Feeding Administration

Current evidence supports early initiation of trophic (minimal enteral) feeds within the first 48 hours of life, followed by progressive advancement at rates of 30–40 mL/kg/day in clinically stable extremely preterm infants, delivered via nasogastric (NG) or orogastric (OG) gavage tube.[1][2] Below is a synthesis of the key recommendations across the literature.

Initiation and Trophic Feeding - Enteral feeds in ELBW infants (<28 weeks or <1000 g) typically begin as very small trophic volumes, 12–24 mL/kg/day, via a NG/OG tube within the first 1–3 days after birth, ideally using colostrum or expressed breast milk.[3][4][5] Parenteral nutrition (PN) is provided concurrently until full enteral feeds are tolerated. A Cochrane review found no strong evidence that early trophic feeding increases the risk of NEC compared with enteral fasting, and it may promote gastrointestinal maturation.[5] Recent trials support early progressive feeding (advancing volumes within the first 96 hours) rather than prolonged trophic-only periods, as this reduces PN duration and central line days without increasing NEC risk.[1][6]

Rate of Advancement - The landmark **SIFT trial** compared daily feed increments of 30 mL/kg/day (faster) vs. 18 mL/kg/day (slower) in infants <32 weeks or <1500 g. There was no significant difference in survival without moderate or severe neurodevelopmental disability at 24 months (65.5% vs. 68.1%; adjusted RR 0.96, 95% CI 0.92–1.01), nor in NEC (5.0% vs. 5.6%) or late-onset sepsis rates.[7]

A Cochrane meta-analysis of 14 trials confirmed that slow advancement (15–24 mL/kg/day) does not reduce NEC risk compared with faster advancement (30–40 mL/kg/day), and may slightly increase the risk of invasive infection and delay achievement of full feeds.[8] Based on this evidence, advancement rates of 30–40 mL/kg/day are now considered safe and are increasingly recommended for stable very preterm infants.[1][9][2]

Feeding Method: Bolus vs. Continuous - Standard practice is **intermittent bolus gavage feeding**, typically administered over 10–20 minutes every 2–3 hours.[10][11] Bolus feeding is considered more physiological, as it promotes cyclical surges of gastrointestinal hormones similar to the mature gut.[11] A Cochrane review found no clear superiority of continuous over intermittent bolus feeding in preterm infants <1500 g.[10] Continuous feeding may be considered for the smallest infants (e.g., <800 g) who do not tolerate bolus feeds.[5]

Tube Route: Nasogastric vs. Orogastric - The choice between NG and OG tubes remains debated. **OG tubes are traditionally preferred** because preterm infants are obligate nasal breathers, and nasal tubes may increase airway resistance.[11] However, a 2025 systematic review and meta-analysis found that **NG feeding** reduced time to full enteral feeds by ~1.6 days compared with OG feeding, though it was associated with more episodes of bradycardia and desaturation.[12] A randomized trial also showed NG tubes had significantly less tube displacement and dislodgement.[13][14] The evidence is of low to very low certainty, and NICU practice varies.

Gastric Residual Monitoring - Recent evidence supports **abandoning routine gastric residual assessment**, as omitting this practice reduces time to full feeds without increasing NEC or other complications. A large confirmatory trial is underway.[1][15]

Milk Type - Breast milk (maternal or donor) is the preferred substrate. When maternal milk supply is limited, **donor human milk reduces NEC incidence compared with formula**.[1] Fortification of human milk is typically initiated once full enteral feeds (~150 mL/kg/day) are achieved.[15]

Summary of Practical Approach

Parameter	Recommendation	References
Initiation	Trophic feeds (12–24 mL/kg/day) within first 24–48 hours	[1], [2], [3]
Progressive feeding	Begin advancing within 96 hours of birth	[4], [5]
Advancement rate	30–40 mL/kg/day in stable infants	[4], [6], [7]
Feeding method	Intermittent bolus every 2–3 hours (10–20 min)	[8], [9]
Tube route	NG or OG per unit protocol; NG may shorten time to full feeds	[9], [10], [11]
Target full feeds	150–160 mL/kg/day	[12]
Milk type	Maternal breast milk preferred; donor milk if unavailable	[4]
Gastric residuals	Routine monitoring may be omitted	[4]

It is important to note that these recommendations apply primarily to hemodynamically stable extremely preterm infants. Infants with significant growth restriction, abnormal antenatal Dopplers (absent/reversed end-diastolic flow), or hemodynamic instability may warrant a more cautious approach, though even in these subgroups, Cochrane data have not shown that delaying progressive feeds reduces NEC.[8][2]

References

1. Enteral Nutrition in Neonates: Current Evidence From Clinical Trials and Evolving Strategies. Romero-Lopez M, Salas AA. Seminars in Perinatology. 2026;50(4):152236. doi:10.1016/j.semperi.2026.152236.
2. Early Enteral Feeding in Preterm Infants. Kwok TC, Dorling J, Gale C. Seminars in Perinatology. 2019;43(7):151159. doi:10.1053/j.semperi.2019.06.007.
3. Advances in Nutrition of the Newborn Infant. Harding JE, Cormack BE, Alexander T, Alsweiler JM, Bloomfield FH. Lancet (London, England). 2017;389(10079):1660-1668. doi:10.1016/S0140-6736(17)30552-4.
4. Early Full Enteral Feeding for Preterm or Low Birth Weight Infants. Walsh V, Brown JVE, Copperthwaite BR, Oddie SJ, McGuire W. The Cochrane Database of Systematic Reviews. 2020;12:CD013542. doi:10.1002/14651858.CD013542.pub2.
5. Early Trophic Feeding Versus Enteral Fasting for Very Preterm or Very Low Birth Weight Infants. Morgan J, Bombell S, McGuire W. The Cochrane Database of Systematic Reviews. 2013;(3):CD000504. doi:10.1002/14651858.CD000504.pub4.
6. Early Progressive Feeding in Extremely Preterm Infants: A Randomized Trial. Salas AA, Li P, Parks K, et al. The American Journal of Clinical Nutrition. 2018;107(3):365-370. doi:10.1093/ajcn/nqy012.
7. Controlled Trial of Two Incremental Milk-Feeding Rates in Preterm Infants. Dorling J, Abbott J, Berrington J, et al. The New England Journal of Medicine. 2019;381(15):1434-1443. doi:10.1056/NEJMoa1816654.
8. Slow Advancement of Enteral Feed Volumes to Prevent Necrotising Enterocolitis in Very Low Birth Weight Infants. Oddie SJ, Young L, McGuire W. The Cochrane Database of Systematic Reviews. 2021;8:CD001241. doi:10.1002/14651858.CD001241.pub8.
9. Commentary on “compatibility of rapid enteral feeding advances and noninvasive ventilation in preterm infants—an observational study”. Buck CO, Taylor SN. Pediatric Pulmonology. 2022;57(5):1113-1116. doi:10.1002/ppul.25867.
10. Continuous Nasogastric Milk Feeding Versus Intermittent Bolus Milk Feeding for Preterm Infants Less Than 1500 Grams. Sadrudin Premji S, Chessell L, Stewart F. The Cochrane Database of Systematic Reviews. 2021;6:CD001819. doi:10.1002/14651858.CD001819.pub3.
11. Short Versus Long Feeding Interval for Bolus Feedings in Very Preterm Infants. Ibrahim NR, Van Rostenberghe H, Ho JJ, Nasir A. The Cochrane Database of Systematic Reviews. 2021;8:CD012322. doi:10.1002/14651858.CD012322.pub2.
12. Effectiveness of Nasogastric Versus Orogastric Tube Feeding in Preterm Infants: A Systematic Review and Meta-Analysis. Bharadwaj SK, Devi R, Somanath SH, Pullattayil AK, Dhyani VS. Journal of Pediatric Gastroenterology and Nutrition. 2025;80(4):723-732. doi:10.1002/jpn3.12476.
13. Achievement of Full Oral Feeding in Preterm Infants Using a Nasogastric or an Orogastric Tube: A Randomized Comparative Study. Chuaysong B, Iamchaimongkol A, Pongmee P, Nuntnarumit P, Swatesutipun B. The Journal of Maternal-Fetal & Neonatal Medicine : The Official Journal of the European Association of Perinatal Medicine, the Federation of Asia and Oceania Perinatal Societies, the International Society of Perinatal Obstetricians. 2025;38(1):2532840. doi:10.1080/14767058.2025.2532840.
14. Nasogastric Versus Orogastric Bolus Tube Feeding in Preterm Infants: Pilot Randomized Clinical Trial. Badran AT, Hashish M, Ali A, Shokeir M, Shabaan A. American Journal of Perinatology. 2021;38(14):1526-1532. doi:10.1055/s-0040-1713865.
15. Routine Monitoring of Gastric Residual for Prevention of Necrotising Enterocolitis in Preterm Infants. Abiramalatha T, Thanigainathan S, Ramaswamy VV, Rajaiah B, Ramakrishnan S. The Cochrane Database of Systematic Reviews. 2023;6:CD012937. doi:10.1002/14651858.CD012937.pub3.

NG/OG tube clamping post feed

There is **no evidence-based recommendation specifying a standard duration for clamping NG/OG tubes after bolus feeding** in preterm infants on CPAP or other noninvasive respiratory support. This practice is largely driven by unit-specific protocols rather than published consensus recommendations.

What the literature supports: The prevailing practice described in studies is to leave the NG/OG tube open (vented) between feeds rather than clamped, to allow gastric decompression of air introduced by CPAP. Behnke et al. described a protocol in which the tube was "left open and vented" between feeds, with active decompression performed routinely during rounds and additionally as needed due to gastric distension.[1] Borenstein-Levin et al. similarly noted that among infants on noninvasive ventilation, bolus feeding may increase reflux while continuous feeding hinders gastric decompression, highlighting the importance of venting.[2]

Rationale against routine clamping on CPAP: CPAP transmits positive pressure to the gastrointestinal tract, causing gaseous distension. Clamping the tube prevents venting of this air, potentially worsening abdominal distension and respiratory compromise.[3]

Gastric emptying in preterm infants on CPAP is fastest in the first 1–2 hours post-feed, with significant residual volumes persisting at 2-3 hours. This suggests that if clamping is practiced (e.g., to prevent reflux of feed contents), a period of **30–60 minutes** post-feed is commonly used in institutional protocols before opening to vent, though this is not evidence-based.[4]

Balancing the Risks: The presence of a tube traversing the gastroesophageal junction increases GER, particularly in the first postprandial hour.[5] This suggests that if the tube is clamped during this period, the risk of GER into the esophagus may actually be higher than the risk of losing feed through vented tube. Conversely, bolus feeding with continuous feeding hinders gastric decompression, and for infants on NIV, length of feeding affects gastric venting. Bolus feeds allow for better gastric decompression between feeds compared with continuous feeds.[6]

Practical approach: Many NICUs clamp the tube briefly after gravity bolus feeding (typically **15–30 minutes**) to allow the feed to settle and reduce immediate reflux, then open the tube to vent air, elevating the syringe barrel for gravity prevention of milk refluxing out the NG/OG . However, some units skip clamping entirely and leave the tube open to air immediately after feeding, particularly in infants on higher CPAP pressures where gastric distension is a concern. The optimal approach should be guided by individual unit protocols, the infant's clinical tolerance, and degree of abdominal distension.

References

1. Compatibility of rapid enteral feeding advances and noninvasive ventilation in preterm infants—An observational study. Behnke J, Estreich V, Oehmke F, et al. Pediatric Pulmonology. 2022;57(5):1117-1126. doi:10.1002/ppul.25868.
2. Continuous Versus Bolus Gastric Tube Feeding in Very Low Birth Weight Infants Supported With Noninvasive Respiratory Support: A Randomized, Pilot Study. Borenstein-Levin L, Riskin A, Hochwald O, et al. American Journal of Perinatology. 2024;41(S 01):e394-e399. doi:10.1055/s-0042-1755551.
3. Effect of Nasal Continuous Positive Airway Pressure vs Heated Humidified High-Flow Nasal Cannula on Feeding Intolerance in Preterm Infants With Respiratory Distress Syndrome: The ENTARES Randomized Clinical Trial. Cresi F, Maggiora E, Lista G, et al. JAMA Network Open. 2023;6(7):e2323052. doi:10.1001/jamanetworkopen.2023.23052.
4. Ultrasound Assessment of Gastric Emptying in Premature Infants Treated With Non-Invasive Ventilatory Support. Hlaing AY, Weinberger B, Schanler R, Cerise J, Kurepa D. Journal of Pediatric Gastroenterology and Nutrition. 2021;73(2):197-202. doi:10.1097/MPG.0000000000003157.
5. Nonpharmacological Management of Gastroesophageal Reflux in Preterm Infants. Corvaglia L, Martini S, Aceti A, et al. BioMed Research International. 2013;2013:141967. doi:10.1155/2013/141967.
6. Continuous Versus Bolus Gastric Tube Feeding in Very Low Birth Weight Infants Supported With Noninvasive Respiratory Support: A Randomized, Pilot Study. Borenstein-Levin L, Riskin A, Hochwald O, et al. American Journal of Perinatology. 2024;41(S 01):e394-e399. doi:10.1055/s-0042-1755551.