Promoting Optimal Growth and Development

Biologic Development

At no other time in life are physical changes and developmental achievements as dramatic as during infancy. All major body systems undergo progressive maturation, and there is concurrent development of skills that increasingly allow infants to respond to and cope with the environment. Acquisition of these fine and gross motor skills occurs in an orderly head-to-toe and center-to-periphery (cephalocaudal-proximodistal) sequence.

Proportional Changes

During the first year of life, especially the initial 6 months, growth is very rapid. Infants gain 150 to 210 g (≈5 to 7 oz) weekly until they are approximately 5 to 6 months old, which is when the birth weight has at least doubled. An average weight for a 6-month-old child is 7.3 kg (16 pounds).

Weight gain slows during the second 6 months. By 1 year old, the infant’s birth weight has tripled, for an average weight of 9.75 kg (21.5 pounds). Infants who are breastfed beyond 4 to 6 months old typically gain less weight than those who are bottle fed, yet their head circumference is more than adequate. There is evidence that breastfed infants tend to self-regulate energy intake. This self-regulation of intake with breastfeeding (vs. formula [bottle] feeding) is believed to have further significance in the development of childhood obesity and subsequent cardiovascular disease (Fewtrell, 2011). Researchers also found that infants who were breastfed in early infancy were more likely to regulate their appetite in late infancy and childhood than infants who were bottle fed (DiSantis, Collins, Fisher, et al, 2011).

Height increases by 2.5 cm (1 inch) a month during the first 6 months of life and also slows during the second 6 months. Increases in length occur in sudden spurts, rather than in a slow, gradual pattern. The average height is 65 cm (25.5 inches) at 6 months old and 74 cm (29 inches) at 12 months old. By 1 year old, the birth length has increased by almost 50%. This increase occurs mainly in the trunk rather than in the legs and contributes to the characteristic physique of the infant.

Head growth is also rapid. Head circumference increases approximately 2 cm (0.75 inch) per month for the first 3 months, 1 cm (0.4 inch) per month from 4 to 6 months, then the rate of growth declines to only 0.5 cm (0.2 inch) monthly during the second 6 months. The average size is 43 cm (17 inches) at 6 months and 46 cm (18 inches) at 12 months. By 1 year, head size has increased by almost 33%. Closure of the cranial sutures occurs, with the posterior fontanel fusing by 6 to 8 weeks old and the anterior fontanel closing by 12 to 18 months old (average, 14 months old).

Expanding head size reflects the growth and differentiation of the nervous system. By the end of the first year, the brain has increased in weight about 2.5 times. Maturation of the brain is exhibited in the dramatic developmental achievements of infancy (Table 9-1). Primitive reflexes are replaced by voluntary, purposeful movement, and new reflexes that influence motor development appear.

### TABLE 9-1

<table>
<thead>
<tr>
<th>Physical</th>
<th>Gross Motor</th>
<th>Fine Motor</th>
<th>Sensory</th>
<th>Vocalization</th>
<th>Socialization and Cognition</th>
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<tbody>
<tr>
<td><strong>1 Month Old</strong></td>
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<tr>
<td>Weight gain of 150 to 210 g (≈5 to 7 oz) weekly for first 6 months.</td>
<td>Hands predominantly closed</td>
<td>Able to fixate on moving object in range of 45 degrees when held at a distance of 20 to 25 cm (8 to 10 inches)</td>
<td>Able to express displeasure</td>
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<td>Height gain of 2.5 cm (1 inch) monthly for first 6 months</td>
<td>Grasp reflex strong</td>
<td>Visual acuity approaches 20/100</td>
<td>Makes small, throaty sounds</td>
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<tr>
<td>Head circumference increases by 1.5 cm (0.6 inch) monthly for first 6 months</td>
<td>Hand clenches on contact with rattle</td>
<td>Facial expression to light</td>
<td>Makes comfort sounds during feeding</td>
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<tr>
<td>Primitive reflexes present and strong</td>
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<td>Doll’s eye reflex and Babinski reflex fading</td>
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<td>Obligatory nasal breathing (most infants)</td>
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<tr>
<td>Assumes flexed position with pelvis high but knees not under abdomen when prone</td>
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<tr>
<td>(at birth, knees flexed under abdomen)</td>
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<tr>
<td>Can turn head from side to side, when prone; lifts head momentarily from bed (see Fig. 9-3, A)</td>
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<tr>
<td>Has marked head lag, especially when pulled from lying to sitting position (see Fig. 9-2, A)</td>
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<tr>
<td>Holds head momentarily parallel and in midline when suspended in prone position</td>
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<tr>
<td>Assumes asymmetric tonic neck flex position when supine</td>
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<tr>
<td>When held in standing position, body is limp at knees and hips</td>
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<tr>
<td>In sitting position, back is uniformly rounded, with absence of head control</td>
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| **2 Months Old** | | | | | |
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Posterior fontanel closed
Crawling reflex disappears
• Assumes less flexed position when prone—hips flat, legs extended, arms folded, head to side
• Low head lag when pulled to sitting position (see Fig. 9-2, C)
• Can lift head almost 90-degree angle from table; bears weight on forearms

Hands often open
Grasp reflex failing
Buccal-salivary fixation and convergence of near objects beginning
When neonate, follows dangling toy from side to point beyond midline
Visually searches to locate sounds
Turns head to side when sound is made at level of ear

Vocalizes, distinct from crying
Crying becomes differentiated
Cross vocalizes to familiar voice

• Demonstrates social smile in response to various stimuli

Evokes, one of the earliest behaviors

8 Months Old

Primitive reflexes fading
• Able to hold head more erect when sitting but still bobs forward
Has only slight head lag when pulled to sitting position
• Assumes symmetric body positioning
• Able to raise head and shoulders from prone position to a 45-90-degree angle from table; bears weight on forearms
When held in standing position, able to bear slight fraction of weight on legs

Regards own hand
• Actively holds rattle when sitting but still bobs forward

Grasp reflex absent
Hands kept loosely open
Clothespin mouth
Pulls at blankets and clothes

Fellows objects to periphery (180 degrees)
Locates sound by turning head to side and looking in same direction

Begins to have ability to coordinate stimuli from various sense organs

• Squats about to show pleasure
Looks, licks, chuckles
Vocalizes when smiling

“Talks” a great deal when spoken to or when told to make sounds

Orthoses described in various periods of wakefulness

Displays considerable interest in surroundings

Cries when parent enters room
Can recognize familiar faces and objects, such as feeding bottle

Shows awareness of strange situations

4 Months Old

Drooling begins
Moro, tonic neck, and rooting reflexes have disappeared

• Has almost no head lag when pulled to sitting position (see Fig. 9-2, C)
• When head is held well in sitting position (see Fig. 9-2, C)
Back less rounded, curved only in lumbar area

Grasps object with both hands
With rattle placed in hand and shake it but cannot pick it up or drop it

Can carry objects to mouth

3 Months Old

Beginning signs of tooth eruption
Both weight doubles

• No head lag when pulled to sitting position
When sitting, able to hold head erect and steady
Able to sit with support during periods when back is well supported

Back straight

When prone, assumes symmetric positioning with arms extended

Can turn over from abdomen to back

When sitting, puts feet to mouth

2 Months Old

Growth rate may begin to decline
Weight gain of 90 to 150 g (3 to 5 ounce) per week for next 6 months

Height gain of 1.25 cm (0.5 inch) monthly for next 6 months

Teething may begin with eruption of two lower central incisors

Cheering and nattering begins

1 Months Old

• When prone, can lift chest and upper abdomen off surface, bearing weight on hands (see Fig. 9-3, C)
When about to be pulled to sitting position, lifts short
Sits in high chair with back supported
Weight on lower extremities
Rolls from back to abdomen

When held in standing position, bears almost all of weight

Hand regard absent

When prone, assumes symmetric tonic neck position intermittently

0 Months Old

• Assumed less flexed position when prone—hips flat, legs extended, arms folded, head to side
• Low head lag when pulled to sitting position (see Fig. 9-2, C)
• Can lift head almost 45-degree angle from table; bears weight on forearms

When prone, can lift head almost 45-degree angle from table; bears weight on forearms

• Assumes symmetric body positioning
• Able to raise head and shoulders from prone position to a 45-90-degree angle from table; bears weight on forearms

When held in standing position, able to bear slight fraction of weight on legs

• Regards own hand

• Actively holds rattle when sitting but still bobs forward

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### Maturation of Systems

Other organ systems also change and grow during infancy. The respiratory rate slows somewhat and is relatively stable. Respiratory movements continue to be abdominal. Several factors predispose infants to more severe and acute respiratory problems than older children. The close proximity of the trachea to the bronchi and its branching structures rapidly transmits infectious agents from one anatomic location to another. The short, straight eustachian tube closely communicates with the ear, allowing infection to ascend from the pharynx to the middle ear. In addition, the inability of the immune system to produce immunoglobulin A (IgA) in the mucosal lining provides less protection against infection in infancy than during later childhood.

The heart rate slows, and the rhythm is often **sinus arrhythmia** (rate increases with inspiration and decreases with expiration). Blood pressure also changes during infancy. Systolic pressure rises during the first 2 months as a result of the increasing ability of the left ventricle to pump blood into the systemic circulation. Diastolic pressure decreases during the first 3 months and then gradually...
rises to values close to those at birth. Fluctuations in blood pressure occur during varying states of activity and emotion.

Significant hematopoietic changes occur during the first year of life. Fetal hemoglobin (HgbF) is present for the first 5 months, with adult hemoglobin steadily increasing through the first half of infancy. Fetal hemoglobin results in a shortened survival of red blood cells (RBCs) and thus a decreased number of RBCs. A common result at 3 to 6 months old is physiologic anemia. High levels of fetal hemoglobin depress the production of erythropoietin, a hormone released by the kidneys that stimulates RBC production.

Maternally derived iron stores are present for the first 5 to 6 months of life and gradually diminish, which also accounts for lowered hemoglobin levels toward the end of the first 6 months. The occurrence of physiologic anemia is not affected by an adequate supply of iron. However, when erythropoiesis is stimulated, iron stores are necessary for the formation of hemoglobin.

The digestive processes are relatively immature at birth. Although term newborn infants have some limitations in digestive function, human milk has properties that partially compensate for decreased digestive enzymatic activity, thus enabling breastfed infants to receive optimal nutrition during the first several months of life. The enzyme amylase (also called ptyalin) is present in small amounts but usually has little effect on the foodstuffs because of the small amount of time the food stays in the mouth. Gastric digestion in the stomach consists primarily of the action of hydrochloric acid and rennin, an enzyme that acts specifically on the casein in milk to cause the formation of curds—coagulated semisolid particles of milk. The curds cause the milk to be retained in the stomach long enough for digestion to occur.

Digestion also takes place in the duodenum, where pancreatic enzymes and bile begin to break down protein and fat. Secretion of the pancreatic enzyme amylase, which is needed for digestion of complex carbohydrates, is deficient until about the fourth to sixth month of life. Lipase is also limited, and infants do not achieve adult levels of fat absorption until 4 to 5 months old. Trypsin is secreted in sufficient quantities to catabolize protein into polypeptides and some amino acids.

The immaturity of the digestive processes is evident in the appearance of stools. During infancy, solid foods (e.g., peas, carrots, corn, raisins) are passed incompletely broken down in the feces. An excess quantity of fiber easily disposes infants to loose, bulky stools.

During infancy, the stomach enlarges to accommodate a greater volume of food. By the end of the first year, infants are able to tolerate three meals a day and an evening bottle and may have one or two bowel movements daily. However, with any type of gastric irritation, infants are vulnerable to diarrhea, vomiting, and dehydration (see Chapter 22).

The liver is the most immature of all the gastrointestinal organs throughout infancy. The ability to conjugate bilirubin and secrete bile is achieved after the first couple of weeks of life. However, the capacities for gluconeogenesis, formation of plasma protein and ketones, storage of vitamins, and deaminitization of amino acids remain relatively immature for the first year of life.

Maturation of the sucking, swallowing, and breathing reflexes and the eruption of teeth (see Teething later in chapter) parallel the changes in the gastrointestinal tract and prepare infants for the introduction of solid foods.

The immunologic system undergoes numerous changes during the first year. Full-term newborns receive significant amounts of maternal immunoglobulin G (IgG), which, for approximately 3 months, confers immunity against antigens to which their mothers were exposed. During this time, infants begin to synthesize IgG but in limited amounts. Approximately 40% of adult levels are reached by 1 year old; therefore, infants are at higher risk for infection during the first 12 months of life. Significant amounts of immunoglobulin M (IgM) are produced at birth, and adult levels are reached by 9 months old. Prebiotic oligosaccharides found in breast milk produce probiotic bacteria such as bifidobacteria and lactobacilli, which in turn stimulate synthesis and secretion of secretory IgA. Secretory IgA is present in large amounts in colostrum; IgA confers protection to the mucous membranes of the gastrointestinal tract (Durand, Ochoa, Bellomo, et al, 2013) against many bacteria, such as Escherichia coli, and viruses such as rubella, polyovirus, and the enteroviruses. The development of the mucosa-associated lymphoid tissue occurs during infancy; in part, this system is believed to prevent colonization and passage of bacteria across the infant’s mucosal barrier. The function and quantity of T-lymphocytes, lymphokines, interferon-γ, interleukins, tumor necrosis factor-α, and complement are reduced in early infancy, thus preventing optimal response to certain bacteria and viruses. The production of IgA and immunoglobulins D and E (IgD and IgE) is much more gradual, and maximum levels are not attained until early childhood. Probiotics may have a significant role in helping the gastrointestinal tract establish a “good” bacterial colonization in the
gut to prevent many illnesses, including antibiotic-induced diarrhea and possibly *Helicobacter pylori* gastritis (Vitetta, Briskey, Alford, et al, 2014).

Evidence indicates that *vernix caseosa*, a white oily substance that coats term infants' bodies and is often found in abundance in creases of the axilla and groin, has innate immunologic properties that serve to protect newborns from infection (Visscher and Narendran, 2014). Vernix also appears to have a role in maintaining the integrity of the stratum corneum and facilitating acid mantle development (Visscher and Narendran, 2014). The epidermis of a full-term infant undergoes maturation during the first month of life; the newborn's skin acts as a barrier to infection, assists in thermal regulation, and prevents transepidermal water loss in term infants.

During infancy, **thermoregulation** becomes more efficient; the ability of the skin to contract and of muscles to shiver in response to cold increases. The peripheral capillaries respond to changes in ambient temperature to regulate heat loss. The capillaries constrict in response to cold, conserving core body temperature and decreasing potential evaporative heat loss from the skin surface. The capillaries dilate in response to heat, decreasing internal body temperature through evaporation, conduction, and convection. Shivering (thermogenesis) causes the muscles and muscle fibers to contract, generating metabolic heat, which is distributed throughout the body. Increased adipose tissue during the first 6 months insulates the body against heat loss.

A shift in the total body fluid occurs; at birth, 78% of a term infant's body weight is water, and there is an abundance of extracellular fluid (ECF). As the percentage of body water decreases, so does the amount of ECF—from 44% at term to 20% in adulthood. The high proportion of ECF, which is composed of blood plasma, interstitial fluid, and lymph, predisposes the infant to a more rapid loss of total body fluid and, consequently, dehydration. The loss of 5% to 10% of term newborns' initial birth weight in the first 5 days of life is attributed to ECF compartment contraction, enhanced renal tubular function, and rapidly increasing glomerular filtration rate (Blackburn, 2013).

The immaturity of the renal structures also predisposes infants to dehydration and electrolyte imbalance. Complete maturity of the kidneys occurs during the latter half of the second year, which is when the cuboidal epithelium of the glomeruli becomes flattened. Before this time, the filtration capacity of the glomeruli is reduced. Urine is voided frequently and has a low specific gravity (1.008 to 1.012). At term, most infants produce and excrete approximately 15 to 60 ml/kg/24 hours, and an output of less than 0.5 ml/kg/hour after 48 hours of age is considered to be oliguria (Blackburn, 2013).

**Auditory acuity** is at adult levels during infancy. Visual acuity begins to improve, and binocular fixation is established. **Binocularity**, or the fixation of two ocular images into one cerebral picture (fusion), begins to develop by 6 weeks old and should be established by 4 months old. **Depth perception** (stereopsis) begins to develop by age 7 to 9 months old but may not be fully mature until 2 or 3 years old, thus increasing infants' and younger toddlers' risk of falling.

**Fine Motor Development**

Fine motor behavior includes the use of the hands and fingers in the **prehension** (grasp) of objects. Grasping occurs during the first 2 to 3 months as a reflex and gradually becomes voluntary. At 1 month old, the hands are predominantly closed; and by 3 months old, they are mostly open. By this time, infants demonstrate a desire to grasp objects, but they “grasp” objects more with the eyes than with the hands. If a rattle is placed in the hand, infants will actively hold on to it. By 4 months old, infants regard both a small pellet and the hands and then look from the object to the hands and back again. By 5 months old, infants are able to voluntarily grasp objects.

By 6 months old, infants have increased manipulative skill. They hold their bottles, grasp their feet and pull them to their mouths, and feed themselves crackers. By 7 months old, they transfer objects from one hand to the other, use one hand for grasping, and hold a cube in each hand simultaneously. They enjoy banging objects and explore the movable parts of toys.

Gradually, the **palmar grasp** (using the whole hand) is replaced by a **pincer grasp** (using the thumb and index finger). By 8 to 9 months old, infants use a crude pincer grasp; and by 10 months old, they have progressed to a neat pincer grasp sufficient to pick up raisins and other finger foods (Fig. 9-1). They can deliberately let go of an object and offer it to someone. By 11 months old, they put objects into containers and like to remove them. By 1 year old, infants try to build towers of two blocks but fail.
Gross Motor Development

Head Control

Full-term newborns can momentarily hold their heads in midline and parallel when their bodies are suspended ventrally and can lift and turn their heads from side to side when they are prone (see Fig. 7-7). This is not the case when infants are lying prone on a pillow or soft surface; infants do not have the head control to lift their heads out of the depression of the object and therefore risk suffocation in the prone position early in infancy (see Sudden Infant Death Syndrome, Chapter 10). Marked head lag is evident when infants are pulled from a lying to a sitting position. By 3 months old, infants can hold their heads well beyond the plane of their bodies. By 4 months old, infants can lift their heads and front portion of their chests approximately 90 degrees above the table, bearing their weight on the forearms. Only slight head lag is evident when infants are pulled from a lying to a sitting position; and by 4 to 6 months old, head control is well established (Figs. 9-2 and 9-3).
FIG 9-2  Head control while pulled to sitting position. A, Complete head lag at 1 month old. B, Partial head lag at 2 months old. C, Almost no head lag at 4 months old.
Rolling Over

Newborns may roll over accidentally because of their rounded backs. The ability to willfully turn from the abdomen to the back occurs around 5 months old, and the ability to turn from the back to the abdomen occurs at approximately 6 months old. Infants put to sleep on their sides may easily roll over to a prone (face-down) position, thus placing them at higher risk for sudden infant death syndrome (SIDS). It is therefore important to place infants in a supine position for sleep. While infants are awake, a prone position (tummy time) is acceptable to enhance achievement of milestones, such as head control, crawling, creeping, and turning over. It is noteworthy that the parachute reflex (Fig. 9-4), a protective response to falling, appears at approximately 7 months old.

Nursing Alert

In the first several months, before the infant can roll over, the head should be positioned on alternating sides to prevent positional plagiocephaly (when asleep or awake in the supine position) (see Chapter 10).
Sitting

The ability to sit follows progressive head control and straightening of the back (Fig. 9-5). For the first 2 to 3 months, the back is uniformly rounded. The convex cervical curve forms at approximately 3 to 4 months old, when head control is established. The convex lumbar curve appears when the child begins to sit, at about 4 months old. As the spinal column straightens, infants can be propped in a sitting position. By 7 months old, infants can sit alone, leaning forward on their hands for support. By 8 months old, they can sit well while unsupported and begin to explore their surroundings in this position rather than in a lying position. By 10 months old, they can maneuver from a prone to a sitting position.
upright at 1 month old. B, At 2 months old, the infant exhibits more control; the back is still rounded, but the infant can try to pull up with some head control. C, The back is rounded only in the lumbar area, and the infant is able to sit erect with good head control at 4 months old. D, The infant can sit alone, leaning on the hands for support, at 7 months old. E, The infant sits without support at 8 months old. Note the transferring of objects that occurs at 7 months old. (B, D, and E, Photos by Paul Vincent Kuntz, Texas Children's Hospital, Houston, TX.)

**Locomotion**

Locomotion involves acquiring the ability to bear weight; propel forward on all four extremities; stand upright with support; cruise by holding on to furniture; and finally, walk alone (Fig. 9-6). Following a cephalocaudal pattern, infants who are 4 to 6 months old have increasing coordination in their arms. Initial locomotion results in infants propelling themselves backward by pushing with their arms. By 6 to 7 months old, they are able to bear all of their weight on their legs with assistance. **Crawling** (propelling forward with the belly on the floor) progresses to **creeping** on hands and knees (with the belly off the floor) by 9 months old. At this time, they stand while holding on to furniture and can pull themselves to the standing position, but they are unable to maneuver back down except by falling. By 11 months old, they walk while holding on to furniture or with both hands held; and by 1 year old, they may be able to walk with one hand held. A number of infants attempt their first independent steps by their first birthday.

**Nursing Alert**

An infant who does not pull to a standing position by 11 to 12 months old should be further evaluated for possible developmental dysplasia of the hip (see Chapter 29).
Psychosocial Development: Developing a Sense of Trust (Erikson)

Erikson’s phase I (birth to 1 year old) is concerned with acquiring a sense of trust while overcoming a sense of mistrust. The trust that develops is a trust of self, of others, and of the world. Infants “trust” that their feeding, comfort, stimulation, and caring needs will be met. The crucial element for the achievement of this task is the quality of both the parent (caregiver)–child relationship and the care the infant receives. The provision of food, warmth, and shelter by itself is inadequate for the development of a strong sense of self. The infant and parent must jointly learn to satisfactorily meet their needs for mutual regulation of frustration to occur. When this synchrony fails to develop, mistrust is the eventual outcome.

Failure to learn delayed gratification leads to mistrust. Mistrust can result from either too much
or too little frustration. If parents always meet their children's needs before the children signal their readiness, infants will never learn to test their ability to control the environment. If the delay is prolonged, infants will experience constant frustration and eventually mistrust others in their efforts to satisfy them. Therefore, consistency of care is essential.

The trust acquired in infancy provides the foundation for all succeeding phases. Trust allows infants a feeling of physical comfort and security, which assists them in experiencing unfamiliar, unknown situations with a minimum of fear. Erikson has divided the first year of life into two oral–social stages. During the first 3 to 4 months, food intake is the most important social activity in which the infant engages. Newborns can tolerate little frustration or delay of gratification. Primary narcissism (total concern for oneself) is at its height. However, as bodily processes (such as vision, motor movements, and vocalization) become better controlled, infants use more advanced behaviors to interact with others. For example, rather than cry, infants may put their arms up to signify a desire to be held.

The next social modality involves a mode of reaching out to others through grasping. Grasping is initially reflexive, but even as a reflex, it has a powerful social meaning for the parents. The reciprocal response to the infant's grasping is the parents' holding on and touching. There is pleasurable tactile stimulation for both the child and the parents.

Tactile stimulation is extremely important in the total process of acquiring trust. The degree of mothering skill, the quantity of food, or the length of sucking does not determine the quality of the experience. Rather, the total nature of the quality of the interpersonal relationship influences the infant's formulation of trust.

During the second stage, the more active and aggressive modality of biting occurs. Infants learn that they can hold on to what is their own and can more fully control their environment. During this stage, infants may be confronted with one of their first conflicts. If they are breastfeeding, they quickly learn that biting causes the mother to become upset and withdraw the breast. Yet biting also brings internal relief from teething discomfort and a sense of power or control.

This conflict may be solved in a variety of ways. The mother may wean the infant from the breast and begin bottle feeding, or the infant may learn to bite substitute nipples, such as a pacifier, and retain pleasurable breastfeeding. The successful resolution of this conflict strengthens the mother–child relationship because it occurs at a time when infants are recognizing the mother as the most significant person in their life.

Cognitive Development: Sensorimotor Phase (Piaget)

The theory most commonly used to explain cognition, or the ability to know, is that of Piaget. The period from birth to 24 months old is termed the sensorimotor phase and is composed of six stages; however, because this discussion is concerned with ages birth to 12 months old, only the first four stages are discussed. The last two stages occur during the toddler period of 12 to 24 months old and are discussed in Chapter 11.

During the sensorimotor phase, infants progress from reflexive behaviors to simple repetitive acts to imitative activity. Three crucial events take place during this phase. The first event involves separation, in which infants learn to separate themselves from other objects in the environment. They realize that others besides themselves control the environment and that certain readjustments must take place for mutual satisfaction to occur. This coincides with Erikson's concept of the formation of trust.

The second major accomplishment is achieving the concept of object permanence, or the realization that objects that leave the visual field still exist. A typical example of the development of object permanence is when infants are able to pursue objects they observe being hidden under a pillow or behind a chair (Fig. 9-7). This skill develops at approximately 9 to 10 months old, which corresponds to the time of increased locomotion skills.
The last major intellectual achievement of this period is the ability to use symbols, or mental representation. The use of symbols allows infants to think of an object or situation without actually experiencing it. The recognition of symbols is the beginning of the understanding of time and space.

The first stage, from birth to 1 month old, is identified by infants' use of reflexes. At birth, infants' individuality and temperament are expressed through the physiologic reflexes of sucking, rooting, grasping, and crying. The repetitious nature of the reflexes is the beginning of associations between an act and a sequential response. When infants cry because they are hungry, a nipple is put in the mouth, and they suck, feel satisfaction, and sleep. They are assimilating this experience while perceiving auditory, tactile, and visual cues. This experience of perceiving certain patterns, or "ordering," provides a foundation for the subsequent stages.

The second stage, primary circular reactions, marks the beginning of the replacement of reflexive behavior with voluntary acts. During the period from 1 to 4 months old, activities such as sucking and grasping become deliberate acts that elicit certain responses. The beginning of accommodation is evident. Infants incorporate and adapt their reactions to the environment and recognize the stimulus that produced a response. Previously, they cried until the nipple was brought to the mouth. Now they associate the nipple with the sound of the parent's voice. They accommodate this new piece of information and adapt by ceasing to cry when they hear the voice—before receiving the nipple. What is taking place is realization of causality and recognition of an orderly sequence of events. The environment is taken in with all of the senses and with whatever motor ability is present.

The secondary circular reactions stage is a continuation of primary circular reactions and lasts until 8 months old. In this stage, the primary circular reactions are repeated and prolonged for the response that results. Grasping and holding now become shaking, banging, and pulling. Shaking is performed to hear a noise, not solely for the pleasure of shaking. The quality and quantity of an act become evident. "More" or "less" shaking produces different responses. Causality, time, deliberate intention, and separateness from the environment begin to develop.

Three new processes of human behavior occur. Imitation requires the differentiation of selected acts from several events. By the second half of the first year, infants can imitate sounds and simple gestures. Play becomes evident as they take pleasure in performing an act after they have mastered it. Much of infants' waking hours are absorbed in sensorimotor play. Affect (outward manifestation of emotion and feeling) is seen as infants begin to develop a sense of permanence. During the first 6 months, infants believe that an object exists only for as long as they can visually perceive it. In other words, out of sight, out of mind. Affect to external objects is evident when the object continues to be present or remembered even though it is beyond the range of perception. Object permanence is a critical component of parent–child attachment and is seen in the development of stranger anxiety at 6 to 8 months old.

During the fourth sensorimotor stage, coordination of secondary schemas and their application to new situations, infants use previous behavioral achievements primarily as the foundation for
adding new intellectual skills to their expanding repertoire. This stage is largely transitional. Increasing motor skills allow for greater exploration of the environment. They begin to discover that hiding an object does not mean that it is gone but that removing an obstacle will reveal the object. This marks the beginning of intellectual reasoning. Furthermore, they can experience an event by observing it, and they begin to associate symbols with events (e.g., “bye-bye” with “Mommy or Daddy goes to work”), but the classification is purely their own. In this stage, they learn from the object itself; this is in contrast to the second stage, in which infants learn from the type of interaction between objects or individuals. Intentionality is further developed in that infants now actively attempt to remove a barrier to the desired (or undesired) action (see Fig. 9-7). If something is in their way, they attempt to climb over it or push it away. Previously, an obstacle would cause them to give up any further attempt to achieve the desired goal.

**Development of Body Image**

The development of body image parallels sensorimotor development. Infants' kinesthetic and tactile experiences are the first perceptions of their bodies, and the mouth is the principal area of pleasurable sensations. Other parts of their bodies are primarily objects of pleasure—the hands and fingers to suck and the feet to play with. As their physical needs are met, they feel comfort and satisfaction with their bodies. Messages conveyed by their caregivers reinforce these feelings. For example, when infants smile, they receive emotional satisfaction from others who smile back.

Achieving the concept of object permanence is basic to the development of self-image. By the end of the first year, infants recognize that they are distinct from their parents. At the same time, they have increasing interest in their image, especially in the mirror (Fig. 9-8). As motor skills develop, they learn that parts of their bodies are useful; for example, their hands bring objects to their mouths, and their legs help them move to different locations. All of these achievements transmit messages to them about themselves. Therefore, it is important to transmit positive messages to infants about their bodies.

**Social Development**

Infants’ social development is initially influenced by their reflexive behavior, such as the grasp, and eventually depends primarily on the interaction between them and their principal caregivers. Attachment to their parents is increasingly evident during the second half of the first year. In addition, tremendous strides are made in communication and personal–social behavior. Whereas crying and reflexive behavior are methods to meet one’s needs in early infancy, the social smile is an
early step in social communication. This has a profound effect on family members and is a tremendous stimulus for evoking continued responses from others. By 4 months old, infants laugh aloud.

Play is a major socializing agent and provides stimulation needed to learn from and interact with the environment. By 6 months old, infants are very personable. They play games such as peek-a-boo when their heads are hidden in a towel, they signal their desire to be picked up by extending their arms, and they show displeasure when a toy is removed or their faces are washed.

**Attachment**

The importance of human physical contact to infants cannot be overemphasized. Parenting is not an instinctual ability but a learned, acquired process. The attachment of parent and child, which often begins before birth and assumes even more importance at birth (see Chapter 7), continues during the first year (Fig. 9-9). In the following discussion of attachment, the term *mother* is used in the broad context of the consistent caregiver with whom the child relates more than anyone else. However, with society’s changing social climate and sex-role stereotypes, this person may well be the father or a grandparent. Studies on father–infant attachment demonstrate that stages similar to maternal attachment occur and that fathers are more involved in child care when mothers are employed (although mothers continue to do the majority of infant care). Additional research has shown that inexperienced, first-time fathers are as capable as experienced fathers of developing a close attachment with their infants. Fathers verbalized more positive feelings of love and affection toward their newborns when they were able to have close physical contact, such as holding their infant (Feeley, Sherrard, Waitzer, et al, 2013). Fathers have also been reported to have a significant role in supporting mothers in the perinatal period. Studies of high-risk infants demonstrate the need for a father’s involvement in the infant’s care because of high demands of the infant and/or restrictions of the mother (Feeley, Sherrard, Waitzer, et al, 2013). Research demonstrates that fathers develop feelings of attachment with their offspring and that their relationship with the infant is an important factor in the mother’s emotional well-being. With many single-parent families in existence, a grandmother (or other significant caretaker) may become the primary caretaker. It is important for nurses to recognize that infant–parent attachments may be present or absent in situations where caretaker roles are less well defined by those involved.

When infants are not provided a safe haven and consistent and loving care, an insecure attachment develops; such infants do not feel they can trust the world in which they live. This insecure attachment may result in psychosocial difficulties as the child grows and may persist even into adulthood. Insecure attachment may also exist in homes where there is domestic violence and maternal postnatal depression.

Attachment progresses during infancy, with the infant assuming an increasingly significant role
in the family. Two components of cognitive development are required for attachment: (1) the ability to discriminate the mother from other individuals and (2) the achievement of object permanence. Both of these processes prepare infants for an equally important aspect of attachment—separation from the parent. Separation-individuation should occur as a harmonious, parallel process with emotional attachment.

During the formation of attachment to the parent, the infant progresses through four distinct but overlapping stages. For the first few weeks of life, infants respond indiscriminately to anyone. Beginning at approximately 8 to 12 weeks old, they cry, smile, and vocalize more to the mother than to anyone else but continue to respond to others, whether familiar or not. At approximately 6 months old, infants show a distinct preference for the mother. They follow her more, cry when she leaves, enjoy playing with her more, and feel most secure in her arms. About 1 month after showing attachment to the mother, many infants begin attaching to other members of the family, most often the father.

Infants acquire other developmental behaviors that influence the attachment process. These include
- Differential crying, smiling, and vocalization (more to the mother than to anyone else)
- Visual-motor orientation (looking more at the mother, even if she is not close)
- Crying when the mother leaves the room
- Approaching through locomotion (crawling, creeping, or walking)
- Clinging (especially in the presence of a stranger)
- Exploring away from the mother while using her as a secure base

Severe attachment disorders are psychological and developmental problems that stem from maladaptive or absent attachment between the infant and parent (Zeanah and Gleason, 2015). There are two different patterns of attachment disorders: the emotionally withdrawn–inhibited pattern and an indiscriminate-disinhibited pattern (Zeanah and Gleason, 2015). These two subtypes have been classified into separate disorders: reactive attachment disorder (RAD) and disinhibited social engagement disorder (DSED) of infancy or early childhood. Infants at risk for severe attachment disorders include those who have been victims of physical or sexual abuse or neglect; infants exposed to parental alcoholism, mental illness, and substance abuse; and infants who have experienced the absence of a consistent primary caregiver as a result of foster care, institutionalization, parental abandonment, or parental incarceration (Zeanah and Gleason, 2015). Children with RAD may manifest behaviors such as not being cuddly with parents, failing to seek and respond to comfort when distressed, minimal social and emotional reciprocity, and emotional deregulation such as unexplained fearfulness or irritability (Zeanah and Gleason, 2015). Children with DSED may exhibit behaviors such as inappropriate approach to unfamiliar adults, lack of suspicion of strangers, and poor impulse control (Zeanah and Gleason, 2015). Either or both of these complex disorders are diagnosed with maltreated and orphaned children. Without early intervention, some of these children fail to develop a conscience and develop an antisocial personality disorder that may lead to criminal acts. Children with autism or other pervasive developmental disorders have behaviors that are categorically different from those with RAD (Zeanah and Gleason, 2015).

**Separation Anxiety**

Between 4 and 8 months old, infants progress through the first stage of separation-individuation and begin to have some awareness of themselves and their mothers as separate beings. At the same time, object permanence is developing, and infants are aware that their parents can be absent. Therefore, separation anxiety develops and is manifested through a predictable sequence of behaviors.

During the early second half of the first year, infants protest when placed in their cribs, and a short time later, they object when their mothers leave the room. Infants may not notice the mother’s absence if they are absorbed in an activity. However, when they realize her absence, they protest. From this point on, they become alert to her activities and whereabouts. By 11 to 12 months old, they are able to anticipate her imminent departure by watching her behaviors, and they begin to protest before she leaves. At this point, many parents learn to postpone alerting the child to their departure until just before leaving.
Stranger Fear

As infants demonstrate attachment to one person, they correspondingly exhibit less friendliness to others. Between 6 and 8 months old, fear of strangers and stranger anxiety become prominent and are related to infants’ ability to discriminate between familiar and unfamiliar people. Behaviors such as clinging to the parent, crying, and turning away from the stranger are common.

Language Development

Infants’ first means of verbal communication is crying. Crying as a biologic sign conveys a message of urgency and signals displeasure, such as hunger. However, crying is also a social event that affects the development of the parent–infant relationship—either by its absence, which usually has a positive effect on parents, or by its presence, which may evoke a negative response or persuade parents to minister to the child’s physical or emotional needs.

In the first few weeks of life, crying has a reflexive quality and is mostly related to physiologic needs. Infants cry for 1 to 1.5 hours a day up to 3 weeks old and then build up to 2 to 4 hours by 6 weeks old. Crying tends to decrease by 12 weeks old. It is thought that the increase in crying for no apparent reason during the first few months may be related to the discharge of energy and the maturational changes in the central nervous system. At the end of the first year, infants cry for attention; from fear (especially stranger fear); and from frustration, usually in response to their developing but inadequate motor skills.

Vocalizations heard during crying eventually become syllables and words (e.g., the “mama” heard during vigorous crying). Infants vocalize as early as 5 to 6 weeks old by making small throaty sounds. By 2 months old, they make single vowel sounds, such as ah, eh, and uh. By 3 to 4 months old, the consonants n, k, g, p, and b are added, and infants coo, gurgle, and laugh aloud. By 6 months old, they imitate sounds; add the consonants t, d, and w; and combine syllables (e.g., “dada”), but they do not ascribe meaning to the word until 10 to 11 months old. By 9 to 10 months old, they comprehend the meaning of the word “no” and obey simple commands. By 1 year old, they can say 3 to 5 words with meaning and may understand as many as 100 words. Because language development is based on expressive skills (ability to make thoughts, ideas, and desires known to others) and receptive skills (ability to understand the words being spoken), it is important that infants are exposed to expressive speech and that infants with delays in achieving milestones are carefully evaluated for potential hearing loss (see Universal Newborn Hearing Screening, Chapter 7).

Play

Play during infancy represents the various social modalities observed during cognitive development. The activity of infants is primarily narcissistic and revolves around their own bodies. As discussed under Development of Body Image (earlier in this chapter), body parts are primarily objects of play and pleasure.

During the first year, play becomes more sophisticated and interdependent. From birth to 3 months old, infants’ responses to the environment are global and largely undifferentiated. Play is dependent; pleasure is demonstrated by a quieting attitude (1 month old), a smile (2 months old), or a squeal (3 months old). From 3 to 6 months old, infants show more discriminate interest in stimuli and begin to play alone with rattles or soft stuffed toys or with someone else. There is much more interaction during play. By 4 months old, they laugh aloud, show preference for certain toys, and become excited when food or a favorite object is brought to them. They recognize images in a mirror, smile at them, and vocalize to them.

By 6 months to 1 year old, play involves sensorimotor skills. Games such as peek-a-boo and pat-a-cake are played. Verbal repetition and imitation of simple gestures occur in response to demonstration. Play is much more selective, not only in terms of specific toys, but also in terms of “playmates.” Although play is solitary or one sided, infants choose with whom they will interact. At 6 to 8 months old, they usually refuse to play with strangers. Parents are definite favorites, and infants know how to attract their attention. At 6 months old, they extend their arms to be picked up; at 7 months old, they cough to make their presence known; at 10 months old, they pull their parents’ clothing; and at 12 months old, they call their parents by name. This represents a tremendous advance from the newborn who signaled biologic needs by crying to express displeasure.

Stimulation is as important for psychosocial growth as food is for physical growth. Knowledge of
developmental milestones allows nurses to guide parents regarding proper play for infants. It is not sufficient to place a mobile over a crib and toys in a play yard for a child’s optimum social, emotional, and intellectual development. Play must provide interpersonal contact and recreational and educational stimulation. Infants need to be played with, not merely allowed to play. Although the type of play infants engage in is called solitary, this is a figurative, not literal, term to denote one-sided play. The type of toys given to children is much less important than the quality of personal interaction that occurs.

**Temperament**

An infant’s temperament or behavioral style influences the type of interaction that occurs between the child and parents, especially the mother, and other family members (see Temperament, Chapter 3). In assessing a child’s temperament, the parents’ perception of the child and the degree of fit between their expectations and the child’s actual temperament are important. The more dissonance or lack of harmony, between the child’s temperament and the parent’s ability to accept and deal with the behavior, the greater risk for subsequent parent–child conflicts.

Although most behavioral researchers agree that there is a strong biologic component to temperament, researchers also suggest that the environment, particularly the family, may modify temperament (Gallitto, 2015). Family interaction with the infant is perceived as a circular process wherein each family member affects the others and the family as a unit. With these concepts in mind, the nurse has an important role in helping the family understand the infant’s temperament as it relates to family dynamics and the eventual well-being of the child and family unit.

Some researchers speculate that infant temperament may contribute to depression. Depressed mothers and fathers (vs. nondepressed mothers and fathers) rate their infant’s temperament as more difficult at 3 and 18 months old (Kerstis, Engström, Edlund, et al, 2013). The researchers stress that depressed parents need to be identified early and provided with supportive programs to enhance the parent-infant relationship. When there is a lack of reciprocity between the infant and parents or when the infant’s behavior does not meet parental expectations, there is increased risk for discord. Researchers have correlated fussy infant temperament with the introduction of complementary feedings at 3 months old (Wasser, Bentley, Borja, et al, 2011) and feeding infants foods that may contribute to obesity (Vollrath, Tonstadt, Rothbart, et al, 2011).

Several instruments can measure infant temperament. These instruments include the Revised Infant Temperament Questionnaire (Carey and McDevitt, 1978), the Infant Behavior Questionnaire (Gartstein and Rothbart, 2003), and the Early Infancy Temperament Questionnaire (Medoff-Cooper, Carey, and McDevitt, 1993). In discussing test results to parents, it is best to avoid descriptors (such as “difficult”); instead, infants can be described in terms of characteristics (such as “intense” or “less predictable”).

**Childrearing Practices Related to Temperament**

With knowledge of the infant’s temperament, nurses are better able to (1) provide parents with background information that will help them see their child in a better perspective, (2) offer a more organized picture of their child’s behavior and possibly reveal distortions in their perceptions of the behavior, and (3) guide parents regarding appropriate childrearing techniques.

Knowledge of the developmental sequence allows the nurse to assess normal growth and minor or abnormal deviations. It also helps parents gain realistic expectations of their child’s ability and provides guidelines for suitable play and stimulation. Parents who lack knowledge of child growth and development may set inappropriate behavioral expectations for their child. Emphasizing the child’s developmental rather than chronologic age strengthens the parent–child relationship by fostering trust and lessening frustration. Therefore, thorough understanding and appreciation of children’s growth and development are essential.

Because of the complexity of the developmental process during the first 12 months, Table 9-1 is presented to help organize and clarify the data already discussed. Although all milestones are important, some represent essential integrative aspects of development that lay the foundation for achievement of more advanced skills. These essential milestones are designated by a black dot (•) in the table. The table represents the average monthly age at which various skills are attained. It must be remembered that although the sequence is the same, the rate will vary among children.
Coping with Concerns Related to Normal Growth and Development

Separation and Stranger Fear

A number of fears can appear during infancy. However, the fear that causes parents the most concern is fear related to strangers and separation. Although erroneously interpreted by some as a sign of undesirable, antisocial behavior, stranger fear and separation anxiety are important components of a strong, healthy parent–child attachment. Nevertheless, this period can present difficulties for the parent and child. Parents may be more confined to the home because the infant violently protests having babysitters. To accustom the infant to new people, parents are encouraged to have close friends or relatives visit often. This provides other persons with whom the child is comfortable and can give parents time for themselves.

Infants also need opportunities to safely experience strangers. Usually toward the end of the first year, infants begin to venture away from the parent and demonstrate curiosity about strangers. If allowed to explore at their own rate, many infants eventually “warm up.” If parents hold the child away from their face, the infant can observe while maintaining close physical contact.

The best approach for the stranger (including nurses) is to talk softly; meet the child at eye level (to appear smaller); maintain a safe distance from the infant; and avoid sudden, intrusive gestures, such as holding out the arms and smiling broadly.

Parents also may wonder whether they should encourage the child’s clinging, dependent behavior, especially if there is pressure from others who view this as “spoiling” (see following discussion). Parents need to be reassured that such behavior is healthy, desirable, and necessary for the child’s optimal emotional development. If parents can reassure the infant of their presence, the infant will learn to realize that they are still there even if not physically present. Talking to infants when leaving the room, allowing them to hear one’s voice on the telephone, and using transitional objects (e.g., a favorite blanket or toy) reassure the continued presence of the parent.

Alternate Child Care Arrangements

For many parents, especially working mothers, locating safe and competent child care facilities for infants is an increasingly difficult problem, one that is compounded by the number of mothers working outside the home. Over the past 40 years, there have been variable shifts in child care arrangements; whereas the majority of children are cared for in group centers or other settings, increasingly more children are being cared for in home settings.

The basic types of care are in-home care, either in the parents’ or caregivers’ home (family daycare), and center-based care, usually in a daycare center. In-home care may consist of a full-time babysitter who lives in the home, a full-time babysitter who comes to the home, cooperative arrangements such as exchange babysitting, or family daycare. A licensed small family child care home typically provides care and protection for up to six children for part of a 24-hour day and does not include informal arrangements, such as exchange babysitting or caregivers in the child’s own home. The six children may include the family daycare provider’s own children younger than 5 years old living in the home. Large family child care homes may provide care for 8 to 12 children. Unfortunately, many family daycare homes operate without a license and may care for large numbers of infants without adequate staff and facilities.

Child center–based care usually refers to a licensed daycare facility that provides care for six or more children for 6 or more hours in a 24-hour day. Work-based group care is another option that is becoming increasingly popular as employers recognize the benefit of providing high-quality and convenient child care to their employees. Sick-child care may also be available for times when children are ill. Such programs are often located in community hospitals or in work settings.

Nurses may fulfill a unique role in guiding parents in locating suitable facilities that have a well-qualified staff. State licensing agencies can help parents identify daycare centers that accept children of specific age groups and are convenient to home and work. Their records are available to the public and provide reports from the health, safety, and fire departments; periodic evaluations from the licensing agency; complaints filed against the center; and qualification of the center’s employees. State-licensed programs are supposed to abide by established standards, which represent the minimum requirements and safeguards. However, enforcement of the standards is sometimes inadequate.

Early childhood programs may also belong to a voluntary accreditation system sponsored by
National Association for the Education of Young Children, which serves as a model for optimum care. References from other parents are also helpful, provided that they have investigated the center carefully and have remained involved with the agency's activities.

The same conscientious attention should be applied to locating competent babysitters. References from other employers are essential, and there is no substitute for observing the interaction between the individual and the child.

Important areas for parents to evaluate are the center’s daily program, teacher qualifications, the nurturing qualities of caregivers, student-to-staff ratio, discipline policy, environmental safety precautions, provision of meals, sanitary conditions, adequate indoor and outdoor space per child, and fee schedule. Although fees vary considerably, a program that charges a minimum fee may also be providing minimum services. Parents should arrange to meet the director and some of the employees, especially those who would be caring for the child. Resources to familiarize parents with characteristics of quality child care and checklists to systematically evaluate the center and compare it with other facilities can help parents make successful choices. At all times, the parent should have the right to visit the child, and regular conferences should occur to review the child’s progress.

One of the areas that is increasingly important in selecting child care is the center’s health practices; however, parents often do not check the center for health and safety features. Evidence shows that children, especially those younger than 6 years old in daycare centers, have more illnesses—especially diarrhea, otitis media, respiratory tract infections (especially if the caregiver smokes), hepatitis A, meningitis, and cytomegalovirus—than children cared for in their homes. The strongest predictor of risk of illness is the number of unrelated children in the room. Proactive infection control measures and education of staff have been effective in reducing the incidence of upper respiratory tract infections, diarrhea, and rotavirus. It has been reported that families that have children in out-of-home child care lose an estimated 6 to 29 days of work per year as a result of children’s illnesses (Shope and Hashikawa, 2012). Parents should inquire about the center’s policy regarding the attendance and care of sick children.

Limit Setting and Discipline

As infants' motor skills advance and mobility increases, parents are faced with the need to set safe limits to protect the child and establish a positive and supportive parent–child relationship (see Safety Promotion and Injury Prevention later in this chapter). Although there are numerous disciplinary techniques, some are more appropriate for this age than others. An effective approach used in disciplining a child is the use of time-out. The basic principles are the same as those discussed in Chapter 14 except that the place for time-out needs to be commensurate with the child’s abilities. For example, a play yard is better for most infants than a chair. Although parents may be concerned about instituting discipline during infancy, it is important to stress that the earlier effective disciplinary methods are used, the easier it is to continue these approaches.

Parents must recognize the infant's cognitive and behavioral limitations; adequate protection from hazards must be implemented because infants and toddlers do not understand a cause-and-effect relationship between dangerous objects and physical harm. Additionally, parents may need reassurance that their infant's behavior is exploratory in nature, not oppositional (at this age) and primarily centered on the infant's basic needs of warmth, love, food, security, and comfort. Parents may verbalize that comforting the infant too much or meeting his or her needs will result in a spoiled child; there is no substantial evidence that meeting the infant's basic needs will result in such behaviors later in life. Children innately test limits and explore during the exploratory phase of growth; instead of discouraging exploration, parents should provide safe alternatives, put dangerous household items away, and give children consistent discipline and nurturing.

Effective teaching for injury prevention optimally begins in infancy by helping parents understand the nature of their child’s normal development. It must be reiterated continually that infants cry because a need is not being met, not to intentionally irritate an adult. A fussy or irritable infant is a potential victim of shaken baby syndrome (or other bodily harm) because adults and caretakers may not understand the nature of the infant's crying.

Thumb Sucking and Use of a Pacifier

Sucking is infants’ chief pleasure and may not be satisfied by breastfeeding or bottle feeding. It is such a strong need that infants who are deprived of sucking, such as those with a cleft lip repair,
suck on their tongues. Some newborns are born with sucking blisters on their hands from in utero sucking activity.

Problems arise when parents are overly concerned about the sucking of the fingers, thumb, or pacifier and attempt to restrain this natural tendency. Before giving advice, nurses should investigate the parents’ feelings and base guidance on this information.

Pacifier use, particularly in the early days after birth and in the birth hospital, has gained considerable attention in the scientific literature. Nelson (2012) suggests that it cannot be stated with absolute certainty that pacifier use is bad in every situation. Health care workers must be informed on potential harm and benefits in pacifier use and provide parents with the highest level of evidence in order to make an informed decision on usage. Researchers and breastfeeding experts recommend that pacifiers are not introduced to breastfed infants unless medically necessary (Lawrence and Lawrence, 2011) (see Research Focus box).

### Research Focus

**Pacifier Use and Breastfeeding**

A recent systematic review found mixed results of pacifier use and breastfeeding outcomes (Nelson, 2012). The association of pacifier use and deceased breastfeeding duration was only found in observational studies, while no effect of pacifier use on breastfeeding duration was noted in randomized control trials (Nelson, 2012). They further concluded that the greatest impact on pacifier use and breastfeeding occurred early in the infant’s life when learning effective sucking and stimulating the mother’s milk.

Pacifier use has been associated with an increased risk of otitis media in several studies (Salah, Abdel-Aziz, Al-Farok, et al, 2013). Because of this, the American Academy of Pediatrics Subcommittee on the Management of Acute Otitis Media recommended that parents reduce pacifier usage in the second 6 months of life (Nelson, 2012). However, the American Academy of Pediatrics’ Task Force on Sudden Infant Death Syndrome (2011) cites strong evidence for a protective effect in SIDS reduction when pacifiers are used at bedtime and nap time. The exact mechanism involved in the protection for SIDS is not known. Still, pacifiers should be cleaned and replaced regularly, and there should be an emphasis on allowing the infant to control the pace, frequency, and termination of feeding rather than allowing the pacifier (or anything else) to become the focus of the interaction. Pacifier use during painful procedures in neonates has been shown to produce an analgesic effect (see Chapter 5).

A systematic review found an association between pacifier use in infancy and a reduction in breastfeeding and exclusive breastfeeding (Nelson, 2012). However, the authors concluded that pacifier use and poor breastfeeding outcomes may not have a causal effect; rather, it may be related to a marker for socioeconomic, demographic, psychosocial, and cultural factors that determine pacifier use and breastfeeding. A recent Cochrane review found that pacifier use in full-term healthy infants started from birth or after lactation did not significantly affect the prevalence of duration of exclusive and partial breastfeeding up to 4 months old (Jaafar, Jahanafar, Angolkar, et al, 2011). At the time of this writing, there is no evidence that pacifier use and nonnutritive sucking in preterm infants has any effect on the initiation and length of breastfeeding. Nonnutritive sucking should not be withheld from preterm infants, especially when used in conjunction with concentrated sucrose for pain management.

To decrease dependence on nonnutritive sucking in young infants, sucking pleasure can be increased by prolonging feeding time. Also, the parent’s excessive use of the pacifier to calm the child should be explored. It is not unusual for parents to place a pacifier in the infant’s mouth as soon as crying begins, thus reinforcing a pattern of distress–relief.

If the child uses a pacifier, stress safety considerations in purchasing one. During infancy and early childhood, there is no need to restrain nonnutritive sucking of the fingers. Malocclusion may occur if thumb sucking persists past approximately 4 years old or when the permanent teeth erupt. Some parents may perceive pacifiers as less damaging because they are discarded by 2 to 3 years old, but thumb sucking may persist well into the school-age years. Because of the limited number of studies correlating pacifier use and increased risk of infections or dental malocclusion, there are no recommendations for or against pacifier use related to oral health (Nelson, 2012). Both pacifier use
and thumb sucking may also have significant cultural variations. Thumb sucking reaches its peak at age 18 to 20 months old and is most prevalent when children are hungry, tired, or feeling insecure. Persistent thumb sucking in a listless, apathetic child always warrants investigation. It may be a sign of an emotional problem between the parent and child or of boredom, isolation, and lack of stimulation.

**Teething**

One of the more difficult periods in infants' (and parents') lives is the eruption of the deciduous (primary) teeth, often referred to as teething. The age of tooth eruption shows considerable variation among children, but the order of their appearance is fairly regular and predictable (Fig. 9-10). The first primary teeth to erupt are the lower central incisors, which appear at approximately 6 to 10 months old (average, 8 months old). These are followed closely by the upper central incisors. A quick guide to assessment of deciduous teeth during the first 2 years is: Age of the child in months − 6 = Number of teeth. For example: 8 months of age − 6 = 2 teeth at this time.

Teething is a physiologic process; some discomfort is common as the crown of the tooth breaks through the periodontal membrane. Some children show minimum evidence of teething, such as drooling, increased finger sucking, or biting on hard objects. Others are irritable, have difficulty sleeping, ear rubbing, and decreased interest in solid foods. Generally, signs of illness such as fever (>39°C), vomiting, or diarrhea are not symptoms of teething but of illness and may warrant further investigation. Because teething pain is a result of inflammation, cold is soothing. Giving the child a frozen teething ring helps relieve the inflammation, but do not freeze teething rings filled with gels or non-sterile water because they may crack and leak into the infant's mouth. Several nonprescription topical anesthetic ointments are available, although the active ingredient in most of them is benzocaine, which may cause a rare but serious disorder called methemoglobinemia.

Therefore, the US Food and Drug Administration recommends use of such products only under the advice and supervision of a health care provider (US Food and Drug Administration, 2014). In the event of persistent irritability that affects sleeping and feeding, systemic analgesics (such as, acetaminophen or ibuprofen) can be given (if age appropriate) for no more than 3 days; however, parents should know that this is a temporary measure, and they should contact the practitioner if symptoms persist or if the child's condition changes.

The use of teething powders or procedures such as cutting or rubbing the gums with salicylates (aspirin) is discouraged because ingestion of the powder, infection or irritation of the tissue, and ingestion or aspiration of the aspirin can occur. Hard candy may cause accidental choking or aspiration and should be avoided at this age.
Promoting Optimal Health During Infancy

Nutrition

Ideally, discussion of optimal nutrition should begin prenatally with a discussion regarding maternal intake of adequate nutrition in the form of a balanced diet and adequate amounts of protein, vitamins, and minerals—all of which have an impact on the growing fetus. Nurses should encourage and provide information for parents to discuss the options of breastfeeding or bottle feeding the infant well in advance of the delivery date. The choice for either is highly individual and is discussed in Chapter 7. This section is primarily concerned with infant nutrition during the months when growth needs and developmental milestones ready the child for the introduction of solid foods.

Despite adequate availability of optimum nutrient sources, experts are concerned that infants are not fed appropriately. Infants may be given solid foods when their digestive systems are not ready to completely absorb such foods. In addition, drinks that are inappropriate for growing infants may be given in place of enriched infant milk and may only provide “empty” calories and contribute to childhood and adult obesity and place infants at risk for iron-deficiency anemia, vitamin D deficiency, and rickets. A survey of infant feeding practices found that about 20% of infants had consumed solid foods before 4 months old despite recommendations that such foods not be introduced until 4 to 6 months old (Aronsson, Uusitalo, Vehik, et al, 2015). Infant health practices, including nutrition, may have a far-reaching, long-term impact on the child’s life. Growth and development could be negatively affected, and so could the risk of acquiring certain chronic health conditions. There is some evidence that childhood obesity is significantly decreased when breastfeeding is continued and solid food introduction is delayed until at least 4 months old (Moss and Yeaton, 2014). Nurses must be proactive in teaching parents what constitutes appropriate infant nutrition and nutritional habits, which provide the child with an optimum opportunity to grow and develop into a healthy child and adult.

Health care professionals have recently become more aware of the use of complementary and alternative medical therapies in children that may not be as beneficial as touted in various media sources. One concern is children’s intake of megavitamins and herbs; parents may assume that the word natural in reference to ingredients means the product is safe when this may not be the case. It is important for nurses to be aware of the effects, availability, and practice of complementary therapies and to be able to cogently discuss their use with parents.

The First 6 Months

Human milk is the most desirable complete diet for infants during the first 6 months. A healthy term infant receiving breast milk from a well-nourished mother usually requires no specific vitamin and mineral supplements with a few exceptions. Daily supplements of vitamin D and vitamin B₁₂ may be indicated if the mother’s intake of these vitamins is inadequate. The American Academy of Pediatrics (Wagner, Greer, American Academy of Pediatrics Section on Breastfeeding, et al, 2008) recommends that all infants (including those exclusively breastfed) receive a daily supplement of 400 IU of vitamin D beginning in the first few days of life to prevent rickets and vitamin D deficiency. Vitamin D supplementation should occur until the infant is consuming at least 1 L/day (or 1 qt/day) of vitamin D–fortified formula (Wagner, Greer, American Academy of Pediatrics Section on Breastfeeding, et al, 2008). Non-breastfed infants who are taking less than 1 L/day of vitamin D–fortified formula should also receive a daily vitamin D supplement of 400 IU (see Safety Alert). If the infant is being exclusively breastfed after 4 months old (when fetal iron stores are depleted), iron supplementation (1 mg/kg/day) is recommended until appropriate iron-containing complementary foods (such as, iron-fortified cereal) are introduced (Baker, Greer, and American Academy of Pediatrics Committee on Nutrition, 2010) (see Community Focus box). Infants, whether breastfed or bottle fed, do not require additional fluids, especially water or juice, during the first 4 months of life. Excessive intake of water in infants may result in water intoxication and hyponatremia.

Community Focus
Administration of Iron Supplements

- Ideally, iron supplements should be administered between meals for greater absorption.
- Liquid iron supplements may stain the teeth; therefore, administer them with a dropper toward the back of the mouth (side). In older children, administer liquid iron supplements through a straw or rinse the mouth thoroughly after ingestion.
- Avoid administration of liquid iron supplements with whole cow’s milk or milk products, because they bind free iron and prevent absorption.
- Educate parents that iron supplements will turn stools black or tarry green.
- Iron supplements may cause transient constipation. Caution parents not to switch to a low-iron containing formula or whole milk, which are poor sources of iron and may lead to iron-deficiency anemia (see Iron-Deficiency Anemia, Chapter 24).
- In older children, follow liquid iron supplement with a citrus fruit or juice drink (no more than 3 to 4 oz).
- Avoid administration of iron supplements with foods or drinks that bind iron and prevent absorption (see Iron-Deficiency Anemia, Chapter 24).

Safety Alert

There are reports of accidental overdoses of liquid vitamin D in infants caused by packaging errors; the syringe for liquid administration may not be labeled clearly for 400 IU. Nurses should educate parents to read syringes and to avoid administering more than 400 IU of vitamin D (US Food and Drug Administration Consumer Health Information, 2010).

Fluoride supplementation in exclusively breastfed children is not required for the first 6 months because of the risk of dental fluorosis. However, fluoride supplementation may be necessary if the breastfeeding mother’s water supply does not contain the required amount of fluoridation (see later in this chapter). Employed mothers can continue breastfeeding with guidance and encouragement.* Mothers are encouraged to set realistic goals for employment and breastfeeding, with accurate information regarding the costs, risks, and benefits of available feeding options. Barriers encountered by working breastfeeding mothers include lack of employer or coworker support, unavailable or inadequate facilities for pumping and storing milk, lack of time to express milk while at work, real or perceived low milk supply, and insufficient time allowed to pump during work. Many mothers may find that a program of breast pumping when away from home and bottle feeding the infant the expressed milk with or without formula supplementation is successful. Expressed breast milk may be stored in the refrigerator (4° C [39° F]) without danger of bacterial contamination for up to 5 days (Lawrence and Lawrence, 2011). Although feeding the infant at home may occur on a demand basis, pumping milk away from home may be needed every 3 to 4 hours to maintain adequate supply. Breast milk may be expressed by hand or pump (manual or electric) and stored in an appropriate air-tight glass or plastic container. Expressed breast milk may be frozen (−18° C [0° F] or lower) for up to 6 months (depending on the type of freezer used) but care should be taken to prevent freezer burn (see Breastfeeding: A Guide for the Medical Profession [Lawrence and Lawrence, 2011] for further guidelines on storing and freezing human milk).

In addition to efficient breast pumping, mothers also need child care by a trusted individual or agency and support and assistance from significant others. As with all breastfeeding mothers, these women must have proper nutrition and rest for adequate lactation. Maternal fatigue is considered the biggest threat to successful breastfeeding in employed mothers.

Nursing Alert

Warming expressed milk in a microwave decreases the availability of anti-infective properties and nutrients (Labiner-Wolfe and Fein, 2013). To prevent oral burns from uneven warming of the milk,
breast milk should never be thawed or rewarmed in a microwave oven. To thaw the frozen milk, either place the container under a lukewarm water bath (<40.5° C [105° F]) or place it in a refrigerator overnight.

There are reports of an increase in the use of herbs by lactating mothers to increase breast milk supply. The galactogogues, including fenugreek, blessed thistle, fennel, and chaste tree, have been purported to increase maternal milk supply, but a recent systematic review found insufficient evidence for the use of any type of galactogogues (Mortel and Mehta, 2013). For a discussion of galactogogues, including those mentioned here, see Appendix P, Protocol 9, in Breastfeeding: A Guide for the Medical Profession (Lawrence and Lawrence, 2011).

An acceptable alternative to breastfeeding is commercial iron-fortified formula. Similar to human milk, it supplies all nutrients needed by infants for the first 6 months. Unmodified whole cow’s milk, low-fat cow’s milk, skim milk, other animal milks, and imitation milk drinks are not acceptable as major sources of nutrition for infants because of their limited digestibility, increased risk of contamination, and lack of components needed for appropriate growth. Whole milk can cause iron-deficiency anemia in infants, possibly as a result of occult gastrointestinal blood loss. Pasteurized whole cow’s milk is deficient in iron, zinc, and vitamin C and has a high renal solute load, which makes it undesirable for infants younger than 12 months old (American Academy of Pediatrics, Committee on Nutrition, 2014).

**Nursing Alert**

Dietary fat in infants younger than 6 months old should not be restricted unless on specific medical advice. Substituting skim or low-fat milk is unacceptable because the essential fatty acids are inadequate, and the solute concentration of protein and electrolytes, such as sodium, is too high.

The amount of formula per feeding and the number of feedings per day vary among infants. Infants being fed on demand usually determine their own feeding schedule, but some infants may need a more planned schedule based on average feeding patterns to ensure sufficient nutrients. In general, the number of feedings decreases from six at 1 month old to four or five at 6 months old. Regardless of the number of feedings, the total amount of formula ingested will usually level off at about 32 ounces (946 ml) per day.

Honey should be avoided in the first 12 months because of the risk of botulism (see Chapter 30); pacifiers should not be coated with honey to encourage the infant to take it. Socializing the infant to food flavors of the family’s culture is common in addition to continuing breastfeeding for 2 to 4 years (see Cultural Considerations box).

**Cultural Considerations**

**Cultural Feeding Practices**

Cultural beliefs and values often influence infant-feeding practices. Health care professionals may benefit from understanding the multicultural feeding practices that parents choose for their infants. Traditional feeding practices include offering a variety of liquids or foods (such as sugared wine, water, or honey) during the first few days of life and thereafter.

Bottled water for mixing powdered or concentrated formula is a relatively safe alternative to tap water if available. Tap water has a high content of contaminants, such as lead. Do not assume, however, that bottled water is sterile unless specifically stated on the container. Fluoridated bottled water is not necessary for mixing powdered formula unless the local water source is low in fluoride, in which case fluoride supplementation is recommended after 6 months old (see Dental Health later in this chapter).

The addition of solid foods before 4 to 6 months old is not recommended. During the early months, solid foods are not compatible with the ability of the gastrointestinal tract and infant’s nutritional needs. Feeding solids to young infants exposes them to food antigens that may produce food protein allergy. Ample evidence indicates that early introduction of foods other than maternal milk in the first 6 months of life predisposes children to an increased risk for food allergy.
Development; foods known to be allergenic (e.g., peanuts, eggs, fish, seafood) should be introduced later than 9 months old according to the child’s risk for atopy (Heinrich, Koletzko, and Koletzko, 2014).

Developmentally, infants are not ready for solid food. The extrusion (protrusion) reflex is strong and often causes them to push food out of the mouth. Infants instinctively suck when given food. Because of their limited motor abilities, infants are unable to deliberately push food away or avoid feeding. Therefore, early introduction of solids is a type of forced feeding that may lead to excessive weight gain and increased predisposition to allergies and iron-deficiency anemia. Parents should be cautioned concerning the use of juices and nonnutritive drinks such as fruit-flavored drinks or carbonated beverages (soda or pop) during this period. Many juices and nonnutritive drinks, although readily available to consumers, do not provide sufficient and appropriate caloric intake for infants younger than 12 months old; such drinks may replace the nutrients in breast milk or formula and lead to growth or health problems. Fruit juices are not required in the first 6 months; no studies have demonstrated benefits of giving fruit juice to infants.

The Second 6 Months

During the second half of the first year, human milk or formula should continue to be the primary source of nutrition. The use of fluoride supplementation depends on the infant’s intake of fluoride tap water (see Dental Health later in this chapter). If breastfeeding is discontinued, a commercial iron-fortified formula should be substituted. Follow-up or transition formulas marketed for older infants offer no special advantages over other infant formulas and provide excessive protein (American Academy of Pediatrics, Committee on Nutrition, 2014). The major change in feeding habits is the addition of solid foods to the infant’s diet. Physiologically and developmentally, infants 4 to 6 months old are in a transition period. By this time, the gastrointestinal tract has matured sufficiently to handle more complex nutrients and is less sensitive to potentially allergenic foods. Tooth eruption is beginning and facilitates biting and chewing. The extrusion reflex has disappeared, and swallowing is more coordinated to allow infants to accept solids easily. Head control is well developed, which permits infants to sit with support and purposely turn their heads away to communicate lack of interest in food. Voluntary grasping and improved eye–hand coordination gradually allow infants to pick up finger foods and feed themselves. Their increasing sense of independence is evident in their desire to hold their bottles and try to “help” during feeding.

Selection and Preparation of Solid Foods

The choice of solid foods to introduce first is variable but should meet the reasons for feeding solids, such as supplying nutrients not found in formula or breast milk. Iron-fortified infant cereal is generally introduced first because of its high iron content (7 mg/3 Tbsp. of prepared dry cereal). Commercially prepared ready-to-serve dry cereals for infants include rice, barley, oatmeal, and high-protein cereals; rice is usually suggested as an initial food because of its easy digestibility and low allergenic potential. Cereals (such as cream of farina) are not used because infant commercial cereals are a better source of iron. Some of the commercial baby cereals are combined with fruit. There is little nutritional benefit from these preparations, and they are more expensive. New foods should be added one at a time; therefore, parents should avoid cereal combinations when beginning a new grain.

Infant cereal (iron fortified) may be mixed with expressed breast milk or water until whole milk is given. After 6 months old, small amounts of 100% fruit juices can be mixed with the dry cereal; the vitamin C content of the juice enhances the absorption of iron in the cereal. Because of their benefit as a source of iron, infant cereals should be continued until the child is 18 months old.

Fruit juice can be offered from a cup for its rich source of vitamin C and as a substitute for milk for one feeding a day. Large quantities of certain juices (e.g., apple, pear, prune, sweet cherry, peach, and grape) are avoided, because they may cause abdominal pain, diarrhea, or bloating in some children. Avoid fruit-flavored drinks, which may be marketed as juices but contain high concentrations of complex sugars. White grape juice (no more than 5 oz/day) may be better absorbed and safe for infants this age without causing gastrointestinal distress. The American Academy of Pediatrics, Committee on Nutrition (2014) recommends that fruit juice intake not exceed 4 to 6 ounces per day and that juices not be given to infants younger than 4 to 6 months old. Because vitamin C is naturally destroyed by heat, juice is not warmed. Juice containers are always
kept covered and refrigerated to prevent further vitamin loss.

The addition of other foods is arbitrary. A common sequence is to introduce strained fruits followed by vegetables and, finally, meats; however, some clinicians prefer to add vegetables before fruit. If foods are introduced early, citrus fruits, meats, and eggs are delayed until after 6 months old because of their potential to result in allergy. At 6 months old, foods such as a cracker or zwieback can be offered as finger and teething foods. By 8 to 9 months old, junior foods and nutritious finger foods such as firmly cooked vegetable, raw pieces of fruit, or cheese can be given. By 1 year old, well-cooked table foods are served.

The introduction of solid foods into the infant's diet at this age is primarily for taste and chewing experience, not for growth. The majority of infants’ caloric needs are derived from the primary milk source (human or formula); therefore, solids should not be perceived as a substitute for milk until the child is older than 12 months old. Portion sizes may vary according to the infant's taste. In general, 1 Tbsp. per year of age (i.e., 1/2 to 1 Tbsp. for most infants under 12 months old) is adequate for most infants. In most cases, 2 Tbsp. may be served, but because of infants' focus on the texture and feel of the food, smaller amounts will be consumed. Another reason for smaller portions is the concern over feeding habits in early childhood and obesity; early feeding of smaller portions may help prevent the “clean your plate” or “eat all your food or you can't get down from the table” concepts, which are known to contribute to overeating in later life. The addition of solid foods to exclusively breastfed infants' diet does not significantly increase overall caloric intake or weight gain.

Commercially prepared baby foods are the most common type of food served to infants in the United States. They are convenient and usually contain no added salt or sugar but can be relatively expensive. An alternative is to prepare baby foods at home, which is a simple and inexpensive process.

In general, low-calorie milk and foods should be avoided in infants and toddlers unless a strict medically prescribed diet is required. Infants' growth during this phase is crucial to future development, and dietary fat should be curtailed with great caution. At the same time, it is important to recognize that certain types of dietary fat are unacceptable for infants; fried potatoes, candy, ice cream, cake, soda pop and other sweetened drinks, and other such items do not constitute an appropriate amount of fat intake and may contribute to childhood obesity. One suggestion is to limit the amount (serving size) of dietary fat in foods provided rather than eliminate them altogether, especially during infancy.

Parents are cautioned to avoid reliance on foods and supplements marketed as iron- or vitamin-fortified as primary sources of minerals. Instead, encourage parents to offer the child a variety of fruits, vegetables, and whole grains, including those known to naturally be rich in iron.

**Introduction of Solid Foods**

When the spoon is first introduced, infants often push it away and appear dissatisfied. Food that is placed on the front of the tongue and pushed out is simply scooped up and refed. As infants become accustomed to the spoon, they will more eagerly accept the food and eventually open the mouth in anticipation (or keep it closed in dislike).

One food item is introduced at intervals of 4 to 7 days to allow for identification of food allergies. New foods are fed in small amounts. As the amount of solid food increases, the quantity of milk is decreased to less than 1 L/day to prevent overfeeding.

Because feeding is a learning process, as well as a means of nutrition, new foods are given alone to allow the child to learn new tastes and textures. Food should not be mixed in the bottle and fed through a nipple with a large hole. This deprives the child of the pleasure of learning new tastes and developing a discriminating palate. It can also cause problems with poor chewing of food later in life because of lack of experience. Guidelines for the introduction of new foods are given in the Family-Centered Care box.
Breastfeeding

• Most desirable complete diet for the first half of the first year.*

• A recommended supplement is oral vitamin D (400 IU/day).

• In exclusively breastfed infants 4 months old and older, recommend an iron supplement of 1 mg/kg/day until iron-rich complementary foods are introduced.

Formula

• Iron-fortified commercial formula is a complete food for the first half of the first year.*

• Requires fluoride supplements (0.25 mg) when the concentration of fluoride in the drinking water is below 0.3 ppm after 6 months old.

• Evaporated milk formula requires supplements of vitamin C, iron, and fluoride (in accordance with the fluoride content of the local water supply after 6 months old).

4 to 12 Months Old (Solid Foods)

• May begin to add solids by 4 to 6 months old.

• First foods are strained, pureed, or finely mashed.

• Finger foods such as teething crackers, raw fruit, or vegetables can be introduced by 6 to 7 months old.

• Chopped table food or commercially prepared junior foods can be started by 9 to 12 months old.

• With the exception of cereal, the order of introducing foods is variable; a recommended sequence is fruit, then vegetables, and then meat.

• Introduce one food at a time, usually at intervals of 4 to 7 days, to identify food allergies.

• Introduce solids when the infant is hungry.

• Begin spoon feeding by pushing food to back of tongue because of infants’ natural tendency to thrust the tongue forward.

• Use a small spoon with a straight handle; begin with 1 or 2 tsp. of food; gradually increase to 2 to 3 Tbsp. per feeding.

• As the quantity of solids increases, decrease the quantity of milk to prevent overfeeding. Limit formula or milk to approximately 960 ml (32 oz) daily and fruit juice to less than 180 ml (6 oz) daily.

• Never introduce foods by mixing them with the formula in the bottle.

Cereal—Start at 4 to 6 Months Old

• Introduce commercially prepared iron-fortified infant cereals and administer daily until 18 months old.

• Rice cereal is usually introduced first because of its low allergenic potential.

• Parents can discontinue supplemental iron when iron-fortified cereal is given.

Fruits and Vegetables—Start at 6 to 8 Months Old

• Applesauce, bananas, and pears are usually well tolerated.
• Avoid fruits and vegetables marketed in cans that are not specifically designed for infants because of variable and sometimes high lead content and addition of salt, sugar, or preservatives.

• Offer fruit juice only from a cup, not a bottle, to reduce the development of early childhood caries. Limit to 4 ounces per day or less.

**Meat, Fish, and Poultry—Start at 8 to 10 Months Old**

• Avoid fatty meats.

• Prepare by baking, broiling, steaming, or poaching.

• Include organ meats such as liver, which has a high iron, vitamin A, and vitamin B complex content.

• If soup is given, be certain all ingredients are familiar to child’s diet.

• Avoid commercial meat and vegetable combinations because their protein content is low.

**Eggs and Cheese—Start at 12 Months Old**

• Serve egg yolk hard boiled and mashed, soft cooked, or poached.

• Introduce egg white in small quantities (1 tsp.) toward the end of the first year to detect an allergy.

• Use cheese as a substitute for meat and as finger food.

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Breastfeeding or commercial formula feeding for up to 12 months old is recommended. After 1 year, whole cow’s milk can be given.

**Weaning**

Defined as the process of giving up one method of feeding for another, weaning usually refers to relinquishing the breast or bottle for a cup. In Western societies, this is generally regarded as a major task for infants and is often seen as a potentially traumatic experience. It is psychologically significant because infants are required to give up a major source of oral pleasure and gratification.

Other cultural groups define weaning in relation to significant life events (e.g., teething) or reaching a specific age. No one time for weaning is best for every child, but generally, most infants show signs of readiness during the second half of the first year. It is recommended that weaning occur with the infant’s needs as a guide (Lawrence and Lawrence, 2011). Their increasing desire for freedom of movement may lessen their desire to be held close for feedings. They are acquiring more control over their actions and can easily manipulate a cup to their lips (even if it is held upside down!). Imitation becomes a powerful motivator by 8 or 9 months old, and they enjoy using a cup or glass like others do.

Weaning should be gradual by replacing one bottle or breastfeeding session at a time. The nighttime feeding is usually the last feeding to be discontinued. It is advisable to never allow a child to take a bottle of milk to bed; this is a major cause of caries in deciduous teeth. If breastfeeding is terminated before 5 or 6 months old, weaning should be to a bottle (not in bed) to provide for the infant’s continued sucking needs. If discontinued later, weaning can be directly to a cup, especially by 12 to 14 months old. Any sweet liquid, such as fruit juice, should be given in a cup and should not be given at bedtime.

**Sleep and Activity**

Sleep patterns vary among infants, with active infants typically sleeping less than placid children. The total daily sleep for 2-month-old infants is approximately 15 hours (range 10 to 20 hours); whereas the total daily sleep for 6- to 12-month-old infants is approximately 13 hours (range 9 to 17
Consolidation of nocturnal sleep hours occurred during the first 12 months with decreasing daytime sleep and increasing nighttime sleep. Generally, by 12 months old, most infants have developed a nocturnal pattern of sleep that lasts at least 8 hours. The number of naps per day varies, but infants typically take two naps by the end of the first year. Breastfed infants usually sleep for shorter periods, especially during the night, compared with bottle-fed infants (Middlemiss, Yaure, and Huey, 2015). A discussion of sleep problems is found in Chapter 10.

Most infants are naturally active and need no encouragement to be mobile. Problems can arise when devices such as play yards, strollers, commercial swings, and mobile walkers are used excessively. These items restrict movement and prevent infants from exploring and developing gross motor skills.Contrary to popular belief, mobile walkers do not enhance coordination and are dangerous if tipped over or placed near the top of stairs, porches, in-ground pools, furnaces, and other hazardous surfaces.

Dental Health

Good dental hygiene begins with appropriate maternal dental health before and during the pregnancy and counseling during early infancy regarding dietary intake for the promotion of optimum oral hygiene. Counsel parents early regarding the risk of feeding practices that increase the risk of poor dental health. Some of these, as previously mentioned, include avoiding propping the milk bottle; giving the milk bottle in the bed; or giving fruit juices in a bottle, especially before 6 months old. These contribute to enamel erosion and early childhood caries (previously called baby bottle tooth decay).

When the primary teeth erupt, cleaning should begin. The teeth and gums are initially cleaned by wiping with a damp cloth; toothbrushing is too harsh for the tender gingiva. The caregiver can stabilize the infant by cradling the child with one arm and using the free hand to cleanse the teeth. Oral hygiene can be made pleasant by singing or talking to the infant. It is recommended that the infant have a brief oral health examination by 6 months old from a qualified pediatric health practitioner; infants at high risk for caries are identified and oral health counseling is implemented. It is also recommended that the infant have an established dental home by 1 year old (American Academy of Pediatric Dentistry, 2014). It is generally recommended that a small, soft-bristled toothbrush be used as more teeth erupt and the infant adjusts to the routine of cleaning. Water is preferred to toothpaste, which the infant will swallow (and if the toothpaste is fluoridated, the infant may ingest excessive amounts of fluoride). The American Academy of Pediatric Dentistry (2014) recommends a “smear” of toothpaste for children younger than 3 years old and a pea-size amount for those 3 to 6 years old.

Fluoride, an essential mineral for building caries-resistant teeth, is needed beginning at 6 months old if the infant does not receive water with adequate fluoride content. The American Academy of Pediatric Dentistry (2014) recommends the determination of fluoride administration be based on individual needs of each child. Systemic fluoride administration should be considered for all children at risk for dental caries who drink fluoride deficient water (<0.6 ppm) but only after determining all dietary sources of fluoride.

Dietary considerations are also important because habits begun during infancy tend to continue into later years. Avoid foods with concentrated sugar (sucrose) in the infant’s diet. Dietary considerations are also important because habits begun during infancy tend to continue into later years. Foods with concentrated sugar are used sparingly (if at all) in the infant’s diet. The practice of coating pacifiers with honey or using commercially available hard-candy pacifiers is discouraged. Besides being cariogenic, honey also may cause infant botulism, and parts of the candy pacifier can be aspirated (Box 9-1). Parents need to be counseled regarding the detrimental effects of frequent and prolonged bottle feeding or breastfeeding during sleep, when the sweet milk or other fluid (such as juice) bathes the teeth, producing early childhood caries. In addition, carbonated beverages should be avoided in infancy. (See Chapter 11 for a more extensive discussion of dental health, including early childhood caries.)

Box 9-1

Safety Promotion and Injury Prevention During Infancy
Birth to 4 Months Old

Major Developmental Accomplishments

Exhibits involuntary reflexes (e.g., crawling reflex may propel infant forward or backward; startle reflex may cause the body to jerk)

May roll over

Has increasing eye–hand coordination and voluntary grasp reflex

Injury Prevention

Aspiration

Aspiration is not as great a danger to this age group, but parents should begin practicing safeguarding early (see 4 to 7 Months Old later in this box).

Never shake baby powder directly on infant; place powder in hand and then on infant's skin; store container closed and out of the infant's reach.

Hold infant for feeding; do not prop bottle.

Know emergency procedures for choking.

Use pacifier with one-piece construction and loop handle.

Burns

Install smoke detectors in home.

Do not use microwave oven to warm formula; always check temperature of liquid before feeding.

Check bathwater.

Do not pour hot liquids when infant is close by, such as sitting on lap.

Beware of cigarette ashes that may fall on infant.

Do not leave infant in sun for more than a few minutes; keep exposed areas covered.

Wash flame-retardant clothes according to label directions.

Use cool-mist vaporizers.

Do not leave child in parked car.

Check surface heat of car restraint before placing child in seat.

Suffocation and Drowning

Keep all plastic bags stored out of infant's reach; discard large plastic garment bags after tying in a knot.

Do not cover mattress with plastic.

Use firm mattress and loose blankets with no pillows.

Make certain crib design follows federal regulations and mattress fits snugly—crib slats 2.375 inches (6 cm) apart.*

Position crib away from other furniture and away from radiators.
Do not tie pacifier on a string around infant's neck.

Remove bibs at bedtime.

Never leave infant alone in bath.

Do not leave infant younger than 12 months old alone on adult or youth mattress or beanbag-type seats.

**Motor Vehicles**

Transport infant in federally approved, rear-facing car seat, preferably in back seat.

Do not place infant on seat (of car) or in lap.

Do not place child in a carriage or stroller behind a parked car.

Do not place infant or child in front passenger seat with an air bag.

Do not leave infant unattended in car.

**Falls**

Use crib with fixed, raised rails.

Never leave infant alone on a raised, unguarded surface.

When in doubt as to where to place child, use floor.

Restrain child in infant seat, and never leave child unattended while the seat is resting on a raised surface.

Avoid using a high chair until child can sit well with support.

**Accidental Poisoning**

Poisoning is not as great a danger to this age group, but parents should begin practicing safeguards early (see 4 to 7 Months Old later in this box).

**Bodily Damage**

Keep sharp or jagged objects, such as knives and broken glass, out of child's reach.

Keep diaper pins closed and away from infant.

**4 to 7 Months Old**

**Major Developmental Accomplishments**

Rolls over

Sits momentarily

Grasps and manipulates small objects

Re-secures a dropped object

Has well-developed eye-hand coordination

Can focus on and locate small objects

Has prominent mouthing (oral fixation)
Can push up on hands and knees
Crawls backward

**Injury Prevention**

**Aspiration**
Keep buttons, beads, syringe caps, and other small objects out of infant's reach.
Keep floor free of any small objects.
Do not feed infant hard candy, nuts, food with pits or seeds, or whole or circular pieces of hot dog.
Exercise caution when giving teething biscuits because large chunks may be broken off and aspirated.
Do not feed infant while he or she is lying down.
Inspect toys for removable parts.
Keep baby powder, if used, out of reach.
Avoid storing cleaning fluid, paints, pesticides, and other toxic substances within infant's reach.
Know telephone number of local poison control center (800-222-1222) (usually listed in front of telephone directory).

**Suffocation**
Keep all latex balloons out of reach.
Remove all crib toys that are strung across crib or play yard when child begins to push up on hands or knees or is 5 months old.

**Burns**
Keep water faucets out of reach.
Place hot objects (cigarettes, candles, incense) on high surface out of child's reach.
Limit exposure to sun; apply sunscreen.

**Falls**
Restrain in a high chair.
Keep crib rails raised to full height.

**Motor Vehicles**
See Birth to 4 Months Old earlier in this box.

**Accidental Poisoning**
Make certain that paint for furniture or toys does not contain lead.
Place toxic substances on a high shelf or in locked cabinet.
Hang plants or place on high surface rather than on floor.
Know telephone number of local poison control center (800-222-1222) (usually listed in front of telephone directory).
**Bodily Damage**

Give toys that are smooth and rounded, preferably made of wood or plastic.

Avoid long, pointed objects as toys.

Avoid toys that are excessively loud.

Keep sharp objects out of infant’s reach.

**8 to 12 Months Old**

**Major Developmental Accomplishments**

Crawls or creeps

Stands holding on to furniture

Stands alone

Cruises around furniture

Walks

Climbs

Pulls on objects

Throws objects

Picks up small objects; has pincer grasp

Explores by putting objects in mouth

Dislikes being restrained

Explores away from parent

Increasingly understands simple commands and phrases

**Injury Prevention**

**Aspiration**

Keep small objects off floor, off furniture, and out of reach of children.

Take care when feeding solid table food to give very small pieces.

Do not use beanbag toys or allow child to play with dried beans.

See also 4 to 7 Months Old earlier in this box.

**Bodily Damage**

See 4 to 7 Months Old earlier in this box.

Avoid placing televisions or other large objects on top of furniture, which may be overturned when infant pulls self to standing position.

**Falls**

Avoid walkers, especially near stairs.*
Ensure that furniture is sturdy enough for child to pull self to standing position and cruise.

Fence stairways at top and bottom if child has access to either end.*

Dress infant in safe shoes and clothing (soles that do not “catch” on floor, tied shoelaces, pant legs that do not touch floor).

**Suffocation and Drowning**

Keep doors of ovens, dishwashers, refrigerators, coolers, and front-loading clothes washers and dryers closed at all times.

If storing an unused large appliance, such as a refrigerator, remove the door.

Supervise contact with inflated balloons; immediately discard popped balloons and keep uninflated balloons out of reach.

Fence swimming pools and other bodies of standing water, such as decorative fountains; lock gate to swimming pools so that only adult can access.

Always supervise when near any source of water, such as cleaning buckets, drainage areas, toilets.

Keep bathroom doors closed.

Eliminate unnecessary pools of water.

Keep one hand on child at all times when in tub.

**Accidental Poisoning**

Administer medications as a drug, not as a candy.

Do not administer medications unless prescribed by a practitioner.

Return medications and poisons to safe storage area immediately after use; replace caps properly if a child-protector cap is used.

Have poison control center number (800-222-1222) on telephone and refrigerator.

**Burns**

Place guards in front of or around any heating appliance, fireplace, or furnace.

Keep electrical wires hidden or out of reach.

Place plastic guards over electrical outlets; place furniture in front of outlets.

Keep hanging tablecloths out of reach (child may pull down hot liquids or heavy or sharp objects).  

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*Information on many items such as cribs or walkers is available from US Consumer Product Safety Commission, 800-638-2772; [http://www.cpsc.gov/](http://www.cpsc.gov/).

**Safety Promotion and Injury Prevention**

Injuries are a major cause of death during infancy, especially for children 6 to 12 months old. The three leading cause of accidental death injury in infants were suffocation, motor vehicle–related injuries, and drowning ([Centers for Disease Control and Prevention, 2012a](http://www.cdc.gov/)). During the years 2000 to 2009, unintentional infant suffocation death rates increased by 54% ([Centers for Disease Control and Prevention, 2012a](http://www.cdc.gov/)). For the years 2010 to 2011, unintentional injuries (accidents) were the leading cause of death in children 1 to 4 years old, whereas accidents were the fifth leading cause of
death in infants from birth to 12 months old (Hamilton, Hoyert, Martin, et al, 2013). Fall-related injuries were the most common cause of unintentional injuries resulting in emergency department visits among infants 0 to 12 months old with 59% of the emergency department visits attributed to this cause (Centers for Disease Control and Prevention, 2012b). In a study of infants treated for accidents, causes of injuries included beds, car seats, and stairs (Mack, Gilchrist, and Ballesteros, 2008). According to a recent Cochrane study, one third of all injuries occur in the home, yet there is insufficient evidence to demonstrate that modification of the home environment has an impact on the rate of injuries (Turner, Arthur, Lyons, et al, 2011). Constant vigilance, awareness, and supervision are essential as children gain increased locomotor and manipulative skills that are coupled with an insatiable curiosity about the environment. Box 9-1 lists the major developmental achievements of each period during infancy and the appropriate injury prevention plan. Table 9-2 lists common types of injuries and associated objects that predispose to such injuries. Suggestions for promoting safety in the home environment are given for specific types of injuries. The acronym SAFE PAD, described in Table 9-2, may be used to identify common types of injuries to infants and older children.

### Table 9-2

<table>
<thead>
<tr>
<th>SAFE PAD Acronym</th>
<th>Risk Factors</th>
<th>Suggested Safety Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAFE</strong></td>
<td>Latex balloons</td>
<td>Avoid latex balloons except with close adult supervision.</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>Smoke detectors</td>
<td>Install smoke detectors on each floor.</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Falls</td>
<td>Stairs — Infants like to climb. Place childproof gate at top and bottom of stairs.</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Burns</td>
<td>Electrical outlets — Place childproof covers over electrical outlets.</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Electrical burns or burns</td>
<td>Water — Infants may burn themselves when playing near water.</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>Physical injuries</td>
<td>Medications — Keep childproof bottles.</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Asphyxia, animal bites</td>
<td>Swimming pools, bird baths, decorative ponds of water, splash pads — Keep children away from these areas.</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Falls</td>
<td>Bed surface (non-infant) — Keep bed surfaces (non-infant) away from infant.</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td>Electrical burns or burns</td>
<td>Electrical outlets — Keep electrical outlets childproof.</td>
</tr>
<tr>
<td><strong>A</strong></td>
<td>Asphyxia, animal bites</td>
<td>Swimming pools, bird baths, decorative ponds of water, splash pads — Keep children away from these areas.</td>
</tr>
</tbody>
</table>

A number of parent education pamphlets (such as Crib Safety Tips and Is Your Used Crib Safe?) are available in English and Spanish from the US Consumer Product Safety Commission, 4330 East West Highway, Bethesda, MD 20814; 800-638-2772; http://www.cpsc.gov.
Motor Vehicle Injuries

A significant number of infants are injured or die from improper restraint within vehicles, most often from riding on the lap of another occupant. Desapriya, Joshi, Subwarzi, et al, (2008) found that falls accounted for a significant proportion of injuries (98%) in infants from birth to 4 months old as a result of inappropriate use of a car restraint system. Reports indicate that child restraint use decreases with increasing age of children and increasing number of occupants. Lack of proper child restraint continues to be a major factor in fatal accidents involving children. One observational report of newborns being placed in a car seat restraint by their family found a 52% incidence of newborn infants placed incorrectly in car seat restraints and a 48% incidence of errors in the placement of infant car seat restraints with 29% of the car seat restraints not attached to the vehicle (Rogers, Gallo, Saleheen, et al, 2012). All infants must be secured in federally-approved restraints rather than held or placed on the seat of the car. There is no safe alternative. Car seat restraints have an expiration date on the seat or in the owner’s manual, which indicates the date when it should be destroyed and a new model purchased. If the car seat is in a motor vehicle accident, it may need to be replaced.

Infant restraints are designed either as an infant-only model or as a convertible infant–toddler model. Either restraint is a semi-reclined seat that faces the rear of the car. A rear-facing car seat provides the best protection for the disproportionately heavy head and weak neck of an infant. This position minimizes the stress on the neck by spreading the forces of a frontal crash over the entire back, neck, and head; the spine is supported by the back of the car seat. If the seat were faced forward, the head would whip forward because of the force of the crash, creating enormous stress on the neck (Fig. 9-11). It is now recommended that all infants and toddlers ride in rear-facing car safety seats until they reach 2 years old or until they surpass the maximum height and weight recommended for the car seat (American Academy of Pediatrics, 2011).* Studies indicate that toddlers up to 24 months old are safer riding in car seats in the rear-facing position (Bull and Durbin, 2008; Truong, Hill, and Cole, 2013).

The restraint is anchored to the vehicle with the vehicle’s seat belt, and the restraint has a harness system for securing the infant. Some harness systems require a clip to keep the shoulder straps correctly positioned. Newer vehicles (manufactured after 1999) have tether straps that attach to anchors in the car seat to better secure the seat and minimize forward movement of the forward-facing convertible seats in the event of an accident. The LATCH (lower anchor and tether for children) system provides car seat anchors between the front cushion and backrest so that the seat belt does not have to be used. Some automobiles have tether straps for rear-facing infant-only seats as well (see Fig 12-11). Although many infant restraints can be recliners, they are used in the car only in the position specified by the manufacturer. In 2014, the National Highway Traffic Safety Administration changed the LATCH system rule, which now states if the combined weight of the child and the car seat is more than 65 pounds, parents will be instructed to use the shoulder-lap belt restraint to restrain the child in the car seat instead of relying on the LATCH system for maximum protection.
Severe injuries and deaths in children have occurred from air bags deploying on impact in the front passenger seat. The back seat is the safest area of the car for children. For restraints to be effective, they must be used properly. Dressing the infant in an outfit with sleeves and legs allows the harness to hold the child securely in the seat. A small blanket or towel rolled tightly can be placed on either side of the head to minimize movement and keep the infant’s hips against the back of the seat. Padding between the infant's legs and crotch is added to prevent slouching. Thick, soft padding is not placed under the infant or behind the back because during the impact, the padding will compress, leaving the harness straps loose. Preterm infants being discharged home from the hospital should be placed in appropriate car seat restraints as they would be placed in the car prior to discharge, and their heart rate and oxygen saturation should be monitored for 90 to 120 minutes to detect any potential problems with airway occlusion. (For further discussion of car seat restraints, see Chapter 11.)

**Nursing Alert**

Rear-facing infant safety seats must not be placed in the front seats of cars equipped with an air bag on the passenger side. If an infant safety seat is placed in the passenger seat with an air bag, the child could be seriously injured if the air bag is released because rear-facing infant seats extend closer to the dashboard.

**Nurse’s Role in Injury Prevention**

The task of injury prevention begins to be appreciated only when the potential environmental dangers to which infants are vulnerable are considered. Injury prevention and parent education should be handled on a growth and developmental basis. It is simply impossible to completely protect infants and small children from all potential dangers without placing them in a sterile, impractical environment. However, many childhood deaths continue to occur as a result of preventable injuries. Nurses must be aware of the possible causes of injury in each age group to provide anticipatory, preventive teaching. For example, the nurse should discuss guidelines for injury prevention during infancy (see Box 9-1) before the child reaches the susceptible age group. Preventive teaching ideally begins during pregnancy.

One third of all injuries to children occur in the home, and therefore the importance of safety cannot be overemphasized. The *Family-Centered Care* box summarizes a home safety checklist that can be presented to parents to increase their awareness of danger areas in the home and assist them in implementing safety devices and practices before their absence can inflict injury on infants. Hands-on displays (such as cabinet latches or toilet seat locks) can familiarize parents with inexpensive, commercial devices that can be used in the home to prevent injuries.

**Family-Centered Care**

**Child Safety Home Checklist**

**Safety: Fire, Electrical, Burns**

- Guards in front of or around any heating appliance, fireplace, or furnace (including floor furnace)*
- Electrical wires hidden or out of reach*
- No frayed or broken wires; no overloaded sockets
- Plastic guards or caps over electrical outlets; furniture in front of outlets*
- Hanging tablecloths out of reach away from open fires*
- Smoke detectors tested and operating properly
- Kitchen matches stored out of child’s reach*
• Large, deep ashtrays throughout house (if used)

• Small stoves, heaters, and other hot objects (cigarettes, candles, coffee pots, slow cookers) placed where they cannot be tipped over or reached by children

• Hot water heater set at 49° C (120° F) or lower

• Pot handles turned toward back of stove and the center of table

• No loose clothing worn near stove

• No cooking or eating hot foods or liquids with child standing nearby or sitting in lap

• All small appliances, such as iron, turned off, disconnected, and placed out of reach when not in use

• Cool, not hot, mist vaporizer used

• Fire extinguisher available on each floor and checked periodically

• Electrical fuse box and gas shutoff accessible

• Family escape plan in case of a fire practiced periodically; fire escape ladder available on upper-level floors

• Telephone number of fire or rescue squad and address of home with nearest cross street posted near phone

**Safety: Suffocation and Aspiration**

• Small objects stored out of reach*

• Toys inspected for small removable parts or long strings*

• Hanging crib toys and mobiles placed out of reach

• Plastic bags stored away from young child’s reach; large plastic garment bags discarded after tying in knots*

• Mattress or pillow not covered with plastic or in manner accessible to child*

• Crib design according to federal regulations (crib slats <2.375 inches [6 cm] apart) with snug-fitting mattress†

• Crib positioned away from other furniture or windows*

• Portable play yard sides up and locked at all times while in use*

• Accordion-style gates not used*

• Bathroom doors kept closed and toilet seats down*

• Faucets turned off firmly*

• Pool fenced with locked gate

• Proper safety equipment at poolside

• Electronic garage door openers stored safely and garage door adjusted to rise when door strikes object

• Doors of ovens, trunks, dishwashers, refrigerators, and front-loading clothes washers and dryers
kept closed*

• Unused appliance, such as a refrigerator, securely closed with lock or doors removed*

• Food served in small, non-cylindric pieces*

• Toy chests without lids or with lids that securely lock in open position*

• Buckets and wading pools kept empty when not in use*

• Clothesline above head level

• At least one member of household trained in basic life support (cardiopulmonary resuscitation [CPR]), including first aid for choking

Safety: Poisoning

• Toxic substances, including batteries, placed on a high shelf, preferably in locked cabinet

• Toxic plants hung or placed out of reach*

• Excess quantities of cleaning fluid, paints, pesticides, drugs, and other toxic substances not stored in home

• Used containers of poisonous substances discarded where child cannot obtain access

• Telephone number of local poison control center (800-222-1222) and home address with nearest cross street posted near phone

• Medicines clearly labeled in childproof containers and stored out of reach

• Household cleaners, disinfectants, and insecticides kept in their original containers separate from food and out of reach

• Smoking in areas away from children

Safety: Falls

• Nonskid mats, strips, or surfaces in tubs and showers

• Exits, halls, and passageways in rooms kept clear of toys, furniture, boxes, and other items that could be obstructive

• Stairs and halls well lighted with switches at both top and bottom

• Sturdy handrails for all steps and stairways

• Nothing stored on stairways

• Treads, risers, and carpeting in good repair

• Glass doors and walls marked with decals

• Safety glass used in doors, windows, and walls

• Gates on top and bottom of staircases and elevated areas, such as porch, fire escape*

• Guardrails on upstairs windows with locks that limit height of window opening and access to areas such as fire escape*

• Crib side rails raised to full height; mattress lowered as child grows*
• Restraints used in high chairs, walkers, or other baby furniture; preferably, walkers not used*

• Scatter rugs secured in place or used with nonskid backing

• Walks, patios, and driveways in good repair

Safety: Bodily Injury

• Knives, power tools, and unloaded firearms stored safely or placed in locked cabinet

• Garden tools returned to storage racks after use

• Pets properly restrained and immunized for rabies

• Swings, slides, and other outdoor play equipment kept in safe condition

• Yard free of broken glass, nail-studded boards, and other litter

• Cement birdbaths placed where young child cannot tip them over*

• Furniture anchored so child cannot pull down on top of self when climbing or pulling to stand

*Safety measures are specific for homes with young children. All safety measures should be implemented in homes where children reside and visit frequently, such as those of grandparents and babysitters.


Injury prevention requires protection of the child and education of the caregiver. Nurses in ambulatory care settings, health maintenance centers, and visiting nurse agencies are in a most favorable position for injury education. Although early postpartum discharge may be restrictive for parent teaching, this is an excellent opportunity to introduce the family to infant safety and safety for other children as well. One approach to teaching injury prevention is to relate why children in various age groups are prone to specific types of injuries. However, injury prevention must also be practical. For instance, parents are taught bathroom cleaning agents, cosmetics, and personal care items can be placed on a top shelf in the linen closet, and towels or sheets can be stored on the lower shelves and floor. In addition, parents should be encouraged to take an infant cardiopulmonary resuscitation (CPR) class to deal effectively with potential problems.

Parents need to remember that infants and young children cannot anticipate danger or understand when it is or is not present. When small children are in the home, dangerous objects must be removed or placed out of reach. Additionally, infants have no cognitive concept of cause and effect and therefore cannot relate meaning to experiences or potential dangers. A dead electrical wire may present no actual harm, but if the child is allowed to play with it, a poor behavior is enforced and will be practiced when the child encounters a live wire. Although it is always wise to explain why something is dangerous, it must be remembered that small children need to be physically removed from the situation.

It is not easy to teach safety, supervise closely, and refrain from saying “no” a hundred times a day. Parents become acutely aware of this dilemma as soon as their infants learn to crawl. When children are taught the meaning of “no,” they should also be taught what “yes” means. Children should be praised for playing with suitable toys, their efforts at behaving or listening should be reinforced, and innovative and creative recreational toys should be provided for them. Infants love to tear paper and avidly pursue books, magazines, or newspapers left on the floor. Instead of always scolding them for destroying a valued book, parents should provide child-safe books (e.g., those constructed of fabric) for them to play with. If they enjoy pots and pans, a cabinet can be arranged with safe utensils for them to explore.

One additional factor must be stressed concerning injury prevention and education. Children are imitators; they copy what they see and hear. Practicing safety teaches safety, which applies to parents and their children and to nurses and their clients. Saying one thing but doing another confuses children and can lead to difficulties as the child grows older.
Anticipatory Guidance—Care of Families

Childrearing is no easy task; it presents challenges to both new parents and seasoned parents. With society’s changing roles, combined with a highly mobile population, traditional role models and time-honored methods of raising children are declining. As a result, parents look to professionals for guidance. Nurses are in an advantageous position to render assistance and suggestions. Every phase of a child’s life has its particular traumas—toilet training for toddlers, unexplained fears for preschoolers, and identity crises for adolescents. For parents of infants, some challenges center around dependency, discipline, increased mobility, and safety. Major areas for parental guidance during the first year are listed in the Family-Centered Care box.

**Family-Centered Care**

**Guidance During Infant’s First Year**

**First 6 Months**

- Teach parents car safety with use of federally approved restraint, facing rearward, in the middle of the back seat—not in a seat with an air bag.
- Understand each parent’s adjustment to newborn, especially mother’s postpartum emotional needs.
- Teach care of infant and help parents understand his or her individual needs and temperament and that the infant expresses wants through crying.
- Reassure parents that infant cannot be spoiled by too much attention during the first 4 to 6 months.
- Encourage parents to establish a schedule that meets needs of child and themselves.
- Help parents understand infant’s need for stimulation in environment.
- Support parents’ pleasure in seeing child’s growing friendliness and social response, especially smiling.
- Plan anticipatory guidance for safety.
- Stress need for immunizations.
- Prepare for introduction of solid foods.

**Second 6 Months**

- Prepare parents for child’s “stranger anxiety.”
- Encourage parents to allow child to cling to them and avoid long separation from either parent.
- Guide parents concerning discipline because of infant’s increasing mobility.
- Encourage use of negative voice and eye contact rather than physical punishment as a means of discipline.
- Encourage showing most attention when infant is behaving well, rather than when infant is crying.
- Teach injury prevention because of child’s advancing motor skills and curiosity.
- Encourage parents to leave child with suitable caregiver to allow some free time.
• Discuss readiness for weaning.
• Explore parents’ feelings regarding infant’s sleep patterns.