

Aspects of Infant Reflexes and Infant-Toddler Physical Development and Self-Help

Primitive Reflexes

The "primitive reflexes" are those that appear and disappear in an expected order during infant development. They are important signs of a normally functioning nervous system when present at the right stage of development; likewise, abnormal absence of an expected reflex at a given stage of infant development, or presence of (or reappearance of) a reflex beyond the normal time it is normally found implies some abnormal function of the nervous system.

Moro reflex, startle reflex	The infant is placed in a semiupright position and the head is momentarily allowed to fall slightly backward into the examiner's hand; the child will symmetrically fling the arms out from the body and flex the thumbs, followed by a reverse flexion of the arms as if grasping onto his mother. An asymmetric response may signify a fractured clavicle or a birth injury to the nerves of the arm which does not function properly. Absence of the Moro reflex in a newborn is an ominous finding, implying some sort of serious neurologic condition.
Grasp response	The grasp response is obtained by placing a finger or object in the open palm of each hand; a normal infant will grasp the object and will resist attempted removal with a tighter grip. This reflex is sometimes strong enough in a really vigorous baby to briefly support the child's body weight as if he were doing pull-ups.
Tonic neck reflex, fencing reflex	The TNR is produced by turning the baby's head to one side while he lies on his back; he extends his arm on the side to which the head is turned, and flexes the other arm, in a pose that mimics a fencer. For an infant to remain in a constant tonic neck response is always abnormal.
Parachute reflex	The child is suspended by the trunk the child suddenly lowered as if the child were

	falling for an instant. The child spontaneously throws out the arms as a protective mechanism. The parachute reflex appears before the onset of walking.
Rooting reflex	The newborn's cheek is lightly stroked, and he turns to find the expected mother's nipple
Sucking reflex	A finger or artificial nipple is placed in the newborn's mouth, and he does what comes naturally
Babinski reflex or sign	A finger is stroked firmly down the outer edge of the baby's sole; the toes spread and extend out.

Neonatal Primitive Reflexes

BABINSKI	BABKIN	DOLL'S EYE
<p>Baby's foot is stroked from heel toward the toes. The big toe should lift up, while the others fan out.</p> <p style="text-align: center;">****</p> <p>Absence of reflex may suggest immaturity of the CNS, defective spinal chord, or other problems. Reflex may be seen up to age one, then reaction will be reversed with the toes curling downward.</p>	<p>When both of baby's palms are pressed, her eyes will close, mouth will open and her head will turn to one side.</p> <p style="text-align: center;">****</p> <p>Absence of this reflex or if it reappears after vanishing around 3-4 mos., it may signify a malfunctioning CNS.</p>	<p>While manually turning baby's head, his eyes will stay fixed, instead of moving with the head.</p> <p style="text-align: center;">****</p> <p>While normally vanishing around one month of age, if it reappears later, there may be damage to the CNS.</p>

GALANT	PALMAR GRASP
<p>While stroking baby's back to one side, her spine and trunk will arch toward that side.</p> <p style="text-align: center;">****</p> <p>Absence may indicate spinal injury or depression of the CNS.</p>	<p>By pressing just one of baby's palms, fingers should grasp the object.</p> <p style="text-align: center;">****</p> <p>Absence or weakness of this reflex could reflect an injured spinal chord or depressed CNS.</p>

PEREZ	PLANTERS GRASP	STEPPING
<p>Firmly stroking baby's spine from tail to head, will make her cry out and head will rise.</p> <p style="text-align: center;">****</p> <p>If this reflex does not vanish in 4-6 months, baby's CNS may be severely depressed.</p>	<p>Pressing thumbs against the balls of baby's feet will make his toes flex.</p> <p style="text-align: center;">****</p> <p>Absence of this reflex may indicate damage to the spinal chord.</p>	<p>Holding baby upright with feet touching a solid surface and moving him forward should elicit stepping movements.</p> <p style="text-align: center;">****</p> <p>After 3-4 months, this reflex should vanish. If it reappears, there may be an injury of the upper spinal chord.</p>

SUCKING	ROOTING	WITHDRAWAL
<p>A finger or nipple placed in baby's mouth will elicit rhythmical sucking.</p> <p>****</p> <p>Depressed sucking may be due to medication given during childbirth</p>	<p>When baby's cheek is stroked at the corner of her mouth, her head will turn toward finger and she will make sucking motions.</p> <p>****</p> <p>If this reflex doesn't vanish in 3-4 months, the CNS may be malfunctioning.</p>	<p>A pin prick to the sole of baby's foot will make baby's knee and foot flex.</p> <p>****</p> <p>Absence of this reflex could indicate a damaged sciatic nerve.</p>

Infant Reflexes

- early periods of life are of particular interest because of two types of movements- infant reflexes and stereotypies
- during the last four months of prenatal life and the first few months after birth a human being's movement repertoire is largely composed of reflexes (reflex machines)

Reflexes

- reflexes are involuntary
- each movement is an involuntary response to a particular stimulus
- most reflexes occur subcortically
- produced without direct involvement of the higher brain centers

Reflexes

- stimulus creates an electrical impulse that travels to the central nervous system, the information is integrated and the appropriate movement message is issued to the muscles involved in the response

Infant versus Lifetime Reflexes

- in normal healthy infants, reflexes usually do not last much beyond the first birthday
- all reflexes that endure throughout the lifespan in normal healthy adult are called lifespan reflexes

Reflexes and Survival

- a human being is born with very few voluntary capabilities and limited mobility
- infant reflexes (primitive reflexes) are predominantly used for protection, nutrition, or survival
- they usually appear during gestation or at birth and are suppressed by 6 months (sucking & rooting)

Reflexes and Future Motor Development

- postural reflexes are related to the development of later voluntary movement
- postural reflexes are the basis of future movements that are initiated by stimulation of higher brain centers
- reflexes provide a form of practice that later blend into voluntary movements

Infant Reflexes

- the number of infant reflexes is difficult to ascertain because of different terminology is often used to describe the same reflex and/or the reflexes are poorly defined (ie palmar grasp reflex)

Primitive Reflexes

- Palmar Grasp Reflex
 - when the palm is stimulated, fingers close
 - one of the first to appear
 - appears in utero endures through the fourth month
 - possibly plays a role in the acquisition of voluntary reaching and grasping

Primitive Reflexes

- Sucking Reflex
 - when the lips are stimulated causing a two responses, creation of negative pressure in the mouth and the tongue applies positive pressure
 - present in utero endures through the third month, at which point it becomes voluntary

Primitive Reflexes

- Searching Reflex
 - often considered in conjunction with sucking reflex
 - assists in the infant finding a source of nourishment
 - failure or persistence can be a sign of dysfunction (asymmetry)

Primitive Reflexes

- Moro Reflex
 - one of the most useful in diagnosing dysfunction
 - present at birth and endures through the sixth month
 - place the baby's head in the palm of your hand and suddenly (gently) lower the head a few inches, causing the baby to extend its limbs
 - failure or persistence can be a sign of dysfunction

Primitive Reflexes

- Startle Reflex
 - causes the arms and legs to flex immediately
 - usually appears after the Moro reflex disappears
 - normally suppressed by 1 year of age

Primitive Reflexes

- Asymmetric Tonic Neck Reflex
 - elicited when the baby is supine or prone, the head is turned to one side, the limbs on the face side extend while the limbs on the other side flex
 - present at birth and endures up to 3 months
 - facilitates body awareness and helps in development of hand eye coordination

Primitive Reflexes

- Symmetric Tonic Reflex
 - placing the baby in a supported sitting position if the baby is tipped forward until the neck is fully flexed, the arms flex, and the legs extend
 - present at birth and endures through 3 months
 - persistence can inhibit walking, standing, and sitting

Primitive Reflexes

- Plantar Grasp Reflex
 - present at birth endures through the first year
 - applying pressure to the ball of the foot causing all of the toes of the foot to flex
 - this reflex must be suppressed before the infant can stand or walk
 - can't put shoes on

Primitive Reflexes

- Babinski Reflex
 - stroke the bottom of the infant's foot from heel to toe eliciting a fanning of all the toes
 - present at birth and endures through 4 months

Primitive Reflexes

- Palmar Mandibular Reflex
 - present at birth and usually disappears by 3 months
 - applying pressure to both palms elicits all or one of the following, the mouth opens, the eyes close, and the neck flexes, tilting the head forward
 - this reflex links humans to animals lower on the phylogenetic chart (helps infant cling to mom)

Primitive Reflexes

- Palmar Mental Reflex
 - present at birth and usually disappears by 3 months
 - scratching the base of the palm causes the lower jaw to open and close
 - the response is a series of jaw muscle contractions

Postural Reflexes

- Stepping Reflex
 - elicited by holding the infant upright, touching the infants toes causing the legs to lift and descend
 - present shortly following birth and endures through the 5 or 6 month
 - precursor to the development of voluntary movement (walking)

Postural Reflexes

- Crawling Reflex
 - present at birth and endures through 3 to 4 months (prior to crawling)
 - baby placed prone and soles of the feet are stroked alternatively causing leg and arm action mimicking crawling
 - forerunner to crawling
 - helps to develop muscle tone

Postural Reflexes

- Swimming Reflex
 - holding the infant horizontally causes the infant to demonstrate a well coordinated swimming action
 - observable as early as 2 weeks through 5 months
 - contributed to the popularity of early swim programs

Postural Reflexes

- Head- and Body- Righting Reflexes
 - believed to be related to the attainment of voluntary rolling movements
 - observable as early as the 1st month and endures through 6 months
 - the body rotates in the direction the head is turned to regain the relationship of the head and shoulders

Postural Reflexes

- Parachuting Reflexes
 - believed to be related to the attainment of upright posture
 - when an infant is off balance in any direction it stimulates a protective movement in the direction of the potential fall
 - appears as early as 4 months and endures past the first year of life
 - appear to be voluntary, but are reflexive

Postural Reflexes

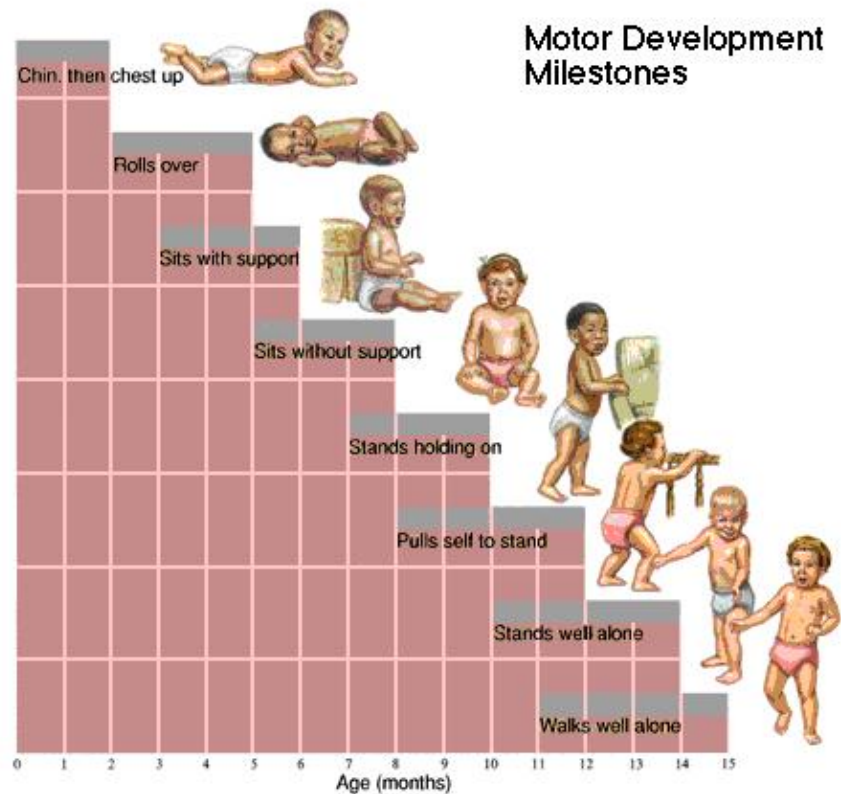
- Labyrinthine Reflex
 - appears at 2-3 months and endures through the first year
 - believed to be critical in the development of upright posture
 - characterized by the head tilting in the opposite direction of body tilt

Postural Reflexes

- Pull-up Reflex
 - also related to the acquisition of upright posture
 - may not appear until the 3rd month and endure through the first year
 - arm's flex or extend in a effort to maintain upright posture

Stereotypies

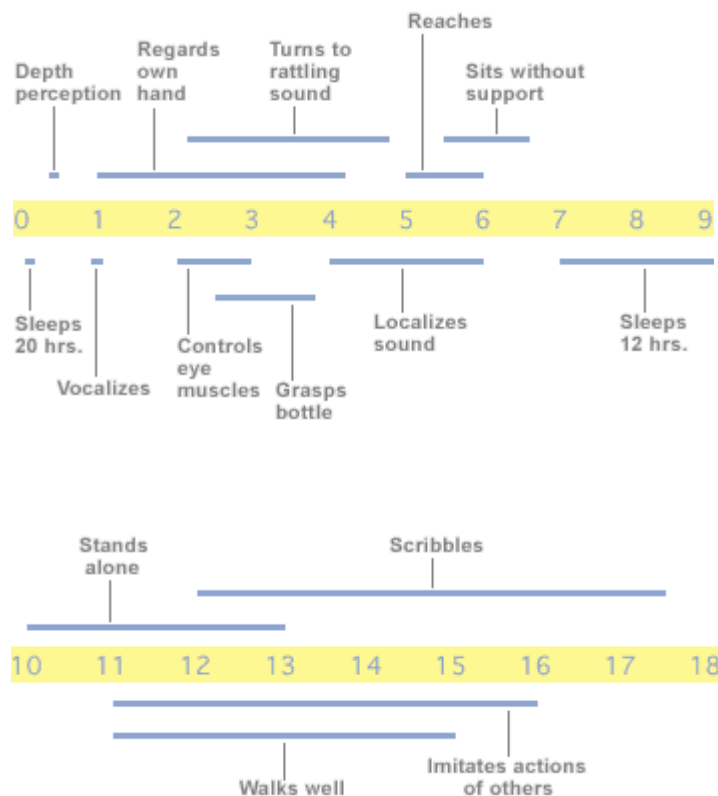
- are rhythmical, patterned, seemingly centrally controlled movements
- movement in its simplest patterned actions for the muscle group involved
- often simple flexion, extensions, and rotations
- common among insects, birds and fish
- considered pathological

**TABLE 4.1**

Gross and Fine Motor Development in the First Two Years

MOTOR SKILL	AVERAGE AGE ACHIEVED	AGE RANGE IN WHICH 90 PERCENT OF INFANTS ACHIEVE THE SKILL
When held upright, head erect and steady	6 weeks	3 weeks–4 months
When prone, lifts self by arms	2 months	3 weeks–4 months
Rolls from side to back	2 months	3 weeks–5 months
Grasps cube	3 months, 3 weeks	2–7 months
Rolls from back to side	4½ months	2–7 months
Sits alone	7 months	5–9 months
Crawls	7 months	5–11 months
Pulls to stand	8 months	5–12 months
Plays pat-a-cake	9 months, 3 weeks	7–15 months
Stands alone	11 months	9–16 months
Walks alone	11 months, 3 weeks	9–17 months
Builds tower of two cubes	13 months, 3 weeks	10–19 months
Scribbles vigorously	14 months	10–21 months
Walks up stairs with help	16 months	12–23 months
Jumps in place	23 months, 2 weeks	17–30 months

Source: Bayley, 1969.



General Developmental Sequence Toddler through Preschool

This part presents typical activities and achievements for children from two to five years of age. It is important to keep in mind that the time frames presented are averages and some children may achieve various developmental milestones earlier or later than the average but still be within the normal range. This information is presented to help understand what to expect from a child.

AGE 2

Physical Development

Walks well, goes up and down steps alone, runs, seats self on chair, becoming independent in toileting, uses spoon and fork, imitates circular stroke, turns pages singly, kicks ball, attempts to dress self, builds tower of six cubes.

Emotional Development

Very Self-centered, just beginning a sense of personal identity and belongings, possessive, often negative, often frustrated, no ability to choose between alternatives, enjoys physical affection, resistive to change, becoming independent, more responsive to humor and distraction than discipline or reason.

Physical Development

Runs well, marches, stands on one foot briefly, rides tricycle, imitates cross, feeds self well, puts

Social Development

Solitary play, dependent on adult guidance, plays with dolls, refers to self by name, socially very immature, little concept of others as "people." May respond to simple direction.

Intellectual Development

Says words, phrases and simple sentences, 272 words, understands simple directions, identifies simple pictures, likes to look at books, short attention span, avoids simple hazards, can do simple form board.

Age 3

Social Development

Parallel play, enjoys being by others, takes turns, knows if he is a boy or girl, enjoys brief group

on shoes and stockings, unbuttons and buttons, build tower of 10 cubes. Pours from pitcher.

Emotional Development

Likes to conform, easy going attitude, not so resistive to change, more secure, greater sense of personal identity, beginning to be adventuresome, enjoys music.

Physical Development

Skips on one foot, draws "Man", cuts with scissors (not well), can wash and dry face, dress self except ties, standing broad jump, throws ball overhand, high motor drive.

Emotional Development

Seems sure of himself, out-of bounds behavior, often negative, may be defiant, seems to be testing himself out, needs controlled freedom.

Physical Development

Hops and skips, dresses without help, good balance and smoother muscle action, skates, rides wagon and scooter, prints simple letters, handedness established, ties shoes, girls small muscle development about 1 year ahead of boys.

Emotional Development

Self-assured, stable, well-adjusted, home-centered, likes to associate with mother, capable, of some self-criticism, enjoys responsibility. Likes to follow the rules.

activities requiring no skill, likes to "help" in small ways--responds to verbal guidance.

Intellectual Development

Says short sentences, 896 words, great growth in communication, tells simple stories, uses words as tools of thought, wants to understand environment, answers questions, imaginative, may recite few nursery rhymes

Social Development

Cooperative play, enjoys other children's company, highly social, may play loosely organized group games - tag, duck-duck-goose, talkative, versatile.

Intellectual Development

Uses complete sentences, 1540 words, asks endless questions, learning to generalize, highly imaginative, dramatic, can draw recognizable simple objects.

Social Development

Highly cooperative play, has special "friends", highly organized, enjoys simple table games requiring turns and observing rules, "school", feels pride clothes and accomplishments, eager to carry out some responsibility.

Intellectual Development

2,072 words, tells long tales, carries out direction well, reads own name, counts to 10, asks meaning of words, knows colors, beginning to know difference between fact and fiction-lying, interested in environment, city, stores, etc.

Age 4

Age 5

8 MONTH MOTOR AND SELF-HELP SKILLS CHECKLIST

Fine Motor

- Tries to pick up tiny objects
- Manipulates toy actively with wrist movements
- Reaches and grasps an object with an extended elbow
- Holds two objects at one time in one hand
- Releases object above surface into large container

Gross Motor Rolls from back to stomach

- Lifts head while lying on his or her back
- Holds weight on one hand while on stomach
- Sits independently for long periods of time, but occasionally uses hands to steady self
- Uses arms and hands to catch self when falling over while seated

- Creeps for mobility
- Stands at furniture and begins to cruise sideways

Feeding Skills

- Mouths and Gums solid foods
- Feeds self crackers
- Holds own bottle
- Opens mouth when spoon is presented
- Drinks from cup held by an adult

12 MONTH MOTOR AND SELF-HELP SKILLS CHECKLIST

Fine motor

- Bangs two cubes held in hands
- Pokes with index finger
- Uses a neat pincer grasp to pick up objects
- Releases objects into a small container with precision
- Tries to imitate a scribble

Gross motor Stands without support for a few seconds

- Walks with both hands held
- Pivots in sitting - twists to pick up objects

Feeding

- Bites through a soft cookie
- Stirs in imitation
- Holds cup and drinks with some spillage

18 MONTH MOTOR AND SELF-HELP SKILLS CHECKLIST

Fine motor

- Builds tower using three cubes
- Places one round peg in pegboard
- After a demonstration, turns over a small container to obtain objects inside
- Scribbles spontaneously
- Uses both hands in midline, one holds the other manipulates

Gross motor

- Walks without support
- Bends over and looks through legs
- Throws ball forward
- Pulls toy behind while walking
- Carries large toy while walking

Feeding Skills

- Brings filled spoon to mouth
- Scoops food

Dressing Skills

- Indicates discomfort over soiled pants verbally or by gestures
- Pulls socks off
- Removes hat
- Places hat on head

24 MONTH MOTOR AND SELF-HELP SKILLS CHECKLIST

Fine Motor

- Imitates circular scribble and horizontal stroke
- Builds tower using 6 cubes
- Holds crayon with thumb and forefinger
- Strings 3 one inch beads
- Snips with scissors

Gross motor

- Walks up stairs holding rail - both feet on one step
- Picks up toy from floor without falling
- Moves on "ride toys" without pedals
- Kicks ball forward

Feeding Skills

- Gives up bottle
- Bites through a variety of food thicknesses
- Brings spoon or fork to mouth with the palm facing up
- Holds small cup in one hand

Dressing Skills

- Is beginning to pull pants down with assistance
- Is beginning to unbutton large buttons
- Anticipates need to eliminate - uses same word for both functions

30 MONTH MOTOR AND SELF-HELP SKILLS CHECKLIST

Fine motor

- Puts tiny objects in small container
- Folds paper in half

Gross motor

- Walks downstairs alone, both feet on one step
- Imitates standing on one foot
- Walks on tip toes a few steps

- Jumps a distance of eight to fourteen inches
- Jumps backwards
- Walks backwards

Feeding Skills

- Pours from a small cup

Dressing Skills

- Undresses with assistance
- Pulls pants up
- Dresses with assistance

3 YEAR MOTOR AND SELF-HELP SKILLS CHECKLIST

Fine Motor

- Builds tower with 9 cubes
- Copy's a circle, vertical, and horizontal line
- Turns book pages one at a time
- Holds a pencil in writing position
- Opens rotating door handles

Gross Motor

- Pedals a tricycle
- Walks down stairs with alternating feet
- Climbs jungle gyms and ladders
- Catches an 8-inch ball

Feeding Skills

- Stabs food with a fork
- Holds spoon in fingers with palm up
- Uses napkin
- Serves self at table with little spilling

Dressing Skills

- Uses toilet with assistance - has daytime control
- Buttons large buttons
- Puts on socks, may have difficulty turning the heel
- Zips and unzips jackets (unable to separate or insert shank)
- Puts shoes on, although may be on wrong feet

4 YEAR MOTOR AND SELF-HELP SKILLS

Fine Motor

- Copies square shapes
- Draws a person with two to four body parts

- Cuts on a line
- Begins to copy some capitol letters

Gross Motor

- Hops and stands on one foot up to 5 seconds
- Kicks ball forward
- Throws ball overhand
- Catches a bounced ball

Dressing Skills

- Puts on socks with heel placement
- Puts shoes on with little assistance
- Buckles shoes and belts

5 YEAR MOTOR AND SELF-HELP SKILLS

Fine Motor

- Copies a triangle and other geometric patterns
- Prints some letters
- Cuts out a circle on a line

Gross Motor

- Does somersaults
- Skips
- Swings

Dressing Skills

- Puts shirt on correctly
 - Puts belt in loop
 - Unties a tie on an apron (behind self)
-