

Pigeon uncovered the “three key factors of sucking” and designed bottle teats to help infants with cleft lip and palate (CLP) latch on and suck.

Pigeon developed a teat shape that enables infants with CLP to suck without spilling milk.

Peristaltic tongue movement demonstrated in infants with CLP with difficulty latching on to the mother’s nipple

Cleft lip and palate (CLP) are variations of a congenital deformity of the upper lip and palate (Fig.1) and the incidence is said to be approximately 0.2% in Japan¹⁾. Feeding infants with CLP involves various challenges, depending on the condition of the cleft. In most cases of infants with a cleft lip, direct breastfeeding is possible. However, some infants with cleft lip and palate have difficulty in successfully latching on to the nipple, and therefore cannot form the necessary mouth shape to create the negative pressure required for sucking. However, the literature has reported peristaltic movement of the tongue and swallowing among infants with CLP using ultrasound images (Fig.2), and this suggests the possibility of successful feeding. Through the use of a bottle teat that permits infants with CLP to suck successfully, bottle-feeding of breast milk or infant formula is possible.

Fig.1 Examples of infants with CLP

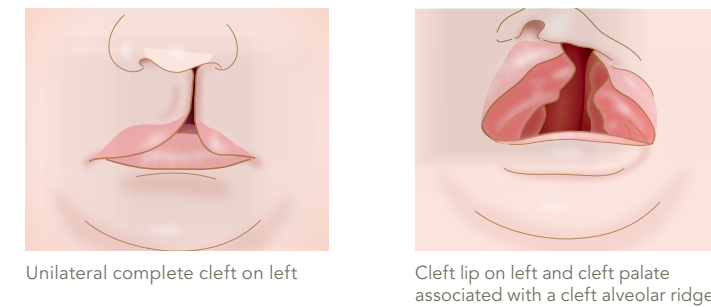
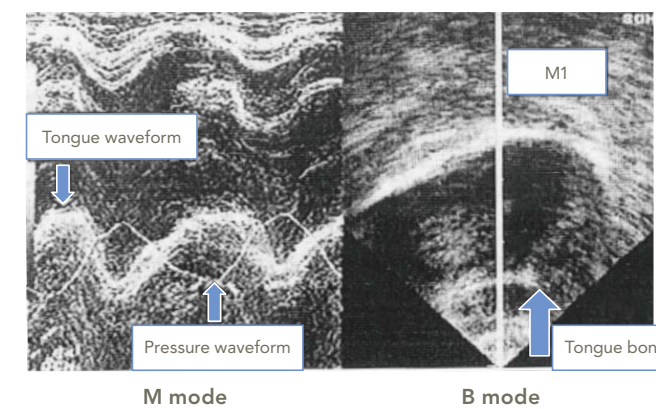


Fig.2 Ultrasound images of infant with CLP sucking²⁾



An infant with CLP was bottle-fed, and the tongue movement and sucking were recorded using ultrasound M and B mode. The resulting images confirmed that the infant was capable of swallowing milk with normal sucking movements.

Subject : Infant with cleft lip and palate
 Method : Sagittal section from the central mandible was obtained using ultrasound M and B mode to observe tongue movement during sucking. The M mode cursor was set on the tip of the nipple in the sagittal radiographic image, (M1 of left fig) yielding the tongue waveform illustrated above. When observing the front jaw, the M mode cursor was set on the front center of the nipple, and the pressure waveform during sucking was measured.

Infants with CLP are capable of swallowing using peristaltic tongue movement.

Enabling infants with CLP to suck using a specially designed teat

Pigeon focused on the fact that infants with CLP who cannot latch on correctly need a uniquely shaped bottle teat to permit them to suck. A normal shaped teat tends to wedge into the cleft. To overcome this problem, a teat was developed with a thicker wall on the palate side (Fig.3). An infant with CLP was bottle-fed with this teat, and observed. The teat did not wedge into the cleft, and the infant was able to suck the teat using peristaltic tongue movement and swallow without spilling milk or choking (Fig.4).

Fig.3 Characteristics of teat designed for CLP³⁾

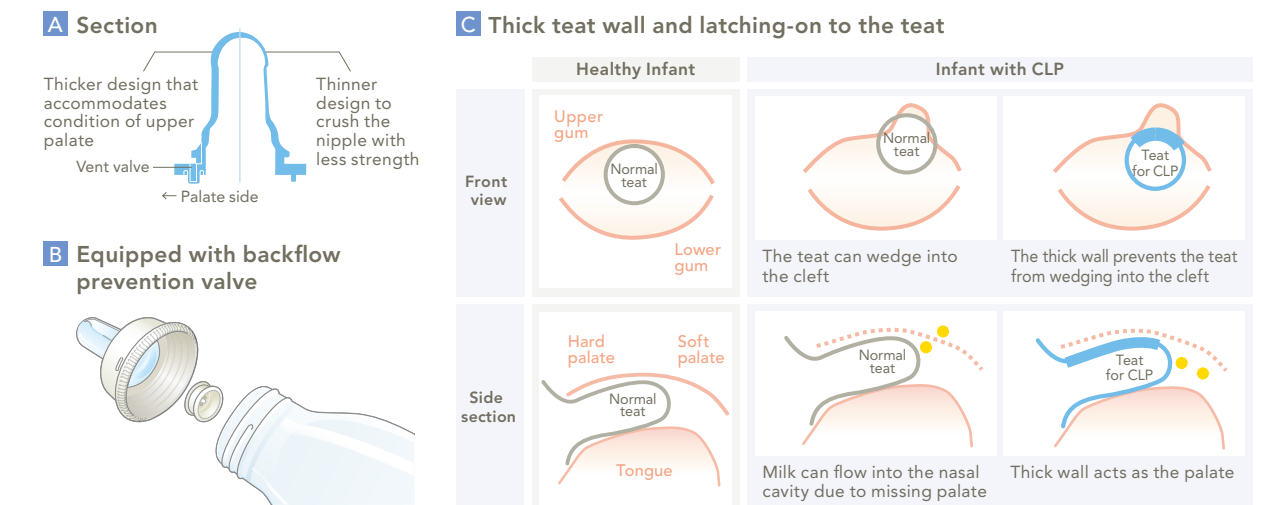


Fig.4 Infant with CLP sucking while bottle-fed



Observations confirmed that the infant could suck without the teat wedging into the cleft, and without spilling milk.

<Subject>
 Gestational age : 37weeks 1day Age: 3months 1week
 Birth weight : 2,716g Weight : 5,000g
 Sex : male

The bottle teat for infants with CLP is a feeding assistance device that enables successful bottle feeding.

References :
 1) Kochi : J Jpn Cleft Palate Assoc 32 : 1-9, 2007 2) Haishima et al. : Pediatric Dental Journal 39(1) : 69-78, 2001
 3) Okano, Saito : 53rd Annual Meeting of Japan Society for Premature and Newborn Medicine, Journal of Japan Society for Premature and Newborn Medicine 20(3) : 218, 2008

Comments of Specialists : They cannot effectively create a vacuum to suck milk so they need special teat and not just a regular teat. (Neonatologist, Philippines)
 (Pigeon : Research on Pediatricians, Lactation Consultants and Neonatologists in the US and Philippines Regarding Breastfeeding, 2014)

