Expert proposes method to help premature infants thrive in the hospital

December 11 2018, by Laura Castañón

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Even when they're not actively feeding, infants are perpetually sucking on toys, pacifiers, their own fingers—whatever they can get ahold of.

"Babies are constantly hand-to-mouth, sucking on everything," said Emily Zimmerman, an assistant professor in Northeastern's Department of Communication Sciences and Disorders. "It's reflexive upon birth."

In a study published in November, Zimmerman found that infants suck more frequently when looking at an image of a woman's face. Her findings could help improve outcomes for infants born prematurely, or others who are struggling to feed.

"Feeding issues are quite common," said Zimmerman, who directs Northeastern's Speech and Neurodevelopment Lab. "If this is a simple, extremely low cost way to enhance sucking, and potentially its link to feeding, it would be advantageous."

When infants suck without acquiring nutrition (called non-nutritive suck), it tends to be in bursts. The infants will cycle through several bouts of rapid sucking with breaks to breathe in between. This behavior can be soothing, and it makes the infants more alert for feeding. It is an important part of their development.

Non-nutritive sucking typically matures between 34 and 36 weeks into a pregnancy. But for infants born early, developmental delays and feeding issues are common. Their patterns of sucking may be erratic or weak. If infants in the neonatal intensive care unit can't suck on a breast or a bottle, they are usually fed through a tube running through their nose to their stomach.

"On average, most studies report that 20 percent of babies experience feeding or swallowing difficulties," Zimmerman said. "That number can get as high as 80 percent in children that have other developmental delays."

To help these infants get back on track, Zimmerman is looking for links

between feeding behaviors like sucking and the sights, smells, and other sensations that babies might be missing out on during an extended hospital stay.

A previous study, which involved fellow Northeastern professor David Lewkowicz, showed that infants preferentially focus on faces, especially when they can smell their mom. Zimmerman wanted to see if this also affected their suck response. She mimicked the earlier setup, giving the infants a T-shirt their mom had slept in and placing them in front of side-by-side images of a woman's face and a car, and added a specially-designed pacifier that could record sucking patterns.

Zimmerman and co-author Courtney DeSousa, who graduated in 2017, compared where the infants were looking with the strength and frequency of their non-nutritive sucking. While the sucking pattern didn't change, the infants sucked more often when they were looking at the woman's face than anywhere else.

"Babies had more suck bursts when looking at the female," Zimmerman said. "It doesn't seem like something that even needs to be said, but until it's written and published, no one knows if they can expand on it. You're not going to do something in the neonatal intensive care unit until it's been vetted."

The infants in the study were all healthy and feeding properly at home, but something as simple as a picture of a face paired with the scent of mom was still able to change their behavior. The response might be even more significant from infants struggling in a hospital environment, Zimmerman said. She plans to investigate this in future studies.

"A lot of my research has focused on ways to enhance this environment, to make the neonatal intensive care unit a more robust place for infants to get the skills they need to thrive and develop," Zimmerman said. "If

someone has a really low suck response, this seems like such an easy thing to try."

More information: Emily Zimmerman et al. Social visual stimuli increase infants suck response: A preliminary study, *PLOS ONE* (2018). DOI: 10.1371/journal.pone.0207230

Provided by Northeastern University