

Understanding Your Preemie

Progress in medical technology and the Neonatal Intensive Care Unit (NICU) have made the survival of smaller and smaller infants possible. As a result, we now have a new kind of human being: THE PRETERM INFANT.

Of course, preemies are in many ways small versions of the full term infant. But preemies also are very different from full term infants, and they live in a world that is very different from that of either the fetus in the womb or the full-term infant at home. Therefore, it is unfair to think of the preemie as either a fetus or a mini full-term baby: preemies are unique, and deserve unique and special treatment.

The preemie of 24 weeks gestational age would normally expect about 16 more weeks in the womb, where:

- ✓ oxygen and food are provided by the placenta, thus there is no need to breathe or digest.
- ✓ temperature is comfortable and stable.
- ✓ there is protection from injury.
- ✓ the effects of gravity are not felt, and the baby moves easily and stays comfortably curled-up (flexed).
- ✓ there is constant motion, thus the baby is rocked gently much of the time.
- ✓ the baby feels the rhythms of the mother's changing day-night activity.
- ✓ the baby's nervous system does not have to respond to lots of different kinds of things (sights, sounds, touches).
- ✓ there are no intense lights, sounds and touches, although the baby does hear his/her mother's rhythmic heart and bowel sounds, can hear speech, and feels gentle touch from his/her own limbs and the fluid and sides of the womb.

The Five Areas of Development

PHYSIOLOGICAL

- things that happen automatically, such as breathing, heart rate, color changes, digestion, bowel-movements

MOTOR

- posture, movements, muscle tone

STATES OF CONSCIOUSNESS

- levels of sleep and being awake, and changes from one to the other

ATTENTION

- the ability to focus on a message, such as to turn to sounds and look at faces and other objects; this leads eventually to being able to respond socially - to interact with - people.

SELF-REGULATION

- the ability to keep the other areas in balance, for example, the ability to calm down (reduce motor activity and change from a state of crying to being quietly awake) when upset, by tucking limbs close to body, bracing self against side of crib, or sucking on hands.

Because the nervous systems (brains) of preemies are not as mature as those of full-term babies, development in these five areas is not as far along as in a full-term baby.

For example, you may find your preemie has:

- Immature physiologic development, as seen when:
 - the baby changes color often; breathing or heart rate is uneven; the baby gags easily.
- Immature motor development, as seen when the baby:
 - twitches, is tense or stiff, trembles; is limp; can't stay curled up.
- Immature control over states of consciousness, as seen when the baby:
 - can't become alert, or stay alert for long; is generally fussy.
- Immature development of attention, as seen when the baby:
 - can't focus on you; becomes worn out trying to respond to you.
- Immature self regulation, as seen when the baby:
 - has a hard time calming down after being disturbed; has trouble handling several kinds of things going on at the same time, e.g. having you talk to and look him/her in the eyes at the same time, or talk while also feeding.

Hearing (The Auditory System)

Hearing is fairly well developed by 20 weeks gestational age (GA).

By 25 to 28 weeks GA, the preemie responds in different ways to different sounds. For example:

- Attends more to - shows more interest in - voices than other sounds.
- Shows dislike (by frowning or startling) of loud noises, such as a machine alarm or loud voice.
- Can pick out the mother's voice (which he/she has heard in the womb) and prefers it over other voices.

What sounds do preemies hear?

- By 28 weeks GA, sounds of about 40 decibels (dB) loudness (between normal speech at 50 dB and whispers at 30 dB).
- At full term, sounds as soft as 20 dB loudness, equal to what an adult with good hearing can hear.
- Sounds with low and medium pitches better than high-pitched sounds.

Seeing (The Visual System)

Seeing takes longer to mature than hearing and touch, but progress occurs rapidly between 22 and 34 weeks of gestational age (GA).

- At first, preemies spend only very brief periods of time with their eyes open, and do not focus on anything.
- By 30 weeks GA, preemies will respond in different ways to different sights.
- They respond to bright light by blinking or shutting their eyes, but in softer light will open their eyes and focus on objects.
- They can scan an object with their eyes, even though they can't yet control the movement of their heads.

Infants don't see as well as adults.

- They are nearsighted (can only see things up close). They see best when objects are about 8 to 10 inches away from their faces.
- Preemies take longer to focus on an object than do full term infants, and their vision is not as clear as either full-term infants or adults.

Understanding Your Preemie

What a baby does and how he/she reacts to what is going on depends a lot on the state of sleep or wakefulness the baby is in. For example:

- ✓ A baby who is in a deep sleep is hard to wake up and will try hard to go back to sleep; a baby in light or dream sleep can be waked quite easily and is more likely to stay awake.
- ✓ A baby cannot focus on your face when in the drowsy wake state, no matter how hard you try to get his/her attention, but can if in an alert state.

Babies have two sleep states, an in-between sleep-wake state, and three wake states. At first the states are hard to tell apart, but they become more clear as the baby grows. The amount of time a baby spends in each state also changes as the baby grows. Both of these patterns of change reflect the gradual maturing of the brain and nervous system.

Sleep States

Deep sleep (also called Non-REM or quiet sleep). The baby is very still. Every now and then there is a sigh or startle. Breathing is quite even. Deep sleep is thought to be the more restful stage of sleep, and important for growth. Young preemies have very little deep sleep, and there may be more little movements and less even breathing.

Light sleep (REM or active sleep). The baby may move quite a bit and make little noises; breathing is uneven; eyelids often flutter (Rapid Eye Movements [REM]), and eyes may open briefly or be kept slightly open for long periods of time.

- Young preemies spend most of their time in light sleep. Very young preemies don't move as much or have as much REM as older preemies.

Sleep/wake Transition It is hard to tell whether the baby is asleep or awake, as when the baby is beginning to wake up. The baby moves quite a bit, may grunt and open eyes briefly, but may go back into light sleep several times before really waking up.

- Young preemies may be in this state quite a bit.

A full term baby spends about 15-20 minutes at a time in deep sleep and 65-70 minutes in light sleep. A young preemie may spend only 2-5 minutes in deep sleep before going back into light sleep. All infants (preemies, too) go to sleep into light sleep, and if not disturbed, wake up from light sleep.

The pattern of more light than deep sleep changes slowly over the first year to the adult pattern of spending more time in deep than light sleep. Thus a gradual increase in the amount of deep sleep shows that the brain is growing as it should.

At term age (40 weeks), preemies still do not have as much deep sleep as the full term. However, if light levels are lower at night than during the day during their "growing" period in the NICU, they may progress faster.

During each sleep period, infants go through two or three light-deep-light sleep cycles. It is important that they be able to go through this cycling. That is a big reason for trying not to disturb infants during their sleep periods.

Wake States

Just as there are levels of sleep, babies also have several levels of being awake:

Drowsy: The baby's eyes open and close, looking like he or she can hardly stay awake or is having trouble waking up. Sometimes the eyes are open, but the baby is "dazed out", not looking at anything. There is usually not much movement.

Active awake: The baby is awake, but is not really looking at anything. Eyes may be open or closed, and the baby is usually quite active. This is often the state the baby is in when fussing or crying.

Alert: The baby is awake with eyes open and is looking around (scanning). Preemies often have a "not very alert" state, in which they seem to be trying to focus but don't have the wide open, shiny eyes of a fully alert baby.

Fussing/crying: This is a pattern we recognize in any aged infant. It usually happens during active wakefulness. But fussing can occur in light sleep, and as they get older, infants may be able to cry and stay alert, although this is hard for them to do. The very young preemie may but not have the strength to make any noise when fussing or crying.

Before 26-27 weeks, it may be hard to tell whether the preemie really wakes up. There is no alert state.

Between 27 and 30 weeks the preemie usually can become alert only for a very short time. When awake, the preemie is either drowsy or active awake. The time spent alert gradually goes up as the baby grows, and the amount of active awake goes down. Thus increasing alertness is another sign that the brain is growing well.

The baby needs to be alert to attend to (think about) what he/she sees. This is a very important form of learning. Alertness is also very important for interacting with people, and therefore is related to social development.

At full term age (39-40 weeks), preemies still are not spending as much time alert as a full term baby does. However, many of the things now being done in NICU's to help preemies grow well (see section on DEVELOPMENTAL CARE) may help them be more alert earlier.

Communicating

Your baby talks to you through his/her behavior and you can learn to understand or "read" your baby's behavior. You can learn who your baby is, what his/her behaviors mean, what he/she likes and doesn't like.

For example, there are cues - signs - a preemie gives when stressed and others when stable:

| | <u>STRESSED</u> | <u>STABLE</u> |
|-------------------|---------------------------|--------------------------|
| Autonomic: | color changes | stable color |
| | gagging, hiccups | sucking |
| Motor: | tremors, twitches | smooth movements |
| | arms or legs out/stiff | relaxed posture |
| | spreading fingers wide | grasping/hand-holding |
| | arching back | loosely curled up/flexed |
| State: | weak/gaspy cry | rhythmic/robust cry |
| | can't be waked up | will slowly wake up |
| | irritability | no irritability |
| | a lot of fussing/crying | not much fussing/crying |
| Attention: | glassy-eyed, turning away | focused attention |
| | abruptly going to sleep | |