Comparison of milk ejection between the left and right breasts using changes in milk flow rates.

Danielle K. Prime
Human Lactation

• Breastmilk is the optimal source of infant nutrition (World Health Organization)
  – Nutritional Value
  – Functional Value  (38% total protein: LF, slgA, Lysozyme)

• Two different concepts
  – Milk synthesis       *Prolactin*
  – Milk ejection       *Oxytocin*

• Without milk ejection, synthesized milk is not removed.
Mammary Gland

- ≈ 9 Ducts
- Adipose Tissue
- Glandular Tissue
  - Lobes
  - Lobules

(Ramsay et al., 2005)
Myoepithelial Cells Contract causing the alveolus to eject milk.
Milk Ejection

- Posterior Pituitary
- Hypothalamus
- Brain Stem
- Sensory Nerves
- Spinothalamic Tract
- Stimulus

Oxytocin Release

Maternal Circulation

Receptor Binding

Myoepithelial Cell Contraction

Milk Ejection
Milk Ejection Measurement

Oxytocin:
• Continuous blood sampling
  • Oxytocin has short half-life (2min), invasive

Effects of Oxytocin:
• Intra-Ductal pressure
  • Invasive cannulation

• Ultrasound measuring duct diameter
  • Requires experienced sonographer

• Measuring milk flow rate
  • Non-Invasive
Measuring Milk Flow

ShowMilk (Medela) Device – Electronic Balance, 8 Hz
Measuring Milk Flow
Experimental Setup

Computer

Breast Pump
(Symphony, Medela AG)

Electronic Balance
(ShowMilk, Medela AG)

Simultaneous and Independent
• Simultaneous pumping of left and right breasts
  – 15 minutes, 3 visits within 3 weeks, n=10
Proportion of the total volume (100%) expressed at 5 and 10 minutes

6.3±2.0min
7.0±2.5min
Preliminary Conclusions

• Measuring one breast is indicative of both breasts function
  The left and right breasts show no difference in:
  – Number of milk ejections
  – Time taken until 80% removed
  – Vacuums preferred by mothers

• After 10 minutes of expression 89% of total yield is removed.
Preliminary Conclusions

- The number of milk ejections during the three expression periods is independent of:
  - Degree of Fullness of the breast
  - Volume of milk expressed
- 50% of mothers had between days variation of 3-6 milk ejections
- Some mothers have very repeatable patterns
Implications

• Simple way of assessing milk ejection in women
  – Allowing many more studies on factors affecting milk ejection

• Simple clinical test for milk ejection
  – While most women (88%) sense the initial milk ejection, none were able to sense all of the multiple milk ejections

• Understand more about the function of the lactating breast
Recruitment of Mothers

- We are currently recruiting for a number of studies including mothers who have any pain during breastfeeding (breast or nipple pain), mothers using nipple shields, and of course mothers who don’t have any problems but are interested in finding out how their breasts work!

- Please Contact: Danielle Prime
  primed01@student.uwa.edu.au
  6488 4429
  0401 303 610
References


