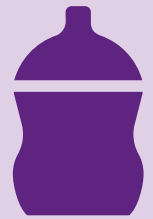


PHILIPS

AVENT

Clinical Trial
Summary

Cross-sectional prospective study examines the fundamental biomechanical requirements needed for an effective feed in infants



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Source:

Biomechanical aspects of nutritive sucking in infants: November 2017

Introduction

This was a cross-sectional prospective study, performed at the Radboud UMC in Nijmegen, the Netherlands. The results describe the biomechanical aspects of nutritive sucking in infants that were 2–5 months of age, while drinking from infant feeding bottles with the Philips Avent Natural bottle and teat. Nutritive sucking is considered one of the most complex activities of infancy, and is an indicator of central nervous system integrity. As such, Philips Avent, together with researchers and health care professionals, examined the biomechanics of nutritive sucking in newborns, and found distinct physiological patterns during the sucking and swallowing phases of breastfeeding. When examining these patterns with the Natural bottle, the flexible, breast-like design of the teat resulted in similar nutritive sucking behaviors.

Key study findings

- Infants between the ages of 2 – 5 months who receive feedings with the Philips Avent Natural bottle and teat show variations in suck-swallow ratios of 1:1 to 4:1 within a single feeding session
- Infants also show variance in inhalation and exhalation after swallowing; exhalation after swallowing occurs often and this variation and adaptive variability is characteristic for typical human (oral) motor development. The Philips Avent teat enables these variable actions during nutritive sucking
- The occurrence of the swallow non-inspiratory flow (SNIF) is significantly influenced by suck-swallow ratios, suggesting a possible role of the intra oral vacuum in SNIF
- Ultrasound videos during nutritive sucking with the Philips Avent Natural teat show normal peristaltic tongue movements, causing a natural deformity of the teat
- The study authors concluded that the ultrasound videos during nutritive sucking using the Philips Avent teats showed normal peristaltic tongue movements causing deformity of the teat. This was similar to the pattern seen in breastfeeding infants in an earlier ultrasound study.

Objective

The aim of this study was to describe the biomechanical aspects of nutritive sucking in infants of 2–5 months old while drinking with the Philips-Avent (Classic+, and Natural 2.0) teats

- Improve the understanding of the process involved in “normal” feeding in infants
- Examine the impact of design on nutritive feeding processes in infants

Methods

Sixteen (6 boys and 10 girls) term-born infants participated in this study, which was conducted at the Radboud University Medical Centre in Nijmegen, the Netherlands, between February 2017 and September 2017. The study population included healthy infants who were enrolled after the parents had given written informed consent.

The biomechanics of different feeding teats during feeding were examined using ultrasound imaging and/or combined measurements of sucking, swallowing, and breathing, using the Digital Swallowing Station (DWS, Kay Pentax).

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- In total, 935 swallowing movements were analyzed
- Swallowing-rate per minute ranged between 23 – 64, with a mean of 38 swallows/minute with the Natural teat
- Preliminary results of the qualitative analysis of the ultrasound measurements during nutritive sucking using the Philips Avent Natural teat show elevation of the medial part of the tongue in a backward moving peristaltic wave, similar to what is seen during breastfeeding, as shown in the Phase 1 and Phase 2 illustrations in Figure 1
- Figure 2 shows the ultrasound images during bottle feeding with the Philips Avent Natural teat, and the deformity of the teat caused by the peristaltic tongue movements

Figure 1. Phase and actions of the infant during breastfeeding in the analyzed sequence. In Phase 1, the infant sucks the nipple to stimulate milk release, and the tongue moves in a characteristic peristaltic motion, traveling from left to right in a wavelike motion. In Phase 2, swallowing corresponds to each suck, with a more pronounced vacuum action. The tongue moves up and down, and assumes a flatter profile.

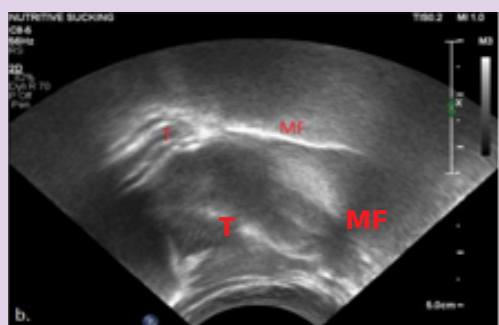


Phase 1



Phase 2

Figure 2. Ultrasound imaging during bottle feed with Philips Avent Natural teat. Ultrasound images show the teat (T) and milk flow (MF) from the teat. The peristaltic movement of the tongue is shown in both images. In the top image, the medial part of the tongue is down (suction phase of sucking); in the bottom image, the medial part of the tongue is up (expression phase of sucking), resulting in deformity of the teat.



Conclusions

The variability in sucking demonstrated by the infants in this study reflects what is seen during normal human oral motor development. The Philips Avent Natural teat enables this variability during nutritive sucking. This may result in a more natural feeding experience for the infant.

References:

1. Howe TH, Sheu CF, Hsieh YW, Hsieh CL. Psychometric characteristics of the neonatal oral-motor assessment scale in healthy preterm infants. *Dev Med Child Neurol.* 2007;49:915-9.
2. Lagarde MLJ and den Engel-Hoek L. Biomechanical aspects of nutritive sucking in infants. Philips Avent, data on file.

