

Nurse-Midwife and the Normal New-Born

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ONE of the most important duties of the nurse midwife who provides primary care is to examine the neonate thoroughly after delivery, yet this skill almost always is attained through trial and error plus pure intuition. The procedures outlined here tend to be not dogmatic but will assist a nurse midwife to complete her goal for care of the immediate newborn.

It makes little difference whether the nurse midwife begins the examination of a normal infant from the head down or the feet up; the important point is that her approach be systematic so that the entire baby is scrutinized and no anatomic areas are ignored.

Evaluation of the New-born

The Apgar scoring-system chart gives an index of the infant's depression or lack of it at birth; determining his need for help through five easily observed signs: Heart Rate, Respiratory Effort, Muscle Tone, Reflex Response and Colour. One minute after delivery is completed (disregarding the cord and placenta), the

infant is scored with 0 or 1 or 2 according to which one of the three statements best describes his condition. A total score of 10 indicates that the infant is in optimum condition. If the score is 5 or more the infant rarely needs special resuscitation measures. A total score of 4 or under demands immediate attention. (Approximately 70 per cent of newborns score 7 or better).

Sleep Characteristics

Normal babies sleep most of the time, awakening only when cold, hungry or uncomfortable. Fifty to 60 percent of their sleep generally is marked by rapid eye movement (REM), sometimes also called "active" sleep. Hence, new-borns grimace or smile asleep, and their eyelids blink. There may be transient crawling movement as well, and perhaps cries.

In deep sleep, the newborn acts semicomatose: if the nurse lifts an arm and then drops it, she finds virtually no tone. In REM sleep, however, the baby has significant tone and responsive reflexes. The third stage, wakefulness, infrequent, accounting for perhaps as little as 10 per cent of the newborn's total time. In premature babies, the proportion of REM sleep is even greater—about 90 per cent in those of around 30 weeks gestation. We do not know the full significance of these REM periods, but they appear to be related to normal brain development.

Head

Examination of the head includes a general assessment of its shape, which may be odd at times, depending on the molding during the neonate's travels through the birth canal. In cases of caesarean section, it is easy to determine the position of the baby in utero by the rounding of the head; a preponderant roundness to the forehead or back indicates, respectively, extension or flexion of the head. The average circumference is 33 to 35.50 cm.

Fontanelles

The next step in the examination involves palpation of the anterior and posterior fontanelles. The anterior fontanelle, 2.5 to 4.0 cm in width, is bordered by the two parietal bones and the frontal bone, which during the newborn period retains the metopic suture, a partial fusion of what once were two frontal bones. It is diamond-shaped and varies in size. All skull bones in the foetus and newborn are movable; they can be "rocked", on either side of a suture. The closer to term the birth is, however, the less the movement as the fibrous sutures become more dense.

APGAR SCORING CHART

SIGN	0	1	2
Heart Rate	Absent	Slow (below 100)	Over 100
Respiratory Effort	Absent	Weak Cry, Hypoventilation	Good strong Cry
Muscle Tone	Limp	Some Flexion of Extremities	Well Flexed
Reflex Response			
1. Response to catheter in nostril (tested after oropharynx is clear)	No Response	Grimace	Cough or Sneeze
2. Tangential Foot Slap	No Response	Grimace	Cry and withdrawal of foot
Colour	Blue, Pale	Body Pink Extremities Blue	Completely Pink

The relative hardness of the flat skull bones, which calcify from the centre out to their periphery, is another indicator of gestational age, immaturity being marked by softness around the periphery of each bone. These tend to be separate bones, each with its own periosteum, so that any damage to them during labour results in localized bleeding under the periosteum producing a cephalohematoma, which is restricted to the individual skull bone.

The posterior fontanelle, 0.5 to 1.0 cm, bounded by the two parietals and occipital bone, is triangular. Its relation to the normal hair whorls should be noted, as dysmorphologists have observed that abnormally placed whorls may be associated with maldevelopment of the brain. The normal hair whorl may coil to the right or left, but normally it always is located no more than 3 cm from the posterior fontanelle.

Molding is the process by which the bones of the head override one another to facilitate delivery.

Craniotables is soft spongy localized areas in the cranial bones. They appear due to pressure, and disappear when pressure is removed.

Abnormalities to look for:

- a. Absence of anterior fontanelle
- b. Sunken, bulging and widening fontanelles
- c. Cephalohematoma

Hair

Scalp hair becomes coarser in most babies as they approach term—a sign of maturity—but very fine and even "cottony" hair is not abnormal.

Ears

The low-set ear frequently associated with mental or (rarely) renal retardation is one with less than one-fourth of its area located above an imaginary line passing through the medial canthi of the eyes. It also can be defined by its rotation—twisted back rather than upright. Any ear, incidentally, should be at least 3.5 cm from tip to top.

Eyes

The eyes must be checked for colobomata, membranous coverings or gross abnormalities. A fuller ophthalmologic evaluation is best put off until the infant is in the nursery.

Nose

Examine for choanal atresia, which is due to the displacement of the cartilage of the vomer during delivery. This obstruction may produce snoring respiration. However, newborns generally are nose breathers, and this obstruction may lead to episodes of hypoxia.

Mouth

Normal, epithelial pearls, sucking blisters, excessive frothy mucus "blowing bubbles", cleft palate and lip, corners of the mouth do not move when baby cries, petechia, oral moniliasis (Thrush). A lacy white material with an erythematous base, occurs on the surface of the oral mucus membrane. If removed it bleeds,

distinguishing it from milk curds which wipe away easily.

Neck

The thyroid isthmus is palpated below the thyroid cartilage, but because it is nondescript in the normal newborn, it usually feels no larger than and the same consistency as a vein on the back of an adult hand. The lateral lobes of the thyroid, even when enlarged, are very hard to palpate in the newborn; if they are enlarged, this is reflected by an enlarged isthmus. Any unusual sinuses or bumps on the neck and face should be noted, too, including preauricular tags and cysts near the thyroglossal duct areas.

Clavicles

The clavicles must be inspected as soon after birth as possible, particularly in large babies—and birth weights are increasing all the time.

Normally, the head is the largest diameter of the foetus until it weighs approximately 8 lb. At that stage, the shoulders measure about the same circumference as the head; they expand as the foetus grows. By 9 lb., there is a significant disparity, and by 10, the shoulders may be so wide that they become impacted during the infant's passage through the birth canal following dilation of the cervix by the head.

In such cases, the nurse midwife must form the baby into a cylinder by pulling down the anterior shoulder, placing a finger into the axilla, and frequently fracturing the clavicle. During this manoeuvre, the brachial plexus—the bundle of nerves that comes from the spinal column and passes underneath the clavicle, distributing its branches out to innervate the arm—can become contused or seriously injured. The effect may be some degree of arm paralysis—Erb's palsy.

The clavicles of all large babies should be examined regardless of whether it was necessary to bring down their anterior shoulders. Early examination is essential, because the clavicle may heal so rapidly, forming a callus, that the grating of the broken fragments (crepitus) may not be detected and may disappear soon after birth.

Thorax

Examination of the thorax involves a check of both nipples and palpation of the areolae and underlying breast tissue. There should be significant breast tissue in term infants, and the areolae should be well demarcated and several millimeters in diameter. The normal chest is fairly round when viewed from above.

There should be no breathing retractions. The abdomen may occasionally balloon up with respiration since the baby is largely a diaphragmatic breather, but by term, some degree of intercostal involvement should be seen as well.

Stethoscopic examination may reveal a number of peculiar adventitious sounds, including some ronchi from mucus, as well as some other coarse sounds. The breath sounds of the normal newborn are heard easily, owing to the limited tubular airway development and relatively small number of alveoli. The older baby with air-

ways of much wider diameters and a much large mass of alveoli, breathes more quietly.

Because of these peculiarities in breath sounds, neonatologists put little faith in the stethoscope for making thoracic diagnoses. Rather, they depend heavily on x-rays if a baby is showing respiratory symptoms.

Heart

Murmurs will not be heard after the first several hours of life unless there is a pathologic problem such as congenital heart disease. The "lub-dub" rhythm of the adult or older child is not heard in the newborn; instead, the baby has a very rapid heart rate—between 120 and 180 beats per minute—with little differentiation between the first and second heart sounds. Thus one hears a rapid "tick tack, tick tack, tick tack."

Abdomen

Umbilical Cord: The umbilical cord should contain a superior thinwalled, large-mouthed vein and two thicker, constricted arteries. The absence of one artery, which occurs in approximately 0.8 per cent of all deliveries, may sometimes indicate a significant visceral malformation.

Liver

The liver should be 1 to 2 cm below the right costal margin. Normally very soft and nondescript, it moves with the baby's respirations. It is the largest organ in the body at this time and, with care, it can be traced across the abdomen into the left upper quadrant. Sometimes the incisura of the left lobe can be palpated in the left epigastrium.

Spleen

The spleen, too, is nondescript and cannot be felt when normal. If enlarged, it is surprisingly superficial and easy to palpate—a sign of abnormality—with the infant in the supine position.

Kidneys

The right kidney may be difficult to palpate because it is partly covered by the liver. At best, with the infant totally relaxed, one can feel about half of it, the lower pole, but if the examiner tries to palpate the entire kidney, the consequent discomfort may cause the abdomen to tense.

With no organs overlying it except the bowel, the left kidney is quite easily felt. It is examined with both hands, one being placed at the costal junction of the ribs and spine, the other on the abdomen about halfway between the umbilicus and left flank. (Warm hands and slow pressure are essential to these examinations, incidentally). The mass so detected by gentle pressure should be firm, not move with respiration, and have about the dimensions of an adult thumb. The rest of the abdomen also must be carefully palpated for cystic masses or unusual contours.

Pelvic Area

With the baby supine, the nurse midwife places her fingers gently into the femoral triangle to feel the pulsations of the femoral artery, which are absent or

greatly diminished in cases of significant obstructive aortic disease, such as coarctation.

Concerning the female genitalia, the mons pubis should be a discrete padded area with significant subcutaneous tissue. The vagina is next inspected peripherally to ensure that the labia majora cover the labia minora and that the urethra is positioned directly under the clitoris. The vagina should be patent—that is, not totally blocked by the hymen. In this regard, it is important to recognize that the rare mass felt above the symphysis pubis may be a full bladder, which suggests the possibility of a hematocolpos or a mucocolpos. Both of these accumulations reflect vaginal retention resulting from an intact hymen, and in turn may obstruct urethral emptying, causing the enlarged bladder.

In the male, the penile foreskin must be examined for intactness. An appearance resembling partial circumcision, or a curled-up thickening on the superior surface of the glans penis suggesting a hood, probably indicates hypospadias of first, second or third degree. Above all, it is important to remember that unless the foreskin is totally intact, no circumcision should be done in the delivery room and the infant must be evaluated more fully for a genitourinary abnormality.

All newborn boys have phimosis—the foreskin does not retract across the glans—so this is no cause for concern. The scrotum should have corrugations on it and a median raphe, a vertical thickening in the centre of the scrotum. Both tests normally are palpable, and some degree of hydrocele often persists after birth, due to the closing of processus vaginalis after they have migrated into the scrotum. The inguinal rings can be palpated with the fifth finger: the excessive potency of either one may be a harbinger of hernia.

Orthopaedic Examination

Hips

It is most important to rule out congenital dislocation of the hips. Since studies have clearly shown that this is a rare condition, occurring in only one in perhaps 2,500 deliveries, it seems odd that so many babies wind up in hip casts.

A hip that is truly dislocated at the time of birth is easily diagnosed. With the baby supine, the nurse midwife flexes the legs about 90 degrees at the hip and compares the levels of the knees. If a hip has been dislocated, the head of the femur will be out of the acetabulum—behind and sometimes a little below it—so a unilateral dislocation will leave the knee on that side lower than the one on the normal side. A bilateral problem is indicated by external rotation of both feet with an upward turning of the soles. X-rays are essential, of course, in verifying this diagnosis.

In a simple test of hip rotation, the nurse midwife places her second and third fingers at the head of the femur while hooking her thumbs around the femur to rotate the infant's hips back and forth. In this way, she can locate the acetabulum and—in cases of dislocation—feel the head of the femur jumping in and out of it.

It is also important to check the hip for instability. An Ortolani manoeuvre often will produce a click or

The Summary of Common Neonatal Reflexes

Reflex	Manner of Elicitation	Gestational Age When Present Consistently	Age When Disappears	Comments
Moro	A hand clap or slap on the mattress. The baby should respond with extension of the trunk and extension and abduction of the limbs, (as if to embrace)	32 weeks	From 1 to 3 or 4 months	A sudden noise or motion may also elicit response. Consistent absence suggests brain damage. Absence on one side may indicate brain damage, fractured clavicle, or injury to brachial plexus. This is especially important to detect because any attempt to lift an affected baby by the arms could result in shoulder dislocation and significant damage.
Tonic neck	When the baby is supine and the head is turned to one side, the arm and leg of the baby is facing extend while the opposite arm and leg flex in a "fencing" position.	Incomplete at birth in normal term infant; often more definite in leg than arm	During the first 6 months, although a partial response may remain until second or third year	If persistent asymmetry and a full response are easily obtained, a cerebral lesion is suggested.
Stepping	When held erect and body supported under the arms with soles flat on table top and trunk inclined forward, baby takes regular, alternating steps.	May tiptoe at 32 weeks; heel-to-toe motion at 40 weeks	6 weeks	Failure to step on several occasions suggest neurological abnormality, stepping with only one foot indicates a unilateral problem.
Neck righting	When head turned to one side, trunk will follow.	34 to 36 weeks	Continues to develop	Other righting reflexes develop as baby grows older.
Placing	When held erect with dorsum of foot drawn against underedge of table top, foot is lifted and placed atop table.	35 weeks		Failure to place or unilateral placing suggests neurological abnormality, as does persistent extension or scissoring of legs.
Palmar grasp	Pressing the examiner's finger into the baby's metacarpophalangeal groove causes the baby to grasp the finger.	Finger grasp is present as early as 28 weeks, but it is approximately 36 weeks before the baby can lift himself off the mattress.	4 to 6 months	

<i>Reflex</i>	<i>Manner of Elicitation</i>	<i>Gestational Age When Present Consistently</i>	<i>Age when Disappears</i>	<i>Comments</i>
Plantar grasp	Pressure on the plantar surface of the foot causes flexion of the toes.		8 to 15 months	
Traction response	After baby grasps hands of examiner, baby pulled to sitting position; baby will flex elbows and support head.	After 36 weeks	Persists	Examiner uses other fingers to help baby grasp
Rooting	Stroking the upper or lower lip or the side of the cheek causes the baby to turn his mouth and face toward the stimulus and open his mouth.	Fairly good by 32 weeks; complete at 34 weeks	3 to 4 months when baby awake; 7 to 8 months when baby asleep	May be difficult to elicit immediately after feeding. Utilize booth rooting and sucking reflexes when putting baby to breast or offering bottle.
Sucking	Stroking the lips produces sucking.	Excellent by 34 weeks; reasonably strong at 32 weeks	12 months; diminishes at 3 to 4 months	May be difficult to elicit in recently fed baby; weak or absent in baby with brain damage.
Swallowing	Place object on back of tongue.	34 to 36 weeks	Persists	

otherwise a lack of stability in this hip, being pulled. Lax ligaments may be the cause of this condition, which is best treated by using triple diapers for several weeks.

Tibia

Foetal tibial torsion stems from normal bone growth with the legs crossed in utero. It is normal and resolves spontaneously. True tibial torsion also may be encountered, though, particularly in premature infants who lie primarily on either their backs or their abdomens so that their feet become either inverted or everted.

Feet

A diagnosis of clubfoot requires that the calcaneus be displaced medially so that the most dependent part of the foot appears to be the talus. The classic horse-foot (talipes equinovarus) meets this criterion, frequently being marked by a curving of the sole. The hallmark of a clubfoot, however, remains the medially turned calcaneus, although another version of the deformity is characterized by a laterally displaced calcaneus. The diagnosis can be made by visual inspection or manual examination of the angle of the calcaneus to the tibia; the normal foot describes a straight line from the tibia through the calcaneus. This

condition should not be confused with metatarsus varus or metatarsus adductus, which are positional "abnormalities" associated with particular foetal positions. In the latter cases, the calcaneus and tibia are properly aligned, and the parents can be reassured that the awkward position of the feet will be "outgrown" long before or, at latest, as soon as their child begins to bear weight on them.

A device used to alleviate the anxiety of a mother is to suggest that each time she changes the baby's diaper she hold the heel firmly and push laterally from its medial side outward five times. This gives her a feeling of being involved in her baby's foot correction.

Spine

In checking the spine's positioning, one should look for any odd pigmentation. The bluish "mongolian spots," said to be venous lakes, are very common in noncaucasian newborns. These resolve spontaneously and are normal. The sacral dimple at the base of the spinal column is normal, of course, and must be differentiated from the almost tail-like depression that marks a pilonidal sinus—a relatively rare condition.

Anus

An unknown number of babies are born with a malpositioned fistula simulating the anus, but either outside of or involving the anal sphincter. This abnormality, which causes incontinent faeces unless corrected, can be corrected readily by simple plastic surgery.

Neurologic Examination

At this point, it is a good idea to check for the cranial nerves and reflexes.

Cranial Nerves

The cranial nerves (with the exception of the olfactory nerve) are evaluated systematically. First, the baby should be pulled to a sitting position slowly, whereupon his eyes should open—promptly if the examination is done in a darkened room. Sometimes it is necessary to recline and raise the infant's back several times to get this reaction. Once the eyes are open, the head can be moved from side to side and slightly up and down. The tendency of the eyes to remain looking forward despite head wags is called the positive doll's-eye sign and is normal. If the eyes shift with the head or move at random, however, there may be an abnormality. The doll's-eye sign indicates that the third, fourth, sixth, and part of the eighth (vestibular) nerves are intact.

The nurse midwife should then shine the light from an ophthalmoscope into the eyes to check for both a red reflex and contraction of the pupil, the latter being a function of the third cranial nerve. The red reflection is merely the retina, of course, and its presence suggests that there are no cataracts or gross tumours. The examination is best conducted with the ophthalmoscope set at a +4 or more diopter so that both the reflex will come through and any clouding of the lens or remnants of the hyaloid artery behind the pupil will be seen.

The next step is to tap the forehead between the eyes; the baby's responsive blinking shows the upper portion of the seventh cranial nerve to be intact.

Creases about the nose while the infant sucks on the examiner's finger establish the normality of the fifth nerve, which innervates the sucking muscles of the cheek as well as the lower portion of the seventh, while normal tongue thrusting indicates an intact 12th nerve. A tight hold on the finger with the lips is another indication that at least part of the seventh nerve is functional.

The nurse midwife should then depress the infant's chin slightly, allowing the tongue to come out to the gums or the lips—a reflex that also points to a normal 12th cranial nerve if the tongue advances in midline. She should then use a tongue depressor to make the baby gag. If the palate ascends with the gag, the ninth nerve is intact, as is the vagus nerve.

Upward head movement and a good measure of resistance when the infant is pulled into a sitting position signify that the 11th cranial (spinal accessory) nerve is active.

Finally, to check the eighth cranial nerve, which controls hearing, the nurse midwife should make a loud noise some distance from the baby, being careful not to create a breeze. If the infant blinks at the sound, that nerve is intact, although the absence of a blink does not necessarily mean deafness. Many babies require some other kind of auditory stimulation, but there is no immediate need to establish their hearing so soon after delivery.

At the time when the nurse midwife inspects the mouth for a gag reflex, she should take a quick look at the gums to check for usual swellings, asymmetries, cysts or other lesions, since the newborn's mouth very frequently has some variation.

Summary

The physical examination described here is sufficient to assure that no major malformations or neurologic problems will be overlooked by the nurse midwife when she engages herself in initial physical assessment of the normal newborn.

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