health record:

- Order for planned tube removal must be documented by the medical officer.
- Date, time, and indication for tube removal.
- If an unplanned tube removal, the date and time of the tube removal must be documented in the health record, including that it was unplanned.

- The removal outcomes including that the tip has been confirmed as intact and removed, and any complications or issues during removal.

3. INSERTION AND MANAGEMENT OF OROGASTRIC TUBES IN ADULTS

The insertion of an orogastric tube is a specialised procedure not routinely carried out on a ward. It is usually inserted in a patient with an altered level of consciousness and usually while they are mechanically ventilated.

The insertion of orogastric tube is to be carried out by, or under the supervision of, a clinician experienced in orogastric tube insertion.

The principles for insertion and management of orogastric and nasogastric tubes are closely aligned. Differences for orogastric tube indication, route and insertion and tube management are specified in the following sections.

Requirements around incident reporting and documentation (refer to section 2.10 *Incident reporting* and section 2.11 *Minimum documentation requirements*), must also be complied to for orogastric tube management.

3.1. Indications for insertion of an orogastric tube

The placement of an orogastric tube may be required in situations where nasopharyngeal insertion is contraindicated (i.e., patients with fracture to the base of the skull). The decision to insert an orogastric tube must be made by an experienced member of the medical team, indicating the rationale for the route of insertion.

3.2. Insertion of an orogastric tube

The tube is passed into the oral cavity, through the oesophagus and into the stomach.

Insertion of the orogastric tube may require the use of a laryngoscope for correct placement, therefore, the optimal timing for this is following intubation by the medical officer performing the intubation.

3.3. Management of an orogastric tube

The ongoing care of an orogastric tube is similar to a nasogastric tube, including section 2.6 *Confirmation of correct placement of nasogastric tubes on insertion*, section 2.7 *When to commence using the tube*, section 2.8 *Tube care and maintenance for nasogastric tubes* and section 2.9 *Removal of nasogastric tubes*.

Differences in orogastric tube management include:

- The tube measurement is to be taken at the marking at the level of the teeth / gums (if teeth absent).
- If the patient is intubated, the orogastric tube is usually secured to the endotracheal tube.

- If the patient is not intubated, the orogastric tube must be secured so it does not dislodge or displace.
- If an orogastric tube becomes dislodged or displaced, a medical order is required before it is reinserted. Cease all feeding or administration of medications via the tube.

4. APPENDICES

1. Appendix 1: Nasogastric tube types
2. Appendix 2: Pre-insertion and post-insertion checklist for nasogastric and orogastric tubes
3. Appendix 3: Tube measurement technique
4. Appendix 4: Nasogastric tube securement techniques
5. Appendix 5: Flowchart for the confirmation of correct placement of nasogastric tubes

4.1. Appendix 1: Nasogastric tube types

Figure 1: Feeding tube

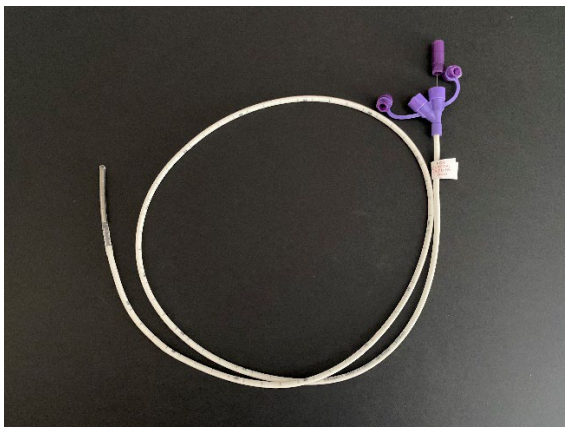
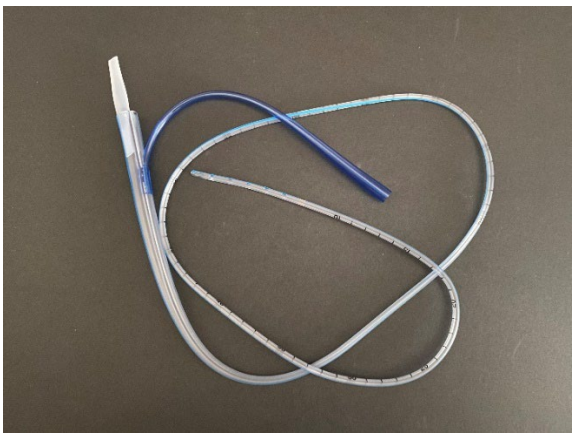


Figure 2: Vented nasogastric tube



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4.2. Appendix 2: Pre-insertion and post-insertion checklist for nasogastric and orogastric tubes

Pre-insertion checklist

Confirm the following before commencing the procedure:

- Confirm procedure is indicated – must be documented by a medical officer
- Contraindications and special precautions considered
- Clinician introduces self to patient
- Complete **Level 1 Procedures safety check**, as outlined in the NSW Health Policy Directive *Clinical Procedure Safety* (PD2017_032)
    - Patient's identity confirmed by at least three approved patient identifiers
    - Procedure verification (consent and confirmation of procedure)
    - Allergy / adverse reaction check
    - Anticipated critical events.
- Record of minimum set of baseline vital sign observations – including respiratory rate, oxygen saturation, heart rate, blood pressure, temperature, level of consciousness, new onset confusion or behaviour change and pain score as outlined in the NSW Health Policy Directive *Recognition and management of patients who are deteriorating* (PD2020_018)
- Gather required equipment:
    - Nasogastric / orogastric tube of appropriate size and type
    - Appropriate syringe to access enteral tube

  - Personal protective equipment
  - Kidney dish
  - Emesis bag and tissues
  - Protective sheet/under pad
  - Securement device / tape
  - 70% isopropyl alcohol wipe or skin degreaser wipe
  - Water soluble lubricant (even if tube is pre-lubricated)
  - Gastric suction pump / drainage bag and spigot / valve, if required
  - pH strip (DO NOT use litmus paper)
  - Yankauer – ensure high pressure suction is working
  - Straw or syringe and water for sips (if allowed) during insertion for patients that are not nil-by-mouth
  - Lubricating sprays may be useful if available
  - Local anaesthetic sprays (if indicated) – order required by medical officer
  - Plastic bag.
- Confirm emergency equipment is accessible and functional – Yankauer, suction, O_2
- Explain procedure to the patient:
  - Explain the procedure, including the rationale
  - Provide privacy
  - Discuss with the patient the discomfort or irritation they may experience
  - Position the patient upright, as appropriate, and sitting comfortably
  - Reassure patient and implement interventions to facilitate patient comfort during the procedure
  - Negotiate a non-verbal sign they may use to indicate they need a break during the procedure.

Post-insertion checklist

Document procedure findings in the patient health record. This includes:

- any attempt at tube insertion, including unsuccessful attempts and reasons for failure, and details of staff who were consulted during escalation process
- nostril used (not applicable for orogastric tube insertion)
- type and size of tube
- centimetre mark at insertion point – if not present, document external length of tube to the base of the distal port
- securement technique used

- nature and amount of aspirate, including the pH
- if pH indicates a need for an x-ray, and if so, if this has been referred to the medical officer
- any complications or issues
- an alert statement to not give fluid, feed, or medication until position of tube is confirmed as correct by the medical officer
- record of minimum set of post-insertion vital sign observations – including respiratory rate, oxygen saturation, heart rate, blood pressure, temperature, level of consciousness, new onset confusion or behaviour change and pain score as outlined in the NSW Health Policy Directive *Recognition and management of patients who are deteriorating* (PD2020_018)
- record of escalation to the medical team or medical officer on call if there is significant deviation from baseline observations or change in condition.

4.3. Appendix 3: Tube measurement technique

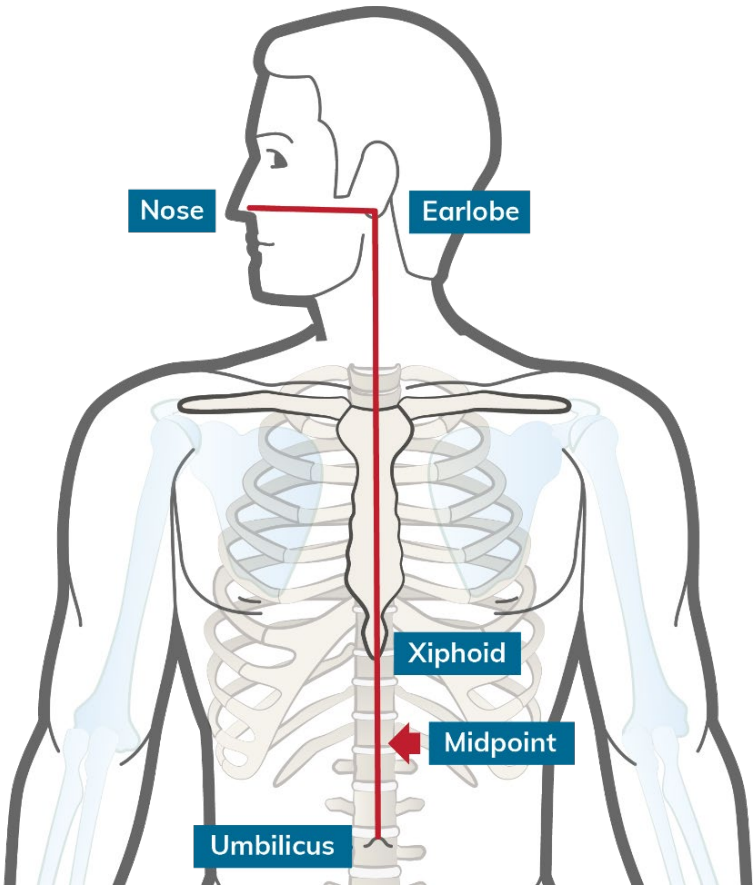
Prior to inserting the tube, calculate the desired insertion length. This can be achieved by measuring the distance from the tip of the nose to the earlobe, to the midpoint between the xiphoid process and the umbilicus [5,6]. Refer to Figure 3.

This desired measurement is to be documented in the health record in centimetres, along with the actual centimetre length of insertion.

In the absence of centimetre markings on the tube, the external portion of the tube are to be measured and documented.

This can be achieved by measuring the tubing in centimetres from the insertion point (tip of the nose) to the end of the tube once the tube has been placed in situ.

Figure 3: Measurement of desired tube insertion length



4.4. Appendix 4: Nasogastric tube securement techniques

When securing a tube:

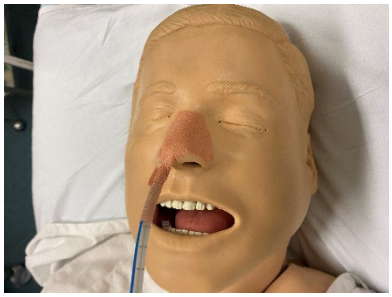
- There must be a suitable amount of contact between both the tape and skin, and tape and tube for adequate adhesion. Refer to Figures 4 to 6.
- Tape may be prepared by the clinician, or a designated securement device can be used. Refer to Figures 4 to 9 for examples of taping and securement devices. If using a designated securement device, refer to product information.
- Routinely change adhesive tape every 24-48 hours, or more frequently if required. A designated securement device should be changed as required or guided in product information.
- To prevent dislodgement, the tape must be replaced immediately any time there is concern it is no longer sticking to the nose or tube.
- Be aware of the potential risk of medical device-related pressure injury caused by adhering the tape or fixation device tightly against the nose; thereby, pushing the tube too firmly against the nasal cavity.

Preventing a medical device-related pressure injury (MDRPI)

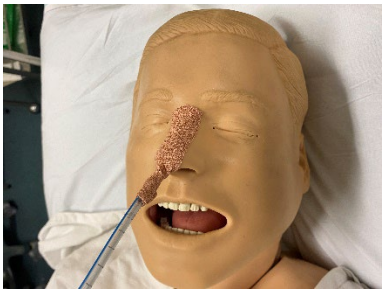
- The area at the point of insertion must be checked once per shift at a minimum.
- Do not place tube directly in contact with the nostril. It is to be suspended away from the side of the nostril.
- Check and clean the nasal mucosa within the nostril. This is to be done at least once every shift and with every tape change.
- Assess condition of skin on nose for a MDRPI.
- Change adhesive tape every 24-48 hours, or more frequently if required. When changing, slightly adjust both the tube and tape positions to minimise MDRPI.

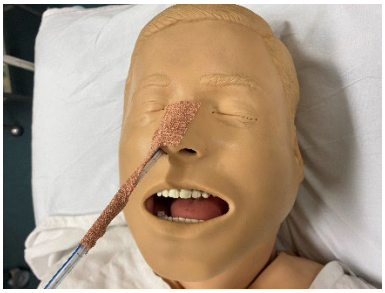
  Note: The skin on the nose may be damaged by overfrequent tape changes.
- Apply a barrier wipe before replacing tape.

Figure 4: Securement of tube using designated securement device



Figures 5 and 6: Securement of tube using clinician-prepared tape



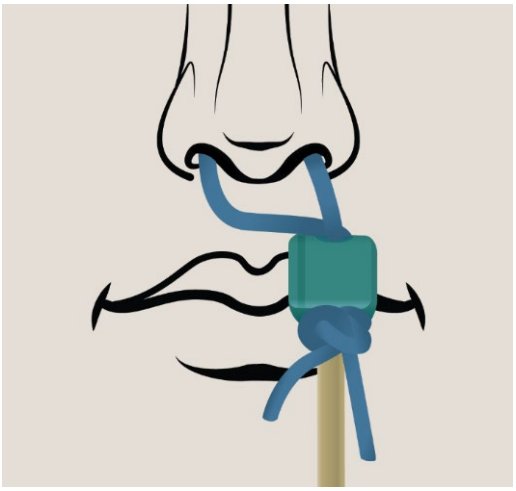


Images created by Elaine McGloin, Sydney Local Health District.

Figure 7: Sample of clinician-prepared tape

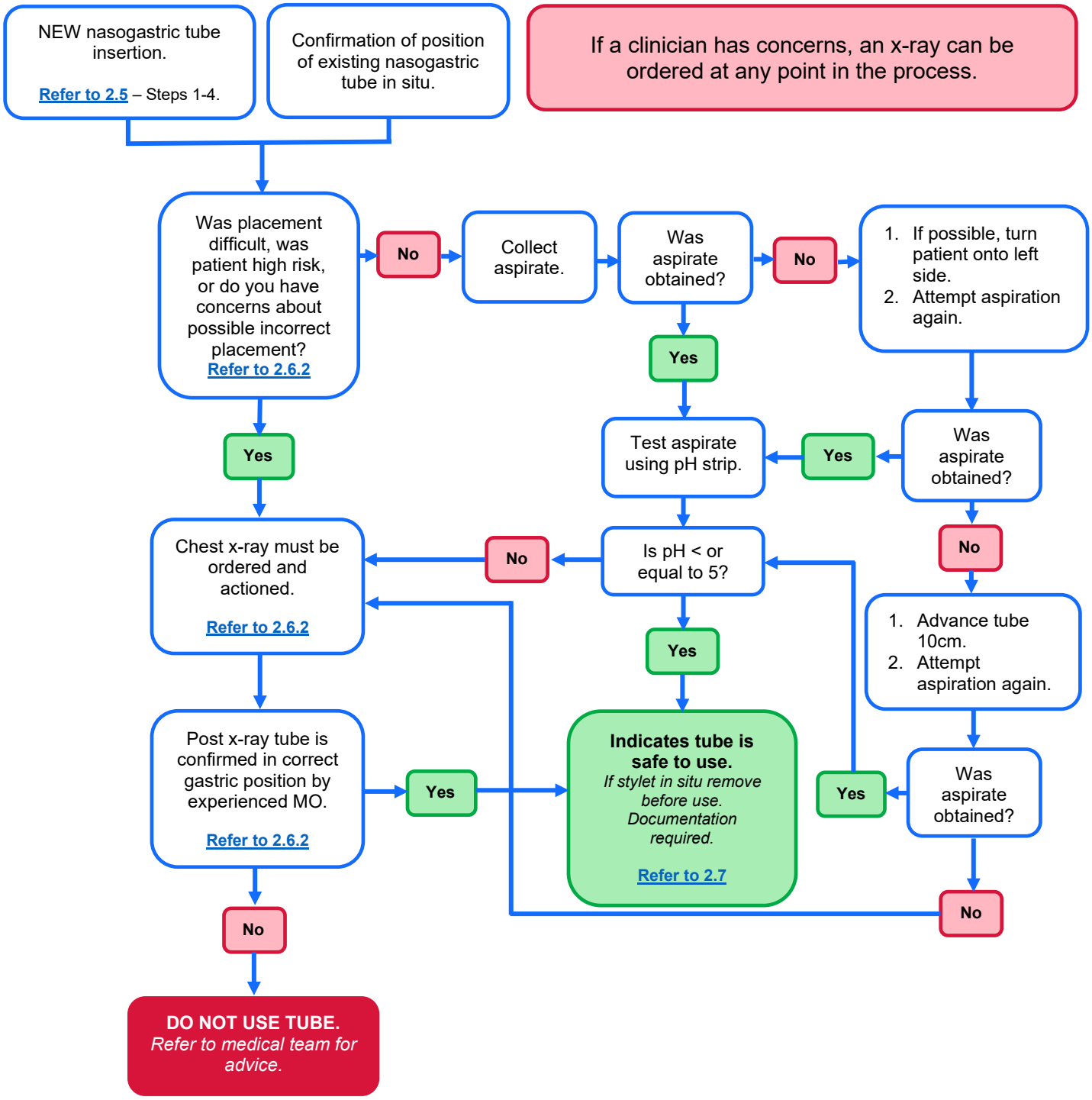
Figure 8: Samples of designated securement devices

Figure 9: Sample of a nasogastric tube bridle, in situ



4.5. Appendix 5: Flowchart for the confirmation of correct placement of nasogastric tubes

This Guideline is not meant to replace the clinical judgement of a healthcare professional. If you are concerned, seek advice from a senior nurse or medical officer.



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