Physical Activity
Developmental Chapters
Infancy
0-11 Months
The first year of life is marked by dramatic changes in the amount and type of physical activity displayed. Infants spend the first days of life sleeping and eating. However, 1 year later, when they become toddlers, they usually are crawling and probably have taken a few independent steps.

Motor skill development begins with the involuntary reflexes that ensure the newborn infant’s survival. Over the next few months, these reflexes disappear as the infant slowly gains voluntary control over body movements. With increasing control comes more physical activity. Sitting up, rolling over, crawling, standing, and eventually walking expand the infant’s level of physical activity.

Motor skill development, like other aspects of the infant’s development, is an individual process. Infants usually acquire motor skills in the same order, but the rate at which they acquire them is individual. For example, some infants walk as early as 9 months, whereas others do not walk until after their first birthday.

The way infants are held and handled, the toys they play with, and their environment all influence their motor skill development. Parents can influence the quality of the infant’s movements by providing a stimulating environment. Physical activity should be promoted from the time infants are born. Motor skills do not just appear. Motor skills, like cognitive skills, flourish when the infant is exposed to a stimulating environment. Physical activity opportunities and nurturing of motor skill development during the first year of life establish the foundation for physical activity behaviors.
eventually walk. They need their head and trunk muscles to control these two large body parts. And they need arm and leg muscles to move their trunks.

Neural development in infants involves the connection of 200 billion neurons, the conducting cells of the nervous system. Stimulation is critical to neural development. Without stimulation (e.g., visual, auditory, tactile), these cells die. With stimulation, these cells create elaborate networks that promote sensory and motor skill development. Stimulation can be provided in many ways (e.g., by hanging a mobile over the infant’s crib, which may motivate the infant to reach, or by placing a toy just out of reach, which may motivate the infant to roll over).

**Healthy Lifestyles**

Infants’ vitality and successful development depend on good nutrition during the first year of life. Full-term infants who are fed on demand usually consume the amount they need to grow well. But feeding infants is much more complex than simply offering food when they are hungry, and it serves purposes far beyond supporting their physical growth. Feeding provides opportunities for emotional bonding between the parent and infant. Infants improve their hand-eye coordination and fine motor skills as they begin to feed themselves.

In addition to interaction during feeding times, infants need play time to explore objects, engage in activities that stimulate their senses, and experience movement and action.

**Building Partnerships**

Partnerships among health professionals, families, and communities are essential for ensuring that families receive guidance on physical activity during infancy. Health professionals can have a tremendous impact on decisions about physical activity as they inform families about the importance of physical activity for motor skill development. They provide an opportunity for families to discuss, reflect on, and decide which options best suit their circumstances. Health professionals also identify and contact community resources that help families.

The community may also need to help families by providing programs that

- Encourage families to promote physical activity in infants.
• Teach families about physical and motor skill development during infancy.

• Give infants the opportunity to be physically active.

In addition, communities can provide (1) affordable, skilled child care providers who promote physical activity in infants, (2) safe environments for indoor and outdoor physical activity, and (3) support for families of infants with special health care needs.

**Strengths, and Issues and Concerns**

During health supervision visits, health professionals should emphasize the physical activity strengths of the infant, family, and community (Table 1) and address any physical activity issues and concerns (Table 2).
### Table 1. Physical Activity Strengths During Infancy

<table>
<thead>
<tr>
<th>Infant</th>
<th>Family</th>
<th>Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Enjoys playing with parents, siblings, grandparents, and others</td>
<td>- Spends time playing with the infant</td>
<td>- Encourages families to promote play and physical activity in their infants</td>
</tr>
<tr>
<td>- Enjoys physical activity (e.g., movement, play)</td>
<td>- Encourages the infant to move and explore</td>
<td>- Provides programs that teach families about physical and motor skill development</td>
</tr>
<tr>
<td>- Enjoys playing with objects and toys</td>
<td>- Provides a stimulating environment that promotes play and physical activity</td>
<td>- Provides programs that give infants the opportunity to be physically active</td>
</tr>
<tr>
<td>- Is curious and explores environment through a variety of physical activities</td>
<td>- Participates in physical activity themselves</td>
<td>- Provides affordable, skilled child care providers who promote physical activity in infants</td>
</tr>
<tr>
<td>- Moves in new ways when challenged with interesting activities</td>
<td></td>
<td>- Provides safe environments for indoor and outdoor physical activity</td>
</tr>
</tbody>
</table>

### Table 2. Physical Activity Issues and Concerns During Infancy

<table>
<thead>
<tr>
<th>Infant</th>
<th>Family</th>
<th>Community</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Was born prematurely</td>
<td>- Lacks knowledge of physical and motor skill development</td>
<td>- Lacks programs that promote physical activity in infants</td>
</tr>
<tr>
<td>- Experiences developmental delays</td>
<td>- Has health problems that affect the amount of time spent with the infant</td>
<td>- Lacks affordable, skilled child care providers who promote physical activity in infants</td>
</tr>
<tr>
<td>- Experiences discomfort with physical activity</td>
<td>- Has a work schedule or other commitments that reduce the amount of time spent with the infant</td>
<td>- Does not provide support for families of infants with special health care needs</td>
</tr>
<tr>
<td>- Has health problems</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INFANCY PHYSICAL ACTIVITY SUPERVISION

An infant’s level of physical activity should be assessed as part of health supervision visits. (For more information on health supervision, see Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents, listed under Suggested Reading in this chapter.)

Health professionals can begin by gathering information about the infant’s level of physical activity. This can be accomplished by selectively asking key interview questions listed in this chapter, which provide a useful starting point for identifying physical activity issues and concerns.

Health professionals can then use this chapter’s screening and assessment guidelines, and counseling guidelines, to provide families with anticipatory guidance. Interview questions, screening and assessment, and counseling should be used as appropriate and will vary from visit to visit, infant to infant, and family to family.

Desired outcomes for the infant, and the role of the family, are identified to assist health professionals in promoting physical activity.

**Interview Questions**

The following questions are intended to be used selectively to gather information, to address the family’s issues and concerns, and to build partnerships.

- Do you have any concerns about Julia’s development?
- How often do you play with her?
- Do both you and your spouse play with Alexander?
- What are some physical activities you do with him?
- How often during the day is Julia in an open environment, such as on the living room floor?
- How do you carry her?
- Is Alexander distressed when you gently bounce him or swing him around?
- Is he interested in his environment? What are his favorite toys? Do toys motivate him to move?
Is Julia interested in objects, toys, and people around her?
What are some of her achievements?
Are you comfortable with Alexander’s increasing independence? Do you encourage him to be independent?
Are you pleased he can stand by himself? Are you worried that he might hurt himself?
When Alexander is awake, how much time does he spend in an infant safety seat or swing, on the floor, on your lap, or in someone’s arms?
How does Julia’s development compare to that of your other children when they were this age?
Do you have any questions?

Screening and Assessment
- Measure the infant’s length, weight, and head circumference, and plot these on a standard growth chart (see Tool H: CDC Growth Charts). Deviation from the expected growth pattern (e.g., a major change in growth percentiles on the chart) should be evaluated. This may be normal or may indicate a problem (e.g., difficulties with eating).
- Examine the infant for other medical problems that may interfere with motor skill development.
- Determine whether the infant has a history of ear infections.
- Determine whether the infant has a heart murmur.
- Assess the symmetry of the infant’s arms and legs.
- Assess the infant’s muscle tone in the arms and legs (i.e., resistance to joint extension).
- Assess the infant’s motor skill development. The Bayley Scales of Infant Development are often used for this purpose (Table 3).¹

Counseling
Health professionals can use the following information to provide anticipatory guidance to families. Anticipatory guidance provides information on the infant’s physical status and on what to expect as the infant enters the next developmental period, and fosters the promotion of physical activity.

General
- Encourage parents to attend classes to learn about promoting physical activity during infancy. Suggest that they participate in parent-infant play groups.
- Infants need the opportunity to move. Encourage parents to provide objects and toys and to play games to encourage their infants to move and do things for themselves.
- Gently turning, rolling, bouncing, and swaying infants are excellent ways to increase their muscle strength and to help them develop important connections between the brain and muscles.
- Tell parents that rough-and-tumble activities are not appropriate for infants. Infants usually signal their distress (e.g., by crying) if the physical activity is too vigorous, overwhelming, or disconcerting. Parents should pay attention to these signals and stop the physical activity if needed.
Encourage parents to ask the child care provider how much time the infant spends moving around (i.e., not sitting in an infant safety seat or sleeping).

### Physical Development

- Infants need physical activity from the time they are born. Encourage parents to nurture their infants’ motor skill development and to promote physical activity.
- Infants need to develop head and trunk control. When infants are 3 months old, parents can encourage this control by (1) placing the infant on their laps, facing them; (2) holding the infant’s hands and encouraging the infant to stand; and (3) pulling the infant up into a standing position. When the infant is pulled up, the infant should stand with the parent’s support. If the infant can hold the upright posture, the parent can gently sway the infant side to side.

### Safety

- Infants need a safe environment for physical activity.

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**Table 3. Motor Skill Development During Infancy**

<table>
<thead>
<tr>
<th>Motor Skill</th>
<th>Mean</th>
<th>Age Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Holds head erect and steady</td>
<td>1.6 months</td>
<td>0.7–4 months</td>
</tr>
<tr>
<td>Sits with support</td>
<td>2.3 months</td>
<td>1–5 months</td>
</tr>
<tr>
<td>Lifts head, shoulders, and forearms while lying down</td>
<td>3.5 months</td>
<td>2–4.5 months</td>
</tr>
<tr>
<td>Sits momentarily without support</td>
<td>5.3 months</td>
<td>4–8 months</td>
</tr>
<tr>
<td>Reaches with one hand</td>
<td>5.4 months</td>
<td>4–8 months</td>
</tr>
<tr>
<td>Rolls over from back to front</td>
<td>6.4 months</td>
<td>4–10 months</td>
</tr>
<tr>
<td>Crawls and pulls on objects to achieve upright position</td>
<td>8.1 months</td>
<td>5–12 months</td>
</tr>
<tr>
<td>Walks with handholds (“cruises”)</td>
<td>8.8 months</td>
<td>6–12 months</td>
</tr>
<tr>
<td>Stands momentarily without support</td>
<td>11 months</td>
<td>9–16 months</td>
</tr>
<tr>
<td>Walks independently</td>
<td>11.7 months</td>
<td>9–16 months</td>
</tr>
</tbody>
</table>

Source: Adapted from Bayley.1
Table 4. Desired Outcomes for the Infant, and the Role of the Family

### Infant

<table>
<thead>
<tr>
<th>Educational/Attitudinal</th>
<th>Behavioral</th>
<th>Health/Physical Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enjoys moving</td>
<td>Achieves motor skills milestones at an appropriate age</td>
<td>Develops the strength and postural control to walk</td>
</tr>
<tr>
<td>Enjoys playing with parents, siblings, grandparents, and others</td>
<td>Plays with objects and toys and explores the environment</td>
<td>Develops the fine motor skills needed to pick up objects, toys, and food and manipulate them with both hands</td>
</tr>
</tbody>
</table>

### Family

<table>
<thead>
<tr>
<th>Educational/Attitudinal</th>
<th>Behavioral</th>
<th>Health/Physical Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understands the importance of physical activity (e.g., movement, play)</td>
<td>Plays with the infant</td>
<td>Recognizes delays in motor skill development</td>
</tr>
<tr>
<td>Recognizes developmentally appropriate motor skills</td>
<td>Promotes physical activity in the infant</td>
<td></td>
</tr>
</tbody>
</table>

References


Suggested Reading


Natalie is Susan and Jacob’s first baby. They are the first among their friends to have a baby. They have no family members living nearby. Susan brings Natalie in to see Dr. Fuentes for her 6-month health supervision visit, and the physician notices that Susan handles Natalie like a china doll. Natalie exhibits very little head and trunk control. When placed on her stomach, she fusses and raises her head only to see what’s in front of her. When a toy is placed in front of her, Natalie looks at the toy but doesn’t reach for it. Dr. Fuentes determines that Natalie’s height and weight are normal. She is alert and happy. However, her motor skill development is lagging—most noticeably in head and trunk control.

Dr. Fuentes asks Susan how she and Jacob interact with Natalie. Susan admits that she and Jacob are not very sure of themselves when it comes to holding and playing with Natalie. Susan discloses that she is afraid Natalie might “break” if she lets her move around too much. In fact, Natalie spends most of the day in her infant seat or crib.

Dr. Fuentes asks Susan to show her how she carries, undresses, and bathes Natalie. The demonstrations confirm that Susan is gentle and extremely careful—so much so that Natalie remains passive. With as much gentleness as Susan exhibited, Dr. Fuentes picks up Natalie. However, Dr. Fuentes encourages Natalie to sit while he holds her firmly under the arms. Dr. Fuentes carefully moves Natalie from side to side to show Susan how she can move Natalie without hurting her.

The secret, Dr. Fuentes says, is to encourage Natalie to move independently. “Natalie’s head and trunk are almost two-thirds of her weight, and she has to learn to control them. You and Jacob need to give Natalie opportunities to strengthen her muscles and her brain’s connections to the muscles, while offering support if she needs it. Tonight, spend some time with Natalie sitting on your lap facing you; hold her gently but firmly, and let her sway back and forth and side to side. Make it a game. Talk to her and encourage her. As long as you are gentle but hold her firmly, she won’t break.”
FREQUENTLY ASKED QUESTIONS
ABOUT PHYSICAL ACTIVITY IN INFANCY

- **How can I encourage my baby to be physically active?**
  Babies need physical activity from the time they are born. Provide your baby with opportunities that encourage her to move. Offer her a challenge (for example, a toy just out of reach) and see how she reacts. She will let you know if you push her too much. When babies move, their arms and legs often look jerky and uncoordinated. Remember, your baby is learning a lot of new skills in her first year. When a baby's brain and muscles learn how to work together, her movements will get smoother.

- **What's the best way to carry my baby?**
  Carry your baby in a way that makes him feel secure and comfortable. Try to vary the position. For example, instead of always carrying your baby so that he faces backward, carry him so that he faces forward, to give him the opportunity to look in the direction you are going.

- **Should I use a walker to help my baby learn to walk?**
  Babies should never be placed in an infant walker (baby walker) because of the considerable risk of injury and even death. The risk of injury from the use of walkers is even greater in homes with stairs. Make sure your child care provider does not use walkers.

- **My baby’s head flops over to the side when she is upright. Should I support her head?**
  Yes, offer light but firm support. Try to offer less support each time, so that eventually she will be able control her head herself.

- **My friend’s baby, who is the same age as mine, is sitting on his own, but my baby can’t do this yet. Should I be worried?**
  Babies develop at different rates. As long as your baby attains motor skills at an appropriate age, there is nothing to worry about.

- **What can I expect my baby to do as he grows?**
  **Newborn to 1 Month**
  Your baby will have rooting, sucking, and swallowing reflexes.
  He will begin to develop the ability to start and stop sucking.
  He will wake up and fall asleep easily.

  **3 to 4 Months**
  Your baby will raise her head when she is on her stomach.
  She will follow objects and sounds with her eyes.
  She will put her hand in her mouth a lot.
  She will sit with support.
6 Months
Your baby’s torso will move in the direction of his head when he turns his head while lying on his back.
He will reach for objects and pick them up with one hand.
He will hold his hands together.
He will sit with support.

7 to 9 Months
Your baby will reach for pieces of food and pick them up between her thumb and forefinger.

9 to 12 Months
Your baby will play games such as peek-a-boo.
He will explore toys with his eyes and mouth, and will transfer a toy from one hand to the other.
He will sit and crawl, and may walk without support.

Resources for Families
See Tool F: Physical Activity Resources for contact information on national organizations that can provide information on physical activity. State and local departments of public health and education and local libraries are additional sources of information.


