The Daily Dreaded Drama of the Disposable Nipple, Part 2: Resolution!
Research and Statements on Nipple Flow Rates / References

Mathew, O. P. (1988). Nipple units for newborn infants: A functional comparison. *Pediatrics*, 81(5), 688–691.

> "However, wide variability in performance was observed not only between different types of nipple units but also within the same type."

Mathew, O. P. (1991b). Science of bottle feeding. *Journal of Pediatrics*, 119(4), 511–519. https://doi.org/10.1016/s0022-3476(05)82397-2

> "Wide variability in milk flow was present within and among the nipple types studied."

Jackman, K. T. Go with the flow: Choosing a feeding system for infants in the neonatal intensive care unit and beyond based on flow performance. *Newborn and Infant Nursing Reviews*. 2013;13(1):31–34. https://doi.org/10.1053/j.nainr.2012.12.003

> "Disposable nipples appeared to have more variability in flow rate measurements between different disposable units as well as between trials using the same unit. "

Damian L, Johnson K. Nipple flow rates: What are they really and how does this affect our clinical practice? Poster presented at: National Association of Neonatal Therapists Conference; 2014; Atlanta GA.

> "Disposable hospital nipples have more variation in flow rates from each unit than commercial nipples."

> "Flow rates of commercially available nipples were more consistent with multiple trials."

Pados, B. F., Park, J., Thoyre, S. M., Estrem, H., & Nix, W. B. Milk flow rates from bottle nipples used for feeding infants who are hospitalized. *American Journal of Speech Language Pathology*. 2015;24(4), 671–679. https://doi.org/10.1044/2015_AJSLP-15-0011

> "This study confirmed results of previous studies which found a wide range in milk flow rates from different nipple types."

> "Dr. Brown's brand was the most consistent brand, with the lowest mean CV of all brands."

Pados, B. F., Park, J., Thoyre, S. M., Estrem, H., & Nix, W. B. Milk flow rates from bottle nipples used after hospital discharge. MCN. *The American Journal of Maternal/Child Nursing*. 2016 Jul/Aug;41(4):237-243. doi: 10.1097/NMC.0000000000000244.

> "Variability in flow rates means that from one feeding to the next, even if the same nipple type is used, the infant is exposed to different flow rates. Medically fragile infants may not be able to adapt to this variability. Choosing a nipple that is consistent in the flow rate delivered may be more supportive of the infant's ability to learn and develop oral feeding skills."

McGrattan, K. E., McFarland, D. H., Dean, J. C., Hill, E., White, D. R., & Martin-Harris, B. Effect of single-use, laser-cut, slow-flow nipples on respiration and milk ingestion in preterm infants. *American Journal of Speech-Language Pathology*. 2017;26(3):832–839. https://doi.org/10.1044/2017_AJSLP-16-0052

> "Taken together, it appears the variability within clinically available, laser cut, SF nipples introduces unknown variability in how they modify milk flow and, consequently, may hinder the ability to consistently provide the intended treatment effect in susceptible infants."

> "Reusable home nipple products that offer infants a slower, more consistent restriction to milk flow across bottle feedings may provide a greater respiratory benefit. Future investigations are necessary to elucidate the effects of these other reusable, flow-restricting products that may serve as a more reliable and effective treatment regimen."

Bell, N., & Harding, C. An investigation of the flow rates of disposable bottle teats used to feed preterm and medically fragile infants in neonatal units across the UK in comparison with flow rates of commercially available bottle teats. *Speech, Language, and Hearing*. 2019; 22(4): 227–235. https://doi.org/10.1080/2050571X.2019.1646463

> "Measurement of variability in flow rate identified a moderate mean flow rate for hospital disposable teats, with a low mean variability in flow rate for commercial teats. "

Pados, B. F., Park, J., & Dodrill, P. Know the flow: Milk flow rates from bottle nipples used in the hospital and after discharge. *Advances in Neonatal Care*. 2019; 19(1):32–41. https://doi.org/10.1097/ANC.0000000000000538.

> "Single-use nipples commonly used for feeding infants with medical complexity were found to be highly variable and/or faster flow than other products; the safety of these products for feeding infants with medical complexity needs to be reconsidered."

Pados B. Milk flow rates from bottle nipples: What we know and why it matters. *Nursing for Women's Health*. 2021;25(3):229-235. https://doi.org/10.1016/j.nwh.2021.03.006

> "In other words, if an infant were fed with a single-use nipple at one feeding and then another single-use nipple at the next feeding, the flow rate delivered between those two nipples (of the same nipple type) could be very different."

> "Additionally, there are sometimes issues with the quality of the products; for example, several nipples were found to not have an opening."

Marshall, J., Clarke, S., Escott, C., & Pados, B. F. Assessing the flow rate of different bottles and teats for neonates with feeding difficulties: An Australian context. *Journal of Neonatal Nursing.* 2021;27(4):285-290. https://doi.org/10.1016/j.jnn.2020.11.014.

> "There was also moderate to high variability observed within the same teat/bottle system for many products."

Macias R, Peterson D, Korkis L, Edson R, Gall R. Prevalence and Impact of Feeding-Related Events on Hospital Stay in Preterm and Term Newborns. *Adv Neonatal Care*. 2023 Dec 1;23(6):541-546. Doi: 10.1097/ANC.0000000000001115.

> "Flow rate variability among nipples used in hospitals has been shown to contribute to the degree of physiologic instability experienced by infants."

For the most recent information on flow rate testing by Britt Pados:
https://www.infantfeedingcare.com/research

Additional Reference cited:

IFCDC Recommendations for Best Practices for Feeding, Eating and Nutrition Delivery. NICU Recommended Standard, Infant Family Centered Developmental Care, website. https://nicudesign.nd.edu/nicu-care-standards/ifcdc--recommendations-for-best-practices-for-feeding-eating-and-nutrition-delivery/. Accessed November 1, 2024.