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Parameters of Milk Expression for Parents of Nonbreastfeeding Newborns

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When Study Results Conflict

It can be frustrating when we diligently look to research as a guide to our clinical practice and the results of various studies are different, sometimes even diametrically opposed. Conflicting research results are often due to differences in study populations that we have not identified, or some confounding factor that we overlooked. The more we understand the methodology of a study, the better we can analyze how much weight to give the findings, and determine what it contributes to our knowledge. Journal word count requirements make it difficult for authors to fully explain the methodology of their study. The Consolidated Standards of Reporting Trials (CONSORT) guidelines aim to standardize the information provided in reports of randomized controlled trials (Begg et al., 1996) and parallel intervention trials (Schulz, Altman, & Moher, 2010), so that sufficient information is supplied to allow the methods to be fully understood and replicated.

Research Design

Performing research is difficult. It's difficult to design a study to eliminate known confounders; to recruit subjects that are a representative of the human population; to get everything to work properly and have enough subjects complete the protocol to yield reliable results. It's difficult to step back from one's work and look with fresh eyes, free from confirmation bias, to see things that have become so much a given in our world that we don't even notice them. It may be impossible to ferret out our own unconscious motivations (Pollack, 1999). In an attempt to avoid commercial bias, the brand and model of breast pump equipment used may not be specified (Fewtrell et al., 2001), making it difficult to evaluate relative performance. Additionally, measures may vary—it can be hard to compare average daily breast milk expressed to the composite breast milk expression over several days or week; 500 ml/day by day 7, 750 ml/day by day 14, or 3,500 ml/week are currently accepted figures for sufficient human milk production in expressing mothers of preterm infants. Only qualitative research has been published on chestfeeding in transmasculine fathers (MacDonald et al., 2016). Graphs that convey both range (the amount each individual subject made)

and mean (the average of all subjects, usually indicated by a dot) are most helpful, showing if the intervention worked better for some than for others.

Dose

“Dose” is an important consideration in research. Did each group in the study receive the same amount of the intervention? Inadvertent dose differences can be introduced innocently. For example, Lussier et al. (2015) intended to avoid burdening their research volunteers by instructing them to hand express milk for 15 to 30 minutes every 3 hours starting 6 hours after birth. The comparison group was supplied with double collection kits (Jones, Dimmock, & Spencer, 2001) and instructed to use the electric breast pump for 15 to 30 minutes every 3 hours. Although, on the surface, the dose seems comparable, this meant that each breast only got half as much expression in the manual-expression group compared to the electric-pumping group. Mothers manually expressed each breast individually, while mothers electric-pumping expressed both breasts simultaneously. This dosage difference was not clear in the published research article, so was not identified by the peer reviewers, but was only revealed at a presentation by several of the authors. In cases where personal communication with authors is not possible, letters to the journal editor allow readers to ask questions about factors the authors may not have considered, which subsequently become part of the record for other readers to access.

Timing of Expression

Another factor which affected both groups equally was the later start of expression, which was guided by the published research of the time (Hill, Aldag, & Chatterton, 2001; Jones et al., 2001). There is now a body of evidence that milk production is maximized by initiation of breastfeeding within 1 to 2 hours of birth (Bystrova et al., 2007; Nakao, Moji, Honda, & Oishi, 2008), or similarly, early milk removal (Parker, Sullivan, Krueger, Kelechi, & Mueller, 2012). Pump-dependent mothers produce more milk with additional manual expression 3 to 5 times daily in the first 5 days postpartum (Larkin, Kiehn, Murphy, & Uhryniak, 2013; Morton et al., 2009).

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In light of this information, it is unsurprising that the mothers who used the electric pump alone for the first 7 days in Lussier and colleague's study made more milk on average than those who hand expressed because each pumped breast was being emptied for twice as long as the hand expressed breast. For all participants, an increased number of daily expressions was associated with more milk expressed. Mothers who hand expressed averaged one less expression per 24 hours, *and* were expressing each breast only half the time, which compounded the difference in their expression dosage. The reason for the reduced number of expressions in the manual-expression group was not explored. If manual expression was more burdensome, this needs to be clarified in further research. However, in mothers of full-term infants with transient latch difficulties, manual expression was associated with a greater likelihood of breastfeeding after discharge versus mothers assigned electric pumping during the postpartum hospitalization (Flaherman et al., 2012). Exclusive breast pumping seems to be burdensome as well; mothers of healthy infants were 1.7 times more likely to abandon breast milk feeding than were mothers who directly breastfed, or combined breastfeeding and breast milk feeding (Jiang et al., 2015).

Let's review other relevant evidence and see where this study fits into the big picture. Even with the most advanced breast pumps, early milk output is lower in protocols that use only the breast pump (Meier, Engstrom, Janes, Jegier, & Loera, 2012) than in those that use manual expression as well (Larkin et al., 2013). Colostrum or transitional milk fat content is higher in manually expressed samples than pumped samples in early postpartum (Mangel et al., 2015), or with both techniques combined (Morton et al., 2012a) suggesting better breast emptying with manual expression, especially before lactogenesis II. Despite more colostrum being removed by manual expression than electric pumping (Ohyama, Watabe, & Hayasaka, 2010), the double dose of pump expression could result in the increased milk removal observed in Lussier's study.

Slusher et al. (2012) also found that double electric pumping resulted in more milk over time than manual expression alone when mothers were instructed to express starting at 2 hours postpartum, and express every 2 hours for at least 20 minutes, or until 2 minutes past the last observed drops of milk to effectively drain both breasts at each expression. This represents an earlier start to expression, and more individualized instruction to maximize breast emptying. Mothers using *sequential* pumping with the

double-electric pump were told to pump each breast for at least 15 minutes. When given these more individualized instructions, mothers who used manual expression alone were able to express more than 500 ml by 6 days postpartum, and meet their infants' milk needs, though the dual-electric pumping mothers expressed significantly more milk overall across the study week. More research is needed to determine the ideal balance of manual and machine expression and which machines are most effective.

Additionally, how quickly expression is begun after birth is important (Parker et al., 2012). This makes sense mechanistically, since oxytocin during labor pushed the baby down the pelvis, it also pushes colostrum down the ducts so it is uniquely available after birth. Parker's study had not yet been published when Lussier's research was designed. Standard of practice at the time was guided by (Hill et al., 2001) finding that mothers of preterm infants are more likely to make sufficient milk to supply their infants if they begin pumping within 6 hours of birth. They also found that most mothers who made sufficient milk pumped 7 to 8 times daily over the first 3 to 6 weeks. The previous practice in the 1990s was to start expressing within 24 hours to allow mothers to recover from birth. The lingering idea that mothers are disabled or weakened after birth can interfere with them being asked to consider

Expression Recommendations for Non-Breastfeeding Preterm or Ill Infants

- Manual expression of colostrum
- Expression begins in the first hour after birth
- Brief, pre-expression breast massage
- Expression in the presence of the infant or in skin-to-skin contact
- Simultaneous dual expression with a breast pump with manual compression of the breast
- Manual expression after pumping 3 to 5 times a day in the first 5 days postpartum
- Expressing at least 6 to 8 times a day for the early weeks

early expression. Incomplete adoption of evidence-based practices for improving milk release, such as kangaroo mother care (Hill & Aldag, 2005), or breast massage (Hill et al., 2001), also potentially affects milk expression research.

Current Expression Recommendations for Nonbreastfeeding Infants

Though no study is perfect, each one provides nuggets of information that we can use to synthesize a more complete picture of reality. As of this writing, the balance of our evidence on expressing for nonbreastfeeding preterm or ill infants supports manual expression of colostrum (Ohyama et al., 2010), beginning expression in the first hour after birth (Parker et al., 2012), brief pre-expression breast massage (Jones et al., 2001), expressing in the presence of the infant or during/after skin-to-skin-contact (Hill et al., 2001), simultaneous dual expression with a breast pump with manual compression of the breast (Morton, 2012b), and further manual expression after pumping 3 to 5 times a day the first 5 days postpartum (Morton et al., 2009), and expressing at least 6 to 8 times a day for the early weeks (Hill et al., 2001; Hill & Aldag, 2005). Lussier and colleagues' study fits well with our current understanding that the amount of expression in the first week postpartum is important to subsequent milk production.

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County-Based Health Coverage for Immigrants Report, From Washington

Northwest Health Law Advocates has published a report titled *County-Based Health Coverage for Immigrants: A Proposal for Counties in Washington State*. The report makes recommendations about how the Washington counties of King and Yakima could fill the gaps in coverage that remain for the counties' close to 51,000 uninsured immigrants. The report also explores how Washington state can implement a county-based health insurance program to provide comprehensive health coverage to immigrants who would otherwise remain uninsured and offers initial recommendations for health insurance program components for Washington counties: <https://nohla.org/index.php/county-based-h-c-adult-immigrants/>