

KUJH-TV News: Actifier pacifier (Feb. 18, 2005)

## **A KU team tests the effects of a high-tech pacifier on the premature infants.**

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Reported by Daniel Cuellar, Morgan Wallace

Susan Stumm, Overland Park doctoral student in speech-language-pathology, holds a tiny newborn baby in her arms and rocks it carefully. The baby sleeps as she feeds him like any normal mother does for her child.

But this child isn't Stumm's and this isn't a normal feeding. Stumm is part of a study with a team of KU research staff and graduate students testing the effects of a specifically designed high-tech pacifier, called the Actifier, on premature infants.

"We think that this will have a huge impact on the preemie population in minimizing language disorders," Stumm said.

Premature babies, babies born at least three weeks early, are in danger of having developmental disorders and impaired sensorimotor skills such as sucking and swallowing. These impairments can lead to speech disorders and learning disabilities.

The Actifier, which was invented in the mid-90s by Steven Barlow, KU speech-language-pathology professor and Donald Finan of the University of Colorado, is being tested to study its impact on these weakened sensorimotor skills and whether or not it will developmentally catch preemies up to their peers who were born to the typical 40 week pregnancy. "One of the primary objectives of the research is whether or not the Actifier will affect this," Barlow said of the infants' impediments.

The study Sponsored by the National Institutes of Health, the study of the Actifier titled "Sensorimotor Control and Development of the Human Orofacial System" explores the development of suck, swallow and respiration. According to Stumm, when babies are in the womb, their final few months consist of sucking in and spitting out fluid, thereby exercising the oral muscles involved in the processes that are precursors to speech development.

"We hypothesize that because babies are premature they miss out on this latter phase of development in utero, so they miss out on all the opportunities to suck and swallow amnio fluid," Stumm said. "Babies born full-term with no complications see this as a natural thing but we see impairments in premature babies."

The Actifier measures the levels of these impairments and tries to correct them.

It determines the integrity of the suck and tests oral muscles and reflexes that originate in the baby's face, according to Barlow. Those signals are sent to the brain and recorded with the research teams' equipment. Also, the bag in the pacifier expands and contracts rhythmically, which teaches the baby how to suck correctly.

"This is hypothesized to provide a salient and useful stimulant for the preterm baby," Barlow said. "If we can provide a pattern of sucking this may help to form neural connections that are meaningful and useful to the baby."

## **The Process**

This research and testing occurs with one team at the neonatal intensive care unit (NICU) at Stormont-Vail hospital in Topeka and another at the NICU at the KU Medical Center in Kansas City. The teams plan on testing around 400 premature infants, many weighing only 1,000 to 1,200 grams, before the study commences in 2007.

These procedures at the NICUs occur weekly during set feeding times and take less than five minutes, according to Stumm. The teams use a portable laboratory that they wheel up to the babies' controlled crib environments. At that point, they hold and swaddle the babies and provide the Actifier like a normal pacifier. The laboratory records all the movement and force friction the babies produce and the Actifier works their oral muscles.

"It's very natural for them. It's very relaxing and we just want to record their suck," Stumm said. "It's very noninvasive and the babies like it."

"The only thing that the babies have to do is suck on a pacifier," Susan Cannon, clinical instructor in physical therapy in the KUMC's Developmental Disabilities Center, adds.

Three different groups of premature infants are tested. The control population consists of infants who were born to term or were premature yet exhibit no signs of health risks. The other two groups consists of preemies who were born with complications. One consists of preemies suffering from respiratory sensory deprivation (RDS). They require some ventilation in an incubator. The third group consists of infants who have suffered intraventricular hemorrhages (IVHs), which are bleeds somewhere in the nervous system. A KU researcher tests the pacifier on a newborn at the KU Medical Center in Kansas City.

"Many of these kids will present difficulties with coordinating muscles and movements for suck and swallow," Barlow said. "Twenty-five to 40 percent of preemies will suffer an IVH."

## The Outlook

The pacifier was developed in the mid-90s and will undergo testing until 2007.

Approximately 500,000 babies are born premature in the United States each year. That's one in eight births. And with such a high percentage of those experiencing IVHs and the developmental disabilities that occur with them, as well as with RDS, an instrument like the Actifier may be able to enhance the future of a high population of children.

"We hypothesize that when we train the babies that are born premature to suck in a rhythmic pattern that matches their motor output that we will essentially replace some if not all of what they missed in utero," Stumm said. "This will either catch them up to their peers that are their age or minimize the speech or swallowing disorders, language disorders as well."

The pacifier is being tested on premature and healthy babies. The researchers also hope that this will limit the time the premature infants spend in the NICU. According to Barlow, medical care costs for micro-preemies, those born at less than 27 weeks gestation, are on an average of \$80,000 per week.

But there is still much testing to be done on the Actifier's effects. Many of the questions still circling Barlow's mind are whether or not it will impact the children's intellectual ability, if it will reduce cognitive and developmental delays, if it will speed up the onset of babbling, and if it will make feeding preemies easier.

"Our goal is to do a longitudinal follow through their preschool year," Barlow said. "So we'd like to learn the outcome for those babies who received intervention in the NICU."

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