Motor Development from Birth to Twelve Months
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Good Beginnings
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A month to month overview-why?

The first year of life is a wonderful compilation of sequential activities. Each one purposefully builds on the previous to allow for the development of:

- Independent locomotion (gross motor)
- Independent use of bilateral upper extremities (fine motor)
- Independent verbal and nonverbal skills (communication)

If one component skill is unattained, further development becomes difficult.
• Understanding the basic components and when milestones are expected to be achieved is ESSENTIAL to designing intervention

• Skills must be acquired in a relatively sequential order to be successful (i.e. you cannot run before you walk, walk before you sit, etc.)

• General principles
  • Cephalo-caudal (head to foot)
  • Proximal-distal (from the core to the extremities)
  • Gross motor-fine motor (large movements before small, refined movements)
Birth to One Month (Neonatal Period)

- Typical gestation is 38-42 weeks
- Purpose: learn to tolerate extrauterine environment
  - Sensory input
  - Feeding
  - Sleeping
- Physiologic flexion dominates
- Pull to sit is completely passive
  - Unable to contract UE/abdominal/LE muscles to assist
  - Neck muscles may contract, but head is too heavy for lifting
Neonate (cont.)

- Reflexes and gravity dominate
  - Moro reflex: Sudden backward movement of the head causes UE abd/ext. followed by add/flex.
  - Rooting reflex: Tactile stimulation to the mouth in supine causes head rotation
- Can clear head to the cheek to either side while prone (prevents suffocation)
Potential Indicators of Atypical Motor Development - Perinatal

- Profound Medical History
  - Prematurity
  - Intraventricular Hemorrhage (Grade III/IV)
  - Bronchopulmonary Dysplasia (BPD)
  - Very low birth weight (under 1500 grams)
  - Perinatal asphyxia

- Neurological insults will either result in a very stiff (hypertonic or spastic) or floppy (hypotonic) muscle pattern
First Month (4-8 weeks)

• **Purpose**: eat, sleep, emotionally bond with caregivers, visual exploration

• **Supine**
  • Random extremity movements
  • Head rotation

• **Prone**
  • Head lifting and turning (requires maximum effort)

• **Visual**
  • Emerging tracking in horizontal plane of a high contrast, black and white object/picture

• **Pull to sit** is still passive, but infant tries to assist
Second Month (8-12 weeks)

- ATNR (asymmetric tonic neck reflex) dominates
  - Head rotation causes extension of face side arm and flexion of skull side arm
- Vision
  - Brief fixation at midline
  - Tracking side to midline/midline to side
Second month (8-12 weeks) (cont.)

- Prone
  - Brief lifting of head to 45°

- Pull to sit
  - Head lag continues despite attempts to assist
  - UE produce some active elbow flexion
Third Month (12-16 weeks)

Symmetry returns
- ATNR starting to integrate, but not fully
- Can hold head in midline
- Can hold a rattle placed in the hand
- Can play with the hands together
Third month (12-16 weeks) (cont.)

• Prone
  VERY important to have a lot of tummy time
  Able to lift head between 45-90°
  Can track horizontally 180°

• Pull to sit
  Head lag persists until nearly upright, then some flexion occurs
Potential Indicators of Atypical Motor Development-3 months

- Inability to keep head in midline
- Inability to lift head while prone
- Inability to bear weight on the UE while prone
- Inability to focus visual gaze
Fourth Month (16-20 weeks)

- The beginnings of movements that are:
  - Controlled and purposeful
  - Alternating and coordinated
- Symmetry extends down through the head and trunk
- ATNR should be rarely seen
Fourth month (16 to 20 weeks) (cont.)

- Prone
  - 90° on elbows
  - Head in midline

- Pull to sit
  - Head righting strong/chin tuck
  - Stabilized in midline with shoulders

- Rolling begins via reflexive action
  - Supine to side
  - Prone to side

- Sitting begins with support
  - Brief periods of maintaining position without support (a few seconds)
Potential Indicators of Atypical Motor Development-4 months

- Continued asymmetry
- Overuse of ATNR reflex
- Inability to keep head in midline in either prone or supine
- Inability to visually track objects
- Lack of UE muscle contraction during pull to sit
- Inability to achieve a sitting position with support
Fifth Month (20-24 weeks)

- Characterized by movement that is:
  - Voluntary
  - Asymmetrical
  - Dissociated
  - Reciprocal
- Head control and righting are present in all positions
- Hands to feet emerges
Fifth month (20-24 weeks) continued

- Prone on extended elbows
- Rolling
  - Active from supine to side
  - Accidental from prone to supine
- Pull to sit
  - Flexes and lifts head when holding hands
  - Abdominal begin to contract
- Sitting
  - Independent briefly but through positional stability
  - LE’s are in ring position
  - Prop sitting with UE’s
- Play involves grabbing, mouthing, banging, shaking a small toy in hand
Potential Indicators of Atypical Motor Development - 5 months

- Lack of flexion control (unable to reach hands to knees/feet)
  - Weak abdominals/lack of kicking LE’s
  - Lack of choice between asymmetry and symmetrical use of UE’s
- Weak use of spinal extensors
  - Unable to stabilize head in supported sitting
  - Unable to attempt to straighten back in supported sitting
- Inability to achieve weight bearing on ischial tuberosities in supported sitting
Sixth Month (24-28 weeks)

- Head control fully developed for prone, supine, and side-lie
- Feet to mouth
- Pulls to sit holding hands
- Sits independently
  - No propping
  - No external support
- Bears full weight on LE’s in supported standing
Sixth month (24-28 weeks) continued

- **Prone**
  - Functional and mobile
  - Prone on extended arms (POEE)
  - Weight shift on extended arms
  - Pivot prone in a circle
- **Rolling**
  - Active supine to prone
  - Head righting is present during the movement
Potential Indicators of Atypical Motor Development-6 months

- Inability to sit
- Inability to be active in prone
- Inability to roll
- Inability to correct head position
Seventh Month (28-32 weeks)

- Very rarely in supine
- Active play in sidelye
- Sit independently
  - Back and pelvis straight
  - Can manipulate toys while in base of support (BOS)
  - Frequent falls backwards
  - Uses protective extension when falling forward
Seventh month (28-32 weeks) continued

- Prone
  - Pushes up into quadruped
  - Rocking in quadruped
- Creeping
  - Sometimes called belly or commando crawling
- Can be supported in standing at trunk or hands
Potential Indicators of Atypical Motor Development-7 months

- Preference for supine over prone
- Inability to roll
- Inability to sit
- Lack of motivation to move
- Compensations to accomplish age-appropriate tasks
  - Head/neck hyperextension while sitting
  - Extra wide BOS during sitting
Eighth Month (32-36 weeks)

- **MOVEMENT!**
- Multiple LE positions in sitting
  - Ring sitting when focused on UE play
  - ½ ring ½ long sit
  - Long sit
  - Side sit
- Transitions in/out of quadruped
  - Pre-vaulting over hip
  - Controlled back to floor
Eighth Month (32-36 weeks) continued

- Crawling emerges
  - Hands and knees
  - Reciprocal extremity movement
- Pull to stand with UE’s
- Kneeling
- Standing at a surface or holding onto fingers
Potential Indicators of Atypical Motor Development-8 months

- Inability to sit
- Inability to vary sitting positions
- Lack of transitions between floor, sitting, and quadruped
- Standing on tiptoes
Ninth Month (36-40 months)

FLOOR MOBILITY

• Combining gross and fine motor skills
• Crawling
  • Varied speeds
  • Quickly changes directions
• Climbing
  • Stairs, furniture
  • Can climb up but not down
Ninth Month (36-40 months) (cont.)

- **Standing**
  - Squat to floor with hand on surface
  - Moving to floor not always controlled

- **Cruising**
  - Along the furniture
  - Lateral (side to side) is the first pattern
Potential Indicators of Atypical Motor Development - 9 months

- Sitting only in ring sit or w-sit
- Inability to transition between positions
- Bunny hopping during crawling
Tenth Month (40-44 weeks)

- Actively exploring environment
- Concepts of in and out/container play
- Crawling and climbing are primary, rarely sitting
  - Can crawl over objects
  - Starting to motor plan going down
Tenth Month (40-44 weeks) continued

- Kneeling and half kneeling
- LE’s contribute to pull to stand
- Standing with hands manipulating objects
- Cruising
  - Lateral
  - Around furniture
- Supported walking
Eleventh Month (44-48 weeks)

- Independent standing
  - Can pull to stand at furniture, on a person, along the wall
- Squatting
- Cruise around and over furniture
  - Must be taught to descend backwards
- Walking
  - With one hand held
  - May attempt to take independent steps
Twelfth Month (48-52 weeks)

- Basic motor skills are all present
- All transitions are independent
  - Moving floor to stand without a surface is new
- Stand independently without support
- Independent walking may begin but is not obligatory
Potential Indicators of Atypical Motor Development - 10-12 months

- Inability to perform any of the age-expected tasks
- Poor quality of movement during age-appropriate tasks
- Poor velocity of movement during age-appropriate tasks