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Clogged Feeding Tubes: A Clinician's Thorn



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Clogged feeding tubes are responsible for significant lost delivery of enteral feeding; they also increase risks and costs to patients in the event that they must be replaced. In addition, misinformation abounds on the internet and among health care providers on how to prevent and safely address clogged tubes. This article will present evidence-based guidelines to clinicians for feeding tube clog prevention and declogging. The current products and techniques for declogging feeding tubes will be discussed with emphasis on practical declogging methods.

INTRODUCTION

Enteral feeding tubes are a lifeline for those patients who rely on them every day for nutrition, hydration and medication administration. According to the American Society for Enteral and Parenteral Nutrition (ASPEN), data from 2009 revealed that more than 245,000 patients per year require at least a temporary feeding tube during a hospital stay, along with another nearly 31,000 who are on enteral nutrition at home; numbers are not available for what are surely many thousands more in long term care facilities.¹ Estimates of the incidence of clogged feeding tubes range widely, from 12.5 - 45% over the life of a tube.¹⁻⁴ The cost of supplies, nursing care, and confirmatory abdominal x-rays required for simple nasoenteric tube replacement

is therefore significant when multiplied across such a large scale, and this is not even to speak of the dollars that could be saved by preventing the need for more involved tube replacements such as via fluoroscopy or endoscopy. Though reliable data on the healthcare costs of tube replacement are scarce, a single trip to fluoroscopy to replace a clogged J-arm at our facility can cost upwards of \$1,000, for example.

As many clinicians know all too well, clogged feeding tubes may result from several factors, including narrow tube diameter, insufficient water flushes, and inattention to proper medication administration.³ There are many anecdotal practices to declog feeding tubes such as using cranberry juice, cola, meat tenderizer and enzymes such as pancreatic lipase, papain, and chymotrypsin, but several studies cast doubt on the effectiveness of these remedies.^{5,6} A review of the literature indicates that the best way to manage clogged

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feeding tubes is by preventing them,^{1,2,7} but in the event that a feeding tube does become occluded, there are safe and effective methods established for restoring tube patency. Declogging methods include warm water flushes, enzymatic clog dissolvers, and mechanical clog removal tools, all of which are reviewed here. Suggestions for how to avoid clogged tubes in the first place are outlined as well.

Declogging

Despite a lack of evidence to support them, many practices persist regarding how to “properly” unclog a feeding tube. As is often true, the internet is as much a source of misinformation as it is of reliable advice when it comes to unclogging feeding tubes. A casual search, such as one that a home patient might undertake, yields erroneous and sometimes even unsafe information, including recommendations to use hot water, coffee, carbonated beverages, pipe cleaners, and meat tenderizer. These common but unsupported methods were repeated often on a number of different sites. Notably, these are only examples from a recent search, and some sites do offer the internet user sound advice; the danger lies in the lay person using an ineffective or even unsafe method, which in the worst case could lead to damaged GI mucosa, or more likely, a costly trip to the emergency department for a new tube.

Water

Research clearly supports water as the best choice for initial declogging efforts, as carbonated beverages, juices, and meat tenderizer have been shown to be ineffective.^{5,8,9} In fact, because of their acidic pH, juices and carbonated beverages may even cause formula

Table 1. TubeClear® Stem French Sizes and Lengths

Nasoenteral and Nasogastric Tubes				
French Size (Fr)	Tube Length (cm)	Tube Length (in)	Model #	Stem Color
10 - 18	91	36	NE-1036	Yellow
10 - 18	107	42	NE-1042	Grey
10 - 18	109	43	NE-1043	Purple
10 - 18	114	45	NE-1045	Orange
10 - 18	122	48	NE-1048	Clear
10 - 18	127	50	NE-1050	Blue
10 - 18	140	55	NE-1055	Green
NE MODEL CLEARING STEMS HAVE WHITE HAND GRIPS AND STEM LABELS				
Gastrostomy and Jejunostomy Tubes				
French Size (Fr)	Tube Length (cm)	Tube Length (in)	Model #	Stem Color
10-18	20	8	G-1008	Yellow
10-18	23	9	G-1009	Grey
10-18	25	10	G-1010	Purple
10-18	28	11	G-1011	Orange
10-18	30	12	G-1012	Clear
10-18	36	14	G-1014	Blue
G MODEL CLEARING STEMS HAVE BLACK HAND GRIPS AND STEM LABELS				

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protein precipitation within the tube, making the clog worse or leading to more clogging later on.² When clogs do occur, and they will, it is best to attempt clearance immediately using warm water and a gentle back and forth motion with the plunger of the syringe.² Alternating pressure and suction with the syringe should not be done with great force because ruptured feeding tubes have occurred.² Thus, syringes of 30 mL or larger are appropriate for gastrostomy tubes, but a 60 mL syringe should be used with smaller-French nasoenteric or jejunostomy tubes since smaller syringes generate excessive pressure.^{1,10} After instilling the lukewarm water, clamp the tube and let it soak for up to 20 minutes if a stubborn clog does not immediately allow for the back on forth motion.

Table 2. Recommendations for Declogging Feeding Tubes

- Start with gentle back and forth flush of warm water, using 30 or 60 mL syringe, not smaller. Allow to sit for 5 minutes and repeat flush actions.
- Try an enzymatic declogging agent such as Clog Zapper, or if available, mix one crushed tablet of Viokace with one 324 mg non-enteric-coated tablet of sodium bicarbonate or 1/8 teaspoon baking soda and 5 mL water and allow to soak in the tube before flushing with 30 to 60 mL water.
- A device to unclog will require a trip to the clinic or emergency room, but the Bionix is available for PEG tubes and the new Tube Clear system can be used with gastrostomy, jejunostomy, and nasoenteric tubes. No device is available for home use.

Table 3. Commercially Available Declogging Products

Product	Website	Phone
Bard Brush	http://www.bardaccess.com/feed-peg-brush.php	800-541-0890
Bionix Feeding Tube Declogger	http://www.bionixmed.com/MED_Pages/DeClogger.html	800-551-7096
Clog Zapper™	http://www.corpakmedsystems.com/enteralPages/clogZapper.html	800-323-6305
TubeClear®	http://www.tubeclear.com/	814-355-0003

Enzymes

If water does not work, then enzyme solutions are a second-line option. Current products in the United States include Viokace and Clog Zapper™. Aside from Viokace, all other pancreatic brands available in the U.S., such as Creon and Zenpep, are enteric coated and therefore cannot be used for this off-label purpose. Since it requires a prescription, Viokace is primarily used only in institutional or clinic settings unless the patient already has it at home for pancreatic enzyme replacement therapy. To use, one tablet of Viokace must be crushed and dissolved with one 324 mg non-enteric-coated tablet of sodium bicarbonate (or 1/8 teaspoon baking soda) and 5 mL water in order to create the alkaline pH for clog dissolving. Clog Zapper™ is a commercially available product from Corpak that requires only water for preparation and may be recommended for home use with training.¹¹

Mechanical Devices

There are currently three approved mechanical devices for clearing feeding tubes. The Bard brush and the Bionix Feeding Tube Declogger are for use only in shorter tubes such as gastrostomy and jejunostomy tubes, not nasogastric tubes. The Bard brush, which is designed to fit 20 Fr and larger PEG tubes, is a flexible nylon stem with soft bristles on the end that are intended to minimize mucosal injury.¹² Its recommended use is actually prophylactic tube cleaning and it is not recommended as a tool to clear clogs, though it does have the advantage of being commercially available online. The Bionix, on the other hand, is specifically

designed to remove clogs. A flexible plastic stem with a “screw and thread design,” this tool comes in varied sizes to fit gastrostomy or jejunostomy tubes sizes 14 to 24 French.¹³ *However, it is only for use by trained professionals in a medical setting.*

Finally, the latest device is the TubeClear® system, which only recently received FDA clearance for use in hospital settings and may be a remedy for resolving clogged nasogastric, gastrostomy, and jejunostomy tubes sizes 10-18 Fr (see Table 1).¹⁴ TubeClear® uses single use stems paired with a control box that plugs into AC power to create a jackhammer-like motion inside the tube. The advantage is its use in long, narrow Dobhoff-style tubes, which are more prone to clogging in the first place and which are time consuming and uncomfortable to replace. TubeClear® also has stems in development for clearing 8 Fr tubes and Gastro-Jejunostomy tubes – the most costly and time consuming to replace, however, these versions are not yet FDA cleared. A summary of declogging tips is presented in Table 2. See Table 3 for commercially available products.

Clog Prevention

As is true in so many cases in the medical setting, an ounce of prevention is worth a pound of cure. While clogged feeding tubes are impossible to prevent 100% of the time, there are a few simple procedures that will save patient discomfort, time, lost feeding delivery, lots of frustration, and money.

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Table 4. University of Virginia Health System Declogging Handout¹⁹

What do You do if Your Feeding Tube Clogs?

To avoid clogged feeding tubes, flush gently.

Always flush the tube immediately before and after feeding with at least 30 mL (1 ounce) of water.

- Never mix medicine with tube feeding unless advised to do so by your healthcare practitioner.
- Flush tube with at least 30 mL of water before and after all medications.
- Flush tube with at least 5 mL water between each medication if more than one is given.
 - Request liquid medications if available; be aware that some liquid preparations can cause diarrhea due to sorbitol content.
- Crush medicine to a fine powder and disperse in 5 mL of warm water. Always check with your pharmacist first to be sure it is okay to crush a particular medicine.
 - Crush with mortar and pestle or other pill crushing device such as Silent Knight, etc.
- Never crush an enteric-coated, time-released, or sustained-release tablet or capsule.
- Never mix fiber supplement with tube feeding formula unless instructed.
- Flush tube with at least 30 mL water before and after fiber supplement administration (but first check with health care provider before putting a fiber supplement down any tube), if used.

What to do when your tube is clogged:

- Warm water is often effective and should be front line treatment.
 - 60 mL syringe filled with lukewarm water
 - Do not try to force the water in, gently and firmly push and pull the plunger back and forth.
 - Clamp the tube for 20 minutes allowing the water to “soak”. Repeat if necessary.

For more information see:

Barnadas G. *Navigating Home Care: Enteral Nutrition – Part One*. Practical Gastroenterology 2003; XXVII(10):13.

Coping Well with Home Enteral Nutrition - Words of wisdom from resilient adult consumers. www.copingwell.com/copingwell/HENCopingManual.pdf.

We advise against using anything else such as carbonated beverages or meat tenderizer to unclog your tube. Clinical studies have not shown them to be effective.

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Tube Diameter

Common sense tells us that the smaller the tube diameter (and also the longer the tube), the more likely the tube is to clog. While flexible, small-bore feeding tubes are the obvious choice for nasoenteric feeding (as opposed to Salem Sump™ type tubes), our anecdotal experience at our institution has been that 12 Fr feeding tubes clog less often than 8 or 10 Fr tubes without sacrificing

patient comfort and should therefore be considered, particularly if smaller tubes have failed. In addition, we use a 24 Fr PEG with a 12 Fr jejunal extension for the same reason. Similarly, 12 Fr jejunal extension tubes through 24 Fr PEGs clog significantly less often than 8-10 Fr tubes, and some case series have borne out this observation.¹⁵

Table 5. 12 Tips to Prevent Clogged Feeding Tubes

1. Use the largest diameter soft, small bore feeding tube feasible without sacrificing patient comfort. This includes jejunal extensions through PEGs.
2. Review all medication with a pharmacist to insure use of liquid or alternative forms of medication administration. Pharmacist review will include incompatibility of pill or liquids and recommendations for timing of medications.
3. Medications may need to be spaced out to avoid interactions.
4. Avoid adding medication directly to the enteral feeding.
5. Avoid use the capsule or extended release forms of medications as these forms can clog when they mix with formula or other pills and are not designed to go through a feeding tube.
6. All tablets should be ground to a fine powder using a mortar and pestle or pill crusher and dissolved in water before administration.
7. Flush with at least 15 mL water before and after each different medication. Always stop continuous or cycled feedings and flush with water before giving medications.
8. When finished with medication administrations, give a final flush.
9. Routinely flush feeding tubes using tepid water, never hot water. With continuous or nocturnal feedings, flush at least 30 mL every 4, 6, or 8 hours to prevent clogging. With bolus feedings, flush at least 60 mL before and after formula infusion.
10. If needed at all, limit residual checks as acidic gastric contents may cause proteins in enteral formulas to precipitate.
11. Review these steps for proper flushing and medication administration with each clinic/office visit with home clients.
12. Provide a handout with clear instructions on prevention to patients and caregivers and also the steps to deal with a clogged feeding tube, including numbers to call and when to seek medical intervention.

Medications

Combining a clear plan for medication delivery with flushing will limit clogged tubes. Medication lists should be given a thorough review by a pharmacist to promote the use of available liquid alternatives; to limit the use of capsules and extended release forms; and to identify which pills can be finely crushed using a mortar and pestle (or other crushing device such as the Silent Knight Pill Crusher by Medline Industries) and dissolved.⁶ Pharmacists might also suggest alternative delivery modes such as intravenous, subcutaneous, intramuscular, transdermal, or rectal in order to limit

the number of different medications that must be flushed down the feeding tube.^{3,16,17} Finally, pharmacists should be enlisted to advise regarding incompatible medications and when they should be separated by 30-60 minutes.³

Water Flushes

Routine, proactive flushing during feeding and medication administration is the best way to prevent many clogged tubes, yet up to 57% of nurses do not flush before giving medications according to various

reports.^{3,16-18} Therefore, proper flushing instructions for both home and institution feeding should be clear to the end provider or caregiver. There are variations in practice such as using sterile water when the tap water is not proven safe, and varied flushing frequencies, but consistent flushing before and after medication administration and bolus feedings, and periodically with continuous or cyclic feedings, is the most important intervention to prevent clogging.

For continuous feedings, a minimum volume 30 mL water flush should be administered at least every 8 hours to maintain tube patency and more as indicated for hydration needs.^{1,16,19} Enteral feedings should be stopped and the line flushed prior to giving medications and again before turning the feedings back on. For bolus or intermittent feedings, at least 60 mL should be flushed *before and after* the enteral formula. The same goes for medications: flush 5, 15, or 30 mL or more *between each medication*.^{1,3,16,19} Finally, if medications are given at the same time as formula boluses, they should all be separated by water, i.e., *water-medication-water-formula-water*. See Table 4 for the University of Virginia Health Systems handout for home patients. Table 5 summarizes the recommendations for clog prevention.

CONCLUSION

Clogged feeding tubes increase health care costs and decrease nutrient delivery. Consistent and scheduled flushing of all types of feeding tubes is the best defense against clogs. However, while avoiding clogged feeding tubes is a worthy goal, they can and will occur. When they do, the front line for declogging is to use lukewarm water as described, and failing that, commercial products are available. Importantly, there is a gap in health care provider knowledge when it comes to best practices for declogging feeding tubes, and addressing this barrier will help prevent lost nutrition for patients, along with wasted time and money. Finally, as declogging devices become more sophisticated and mainstream, tube replacements due to occlusion will hopefully become a rare occurrence. ■

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