Journal of Neonatal Nursing (2015) 21, 121—126

www.elsevier.com/jneo

A self-paced oral feeding system that enhances preterm infants' oral feeding skills

C. Lau, PhD [a,*], S. Fucile, OTR, PhD [b], R.J. Schanler, MD [c,d]

[a] *Department of Pediatrics/Neonatology, Baylor College of Medicine, One Baylor Plaza, BCM320, Houston TX 77030-3498, USA*
[b] *Department of Pediatrics/Neonatology, University of Florida, Gainesville FL, USA*
[c] *Neonatal-Perinatal Medicine, Cohen Children's Medical Center of New York, New Hyde Park, NY, USA*
[d] *Hofstra North Shore Long Island Jewish School of Medicine, Hempstead NY, USA*

Available online 3 October 2014

KEYWORDS
Newborn;
Prematurity;
Bottle feeding

Abstract *Aim:* Very low birth weight (VLBW) infants have difficulty transitioning to independent oral feeding, be they breast- or bottle-feeding. We developed a 'self-paced' feeding system that eliminates the natural presence of the positive hydrostatic pressure and internal vacuum build-up within a bottle during feeding. Such system enhanced these infants' oral feeding performance as monitored by overall transfer (OT; % ml taken/ml prescribed), rate of transfer (RT; ml/min over an entire feeding). This study hypothesizes that the improvements observed in these infants resulted from their ability to use more mature oral feeding skills (OFS).
Methods: 'Feeders and growers' born between 26 and 29 weeks gestation were assigned to a control or experimental group fed with a standard or self-paced bottle, respectively. They were monitored when taking 1—2 and 6—8 oral feedings/day. OFS was monitored using our recently published non-invasive assessment scale that identifies 4 maturity levels based on infants' RT and proficiency (PRO; % ml taken during the first 5 min of a feeding/total ml prescribed) during bottle feeding.

Abbreviations: GA, gestational age; OFS, oral feeding skills; OT, overall transfer; PMA, postmenstrual age; PRO, proficiency; RT, rate of transfer; SP, self-paced; STD, standard.

* Corresponding author. Tel.: +1 832 826 1384 (office); fax: +1 832 825 2799.
E-mail address: clau@bcm.edu (C. Lau).

http://dx.doi.org/10.1016/j.jnn.2014.08.004

Results: Infants oral feeding outcomes, i.e., OT, RT, PRO, and OFS maturity levels were enhanced in infants fed with the self-paced vs. standard bottle ($p \leq 0.007$). *Conclusion:* The improved oral feeding performance of VLBW infants correlated with enhanced OFS. This study is a first to recognize that VLBW infants' *true* OFS are more mature than recognized. We speculate that the physical properties inherent to standard bottles that are eliminated with the self-paced system interfere with the display of their *true* oral feeding potential thereby hindering their overall oral feeding performance.

Background

Infants born prematurely are at high risk of encountering difficulty feeding by mouth. Insofar as attainment of independent oral feeding is an important factor predictive of hospital length of stay (American Academy of Pediatrics — Policy Statement, 2008), any tool or therapy that can enhance preterm infants' oral feeding skills not only ensures safe and successful oral feeding, but also shortens their hospitalization, hastens mother-infant reunion, and decreases medical cost.

In an earlier study, we compared the oral feeding performance of very low birth weight (VLBW) infants (26—29 weeks gestation) who were offered in two consecutive feeding, in a random order, a standard (STD) bottle and a "self-paced" (SP) feeding system (Lau and Schanler, 2000). Enhanced overall transfer (OT; % volume taken/volume prescribed) and rate of transfer (RT, ml/min over an entire feeding) were consistently observed when the subjects fed with the SP system (Lau and Schanler, 2000; Fucile et al., 2009). Additionally, these infants used more mature sucking patterns than their STD counterparts, (Fucile et al., 2009). No adverse events occurred that did not self-resolve, e.g., oxygen desaturation, bradycardia, and/or apnea (Fucile et al., 2009).

Briefly, the properties of the SP feeding system consist of the continuous elimination of the hydrostatic pressure normally present when a bottle is tilted and of the vacuum build-up as the container empties during a feeding (Figs. 1 and 2). Two benefits ensue from this technique. First, the absence of milk drip gives infants control over their own feeding as milk only flows when they are actively sucking; the absence of milk drip allowing them to pause/rest/breathe whenever needed. Second, in the absence of any internal vacuum build-up which naturally holds back milk outflow and occurs when a STD bottle is used (Fig. 2) (Lau and Schanler, 2000), infants are more efficient as

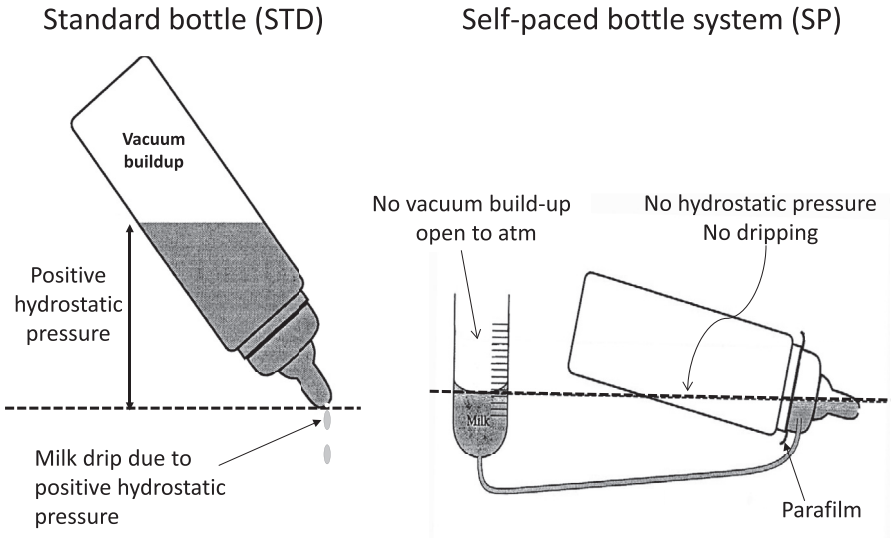

Fig. 1 Differing physical properties between a standard (STD) and self-paced (SP) feeding tool.