

Enteral Feeding in Newborn Intensive Care Unit (NICU)

Procedure Responsibilities and Authorisation

Department Responsible for Procedure	NICU
Document Facilitator Name	Richard Pagdanganan
Document Facilitator Title	ACNM
Document Owner Name	Chantelle Hill
Document Owner Title	CNM
Target Audience	Nurses
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Procedure Review History

Version	Updated by	Date Updated	Summary of Changes
7	Tricia Ho	July 2010	3 yearly review
8	Karen Eastick & Joyce Mok	April 2015	Due for review
9	Richard Pagdanganan	January 2019	3 yearly review and changes in management of gastric aspirate

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Enteral Feeding in Newborn Intensive Care Unit (NICU)

1 Overview

1.1 Purpose

To outline the specific procedure for the care of babies receiving enteral feeding in NICU. This procedure is based on the best practice guidelines according to Lippincott Procedures.

1.2 Scope

Waikato staff working in NICU

1.3 Patient / client group

Neonates and infants in NICU

1.4 Indications

- To provide nutritional requirements for growth in premature infant when their nutritive sucking ability and coordination is immature and unable to achieve full oral feeding.
- To provide nutrition when the infant is unable to take sufficient quantity of milk orally to meet their nutritional requirements.
- To provide nutrition for infants with clinical conditions that affect oral feeding ability, e.g. RDS, cleft lip/palate, dysphagia.

1.5 Definitions

Enteral feeding	Gavage feeding via a feeding tube that is passed through the nares or mouth, past the pharynx, down the oesophagus, and into the stomach or jejunum.
Jejunal feeding	Feeding bypass the stomach and reduces the digestive capacity of GI tract. Feeds can only be by continuous infusion. Placement of tube is confirmed by X-ray, which is not routinely done in NICU. Special considerations: <ul style="list-style-type: none"> - Jejunal feeding may induce symptoms of malabsorption because the stomach is not able to aid in digestion e.g. frequent bowel motion, slow weight gain, necrotising enterocolitis. - No medications should be administered via jejunal feeding. In rare instances specific essential medication may be given via jejunal tube after consultation with NICU consultant.
NNP	Nurse Practitioner
CNS	Clinical Nurse Specialist
EBM	Expressed breast milk
ELBW	Extreme low birth weight

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2 Clinical Management

2.1 Competency required

- Registered Nurse/Registered Midwife who has completed orientation.
- Enrolled Nurse who has completed orientation and achieved competency and under the direction and delegation of a registered nurse.
- All student nurses or student midwives must be supervised by a registered nurse

2.2 Equipment

- Feeding tube of appropriate size according to the weight of the infant
- An extra feeding tube (Fr 5 or Fr 6) and a 5 ml or a 10 ml syringe if infant is having jejunal feeding
N.B: use Fr size 5 for infants on continuous jejunal feed. Occasionally bigger babies requiring gastric venting or free drainage will use a size 8Fr gastric tube.
- Syringe for aspiration (2 ml or 5 ml)
- pH testing strip
- Tape to secure feeding tube
- Duoderm (base tape) if indicated
- Measured milk feed (checked EBM or formula)
- Medications (prescribed and checked)
- Gloves
- Small blue label for documenting time and date tube inserted and length of insertion

Additional equipment for continuous feeding

- Feeding pump, e.g. Nutrisafe™. If not available, request an Asena™ Syringe Driver via Customer Portal
- Long extension set
- Additive label

Special notes:

- **Never use** a cut pressure disc to bypass the NICU Asena™ pumps; and never use an ordinary extension set on NICU Asena™ pumps because risks of errors if pressure function is bypassed.
- NICU Asena™ syringe pump has a built in pressure function and is to be used with tubing that has a pressure disc, therefore the NICU Asena™ pumps are not suitable for continuous or compressed feeding.

2.3 Procedure

2.3.1 Gastric Feeding

1 Insertion of feeding tube

1. Preparations

- Explain procedure to parents, to relieve anxiety and keep them informed.
- Perform hand hygiene.
- Put on gloves (optional).
- Assemble equipment required for insertion of gastric tube.

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2. Position infant

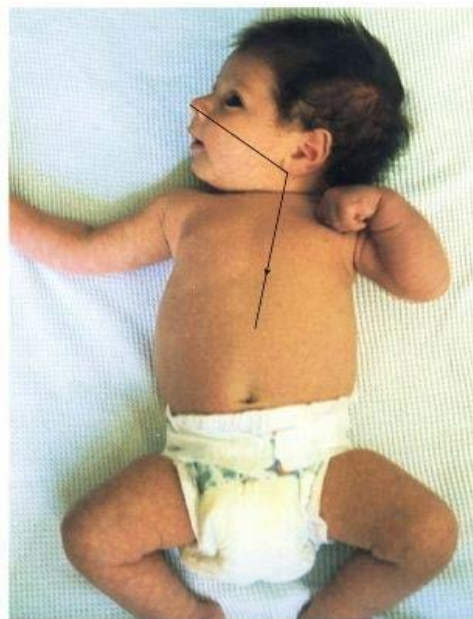
Position the infant on their side or back with the head of bed elevated to facilitate easy passage of the feeding tube.

3. Measure length of insertion

- For naso-gastric tube:
Length to be inserted = from tip of nose to ear tragus to halfway between xiphisternum and umbilicus (refer diagram below).

For infants with respiratory problems needing support, e.g. ventilated, CPAP, low flow, having apnoea, **do not place naso-gastric tube as this will partially obstruct and increase airway resistance.**

- For oro-gastric tube:
Length to be inserted = measure from the tip of the neonate's lip or nose to the tip of the earlobe, to the xiphoid process, and then midway to the umbilicus (as shown below).
- Note the measured length (in cm) on the feeding tube to be inserted into the stomach to ensure correct positioning of the feeding tube in the stomach.



Source: Lippincott Procedures: Enteral gastric tube feedings, neonatal (August, 2018)

4. Inserting feeding tube

- Explain the procedure to the parent.
- Perform hand hygiene and put on gloves as necessary.
- Give dextrose gel 40% as analgesia prior NGT/OGT insertion.

Note:

For babies >1000g, discuss with NNP/CNS/Registrar and assess individual baby's tolerance to administration of medications orally before the analgesia. Some babies cannot tolerate even the minimal amount of liquid in their mouth.

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- If inserting the feeding tube nasally, lubricate the tip of the tube with some saliva from the infant's mouth to reduce friction and allow smooth passage of tube.
- Stabilise infant's head with one hand, and pass the tube via the nose or mouth into the stomach, down to the pre-measured length.
- Observe infant during procedure for changes in heart rate (HR), respiratory rate (RR), SpO₂, coughing, gagging or choking because the passage of the tube may cause a vagal response such as gagging, apnoea and desaturation. Infant should recover fairly quickly from procedure and vital signs re-stabilise.
- Stop advancing the feeding tube and remove the tube immediately if the infant begins coughing, choking, becomes cyanotic or bradycardic, and does not recover promptly because any signs of persistent coughing, apnoea or desaturations may indicate that the tube has entered the trachea.
- Wait until the infant recovers and returns to stability before repeating insertion of the feeding tube, following the steps as above.

5. Checking tube placement

- When the tube is inserted to the pre-measured length and no sign of respiratory distress is observed, test for placement of the tube in the stomach.
- Use a 2ml or 5ml syringe and aspirate a small amount of stomach content and check content with pH strip.
- When pH strip indicates stomach pH 5 or less, this indicates that the tube is in the stomach. Stomach aspirate is acidic with a pH in the 0-5 range (refer to pH strip guide).
- Note and document the characteristics and amount of aspirate e.g. milky, bile-stained, clear mucus, blood-stained etc.
- Failure to obtain gastric aspirate does not necessarily indicate improper placement; there may not be any stomach content or the feeding tube may not be in contact with fluid.
- Strategies to help facilitate obtaining an aspirate:
 1. Reposition the infant to move the feeding tube away from the stomach wall, and wait for 5 to 20 minutes before trying again to obtain an aspirate.
 2. Slightly advance the feeding tube and reattempt aspiration.
 3. Instil a small amount of air, e.g. 0.5 ml, to move the gastric tube away from the stomach and try again to obtain an aspirate.
If instillation of air is unsuccessful, the gastric tube may be kinked or dislodged and should be removed and replaced.

6. Securing feeding tube

- Secure feeding tube with tape in a position that will not cause indentation to the nares to prevent scarring on nares or pressure on the nostril.
- Use Duoderm, if necessary, as base tape to protect skin integrity and minimise trauma especially with ELBW patients.
- Place a blue label on the feeding tube with the date and length inserted to document when the tube was inserted/changed.

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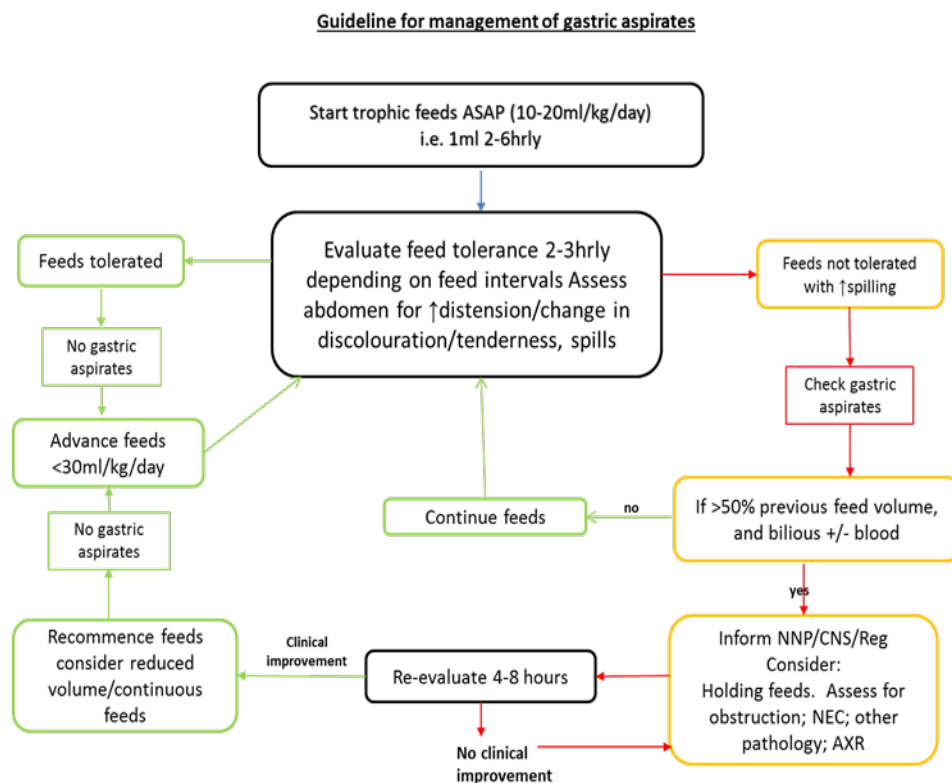
2.3.2 Aspiration of NG/OG gastric tube:

1. Confirming tube placement before feed

- Before every feed, tube placement must be checked and confirmed length of insertion and pH strip
- Check that the tape has not come loose from the nose or from the tube.
- Check measurement of tube at nares to recorded measurement.

2. Assessment of gastric aspirate.

Figure 1: Guideline for Management of Gastric Aspirates



Gastric aspirate guideline based on the feeding algorithm developed by Torazza et.al (2014).

- If gastric aspirate contains blood, notify NNP/CNS/Registrar promptly.
 - Report any abdominal distension, discolouration, tenderness, tightness, visible bowel loops.
 - Keep aspirate for inspection.
 - Withhold feed and wait for medical review and further instructions.
 - Discard aspirate if it is blood-stained as any deviations from normal may indicate an intestinal obstruction, infection or other gastric intestinal tract (GIT) problems.

2.3.3 Bolus gastric feeding:

1. Preparations

- Perform hand hygiene
- Warm the feed as cold milk has the potential to adversely affect infant temperature.

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- Confirm tube position to ensure proper placement of feeding tube before commencement of feeding.

2. Giving feed

- Connect feed syringe to gastric tube and allow the measured amount of EBM/formula to flow into the stomach by gravity. Milk that flows too quickly into the stomach will lead to “gastric dumping”, which may lead to regurgitation, vomiting, reflux and increase the risk of milk aspiration.
- Alter the rate of flow by changing the height of the feed syringe. Rapid feeding may compromise respiratory effort and cause desaturations or apnoea.
- **Only nurses can start a tube feed:** parents can hold a tube feed but a nurse **must be nearby to supervise** the process and intervene if necessary to ensure procedure is carried out safely by parents to prevent complications.
- Check compatibility of medications before them adding to milk.
- Unless contraindicated, add prescribed vitamins/medications to be given together with the feed.

3. Developmental supportive care

- With parental consent, offer a pacifier (non-nutritive sucking) to the infant during feeding because non-nutritive sucking helps earlier transition from tube feeding to breastfeeding, and improves feeding abilities and earlier achievement of exclusive breastfeeding.
- During tube feed mother can put her infant to the breast if infant’s condition allows, so that the infant can associate a full stomach with breastfeeding, enhance infant feeding experience and facilitate parental bonding.
- Parents can cuddle their infant during tube feeding provided the tube is correctly positioned and secured and a nurse is supervising the tube feeding to ensure safety of infant. Cuddling keeps infant calm and relaxed, allowing the milk to flow more easily.

4. Tube change

- Indwelling gastric feeding tube, e.g. Nurisafe2™ is changed every 28 days and if dislodged, clean with sterile water.
- Place a blue label on the feeding tube with the date and length inserted to document when the tube was changed.

5. Documentation

- Time, type, amount of feed
- Type and amount of aspirate
- Method of feeding: NG or OG feed
- Any spilling or vomiting
- Date and time of tube change

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2.3.4 Continuous naso/oro-gastric feeding:

1. Insertion of gastric tube

Follow steps in Section 2.3.1

2. Confirming tube position & gastric aspirate

Follow steps in Section 2.3.2

3. Giving continuous feed

- Collect and check EBM/ formula milk.
- Wear personal protective equipment, e.g. gloves when preparing EBM.
- Check and prepare the milk on the bedside according to NICU Nursing Procedure: *Labelling, handling, storage, transport and administration of human milk (2771)*
- Draw up 4-hour volume of milk in a syringe.
- Change the milk syringe and extension set every 4 hours.
- Recommended maximum “hang time” of 4 hours is considered to be safe from bacterial growth. Longer hang time should be avoided because of the potential for significant increase in microbial growth in milk feed.
- Connect the syringe to a long extension and prime it with the milk.
- Label the milk syringe with an additive label with the infant’s name and ID, type and amount of milk, the date and time.
- Check rate against prescriptions before activating the syringe pump to ensure correct hourly volume is set.
- Attach the milk syringe onto a feeding pump and set the prescribed hourly rate of infusion to ensure correct amount is delivered every hour.
- Connect extension set to the infant’s feeding tube and start continuous feeding.
- Record volume infused every hour to ensure the correct amount is being given each hour.

4. Checking tube position

- Check the placement of the feeding tube minimum of 4 hourly; more frequently if baby is awake or active.
- Check the tape to ensure it is not loose and the tube has not slipped out because accidental dislodgement may cause aspiration.

5. Checking gastric aspirate

- Refer to the guideline for management of gastric aspirates.
- Large aspirates may indicate feed intolerance, intestinal obstruction or other enteral problems.
- Report any concerns or ask NNP/CNS/Registrar to review infant.

6. Changing tube

- Indwelling Nutrisafe™ feeding tube is changed every 28 days and whenever it is dislodged
- Flush the tubing with sterile water.
- Place a blue label on the on the feeding tube with the date and length inserted to document when the tube was changed and allow for checking of tube placement pre feed.

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2.3.5 Continuous Jejunal Feeding

1. Insertion of jejunal tube:

1. Preparation

- Explain procedure to parents to relieve anxiety and keep parents informed.
- Perform hand hygiene.
- Assemble and prepare equipment required.

2. Positioning infant

Give dextrose gel 40% prior to the insertion of the feeding tube.

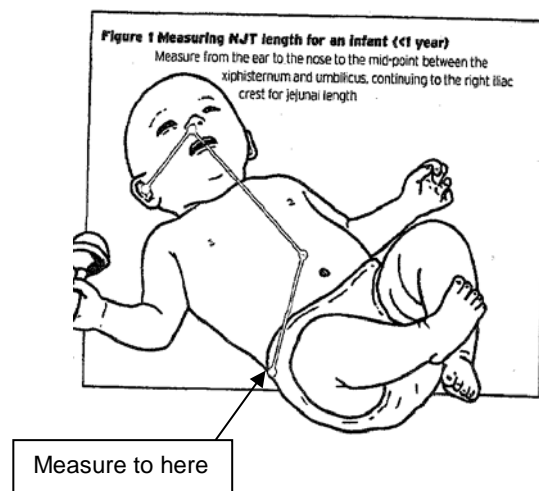
Note:

For babies >1000g, discuss with NNP/CNS/Registrar and assess individual baby's tolerance to administration of medications orally before the analgesia. Some babies cannot tolerate even the minimal amount of liquid in their mouth.

- Position infant on their right side to allow easier passage of the feeding tube through the pyloric sphincter into the jejunum.
- Ask for help to hold infant if necessary.

3. Inserting naso/oro-jejunal tube (NJ/OJ tube)

- Measure length of insertion = as per naso/oro-gastric insertion then continue to right iliac crest (refer diagram below for naso-jejunal tube).
- Mark the measured length to be inserted with a small piece of tape.



- Follow steps for naso/oro insertion in Section 2.3.1
- Once gastric feeding tube is confirmed as being in the stomach, inject sufficient air to allow slightly dilate the stomach and sphincter and enable easier passage of the tube through sphincter.

As a guide:

- For infant <2.5kg inject 5ml of air
- For infant >2.5kg inject 10ml of air.
- Once jejunal tube is in correct position there should be small amount of negative pressure in syringe when aspirating syringe as minimal air is present past the stomach and in the jejunum.
- Insert a size 5Fr gastric tube for checking gastric aspirate and administration of medication as required.

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- Secure both tubes to infant skin using duoderm as barrier if indicated.
- Ensure tubes are securely taped to prevent jejunal tube migrating back into the stomach.
- Aspirate air from gastric tube to remove air introduced during tube placement and reduces excess air in bowel.
- Use the blue labels and document the length of insertion and date and time for the gastric tube and jejunal tube.
- Note:
PVC tubes used for jejunal feeding must be replaced every 5 days.

4. Giving continuous jejunal feeding

- Confirm correct placement of jejunal tube.
- Prepare milk for continuous feeding, following steps in Section 2.3.4, steps 3.
- **No medications given via jejunal tube:** all oral meds must be given via the gastric tube with 1-2ml of milk. In *rare* instances, specific essential medication may be given via jejunal tube after consultation with NICU consultant.
- Document tolerance of jejunal feeding and reassess at medical rounds to facilitate change back to gastric route.

5. Checking gastric aspirate

- Aspirate gastric tube 4-hourly (do not aspirate jejunal tube).
- If >approx. 3ml of residual milk in stomach, this may indicate misplacement of the jejunal tube. Refer to the guideline for the management of gastric aspirates, section 2.3.2 step 2.
- Check with NNP/CNS/Registrar if appropriate time to try continuous gastric feeding prior to replacement of the jejunal tube.
- Replace jejunal tube as indicated.

2.3.6 Compressed gastric feeds (for transition to bolus feeds)

1. Insertion, checking and aspiration of gastric tube

Follow steps in Sections 2.3.1 and 2.3.2.

2. Giving compressed feed

- Collect, check and draw up the prescribed volume of milk (2- or 3-hourly feed) + 2ml (to prime the tubing) in a syringe.
- Check and prepare the milk on the bedside according to NICU Nursing Procedure: *Labelling, handling, storage, transport and administration of human milk (2771)*
- Label the milk syringe with an additive label with the infant's name, NHI, type and amount of milk, the date and time to identify correct infant and ensure correct type and amount of milk is delivered.
- Connect the syringe to a long extension tube and prime with the milk.
- Attach the milk syringe onto a syringe pump, set the measured volume over 30 or 60 minutes as prescribed.
- Check rate against prescriptions before activating the syringe pump to ensure correct hourly volume is set.
- Check placement of the gastric feeding tube prior to a feed that it remains at the correct position.

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- Check that tape is not loose and tube has not slipped out to ensure safe delivery of milk.
- Connect extension tube to the infant's feeding tube and start the feed

Notes:

- As an interim step, if bolus feeds are not tolerated, a compressed feed over 30-60 minutes may be prescribed to observe for feed tolerance and transition to bolus feeds.
- Compressed feed mimics physiological distension of the stomach, stimulates production of gastric juices and thus allows increase in gut motility, feed tolerance and decompresses stomach in between feeds by venting OG tube.

3. Checking gastric aspirate

- Refer to the guideline for the management of gastric aspirates: Section 2.3.2, step 2 .
- Report any concerns to NNP/CNS/Registrar, and may require further investigations or possible change in management.

4. After care

- Dispose equipment according to Waikato DHB policies
- Document procedures in clinical records and NICU observation charts

2.4 Potential complications

- Aspiration
- Difficulty with tube placement that may lead to nasal injury
- Perforation of the gut
- Malabsorption

3 Evidence base

3.1 References

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3.2 Associated Waikato DHB Documents

- Waikato NICU Medical Guideline: Enteral feeding (1196)
- Waikato NICU Nursing Procedure: Labelling, handling, storage, transport and administration of human milk (2771)

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