Infant reflexes and stereotypies are very important in the process of development.
### Importance of Infant Reflexes

- Reflexive movements occur during the last 4 months of prenatal life and the first 4 months after birth
  - Reflexes occur **subcortically** (below the level of the higher brain centers)
  - E.g., palmer grasp
Infant vs. Lifespan Reflexes

- Most “infant” reflexes do not last beyond the first year
- Reflexes that endure are called “lifespan” reflexes
  - Knee-jerk reflex
  - Flexor-withdrawal reflex
Infant vs. Lifespan Reflexes

• Many of the reflexes do not completely disappear
  – First, they are inhibited by the maturing nervous system
  – Second, they are integrated into new movement behaviors
Role of the Reflexes in Survival

- Infant reflexes are called *primitive reflexes*
  - Asymmetric tonic neck reflex
  - Symmetric tonic neck reflex
  - Moro reflexes
    • Startle reflex
- Primitive reflexes are repressed by 6 months of age
- Primitive reflexes are important for
  - Protection
  - Nutrition
    • Sucking reflex
    • Rooting reflex
  - Survival
    • Labyrinthine reflex
Role of Reflexes in Developing Future Movement

• Postural reflexes
  – Prevalent belief: automatic movement is “practice” for future voluntary movement
    • Other experts believe these reflexes may not be related to future motor development
  – Emanate from higher brain centers
  – These reflexes disappear when voluntary behavior surfaces
Role of Reflexes in Developing Future Movement

- When the stepping reflex is stimulated, walking may begin at an earlier age

- Link between stimulation of the reflex preceding the disappearance phase and early movement

- Small amounts of practice can lead to significant results
# Role of Reflexes in Developing Future Movement

<table>
<thead>
<tr>
<th>Infant Reflex</th>
<th>Future Voluntary Movement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crawling</td>
<td>Crawling</td>
</tr>
<tr>
<td>Labyrinthine</td>
<td>Upright posture</td>
</tr>
<tr>
<td>Palmar grasp</td>
<td>Grasping</td>
</tr>
<tr>
<td>Stepping</td>
<td>Walking</td>
</tr>
</tbody>
</table>
Reflexes as Diagnostic Tools

- Can help determine the level of neurological maturation
  - Reflexes are age-specific in normal, healthy infants
- Moro reflex
  - May signify a cerebral birth injury if lacking or asymmetrical
- Asymmetric tonic neck reflex
  - May indicate cerebral palsy or other neurological problem
## Reflexes as Diagnostic Tools

<table>
<thead>
<tr>
<th>Reflex</th>
<th>Concern when lacking, weak, asymmetrical or persisting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moro</td>
<td>Cerebral birth injury</td>
</tr>
<tr>
<td>Asymmetric tonic reflex</td>
<td>Cerebral palsy; other neural damage</td>
</tr>
</tbody>
</table>

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Reflexes as Diagnostic Tools

• Milani Comparetti Neuromotor Development Examination
  – Measures several infant reflexes from birth to 24 months
  – Purpose: develop profile of child’s movement in relation to what is expected at a specific age
  – Useful in determining motor delay
Reflexes as Diagnostic Tools

• Primitive Reflex Profile
  – Quantification of the level of presence or strength of primitive reflexes
  • Asymmetric tonic neck reflex
  • Symmetric tonic neck reflex
  • Moro reflex
Pinpointing the Number of Infant Reflexes

- Different terminologies used for same reflex by experts
  - Rooting reflex = search reflex; cardinal points reflex
- Reflexes are often poorly defined and more complex than once thought
  - Palmar grasp vs. traction response
Primitive Reflexes ~
Palmar Grasp

• The palmar grasp reflex is one of the most noticeable reflexes to emerge
• Appears in utero
• Endures through the 4th month postpartum
• Negative palmer grasp: neurological problems; spasticity
• Leads to voluntary reaching and grasping

May predict handedness in adulthood
Primitive Reflexes ~
Sucking

• Occurs pre-and postnatally
  – Babies are born with blisters on lips

• Stimulated by touching the lips
Primitive Reflexes ~ Search

- Helps the baby locate nourishment
- Baby turns head toward the food
- Usually works in conjunctions with sucking reflex
- Contributes to head- and body-righting reflexes

Stimulus ~ touching the cheek
Primitive Reflexes ~ Morto Reflex

- Palm of hand lifts back of head
- Hand is removed suddenly so that head begins to fall
  - Head is supported
- Moro reflex precedes the startle reflex and causes the arms and legs to extend immediately rather than flex
- Disappears at 4-6 months
Startle

- Similar to the Moro reflex
- May not appear until 2-3 months after Moro disappears
- Elicited by a rapid change of head position, by striking the surface that supports the baby, loud noise
- Causes the arms and legs to flex immediately
Primitive Reflexes ~
Asymmetric Tonic Neck Reflex

- Causes flexion on one side and extension on the other
- Not always seen in newborn
- Facilitates the development of bilateral body awareness
Primitive Reflexes ~
Symmetric
Tonic Neck Reflex

• Limbs respond symmetrically
• Its persistence may impede other motor milestones
### Primitive Reflexes ~ Symmetric Tonic Neck Reflex

<table>
<thead>
<tr>
<th>Place baby in a sitting position ~ tip forward</th>
<th>Neck flexes</th>
<th>Arms flex</th>
<th>Legs extend</th>
</tr>
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<tbody>
<tr>
<td>Place baby in a sitting position ~ tip backward</td>
<td>Neck extends</td>
<td>Arms extend</td>
<td>Legs flex</td>
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</tbody>
</table>
Primitive Reflexes ~
Plantar Grasp

• The toes appear to be grasping
• Stimulus is touching the ball of the foot
• This reflex must disappear before the baby can stand or walk

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Primitive Reflexes ~
Babinski Reflex

- Elicited by a stimulus similar to plantar grasp, but response is different
- Test of the pyramidal tract activity for later motor movement
Primitive Reflexes ~ Palmar Mandibular Reflex

- Makes the eyes close, the mouth open, and/or neck flexes which tilts the head forward
- Also called the Babkin reflex
- Stimulus is pressure to both palms
Primitive Reflexes ~
Palmer Mental Reflex

• Elicits a facial response when the base of the palm is scratched
• Lower jaw opens and closes
Stepping reflex is a forerunner to walking
Postural Reflexes ~ Crawling

• Believed to be essential to the voluntary creeping movement
• Observed from birth to 3-4 months
Postural Reflexes ~ Swimming

- Characterized by the baby’s swimming-like movements when held in a horizontal position
Postural Reflexes ~ Head-and-Body Righting

- The head “rights” itself with the body when the body is turned to one side
  - Body follows head
- Precursor to rolling movements
- Body righting may not be evident before month 5
Postural Reflexes ~ Parachuting Reflexes

- Propping reflexes
- Related to upright posture
- This reflex is a conscious attempt to break a potential fall
Postural Reflexes ~ Labyrinthine

• This reflex endures throughout most of the first year
• Related to upright posture
• Head tilts in the opposite direction of body tilt
When the baby is tipped backward, supporting arms flex in an effort to maintain the upright position.