



Administering Medications through Feeding Tubes (GT, NG, JT, NJ, etc)

Updated August 2021

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This information should not replace guidance from a health care professional managing the care of your child or loved one. Caregivers should use this guide to help inform conversations as part of the health care team, working with medical professionals to determine the best medications and routes of administration to use given the individual patient's medical history and needs.

Sometimes oral intake is not possible or is not ideal. In these instances, the use of alternative routes can be quite beneficial. Both nutrition and medication administration can be improved or maintained through the appropriate use of enteral alternatives such as gastrostomy tubes (GT), nasogastric tubes (NG), gastrostomy buttons (G-Buttons; GB), jejunostomy tubes (JT), and nasojejunal tubes (NJ). However, these routes present unique barriers and considerations the traditional oral route does not.

Miscellaneous tips for medication administration via feeding tubes¹⁻⁸:

- **Product choices:**
 - Generally, products that are extended release or delayed release should not be crushed. There are a few exceptions, outlined below.
 - If using a liquid formulation, elixirs and suspensions may be less likely to clump with enteral nutrition compared to syrups.

- Some liquids may contain high amounts of sugar alcohols (e.g. sorbitol, malitol) or have a high osmolality. Both of these can increase the risk of developing abdominal cramping, bloating, nausea, and diarrhea. These side effects can be reduced via preparation methods such as further dilution or switching to an alternative medication formulation. This risk of diarrhea is higher when medications are administered via jejunostomy routes.
 - If the medication is intended for administration in the cheek or under the tongue, continue to use via those routes. Using these products through enteral tubes may reduce medication efficacy.
 - It is recommended to use sterile or filtered water for preparation and flushing of medications.

 - **Administration:**
 - If multiple medications need to be administered, only administer one medication at a time unless your provider advises you differently.
 - Flush with at least 5 to 10 mL water between each medication administration.

 - **Flushing:**
 - Regular flushing of the tube will prevent clogging and help prolong the life of the enteral feeding tube.
 - Pulsatile flushing can create turbulence within the feeding tube. This can “clean” the inner walls and help keep the tube from clogging.
 - Water is the best fluid to flush tubing. Sometimes, warm water may help prevent clogging.
 - Anecdotally, soda and soda water have been used to unclog enteral tubes. However, caution must be used with this method as the acidic nature of these liquids could further clog the tube by causing feed clumping.
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General crush and mix recommendations for administration of tablets via feeding tube^{1, 2, 6, 7}:

1. Stop enteral feed and flush.
 2. Place the tablet in the barrel of an appropriate size and type of syringe (usually, 30 to 50 mL syringes will suffice). May crush tablet within syringe.
 3. Draw up specified volume (per medication table below) within the syringe.
 4. Allow tablet(s) to disperse.
 5. Give medication.
 6. Draw up specified flush volume (per medication table below) in the same syringe. Shake well to ensure any residual medication is not left within the syringe.
 7. Give this volume to ensure the full dose has been administered.
 8. Flush tube, and restart feeds.
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In the table on the following pages, find information regarding which medications can be given through alternative enteral routes and recommendations on preparation.

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Acetazolamide (<i>Diamox</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Do not use extended release capsules. If tablets are used, note that this mixture can settle quickly. Be sure to shake well prior to administration. References: 1-16
Amantadine (<i>Symmetrel</i> [®] , <i>Gocovri</i> [®] , <i>Osmolex ER</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	May open immediate release capsules or crush immediate release tablets and mix in water. Do NOT use extended release formulations. If using liquid formulation, dilute with at least 10 to 30 mL water. This product has a very high osmolarity and considerable amounts of sorbitol which can increase the risk of diarrhea and GI side effects. Do not use extended release formulations References: 1-12, 17-19
Baclofen (<i>Gablofen</i> [®] , <i>Lioresal</i> [®] , <i>Ozobax</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Oral solution does contain sorbitol. If larger doses are required, consider diluting with at least 10 mL prior to administration. References: 1-12, 20
Brivaracetam (<i>Briviact</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Oral solution does contain sorbitol (209.8 mg/mL). If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. Tablets may be crushed, but may taste bad References: 1-12, 21
Calcium carbonate-vitamin D	Yes	Yes	30-50 mL (prepare) + 10-30 mL (rinse)	Effervescent tablets preferred (reduced potential for GI side effects). Effervescent tablets may help reduce volume (could use as little as 10 mL to mix and dissolve). Allow time for effervescent tablet to completely dissolve before administering. References: 1-12, 17-19

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Cannabidiol (<i>Epidiolex</i> [®])	Yes	No	--	Do not use with tubes made of polyvinyl chloride (PVC) as they may harden and potentially crack. References: 1-12, 23
Cannabidiol (artisanal brands)	Yes	No	--	Only oral solution/liquid eligible for enteral administration Do not use with tubes made of polyvinyl chloride (PVC) as they may harden and potentially crack. References: 1-12, 23
Carbamazepine (<i>Carbatrol</i> [®] , <i>Equetro</i> [®] , <i>Tegretol</i> [®] , <i>Tegretol XR</i> [®])	Yes	Possible, not preferred*	10-60 mL (prepare) + 10 mL (rinse)	If oral solution is used, dilute dose with 30-60 mL water to ensure medication does not stick to tubing and to prevent GI side effects as this contains sorbitol. If tablets are used, note that this mixture can settle quickly. Be sure to shake well prior to administration. Note, converting non-liquid formulations for enteral administration could still result in tube blockage. Separate dose administration from feeds by at least 1 hour. Do not use extended release capsules or tablets. *Potential for increased side effects or loss of efficacy with GJ/JT administration; consider decreasing dose and increasing frequency to avoid negative outcomes. References: 1-12, 26-28
Cenobamate (<i>Xcopri</i> [®])	--	--	--	-- References: 1-12, 29, 30
Clemizole	--	--	--	--
Clobazam (<i>Frisium</i> [®] , <i>Onfi</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Oral solution preferred; if oral film, consider transition to oral solution or tablet. References: 1-12, 31

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Clonazepam (<i>Klonopin</i> ®)	Yes	Yes	10-60 mL (prepare) + 10-15 mL (rinse)	Some liquid formulations may not be compatible with tubes composed of PVC or polystyrene. Please check with your physician or pharmacist. If using liquid, ensure this is diluted with 30-60 mL water to prevent binding to tubing. Flushing can be performed by flushing three consecutive times with 5 mL or by flushing with at least 5 mL water and immediately delivering a minimum of 10 mL feeds after. References: 1-12, 32,33
Clonidine (<i>Catapres</i> ®, <i>Kapvay</i> ®)	Yes	Yes	10 mL (prepare)* + 10 mL (rinse)	Oral solution preferred *Per 0.1 mg tablet References: 1-12, 34
Diazepam (<i>Valium</i> ®, <i>Valtoco</i> ®, <i>Diastat</i> ®)	Yes	Yes	10-60 mL (prepare) + 10 mL (rinse)	For oral liquid formulations, dilute with 30-60 mL water to prevent binding of the medication to tubing and to prevent GI side effects. If GT/NG: oral solution preferred. May mix with water to reduce resistance when flushing. If JT/NJ: tablets preferred to reduce GI discomfort. Oral solution does contain sorbitol. References: 1-12, 35-41
Eslicarbazepine (<i>Aptiom</i> ®)	Yes	Yes	10 mL (prepare)* + 10 mL (rinse)	*Minimal information regarding feeding tube administration available. May need more volume to ensure full dose is administered (both mixing and flushing). References: 1-12, 42,43
Esomeprazole (<i>Nexium</i> ®)	Yes	Yes	25-50 mL water and 5 mL air (prepare) + 25 mL water and 5 mL air (rinse)	Packet for oral solution or tablet preferred If preparing a solution, administer 5-10 mL at a time; invert syringe to ensure medication is thoroughly mixed after each 5-10 mL given. References: 1-12, 44-48

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Ethosuximide (Zarontin®)	Yes	Yes	10 mL (prepare)* + 10 mL (rinse)	Oral solution is preferred. Mix with equal amount of water (ex. Dose = 5 mL; mix with another 5 mL water) to reduce resistance to flushing. <i>*Minimal information regarding feeding tube administration available. May need more volume to ensure full dose is administered (both mixing and flushing).</i> References: 1-12, 49,50
Famotidine (Pepcid®)	Yes	--	10 mL (prepare) + 10 mL (rinse)	Oral solution preferred. If tablet, flush before and after administration. References: 1-12, 51
Felbamate (Felbatol®)	Yes	--	10 mL (prepare)* + 10 mL (rinse)	Oral solution preferred; however, may still require dilution prior to administration. Oral solution does contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. <i>*Minimal information regarding feeding tube administration available. May need more volume to ensure full dose is administered (both mixing and flushing).</i> References: 1-12, 52,53
Fenfluramine (Fintepla®)	Yes	--	--	If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. Product is compatible with most commercially available gastric and nasogastric feeding tubes. References: 1-12, 54
Gabapentin (Neurontin®)	Yes	Yes	15 mL (prepare) + 15 mL (rinse)	Oral solution preferred. However, liquid may contain xylitol and could contribute to GI discomfort. May dilute with liquid prior to administration to help reduce GI side effects. References: 1-12, 55
Glycopyrrolate (Cuvposa®, Robinul®)	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Oral solution preferred; however, the liquid does contain sorbitol and could contribute to GI side effects/discomfort. To prevent these effects, consider further diluting liquid with water. References: 1-12, 56-58

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Lacosamide (<i>Vimpat</i> [®])	Yes	n/a	10 mL (prepare) + 10 mL (rinse)	If oral solution, ensure tubes are composed of polyurethane and silicone. Oral solution does contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. References: 1-12, 59,60
Lamotrigine (<i>Lamictal</i> [®] , <i>Lamictal XR</i> [®] , <i>Subvenite</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	ODT and chewable tablets should be dissolved in a minimal amount of water as these dissolve very quickly. References: 1-12, 61-63
Lansoprazole (<i>Prevacid</i> [®])	Yes	Yes	10 mL water or sodium bicarbonate 8.4% (prepare) + 10 mL water or sodium bicarbonate 8.4% (rinse)	Oral solution not preferred – granules may block the tube. Capsules may be opened and dissolved in sodium bicarbonate 8.4%. Orally disintegrating tablets may be dissolved in water. If tube becomes blocked, you may “lock” the tube using sodium bicarbonate 8.4% to dissolve granules stuck in the tube References: 1-12, 64,65
Levetiracetam (<i>Keppra</i> [®])	Yes	Yes	10 mL (prepare)* + 10 mL (rinse)	Oral solution preferred. However, oral solution does contain malitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. <i>*Per 500 mg tablet</i> References: 1-12, 66-68
Levocarnitine (<i>Carnitor</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Oral solution preferred. References: 1-12, 69
Lorazepam (<i>Ativan</i> [®])	Yes	Yes	15 mL (prepare) + 15 mL (rinse)	Oral concentrate preferred. References: 1-12, 70-72
Lorcaserin	--	--	--	-- References: 1-12, 73

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Methsuximide (<i>Celontin</i> [®])	Yes*	No**	--	If enteral administration is desired, the compounded oral suspension must be used. This product will likely need to be filled with a specialty pharmacy. <i>*Must use oral suspension. No data to support opening and mixing capsule.</i> <i>**Administration via a jejunostomy tube is discouraged at this time (minimal/no data).</i> <small>References: 1-12, 74</small>
Midazolam (<i>Versed</i> [®] , <i>Nayzilam</i> [®])	Yes	Yes	--	Oral syrup does contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. The oral syrup, if combined with feeds, can create clumping and increase the possibility of clogging the tube. Please pause feeds and flush with water before and after administration. <small>References: 1-12, 75-78</small>
Mycophenolate mofetil (<i>Cellcept</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Oral solution preferred. However, oral solution does contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. Mycophenolate is considered a hazardous medication and opening capsules/crushing tablets are not considered to be safe. <small>References: 1-12, 79-81</small>
Mycophenolic acid (<i>Myfortic</i> [®])	--	--	--	Do not crush. Speak with your provider about alternative formulations. <small>References: 1-12, 82</small>
Nystatin (<i>Bio-Statin</i> [®])	Possible, not preferred	Possible, not preferred	10 mL (prepare) + 10 mL (rinse)	Ask your provider what the purpose of the medication is for the patient. For some, oral administration may be needed to appropriately treat or prevent the infection. Nystatin oral solution has a very high osmolality; if a non-oral route is needed, dilute solution with at least equal volume of water to dose. <small>References: 1-12, 83,84</small>

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Oxcarbazepine <i>(Trileptal[®], Oxtellar XR[®])</i>	Yes	Possible, not preferred*	10-60 mL (prepare) + 10 mL (rinse)	<p>If oral solution is used, dilute dose with 30-60 mL water to ensure medication does not stick to tubing and to prevent GI side effects as this contains sorbitol.</p> <p>If tablets are used, note that this mixture can settle quickly. Be sure to shake well prior to administration. Note, converting non-liquid formulations for enteral administration could still result in tube blockage.</p> <p>Separate dose administration from feeds by at least 1 hour.</p> <p>Do not use extended release capsules or tablets</p> <p><i>*Potential for increased side effects or loss of efficacy with GJ/JT administration; consider decreasing dose and increasing frequency to avoid negative outcomes</i></p> <p style="text-align: right;">References: 1-12, 85,86</p>
Perampanel <i>(Fycompa[®])</i>	Yes	Possible, not preferred*	10 mL (prepare) + 10 mL (rinse)	<p><i>*Site of absorption not specifically known, but due to rapid absorption, it is likely upper GI tract. Therefore, jejunostomy not ideal for administration. If administered jejunally, monitor for decreased efficacy.</i></p> <p>If using oral suspension, this product does contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water.</p> <p style="text-align: right;">References: 1-12, 87,88</p>
Phenobarbital	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	<p>If NJ/JT: mix liquid with water to reduce potential for side effects.</p> <p style="text-align: right;">References: 1-12, 89-92</p>

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Phenytoin (<i>Dilantin</i> ®, <i>Phenytoin InfaTabs</i> ®)	Yes	Possible, not preferred*	30-60 mL (prepare) + 10 mL (rinse)	<p><i>*Phenytoin requires specific amounts in the blood to be effective. Giving through a jejunostomy tube can affect these concentrations and is, therefore, not preferred.</i></p> <p>Stop the enteral feed and flush the tube 2 hours before dosing to prevent the medication from binding to the feeds (could potentially make medicine less effective).</p> <p>For liquid, mix with 30-60 mL water to prevent binding of the medication to the tubing.</p> <p>Allow powder from capsules to dissolve for about 5 minutes.</p> <p style="text-align: right;">References: 1-12, 93-95</p>
Polyethylene glycol 3350 (<i>Miralax</i> ®)	Yes	Yes	Per product instructions	<p>Follow product instructions.</p> <p style="text-align: right;">References: 1-12, 96,97</p>
Potassium citrate/citric acid (<i>Cytra-K</i> ®)	Yes	Possible, not preferred*	120-320 mL (prepare) + 10 mL (rinse)	<p>All products should be diluted with water prior to administration (regardless of oral or enteral routes). Oral solution should be mixed with 4 to 8 ounces of water.</p> <p><i>*This product is highly concentrated and could cause GI discomfort and/or diarrhea. If jejunal administration is required, this medication may require more than 8 ounces of water to avoid GI side effects.</i></p> <p style="text-align: right;">References: 1-12, 98</p>

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Prednisone (<i>Deltasone</i> [®] , <i>Rayos</i> [®])	Yes	Yes	<p><u>For doses less than 5 mg:</u> 5 mL (prepare) + 5 mL (rinse)</p> <p><u>For doses greater than 5 mg but less than 50 mg:</u> 10-20 mL (prepare) + 10 mL (rinse)</p> <p><u>For doses 50 mg or more:</u> 20-30 mL (prepare) + 10-20 mL (rinse)</p>	<p>If a liquid product is needed, oral solution preferred over the oral concentrate as it is less likely to cause GI irritation.</p> <p>If using oral concentrate or oral solution, these products do contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water.</p> <p>Do not crush delayed release tablets.</p> <p>Consider using prednisolone orally disintegrating tablets instead.</p> <p style="text-align: right;">References: 1-12, 101-103</p>
Prednisolone (<i>Millipred</i> [®] , <i>Orapred</i> [®] , <i>Pediapred</i> [®] , <i>Veripred</i> [®])	Yes	Yes	<p><u>For doses less than 5 mg:</u> 5 mL (prepare) + 5 mL (rinse)</p> <p><u>For doses greater than 5 mg but less than 50 mg:</u> 10-20 mL (prepare) + 10 mL (rinse)</p> <p><u>For doses 50 mg or more:</u> 20-30 mL (prepare) + 10-20 mL (rinse)</p>	<p>If a liquid product is needed, oral solution preferred over the oral syrup as it is less likely to cause GI irritation.</p> <p>If using oral syrup or oral solution, these products do contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. Of note, Orapred[®] brand contains less sorbitol compared to Pediapred[®] brand.</p> <p>Do not crush enteric coated tablets. Use orally disintegrating tablets.</p> <p style="text-align: right;">References: 1-12, 104-107</p>
Pregabalin (<i>Lyrica</i> [®] , <i>Lyrica CR</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	<p>Oral solution preferred. If oral solution not a feasible option, utilize capsule formulation.</p> <p>Oral solution does contain artificial sweeteners. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water.</p> <p style="text-align: right;">References: 1-12, 108,109</p>

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Primidone (<i>Mysoline</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	-- References: 1-12, 110
Rufinamide (<i>Banzel</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Oral solution does contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. References: 1-12, 111, 112
Soticlestat	Yes	--	10 mL (prepare) + 10 mL (rinse)	-- References: 1-12, 113
Stiripentol (<i>Diacomit</i> [®])	Yes	Yes	Per product instructions	Packet for oral suspension preferred. Do not open and crush capsule. Mix oral packet for suspension with package instructions. Oral suspension does contain sorbitol. If larger doses are required, consider diluting with at least 10 mL prior to administration. References: 1-12, 114-116
Topiramate (<i>Topamax</i> [®] , <i>Qudexy XR</i> [®] , <i>Trokendi XR</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	Tablets and oral suspension preferred. Do NOT open and mix extended release capsules. For tablets, must shake in water for 5 minutes to create a slurry mixture. Oral suspension does contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. Capsule contents do not work well for enteral tube administration as the granules/beads stick to the tubing and can block the tube. References: 1-12, 117-120
Tiagabine (<i>Gabitril</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)	-- References: 1-12, 121

Medication	NG/GT	JT/NJ	Amount of water to prepare non-liquid medications for enteral administration	Other Pertinent Information
Valproic acid/ Divalproex Sodium (<i>Depakote</i> [®] , <i>Depakote ER</i> [®] , <i>Depakote Sprinkles</i> [®] , <i>Depakene</i> [®] , <i>Depacon</i> [®])	Yes	No	10 mL (prepare) + 10 mL (rinse)	If using liquid, dilute with water to improve resistance to flushing. Do NOT use delayed release capsules or extended release tablets. May use delayed release tablets if directed to do so by physician. If NJ/JT: use tablet (delayed release). Your physician may choose to draw labs to ensure the patient remains within a therapeutic range. <small>References: 1-12, 122-128</small>
Vigabatrin (<i>Vigadrone</i> [®] , <i>Sabril</i> [®])	Yes	Yes	10 mL (prepare) + 10 mL (rinse)*	Use sachet formulation. *Mix packet with 10 mL and give specified volume per the patient's prescription. <small>References: 1-12, 129-131</small>
Zonisamide (<i>Zonegran</i> [®])	Yes	No	10 mL (prepare) + 10 mL (rinse)	Oral suspension does contain sorbitol. If the patient has GI discomfort or develops diarrhea, consider further diluting liquid with water. <small>References: 1-12, 132,133</small>

Abbreviations: gastrointestinal (GI); gastrostomy tube (GT); jejunostomy tube (JT); nasogastric tube (NG); nasojejunal tube (NJ); orally disintegrating tablet (ODT); polyvinyl chloride (PVC)

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