Breastfeeding is widely accepted as the optimal method of feeding infants, providing critical nutrients and immunities from the mother. However, some families experience breastfeeding problems, and others need to maintain breastfeeding in the face of mother-infant separation. Current devices such as breast pumps and bottles do a poor job of mimicking natural breastfeeding. Furthermore, the highest quality devices are not covered by basic insurance, leaving a sizable portion of the target demographic with pumps that deliver suboptimal performance. This technology describes a series of devices that mimic the infant’s normal suckling to improve breast pumps and alternative feeding. This technology can be used to diagnose breast pumping and allow for greater product customization, as each device can be tailored to the mother’s breast and nipple characteristics. Additionally, a novel nipple that better supports normal infant sucking can be used to deliver expressed milk to the baby, and can be customized to help strengthen weak sucking. This technology provides an efficient, high quality system for infant feeding.

Provides non-invasive, customized physiological breastfeeding and defect diagnosis

This technology describes three devices that improve the efficiency of infant feeding by mimicking normal breastfeeding and diagnosing potential problems in the breast or infant suckling. The breast pump and baby bottle nipple are designed to closely resemble or elicit the actions performed in physiological breastfeeding. The breast pump has a man-made infant mouth that is installed on the breast flange and controlled by a control box containing a vacuum pump, an air pump, valves and electronics; this will operate the mouthing and sucking mechanisms according to computer simulations, to mimic normal infant performance. The baby bottle nipple is formed into the shape of a typical breast, but is made of a softer polymer that allows for expansion during latch-on and supports more normal coordination of swallowing and breathing. In addition, the nipple also includes feeding ducts that mimic those found naturally in the breast, resulting in a more physiologically accurate experience. The computer simulations used to produce the breast pump and nipple can also be used in diagnostics: utilizing a conical flange, the length of the teat can be safely measured and modeled, which can lead to further customization of the pump and baby bottle nipple.

Prototypes of this technology have been developed and are currently undergoing testing at Columbia.
Lead Inventor:

Andrew F. Laine, Ph.D.

Applications:

• Improved baby bottle nipple for use when breastfeeding infants are separated from mother
• Basic research and development on breast morphology
• Aiding premature infants in feeding
• Provide mothers with an efficient method to feed their infants during separations.

Advantages:

• Pump and bottle nipple devices closely mimic/elicit physiological latch-on and suckling motions
• Can be customized to mother’s breast using non-invasive techniques
• Can increase efficiency of milk extraction
• Conical flange can be used to diagnose breast inelasticity and infant suckling abnormalities
• Can be expanded to include additional features, such as a nipple shield or lactation accelerator, to further aid in infant feeding.

Patent Information:

Patent Pending (WO/2016/145173)

Tech Ventures Reference: IR CU15148

Related Publications:


Inventors

Andrew F. Laine