NICU specialists stroke, nudge hospital’s tiniest patients

Therapy for the Three-Pound Set

By Tyler Smith

It’s shortly before noon at University of Colorado Hospital and three therapists fan out across an inpatient unit. They’ll spend the next hour with patients, massaging, aligning, and uttering gentle words of encouragement as they promote movement.

It would be an unremarkable scene but for one fact: the therapists ply their trade in the Neonatal Intensive Care Unit (NICU) with patients who often weigh less than three pounds. In this softly lit, nearly silent world, they help their tiny patients make subtle adjustments to a still foreign – and sometimes hostile – environment, where they face challenges unknown to most full-term infants.

“These babies are no longer in the contained world of the womb that helps them to develop,” said Frieda Elisha-Hunter, PT, an inpatient physical therapist who works in the NICU. “We’re trying to help them make up for being born into an abnormal world away from the womb.”

On this December day, Elisha-Hunter joined her colleagues Elizabeth Black, PT, and Danielle Bondurant, PT, in working with a group of tiny patients. The three are part of a NICU developmental team that includes physical, occupational and speech/language therapists. These clinicians are responsible for delivering therapy services to preemies at greatest risk of developmental delays: those born at 33 weeks or less or are small for their gestational age; those exposed to drug and alcohol in-utero; and those with genetic abnormalities. Nurses and physicians also make referrals for other reasons, such as club feet.

Womb isometrics. It’s work that began some 45 years ago at UCH, Elisha-Hunter said, and the hospital remains a leader in a comparatively rare field.

The notion of developmental therapy for patients whose lives have barely begun might seem strange initially. But it’s easy to forget that fetuses do far more in the womb than simply float in a watery world waiting to be born. The womb’s very design promotes crucial physical development, said Black.

As the fetus grows, the womb becomes increasingly cramped. The fetus pushes and contorts to find a comfortable position like a child carving out space in a crowded bed. The bending and curling motions help develop the muscle tone infants will need to progress after birth.

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Outside the womb, gravity pushes infants’ arms and legs away from curling and flexing and toward extension, Elisha-Hunter explained. Babies born at term have, in essence, done the reps in the womb to overcome the gravitational pull and return to a curled position. Prematurely born infants lose that time and therefore need make-up help, she said.

“Their muscles are weak,” Elisha-Hunter said. That puts preemies at risk of falling behind in developmental milestones, such as rolling, crawling and sitting. “They’re already behind and they won’t catch up without help,” she added.

Problems averted. Premature birth can have other profound developmental consequences. Prematurely born infants are at increased risk for osteoporosis, which damages their weight-bearing capabilities. They may have trouble turning their heads from side to side. That, in turn, causes flatness on one side of the skull, another inhibitor to physical development, including rolling over.

In addition, their immature nervous systems are poorly equipped to filter sensory stimulation, another potential source of developmental delays. Some, for example, may be unable to tune out environmental distractions, while others shut down as a protective mechanism.

In response to these and other challenges, the therapists provide positive interventions that help preemies develop abilities often taken for granted. They encourage them to move their heads, turn their ankles, flex their legs, curl their fingers, and purse their lips to suck.

All the while, therapists also stay alert for signs of stress. These can be subtle, said Bondurant. She was settled in a chair with

Anaia Robinson, an identical triplet born to mother Teryn on Nov. 11. When infants cough, sneeze, yawn, splay their fingers, furrow their brows or change in color, they are signaling distress, Bondurant said. Therapists must calm them before therapy.

Magic touches. On this December morning, little Anaia seems relaxed and ready to go. “When babies are happy we can do more with them,” Bondurant said.

As Teryn and nurse Katie Hepp, RN, busied themselves with sisters Grace and Lily, Bondurant gently manipulated Anaia’s hands, helping her to open and close them, a crucial skill for grasping. She rolled the baby’s feet and helped her to practice kicking her legs out and bringing them back in, the desired alternative to extension.

“Her legs are straight out,” Bondurant said. “That’s typical, but it’s not what we want.”

Bondurant did pelvis tilts and oblique work before Anaia began falling asleep. She then massaged the tiny girl’s shoulders, head, and back – an aid, she said, to improved muscle tone and control, as well as to oxygenation and better breathing.

Developmental therapy has other benefits, said Hepp as she cared for Anaia sister Lily. “They learn how to calm themselves and learn how to self-soothe and to focus on a pacifier,” Hepp said.

Minor details. The delicacy of the NICU environment was obvious a few minutes later as Elisha-Hunter approached an isolette – essentially an incubator – of a 31-week-old boy born two-and-a-half weeks earlier. Elisha-Hunter dropped heat shields to prevent the shock of temperature change – cold air can cause the infants to

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burn precious calories too quickly – and checked the baby’s heart rate, which at 180 beats a minute was “okay,” she said.

Elisha-Hunter also checked his oxygen saturation level, which the NICU keeps within a range of 85 to 95 percent to prevent retinopathy of prematurity, a disease caused by disorganized growth of blood vessels in the retina that can lead to blindness. It has been linked to excessive oxygen delivered to developing eyes.

Light entered the isolette from both sides to discourage the infant from turning one way consistently. Elisha-Hunter watched his oxygen saturation, took his body temperature with an axillary thermometer, and touched him gently.

“We want him to wake up with gentle rocking,” she said as she watched his mouth move and massaged his head in the direction of his hair follicles.

The infant’s oxygen level slowly decreased. “We want to see if he can regroup on his own,” Elisha-Hunter said. She then increased the oxygen flow slightly. The goal, she said, was to encourage him to transition smoothly from sleep to wakefulness.

“When they are calm and alert, that’s when learning happens,” she said softly.

After a time, Elisha-Hunter brought the boy’s hands to his mouth and massaged across his lips, encouraging him to root, she explained.

“I don’t expect a big response,” she said. “But I want him to feel a nice touch around his face.” Many of the sensations newborns experience in the NICU, are “noxious stimulations” from feeding and breathing tubes, she said, and can discourage them from eating.

Soon she placed his hand on top of his head, explaining that the movement, however small, stretched his shoulders and also began to present to him his own “body schema”: the outline of his own anatomical puzzle that he must learn.

Real world. In another room, 33-week-old Indra Gonzales lay in an open bed near her twin sister Jenevisia. Black massaged her in an effort to keep her temperature regulated, stimulate digestion, and facilitate growth and weight gain.

“Her growth is not what we would like it to be,” Black said, as she looked down on the girl. Black put one of Indra’s fingers to the girl’s lips, encouraging her to suck and swallow, but the infant began hiccupping, a sign of stress.

The situation pointed up the delicacy of caring for these vulnerable patients. Important as it is to limit their stress levels, providers like Black must also help them prepare for the world outside the NICU. Indra will eventually move to and share a home with a twin sister and other siblings, Black said.

“It will be a challenge,” she said. “We try to gradually introduce her to some of the stimulation she will be subject to when she is discharged.” Ultimately, the girls’ parents will need to figure out the things that cause the infants the most stress and adapt.

Black positioned Indra “to help with the hiccups” and prepared to leave. “You have to know when to walk away, when there are no extra things to push,” she said.

Indeed, the skill of the three developmental therapists lies in finding in their patients an elusive spot between rest and motion, sleep and wakefulness, silence and stimulation in a twilight world. That place lies, literally, at the tips of their fingers.