

Nasogastric/Orogastric Tube Insertion, Verification, and Removal (Pediatric and Neonatal)

Key Words

Nasogastric (NG)	Orogastric (OG)	NG tube	OG tube
pH verification			

Definition

1. Nasogastric (NG) tubes or Orogastric (OG) tubes are small tubes placed either through the nose or the mouth and end with the tip in the stomach. NG/OG tubes may be used for feedings, medication administration, or removal of contents from the stomach via aspiration, suction, or gravity drainage.

Indications

1. Nutrition/feeding administration (prematurity, critical illness, anatomic defects)
2. Medication administration
3. Evacuation of stomach contents

Contraindications

1. Suspected/known basilar skull fracture
2. Maxillofacial trauma

Standard Requirements

1. Insertion will be ordered by a provider
2. Procedure will be performed by a RN or provider
3. Prior to placement, child's history will be reviewed for cervical spine mobility, nasal or palate deformity, epistaxis, gastric fundoplication, gastric or esophageal surgery, esophageal malformations or injuries, and pyloric malformations, uncontrolled coagulopathy, or fully anti-coagulated patient. These conditions may make placement difficult or place the patient at higher risk for complications from procedure.
4. Initial and ongoing assessment of placement will be verified by x-ray and/or pH of gastric contents, according to grid in Appendix I
5. Initial tube placement must be verified by two trained caregivers (provider or RN) prior to use (not applicable in the home care setting). X-ray read by provider may constitute double check. Double check will be documented in the EMR.
6. In addition to x-ray and pH verification, ongoing assessment will include:
 - a. Assessment of external tube length (exit site marker to the proximal junction of the hub)
 - i. Once per shift for patients on continuous feedings (at minimum every 8 hours)
 - ii. Prior to feedings or medications for patients on intermittent feedings
 - iii. NOTE: A change in the centimeter number can indicate a change in the internal tube position. However, tubes CAN migrate out of position

WITHOUT this change. Patient's clinical condition must be assessed in conjunction with external tube length and pH measurement.

- b. Changes in clinical condition
 - i. Prolonged or persistent coughing
 - ii. Gagging, choking, general color change
 - iii. Vomiting
 - iv. A change in respiratory effort, oxygen requirement, respiratory rate, or persistent decrease in pulse oximetry >5% from patient's baseline
 - v. Increased restlessness, different from patient's baseline
 - vi. Unexplained irritability, discomfort, or abdominal pain different from patient's baseline
 - vii. Change in quality of cry
7. Family will be educated about the procedure, including purpose of tube and expected outcomes. Education will be documented in the EMR.
8. Family may be present for insertion and provide comfort to child if so desired.
9. Precautions per Children's Policy #1201.01: Standard Precautions for Infection Prevention and Control, and according to patient's clinical condition.
10. Pain will be assessed prior to, during, and post-procedure according to Children's Policy #375.00: Pain Prevention, Assessment, and Management and in accordance with the Children's Comfort Promise.

Tube Placement

1. Equipment
 - a. PPE
 - b. NG or OG in size appropriate to patient **and** appropriate for intended purpose
 - c. Water soluble lubricant, if necessary
 - d. Oral syringe or luer-lock syringe with syringe adapter (blue "Christmas tree"), appropriate to type of tube used
 - e. Stethoscope
 - f. Permanent marker or tape
 - g. Suction will be available
 - h. pH strips
 - i. Strips are single patient use
 - ii. Date/time package when opened
2. Procedure
 - a. Ensure that the child's vital signs and indicators of adequate oxygenation and ventilation are monitored.
 - b. Position the child in the supine position. The head of the bed may be flat or (preferably) elevated as the child's condition permits. **If indicated, enlist a second person to help keep the child immobile during the procedure and/or encourage parental presence for support.**
 - c. Measure the tube from the tip of the nose to the earlobe, then from the earlobe to the midpoint between the xiphoid and the umbilicus. Mark this point on the tube with a marker or small piece of tape.
 - d. Lubricate the distal tip of the tube with a water-soluble lubricant.

- e. Gently but steadily thread the tube through either the mouth or the nare to the previously identified mark. **Avoid extending the head backward. If a cervical spine injury is present, do not flex the child's head. If passage is difficult or if choking, coughing, cyanosis, or decreased oxygen saturation occur, remove the tube and reattempt placement at a different angle.**
 - i. **For nasal placement:** Insert the tube into a patent nostril, aiming posterior and parallel to the nasal septum. When the tube touches the pharynx, flex the child's head forward and, if the child is cooperative, ask the child to swallow. Advance the tube as the child swallows. Infants may be offered a pacifier.
 - ii. **For oral placement:** Position the end of the tube downward and insert the tube into the oral cavity over the tongue. Aim the tube back and down toward the pharynx. When the tube touches the pharynx, flex the head forward. If the child is cooperative, ask the child to take sips of water through a straw while the tube is advanced.
- f. Stabilize tube by taping it securely to the face or using an approved securement device
 - i. Avoid tape directly on the nare.
 - ii. Ensure that the previously identified mark is visible where the tube exits the mouth or the nare.

Verification of Tube Placement

1. Initial and ongoing assessment of placement with follow grid in Appendix I
 - a. In high risk patients defined as neurologically impaired, sedated, obtunded, critically ill, with static encephalopathy, and those with reduced or absent gag reflex
 - i. X-ray verification is required for initial placement, and a baseline pH will be obtained prior to using the tube
 - ii. pH measurement, external tube length, and/or clinical condition of patient will be used for ongoing verification of tube placement
 - iii. If x-ray is obtained for another clinical reason, NG/OG located should be verified.
 - b. In low risk patients and those in the neonatal community
 - i. X-ray is not required for verification of initial tube placement; X-ray may be obtained if there is any question about proper placement, changes in patient condition, or any other concerning factors.
 - ii. pH measurement, external tube length, and/or clinical condition of patient will be used for both initial and ongoing verification of tube placement.
 - iii. If x-ray is obtained for another clinical reason, NG/OG location should be verified.
2. pH verification steps (initial and ongoing verification of tube placement)
 - a. Acid suppressing medications may affect gastric pH. In patients receiving these medications, pH check to be obtained just prior to medication administration.

- b. Attach oral syringe or luer-lock syringe with syringe adapter to the NG or OG tube and flush tube with 2-5 mL of air. Flushing the tube with air clears the tube of liquid. Do NOT flush the tube with water: If initial placement, placement has not yet been confirmed. For initial and ongoing verification, water may alter the pH level.
- c. Draw back on syringe plunger slowly to aspirate fluid from the stomach.
- d. If unable to aspirate fluid, try the following steps:
 - i. If using a dual-port tube, make sure second port is tightly sealed
 - ii. May attempt to inject another 1-5mL of air as the tube may be against the stomach wall. Attempt to aspirate fluid again. Repeat action 2 or 3 times.
 - iii. Place patient on left side and wait a few minutes for tube tip to fall below fluid level in stomach and to allow for gastric secretion accumulation. Reattempt aspiration.
 - iv. For patients who are NPO may perform oral cares in an attempt to stimulate gastric secretion production.
 - v. Ask another RN to try to aspirate.
 - vi. If multiple interventions have been tried, external tube length is unchanged, and there are no changes in clinical condition, may proceed to feeding or medication administration.
- e. Apply aspirate to pH strip and obtain pH reading. pH should be ≤ 6 to confirm appropriate placement.

NG or OG Tube Removal

1. Turn off suction or continuous feeding, if applicable.
2. Position the child in the supine position. Elevate the head of the bed as tolerated by the child. **If indicated, enlist a second person to help keep the child immobile during the procedure and/or encourage parental presence for support.**
3. Gently remove tape from the face. Consider the use of adhesive remover or saline wipe to assist in the removal of tape.
4. Occlude the tube by pinching it closed, bending it, and holding it with the thumb and index finger. Pull the tube out of the mouth or nose using a swift, consistent motion.

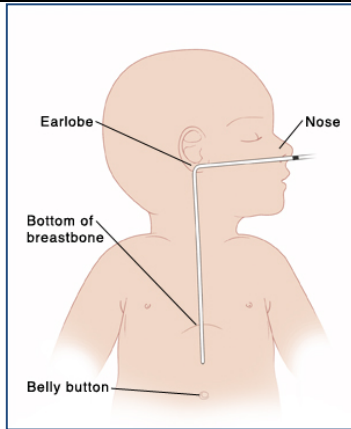
Documentation

1. Initial placement of tube
 - a. Type of tube
 - b. Size
 - c. Location
 - d. External length measurement
 - e. Purpose of tube (activity)
 - f. Method of placement confirmation, including pH measurement
 - g. Tolerance of insertion procedure
 - h. Pain management strategies employed
2. Ongoing verification of placement
 - a. Type of tube
 - b. Size

- c. Location
 - d. External length measurement
 - e. Activity of tube
 - f. pH measurement
 - g. Any changes in clinical condition
3. Removal
- a. Patient's tolerance of procedure

Appendix I: Verification of Placement Grid

Care Community	Initial Placement	Ongoing Verification Method and Frequency
<p>Critical Care (PICU, CVCC)</p> <p>Acute Care (Med/Surg, SSU/SPS)</p> <p>Emergency Department</p>	<p>Measurement: Nose-ear-mid umbilicus</p> <p>High risk patients: Radiographic confirmation of placement. This should be done with the initial x-ray for all intubated patients.</p> <ul style="list-style-type: none"> • High risk patients <ul style="list-style-type: none"> ○ Neurologically impaired, sedated, obtunded, critically ill, with static encephalopathy, and those with reduced or absent gag reflex <p>Low risk patients: pH measurement for confirmation of placement.</p> <ul style="list-style-type: none"> • Aspirate pH of ≤ 6 indicates gastric placement. • Aspirate pH > 6 requires x-ray confirmation or tube removal and replacement. <p>For all patients:</p> <ul style="list-style-type: none"> • Monitor for signs of respiratory distress (e.g. coughing, dyspnea, cyanosis, desaturation, etc.) with placement. The presence of these signs should prompt tube removal and new insertion attempt. • Obtain baseline pH. pH ≤ 6 indicates gastric placement. • Mark exit point on tube with permanent marker or tape. Measure and document external length from nare or mouth, to the proximal junction of the hub. 	<p>If daily x-ray is obtained, verify location of feeding tube.</p> <p>Assessment of clinical condition. Changes may include, but are not limited to:</p> <ul style="list-style-type: none"> • Prolonged or persistent coughing • Gagging, choking or general color change • Vomiting • Change in respiratory effort or rate, oxygen requirement, or decrease in pulse oximetry readings • Increased restlessness • Unexplained irritability or discomfort • Abdominal pain • Change in the quality of cry <p>Measure and document external tube length and pH:</p> <p>Intermittent feedings:</p> <ul style="list-style-type: none"> • Measure external tube length and pH prior to each feeding. Monitor for changes in pH, even if patient is on acid-blocking medications such as H2 blockers or proton pump inhibitors. • If unable to obtain gastric aspirate, employ additional techniques outlined in "Verification of Tube Placement" section • If still unable to obtain pH but external length measurement and clinical condition are unchanged,



Other non-radiologic methods for verification, including auscultation and observation of aspirates, have not been shown to be reliable enough to be the sole method of verification. None of these methods should be used alone to verify tube placement.

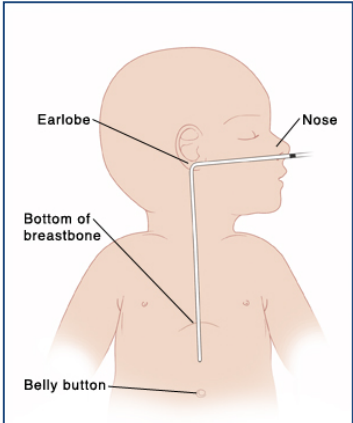
may feed or give medication as ordered.

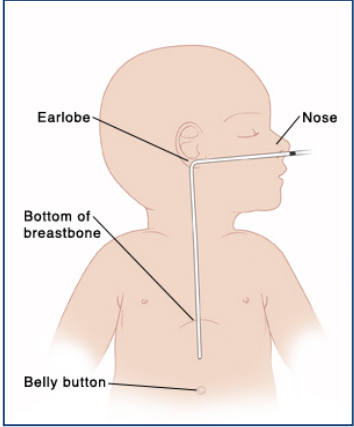
Continuous feedings:

- Measure external tube length once per shift (at minimum every 8 hours). If external tube length measurement is unchanged, exit site marker is visible and there are no changes in clinical condition (see signs above), continue feedings without interruption. (Continue to check for preaspirates according to your care community guidelines).

If the exit site marker is no longer visible or there are changes in length, assess patient condition and check pH.

- If unable to obtain pH and patient condition is stable, attempt to reposition the tube to proper measurement, attempt to aspirate and check pH again.
 - If tube is successfully repositioned to proper measurement, clinical condition is unchanged, and RN is unable to obtain pH, may proceed with use of tube and monitor patient closely for changes in clinical condition.
 - If there are changes in patient condition, pull tube, or consult provider for x-ray

		<p>to verify tube location in the stomach.</p> <p>If vomiting occurs at any time, tube placement should be verified as directed under “initial placement.”</p> <p>Other non-radiologic methods for verification, including auscultation and observation of aspirates, have not been shown to be reliable enough to be the sole method of verification. None of these methods should be used alone to verify tube placement.</p>
<p>Neonatal</p>	<p>Measurement: Nose-ear-mid umbilicus</p> <p>Monitor for signs of respiratory distress (e.g. coughing, dyspnea, cyanosis, desaturation) with placement. The presence of these signs should prompt tube removal and a new insertion attempt.</p> <p>Mark exit point on tube with permanent marker or tape. Measure and document external length from nare or mouth, to the proximal junction of the hub.</p>  <p>Obtain baseline pH. pH ≤ 6 indicates gastric placement.</p> <p>Other non-radiologic methods for verification, including auscultation and observation of aspirates, have not been shown to be reliable enough to be the sole method of verification. None of these methods should not be used</p>	<p>If x-ray is obtained for any reason, verify location of feeding tube.</p> <p>See ongoing verification process as described for Acute and Critical care.</p>

	<p>alone to verify tube placement.</p>	
<p>Home Care</p>	<p>Measurement: Nose-ear-mid umbilicus</p> <p>Monitor for signs of respiratory distress (e.g. coughing, dyspnea, cyanosis, desaturation) with placement. The presence of these signs should prompt tube removal and a new insertion attempt.</p> <p>Mark exit point on tube with permanent marker or tape. Measure and document external length from nare or mouth, to the proximal junction of the hub.</p>  <p>Obtain baseline pH. pH ≤ 6 indicates proper gastric placement.</p> <p>Other non-radiologic methods for verification, including auscultation and observation of aspirates, have not been shown to be reliable enough to be the sole method of verification. None of these methods should not be used alone to verify tube placement.</p>	<p>Assessment of clinical condition. Changes may include, but are not limited to:</p> <ul style="list-style-type: none"> • Prolonged or persistent coughing • Gagging, choking or general color change • Vomiting • Change in respiratory effort or rate, oxygen requirement, or decrease in pulse oximetry readings • Increased restlessness • Unexplained irritability or discomfort • Abdominal pain • Change in the quality of cry <p>Measure and document external tube length twice a day for continuous feeds or before each feeding with intermittent feeds. Measure from nare to the proximal junction of the hub.</p> <p>If the exit site marker is no longer visible or there are changes in length, or there are any changes in the child's condition (see above) do not feed or administer any medication. Contact home care or provider for follow up immediately.</p> <p>If the patient is on intermittent feedings:</p> <ul style="list-style-type: none"> • Measure external tube length and pH prior to each feeding. Monitor for changes in pH, even if patient is on acid-blocking medications such as H2-blockers or proton pump inhibitors. • If pH is ≤ 6 and there are no changes in clinical

		<p>condition, proceed with feeding.</p> <ul style="list-style-type: none"> • If the pH value is ≥ 6 or is significantly changed from the previous values, hold feeding and contact home care or provider for further instructions. • If unable to obtain pH, even after employing additional techniques, and external length measurement and clinical condition are unchanged, may feed as ordered. <p>Continuous feedings:</p> <ul style="list-style-type: none"> • Measure external tube length twice a day. If external tube length measurement is unchanged, exit site marker is visible and there are no changes in clinical condition (see signs above), continue feedings without interruption. (<u>Continue to check for preaspirates according to your care community guidelines</u>).
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