



Al-Mustaqbal University / Nursing College  
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## Lecture 3 & 4

# Growth and Development of the Newborn and Infant

By

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# GROWTH AND DEVELOPMENT OF THE NEWBORN AND INFANT

- The newborn or neonatal period of infancy is defined as the period from birth until 28 days of age.
- Infancy is defined as the period from birth to 12 months of age.

## PHYSICAL GROWTH

Ongoing assessments of growth are important so that too-rapid or inadequate growth can be identified early.

With early identification, the cause can be diagnosed and the potential for further appropriate growth maximized.

Infants grow very rapidly over the first 12 months of life.

# WEIGHT

- The average newborn weighs (3,400 g) at birth. Newborns lose up to 10% of their body weight over the first 5 days of life. and regains his or her birthweight by 10 to 14 days of age.
- The average newborn then gains about 20 to 30 g per day
- Most infants **double** their birthweight by 4 to 6 months of age and **triple** their birthweight by the time they are 1 year old

# HEIGHT

- The average newborn is (48 to 53 cm) long at birth.
- During the first 6 months, length increases by (2.5 cm) per month,
- then by about a (1.25 cm) per month in the second 6 months

# HEAD AND CHEST CIRCUMFERENCE

- Average head circumference of the full-term newborn (33 to 35 cm).
- The head circumference increases rapidly during the first 6 months: the average increase is about (1.5 cm) per month.
- From 6 to 12 months of age, the head circumference increases an average of (0.5 cm) monthly.

# ORGAN SYSTEM MATURATION

- **The brain** undergoes tremendous growth during the first 2 years of life.
- By 6 months of age the infant's brain weighs half that of the adult brain.
- At age 12 months, the brain has grown considerably.

# THE RESPIRATORY SYSTEM

The respiratory system continues to mature over the first year of life. The respiratory rate slows from an average of 30 to 60 breaths in the newborn to about 20 to 30 in the 12-month-old.

The respiratory system does not reach adult levels of maturity until about 7 years of age.

The lack of immunoglobulin A (IgA) in the mucosal lining of the upper respiratory tract also contributes to the frequent infections that occur in infancy.



# CARDIOVASCULAR SYSTEM

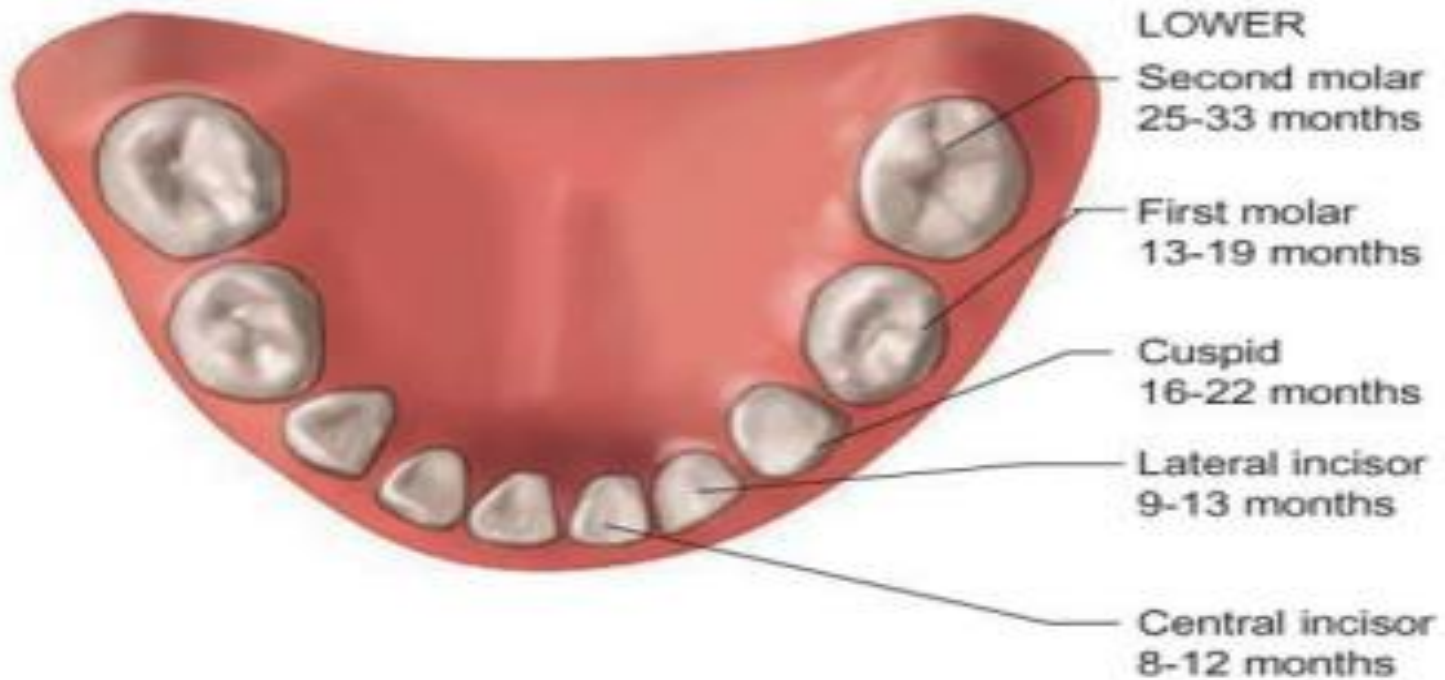
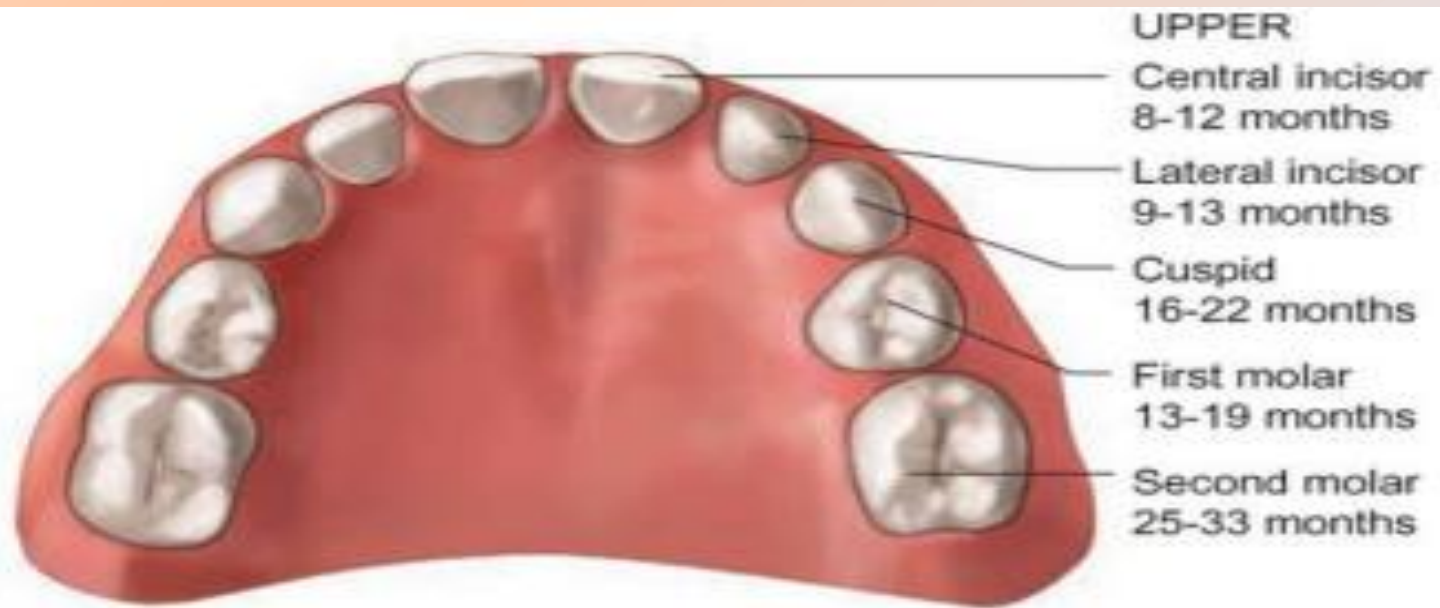
- The heart doubles in size over the first year of life. As the cardiovascular system matures,
- the average pulse rate decreases from 120 to 140 in the newborn to about 100 in the 1-year-old.
- Blood pressure steadily increases over the first 12 months of life, from an average of 60/40 in the newborn to 100/50 in the 12-month-old.

- Over the first year of life, thermoregulation (the body's ability to stabilize body temperature) becomes more effective: the peripheral capillaries constrict in response to a cold environment and dilate in response to heat.

# GASTROINTESTINAL SYSTEM

## Teeth

- On average, the first primary teeth begin to erupt between the ages of 6 and 8 months. The primary teeth (also termed deciduous teeth) are lost later in childhood and will be replaced by the permanent teeth.
- The lower central incisors are usually the first to appear, followed by the upper central incisors .
- The average 12-month-old has four to eight teeth.



- The stomach capacity is relatively small at birth. However, by 1 year of age the stomach can accommodate three full meals and several snacks per day.
- The liver is also immature at birth. The ability to conjugate bilirubin and secrete bile is present after about 2 weeks of age.

# Stools

- The newborn's first stools (meconium) are the result of digestion of amniotic fluid swallowed in utero. They are dark green to black and sticky
- Newborns may have as many as 8 to 10 stools per day or as few as one stool every day or two.
- After the newborn period, the number of stools may decrease

# GENITOURINARY SYSTEM

- In the infant, extracellular fluid (lymph, interstitial fluid, and blood plasma) accounts for about 35% of body weight and intracellular fluid accounts for 40%, Thus, the infant is more susceptible to dehydration.
- The renal structures are immature
- The glomeruli reach full maturity by 2 years of age.



# IMMUNOLOGIC SYSTEM

- Newborns receive large amounts of IgG through the placenta from their mothers. This confers immunity during the first 3 to 6 months of life for antigens to which the mother was previously exposed.



# INTEGUMENTARY SYSTEM

- At birth, the infant may be covered with **vernix** which protects the developing infant's skin.
- The newborn and young infant's skin is relatively thinner than that of the adult, with the peripheral capillaries being closer to the surface.

# PSYCHOSOCIAL DEVELOPMENT

- When the infant's needs are consistently met, the infant develops this sense of trust. But if the parent or caregiver is inconsistent in meeting the infant's needs in a timely manner, then the infant develops a sense of mistrust.

# MOTOR SKILL DEVELOPMENT

- The term “**gross motor skills**” refers to those that use the large muscles (e.g., head control, rolling, sitting, and walking).
- Gross motor skills develop in a cephalocaudal fashion (from the head to the tail)

Age	Gross Motor Skills
1 month	Lifts and turns head to side in prone position Rounded back in sitting
2 months	Raises head and chest, holds position Improving head control
3 months	Raises head to 45 degrees in prone
4 months	Lifts head and looks around Rolls from prone to supine
5 months	Rolls from supine to prone and back again
6 months	Tripod sits
7 months	Sits alone with some use of hands for support
8 months	Sits unsupported
9 months	Crawls, abdomen off floor
10 months	Pulls to stand Cruises
12 months	Sits from standing position Walks independently

# *Tripod Position*



# FINE MOTOR SKILLS

**Fine motor development** includes the maturation of hand and finger use.

Fine motor skills develop in a proximodistal fashion (from the center to the periphery)

Age	Fine Motor Skills
1 month	Fists mostly clenched Involuntary hand movements
3 months	Holds hand in front of face, hands open
4 months	Bats at objects
5 months	Grasps rattle
6 months	Releases object in hand to take another
7 months	Transfers object from one hand to the other
8 months	Gross pincer grasp (rakes)
9 months	Bangs objects together
10 months	████████████████████ Puts objects into container and takes them out
11 months	Offers objects to others and releases them
12 months	Feeds self with cup and spoon ████████████████████ ████████████████████



# SENSORY DEVELOPMENT

- **Sight** :The newborn is nearsighted, preferring to view objects at a distance of 8 to 15 inches.
- newborns show a preference for certain objects, particularly those with contrasts such as black-and-white stripes.
- At 1 month of age the infant can recognize by sight the people he or she knows best
- Full color vision develops by 7 months of age, as do distance vision.



- **Hearing** :
- The newborn's hearing is intact at birth and as acute as that of an adult.
  
- **Smell and Taste**
- The sense of smell develops rapidly
- 7-day-old infant can differentiate the smell of his or her mother's breast milk from that of another woman
- Newborns prefer sweet tastes to all others.

## Touch

- Most immature infant responds to soothing stroking.
- The infant dislikes rough handling and may cry.

# COMMUNICATION AND LANGUAGE DEVELOPMENT

- crying is the only means of communication for the newborn and infant.
- At 4 to 5 months of age, the infant makes simple vowel sounds, laughs aloud.
- 7 to 10 months, mamama, dadada without meaning.
- At 9 to 12 months of age the infant starts to imitate other speech sounds.
- 12-month-old uses two or three recognizable words with meaning,

# SOCIAL AND EMOTIONAL DEVELOPMENT

- The infant exhibits a first real smile at age 2 months.
- At 6 to 8 months of age the infant may enjoy socially interactive games such as peek-a-boo

'peek-a-boo'



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# PROMOTING GROWTH AND DEVELOPMENT THROUGH PLAY

- infant usually engages in solitary play does not share with other infants
- infants often enjoy the most basic ones, such as plastic containers of various shapes and sizes, soft balls, and wooden or plastic spoons.
- Books are also very important toys for infants. Reading to all ages of infants is appropriate,
- older infant develops fine motor skills by learning to turn book pages.

# PROMOTING SAFETY

Accidental injuries are a major cause of death during infancy; common causes include:

- **a) Falls:** off beds and down stairs
- **b) Aspiration:** of small objects
- **c) Poisoning:** from overdose of medications or ingestion of toxic household substances
- **d) Suffocation:** due to unintentional covering of the nose and mouth, pressure on the throat or chest, or prolonged lack of air such as in a closed parked car
- **e) Burns:** from hot liquids or foods, scalding bath water, excessive sun exposure, or electrical injury
- **f) Motor vehicle accidents:** most commonly linked to improper use or non-use of an infant car seat.



# PROMOTING NUTRITION

- Breastfeeding and bottle-feeding of infant formula are both acceptable means of nutrition in the newborn and infant. Breast milk or formula supplies all of the infant's daily nutritional requirements until 4 to 6 months of age, at which time solid foods may be introduced



# NUTRITIONAL NEEDS

Nutritional Requirements	Newborn	Infant
Fluid	140–160 mL/kg/day	100 mL/kg/day for first 10 kg 50 mL/kg/day for next 10 kg
Calories	105–108 kcal/kg/day	1 to 6 months: 108 kcal/kg 6 to 12 months: 98 kcal/kg

Adapted from Johns Hopkins Hospital, Custer, J. W., Rau, R. E., & Lee, C. K. (2008). *The Harriett Lane handbook* (18th ed.). St. Louis: Mosby.

## PROGRESSING TO SOLID FOODS

- After 4- 6 months of age, infants usually require the nutrients available in solid foods in addition to their breast milk or formula.
- The ability to swallow solid food does not become completely functional until 4 to 6 months of age.

- Before the introduction of solid foods and the cup, the infant should be able to sit supported in a high chair. Solids should be fed with a spoon.
- Iron-fortified rice cereal mixed with a small amount of breast milk or formula is a good choice for the first solid food.
- The cereal is easily digested and its taste is generally well accepted.

# PROMOTING HEALTHY SLEEP AND REST

- Newborns sleep about 20 hours a day, waking frequently to feed and quickly returning to sleep.
- By 3 months of age, most infants sleep 7 to 8 hours per night without waking.

- baby should sleep on a firm mattress without pillows. The baby's bed should be placed away from air conditioner vents, open windows, and open heaters.
- Sudden infant death syndrome (SIDS) has been associated with prone positioning of newborns and infants, so the infant should be placed to sleep on the back

# PROMOTING HEALTHY TEETH AND GUMS

- Before tooth eruption, parents should clean the child's gums after feeding with a damp washcloth.
- After teeth have erupted, parents can continue to use a soft cloth for tooth cleaning and then eventually use a small soft-bristled toothbrush.
- Toothpaste is unnecessary in infancy. Infants should not be allowed to take milk or juice bottles to bed, as the high sugar content of the fluid in contact with the teeth all night leads to dental caries



# HAVE A NICE DAY

