



Pediatrics TeamWork<sup>K</sup>  
437

# Normal Development & Behavior

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# Growth vs Development



## Growth

- Growth: Increase in size of body (or separate parts of it) or difference in proportion
- Growth is not linear; most rapid growth is during the first 2 years and then at puberty.
- Different tissues grow at different times; First 2 years; mostly the CNS

**Parameters of average growth:** Very important, have to memorise.

### Weight:

- gain of 20-30 g/day
- double (birth weight) by 4-5 months of age
- triple at 1 year, quadruple at 2 years



### Height: (average newborn height is 50cm)

- 50% in the first year
- At 2 years reaches 1/2 of adult height
- double by 3-4 years, triple by 13 years



## Development

- Change in function, including those influenced by the emotional and social environment.
- Development is influenced by genetic potential and the child environment.



*"States Parties recognize the right of the child to rest and leisure, to engage in play and recreational activities appropriate to the age of the child and to participate freely in cultural life and the arts."*

-UNICEF

## Brain Growth

- The brain is smooth at 28 weeks. (no sulci or gyri)
- Most of the growth of the brain is outside the uterus.
- The first 2 years of life, the brain increases to up to 80% of adult size (triple to four times).
- It grows by making sulci and gyri which are important to increase the capacity of the brain.
- The brain continues to grow, until by adulthood (18 years) it reaches its largest size.

## Brain Development ( The first 2 years )

- Number of neurons is fixed in the fetus.
- Growth is by making connections and synapses in which the neurons are myelinated.
- The brain has 2 hemispheres; each area of the brain is specialized in certain cognitive domain e.g. hearing, vision, thinking each one is in a special area.
- Thinking, judgment and cognition is in the frontal lobe. (frontal and prefrontal cortex)

# Child Development



**Child development**, the skills acquired by children between birth and about 5 years of age.

- **Fields of development include:**

Gross motor for mobility: (big muscles)



- the most obvious initial area e.g. rolling, sitting, crawling, walking....

Fine motor and Vision: (always mention together)



- Grouped together as vision is necessary for fine motor development, hand function e.g. holding toys, spoon, writing, coloring

You need to make sure his vision is ok before evaluating fine motor, if not fix it before evaluating

Social, emotional and behavioral:



- A spectrum of psychological development and self dependent skills. This is to interact

Just know this domain as "self dependent skills" or "daily living skills". Eg. dressing/undressing, drinking, showering/bathing, brushing teeth and washing face.

Hearing, speech and language:



- Normal speech and language development is dependent on good hearing skills to be able to communicate

- Speech is articulation and pronunciation and is a function of muscles.
- Language includes the ability to express, choose words and understanding (both expressive and receptive). Its a function of the CNS

- A deficiency in any one skill area can have an impact on other areas and may result in global developmental delay (domains depends on each other, so a delay in one domain could affect others) ex; A child 6 months old who isn't able to sit by himself yet independently, he won't be able to develop fine motor skills because he is using his hand to support him and not to fall down, you need to develop your ability to sit to explore fine movement
- **Language is the key to develop, if you have two domains affected one of them is language, fix language first!!**



**Knowledge of normal growth and development of children is important:**

- To help children achieve their maximum potential
- To recognize abnormal deviations from normal pattern so:

Refer for further diagnostic work up and management e.g. **impairments of hearing and vision must be recognized and treated early**

Act as an entry point for the care and management of children with special needs



**The four domains of development** are the most important part of the lecture and may come as an OSCE station. Know all the domains and 2 examples from each!!!

# Child Development



## Influences on development

- It is the result of an interaction of heredity (genetic) and the environment of the developing brain.
- The child's physical (e.g. food, shelter, vision, hearing, good health) and psychological (e.g. security, role models, opportunities to learn from play, affection, care, self respect and independence) needs must be met.
- Child's development can be significantly impaired if the environment fails to meet the child's needs. **Known as environmental deprivation**
- If the child has no interaction with human, he will have abnormal language development.
- NOTE that even if the genetic is poor if you put the child in rich environment it will have a big impact and the child will develop more than his genetic potential



You can [click here](#) to watch the impact of emotional neglect / deprivation on children. It is an interesting experiment (Do it after you finish studying!)

## Developmental assessment

### Normal development is monitored via:

- Parents (or close caregiver)
- Regular child health surveillance (eg. when child comes in for immunization)(Surveillance is not screening)
- Whenever a child is seen by a healthcare professional (brief opportunistic overview) (eg. sick in ER)

## Indications for developmental assessment:

- Part of routine immunization visit and routine examination of infant to diagnose treatable conditions e.g. deafness
- History of difficulties in pregnancy, labor or the newborn period
- Hypoxic symptoms: convulsions or meningitis early in life (first 2 years of life) might affect the growing brain and may lead to cerebral palsy (any NICU admission)
- Unusual behavior or physical feature (dysmorphic features) (eg. convulsions, abnormal involuntary movements, physical dysmorphic features)

## Developmental Screening:

- Be familiar with WIDE SPECTRUM of normal development (eg. can skip crawling and walk straight away and there is a age range for each milestone )
- History, physical and developmental examination
- Explore each domain of development separately (cover 2 areas of each domain)
- Specific developmental delay: Lag behind chronological age (age from date of birth) in one domain
- Developmental age : the ability to do the skills where does it fit in developmental age vs Chronological age : age since birth
- Global developmental delay: Lag behind chronological age in two or more domain



### In OSCE after asking about the domains ask:

- Difficulty in pregnancy, labor or newborn period?
- Any hypoxic ischemic insults in first 2 years of life? (Eg. cord around neck or NICU admission)

# Developmental Assessment



## 1. Developmental History:

<p><b>Prenatal (Pregnancy) risk factors</b></p>	<ul style="list-style-type: none"> <li>Maternal infections: Specific infections affect the mother and the fetus e.g. TORCH Infection: Toxoplasmosis, Rubella, CMV, Herpes virus ( will result in developmental delay , microcephaly, growth retardation , intellectual disability)</li> <li>History of any febrile illness or skin rash during pregnancy</li> <li>Antenatal screening test</li> <li>Antenatal U/S (oligohydramnios or polyhydramnios may indicate brain problem)</li> </ul>
<p><b>Perinatal factors (intrapartum)</b></p>	<ul style="list-style-type: none"> <li>Perinatal fetal distress, Hypoxic Ischemic insult (ask about how many hours the labor was , aspiration of meconium , or PROM , if PROM present for more 18 - 24 h , take seriously and make sure the child is not infected )</li> <li>APGAR score (the status of the fetus at birth)</li> </ul> <p>If the baby cries immediately, breathes spontaneously and able to swallow feeding within the first 24 hour, it is a good indication of no hypoxic ischemic insult.</p>
<p><b>Postnatal development</b></p> <p>Most importantly to ask about weeks of gestation and birth weight specifically</p>	<ul style="list-style-type: none"> <li>Duration of gestation and birth weight: (preterm is less than 36 weeks) Preterm babies have tendency to have periventricular hemorrhage, Small for gestational age; tend to have hypoglycemia.</li> <li>Sucking or swallowing difficulties (needed NG Tube?)</li> <li>Fever, lethargy, irritability, CNS infection</li> <li>Major illnesses: A congenital heart disease, Congenital liver or renal failure.</li> </ul>
<p><b>Emotional &amp; environmental deprivation</b></p>	<p>An environmental stimulation is very important for brain development</p>
<p><b>Family history</b></p>	<p>Similar problem or other developmental disabilities</p>



## Developmental patterns:

**Accelerated development**  
He is delayed but able to catch up

**Developmental regression**  
Loss of the previously acquired skills which might indicate neurodegenerative disorder. (Could be secondary to anything eg. medical problem, environmental factor, PTSD)

**Developmental delay:** Child is behind but will catch up eventually.

**Disability:** Child is significantly delayed that even if they improve they will still be behind their peers



- When determining the developmental age in OSCE always give a range (eg. 6-12 month) not an exact age (eg 9 months).
- Signs of hypoxic stress:
  - Deceleration on CTG
  - Change in colour of amniotic fluid (passed meconium)

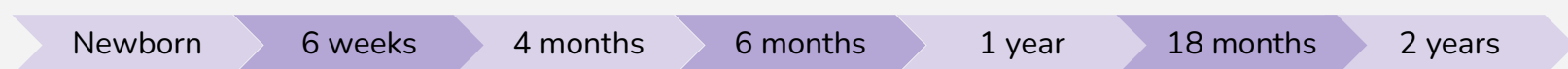
# Developmental Assessment



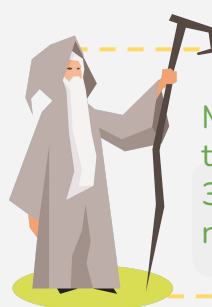
## Physical Examination

<p>Requirements of general P/E</p>	<ul style="list-style-type: none"> <li>○ Stethoscope for the heart and lungs</li> <li>○ Patellar hammer for jerks</li> <li>○ Non-stretch tape for skull circumference + head circumference chart (Plot reading in growth chart as may come in OSCE)</li> <li>○ Scales for weighing + weight and height chart</li> <li>○ Developmental assessment tools:             <ul style="list-style-type: none"> <li>■ To assess child's skills by play and facilitating observer assessment</li> <li>■ It allows a quick screening of mobility, hand skills, play, speech and language.</li> </ul> </li> <li>○ One-inch block or cubes</li> <li>○ Blunted end pencil or crayon and paper</li> <li>○ Picture card or book</li> <li>○ Bell for hearing assessment</li> <li>○ A ball, doll.</li> </ul>
<p>Abnormal appearance</p>	<ul style="list-style-type: none"> <li>○ Dysmorphic features</li> <li>○ Craniofacial and lip deformities</li> </ul>
<p>Cardiovascular</p>	<ul style="list-style-type: none"> <li>○ Congenital heart disease (Do not forget to check the lecture from our team!)</li> </ul>
<p>Skin</p>	<ul style="list-style-type: none"> <li>○ Hyperpigmentation</li> <li>○ Hypopigmentation</li> </ul> <p>Skin and CNS are related to each other, so do not forget to examine the child for any unusual skin lesion</p>
<p>Growth parameters</p>	<ul style="list-style-type: none"> <li>○ Head circumference, plotted on head circumference chart</li> <li>○ The most important is maximum head circumference, because the size of the brain is reflected by the size of the skull imp in osce and mcqs</li> </ul>
<p>Hip</p>	<ul style="list-style-type: none"> <li>○ Subluxation or dislocation of the hip leads to abnormal gait; wobbling gait, a treatable condition</li> </ul>

Developmental assessment is done at:



By 2 years most of the brain has grown



Measure head circumference at the widest diameter of the head 3 times, then take average of readings. (may come in OSCE)

# Developmental Domains



<p><b>newborn</b></p> <p>Limbs flexed, symmetrical posture</p>	<p><b>newborn</b></p> <p>Marked head lag on pulling up</p>	<p><b>6 weeks</b></p> <p>Follows moving object or face by turning the head (illustrated).</p>	<p><b>4 months</b></p> <p>Reaches out for toys</p>
<p><b>6-8 weeks</b></p> <p>Raises head to 45° in prone</p>	<p><b>6-8 months</b></p> <p>Sits without support - at 6 months: with round back (shown) - at 8 months: with straight back (shown)</p>	<p><b>4-6 months</b></p> <p>Palmar grasp</p>	<p><b>7 months</b></p> <p>Transfers toys from one hand to another</p>
<p><b>8-9 months</b></p> <p>Crawling</p>	<p><b>10 months</b></p> <p>Cruises around furniture</p>	<p><b>10 months</b></p> <p>Mature pincer grip</p>	<p><b>16-18 months</b></p> <p>Makes marks with a crayon</p>
<p><b>12 months</b></p> <p>Walks unsteadily, broad gait, hands apart</p>	<p><b>15 months</b></p> <p>Walks steadily</p>	<p><b>14 months-4 years</b></p> <p>Tower of three (18 months) Tower of six (2 years) Tower of eight or a train with four bricks (2 1/2 years) Bridge (from a model) 3 years Steps (after demonstration) 4 years</p>	<p><b>2-5 years</b></p> <p>Line (2 years) Circle (3 years) Cross (3 1/2 years) Square (4 years) Triangle (5 years)</p> <p>Ability to draw without seeing how it is done. Can copy (draw after seeing it done) 6 months earlier.</p>

<p><b>NEWBORN</b></p> <p>Startles to loud noises</p>	<p><b>3-4 MONTHS</b></p> <p>Vocalises alone or when spoken to, coos and laughs</p>	<p><b>6 WEEKS</b></p> <p>Smiles responsively</p>	<p><b>6-8 MONTHS</b></p> <p>Puts food in mouth</p>
<p><b>7 MONTHS</b></p> <p>Turns to soft sounds out of sight</p>	<p><b>7-10 MONTHS</b></p> <p>dada mama</p> <p>At 7 months, sounds used indiscriminately. At 10 months, sounds used discriminately to parents</p>	<p><b>10-12 MONTHS</b></p> <p>Waves bye-bye, plays peek-a-boo</p>	<p><b>12 MONTHS</b></p> <p>Drinks from a cup with two hands</p>
<p><b>12 MONTHS</b></p> <p>Dink</p> <p>Two to three words other than 'dada' or 'mama'</p>	<p><b>18 MONTHS</b></p> <p>Where is your nose?</p> <p>6-10 words. Shows two parts of the body</p>	<p><b>18 MONTHS</b></p> <p>Holds spoon and gets food safely to mouth</p>	<p><b>18-24 MONTHS</b></p> <p>Symbolic play</p>
<p><b>20-24 MONTHS</b></p> <p>Give me teddy</p> <p>Uses two or more words to make simple phrases</p>	<p><b>2 1/2-3 YEARS</b></p> <p>Push me fast daddy</p> <p>Talks constantly in 3-4 word sentences</p>	<p><b>2 YEARS</b></p> <p>Dry by day. Pulls off some clothing</p>	<p><b>2.5-3 YEARS</b></p> <p>Parallel play. Interactive play evolving. Takes turn</p>

## Dr's Notes

There is rapid progression of language after 18 months:

- 18 months → 6-10 words
- 24 months → 50 words (and 2 word sentences)

General easy to remember points regarding language:

- 2 years:
  - 2 word sentences
  - Follows 1-2 step commands
- 3 years
  - 3 word sentences
  - Follows 3 step commands



Highly recommended videos to understand primitive reflexes:

1.Video explaining reflexes [CLICK!](#)

2.Video demonstrating reflexes [CLICK!](#)

## Newborn

- On Prone position (**on tummy**): the pelvis is high, knees are under the abdomen. (**neutral flexed position. If extended may indicate to hypotonia**)
- On ventral suspension the head is not in the plane of the body (**don't do this baby may fall**)
- The hips are not extended
- If you extend the legs, they will come back. Why this position/posture? Intrauterine position
- He loses it after 6 weeks of birth.

## 6 weeks

MCQ: When does head control start? 6 weeks

- When prone, the pelvis is flat and the legs are stretched, briefly raises head (**for few seconds**).
- On ventral suspension, the head is held up momentarily in the same plane of the body
- Supine: there is a head lag when pulled into sitting position, still no head control on pulling to sitting position (**still not 100% head control, but minimal**)
- Vision: able to follow up to **90 degrees** with a moving objects. (**may come as MCQ**)
- Social: Smiling (6-8 weeks) a social smile; returning the smile when smiled at.
  - \* Newborns can smile but not socially (**random smile, not in response**)

## 4 months

Complete head control at 3-4 months

- **Gross Motor:**
  - In the sitting position there is no head lag on pulling to sitting position
- **Fine Motor:**
  - Reach out for gross objects and brings them to the mouth (**now has good trunk support so can use fine motor skills**)
- **Language:**
  - Turns head towards sounds (**not answering to name specifically**)
- **Adaptive:**
  - They laugh with sound
- Losing the primitive reflexes.
- They are replaced by postural reflexes, which is essential for independent sitting and walking.
- Continuation of primitive reflexes indicates a previous hypoxic ischemic encephalopathy (HIE)

Primitive reflexes: (**Doctor recommended you watch youtube videos of these reflexes to understand; see previous slide**)

- **Moro reflex:** Sudden extension of the head causes symmetrical extension then flexion of the arms, disappears by 4 months.
- **Grasp reflex:** Flexion of fingers when an object is placed in the palm
- **Rooting reflex:** Head turns to stimulus when touched near the mouth
- **Stepping response:** Stepping movements when held vertically and dorsum of feet touch a surface
- **Asymmetrical tonic neck reflex:** When lying supine and turn the head to one side, the infant adopts an outstretched arm to the side to which the head is turned.
- Absence may suggest CNS abnormality
- Persistence after **4-6 months** may indicate abnormality (cerebral palsy, HIE) (**may come as MCQ**)
- Asymmetry suggests focal motor lesions (e.g.brachial plexus injury)

## 6 months

- **Gross motor:**
  - Tripod sit, can't sit independently
    - \*Tripod sit: leaning on hands forward for support with their backs rounded
  - Rolls from prone to supine position (**4-6 months**)
- **Fine motor skills:**
  - Transfer one cube, object from one hand to another.
- **Language:** babbles
- Hearing test at 6-7 months: Put the infant in the mother's lap and distract him, then make a sound if turns his head toward the sound, it's positive (**not accurate, better to send for audiology screening**)
- Stranger Anxiety (**recognises unfamiliar people**)



## 9 - 10 months

- **Gross motor:**
  - Sits up independent with back straight
  - Pulls to standing position
  - Crawl
- **Fine Motor:** (9-12 months)
  - Index finger approach (mature pincer grip)
- **Early language:**
  - 1 word: Repetitive consensus sounds (mama and baba) with no meaning
  - made of a consonant and a vowel
  - Responds to “no” (has to learn it from environment first)
- **Socially:** (gestures)
  - Start to interact
  - Play peek-a-boo
  - Pat a table (bange the table to make sounds)
  - Wave bye bye
  - Reach to be picked up

## 12 months

- **Gross Motor:**
  - Walks on hands and feet like a bear
  - Pull himself to stand from sitting position
  - Walk with one hand held
  - Cruising → walks 2-3 steps around furniture
- **Language:**
  - Two to three words with meaning, no sentences yet.
  - Able to recognize the names of siblings or some objects
  - Follows 1-step command (first with pointing and gestures then without)
  - Uses facial expression, sounds and actions to make needs known
- **Social:**
  - Responds to own name (9-12 months)
  - separation anxiety
- **Adaptive:**
  - Releases objects or cubes to another person at request
  - Releases ball with throw

## 18 months

- **Gross Motor:**
  - Runs but stiffly
  - Walks up stairs with one hand held MCQ
  - Walks forward
- **Fine Motor:**
  - Stack 3 cubes over each other MCQ
  - Scribbling MCQ
  - Imitate vertical stroke only
- **Language:**
  - Names familiar pictures
  - Points to three body parts on request, either on self or on a teddy bear
  - Follows simple commands
- **Adaptive:**
  - Shows affection towards others
  - Starts to eat with spoon

## 24 months

- **Gross Motor:**
  - Runs well
  - Walks up and down the stairs, one step at a time
  - Kicks ball (important in osce )
- **Fine Motor: (depends on environmental exposure)**
  - Stacks a tower of 6 cubes imp
  - Draws vertical and circular stroke imp
  - Holds spoon very well
- **Language:**
  - 3 words phrases, subject, verb and object
  - Uses "I, me, you" (e.g. I want water)
  - Understand routine 2-step commands
- **Adaptive:**
  - Parallel play (playing alone but watching others play and copying them. Not engaging yet)
  - Helps to dress/undress
  - Listens to stories

## 36 months

- **Gross Motor:**
  - Rides tricycle
  - Stands on one foot briefly
- **Fine Motor:**
  - Copies a circle imp
  - Turns one page at a time
  - Puts on shoes
  - Dress/undress fully except for buttons
- **Language:**
  - 3 or more words into a sentence
  - Recognizes colors, plurals
  - Counts to 10 (counts and understands quantity)
- **Adaptive:**
  - Knows gender and age
  - Plays make-believe cooperative play

## 48 months

- **Gross Motor:**
  - Hops on one foot
- **Fine Motor:**
  - Uses scissors
  - Buttons clothes
- **Language:**
  - 100% intelligible! (good pronunciation)
  - Uses past tense
  - Understands 3-part directions
- **Adaptive:**
  - Fully toilet-trained by day differ from environment to another , but in development you need to detect red flags ex ; 2 years old not talking , no waiting , you have to do hearing and language.
  - Tries to comfort someone who is upset

# Final word!



## Developmental Evaluation

### Factors affect developmental evaluation:

- Prematurity: consider corrected age for developmental evaluation not chronological age.  
e.g. the anticipated developmental skills of a 12-month-old baby (chronological age) born 3 months early at 28 weeks gestation are more like those of a 9-month-old baby (corrected age).
- Familial factors:
  - Some kids talk earlier or later
  - Siblings with similar problems
- Spectrum of normal range
- Environmental Factors: lack of environmental stimulation, screen time
- Sensory Input: R/O vision and hearing pathology

## Dr's Notes

- The 4 domains of development are the most important part of this lecture
- The MCQs may include 2-4 questions from this lecture
- The OSCE station for this lecture will most likely include either head circumference or developmental evaluation
- No babies in OSCE
- If you ask the mother questions in the exam and she says no MOVE ON don't waste your time (won't bring complicated past history for undergrad) but make sure to ask the main questions.
- In OSCE most cases brought are 18, 24, 36 and 48 months.
- Doctor sent a PDF of a book chapter "From Birth to Five Years" which she recommended we read ([LINK](#))
- Always mention sleep and diet, dont miss it in clerking

## Book Notes

- All newborn infants must have their hearing screened
- Screening of visual acuity (VA) and squint occurs at school entry
- In the school years, the evidence of developmental progression is predominantly cognitive and the development of abstract thinking, although there is also further maturation of early developmental and social skills.
- Median age vs Red flag age:

Median age	Red flag age
It is the age when half of a population of children achieve that skill; it serves as a guide to when stages of development are likely to be reached but it doesn't tell us if the child's skills are outside the normal range	It is the age by which a developmental milestone should have been achieved. It is more useful than median age. Failure to meet a red flag age is a prompt for more detailed assessment to determine if investigation or intervention is required

# Book



- The percentage of children who take their first steps unsupported is:

25% by 11 months

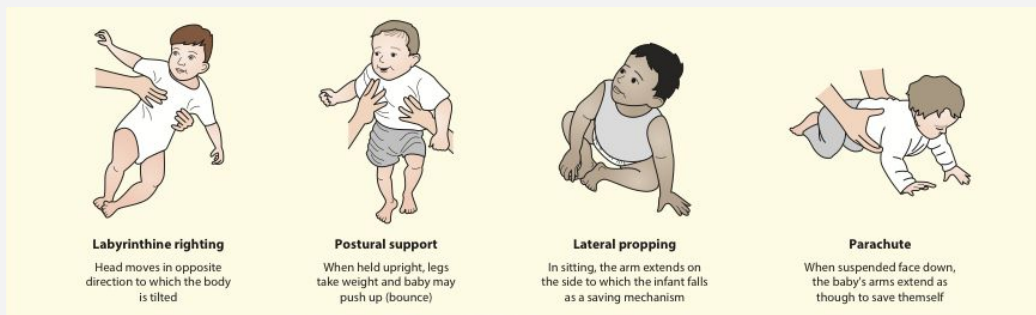
50% by 12 months

75% by 13 months

90% by 15 months

97.5% by 18 months

- Any child who is not walking by age of 18 months must be assessed and examined for an underlying cause.
- Postural reflexes appear at 4 to 12 months:



**Labyrinthine righting**  
Head moves in opposite direction to which the body is tilted

**Postural support**  
When held upright, legs take weight and baby may push up (bounce)

**Lateral propping**  
In sitting, the arm extends on the side to which the infant falls as a saving mechanism

**Parachute**  
When suspended face down, the baby's arms extend as though to save himself

- Normal development implies steady progress in all four developmental domains with acquisition of skills occurring before red flag ages are reached.

## Summary

### Development domains with red flag ages

Developmental Domain	Key Skills	Red Flag Ages												
Gross motor development	<ul style="list-style-type: none"> <li>Acquisition of tone and head control</li> <li>Primitive reflexes disappear</li> <li>Sitting</li> <li>Locomotor patterns</li> <li>Standing, walking, running</li> <li>Hopping, jumping, peddling</li> </ul>	<table border="1"> <thead> <tr> <th>Gross motor</th> <th>Red flag ages</th> </tr> </thead> <tbody> <tr> <td>Head control</td> <td>4 months, 9 months, 12 months, 18 months</td> </tr> <tr> <td>Sits unsupported</td> <td></td> </tr> <tr> <td>Stands with support</td> <td></td> </tr> <tr> <td>Walks independently</td> <td></td> </tr> </tbody> </table>	Gross motor	Red flag ages	Head control	4 months, 9 months, 12 months, 18 months	Sits unsupported		Stands with support		Walks independently			
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Vision and fine motor development	<ul style="list-style-type: none"> <li>Visual alertness, fixing and following</li> <li>Grasp reflex, hand regard</li> <li>Voluntary grasping, pincer, points</li> <li>Handles objects with both hands, transfers from hand to hand</li> <li>Writing, cutting, dressing</li> </ul>	<table border="1"> <thead> <tr> <th>Vision and fine motor</th> <th>Red flag ages</th> </tr> </thead> <tbody> <tr> <td>Fixes and follows visually</td> <td>3 months</td> </tr> <tr> <td>Reaches for objects</td> <td>6 months</td> </tr> <tr> <td>Transfers</td> <td>9 months</td> </tr> <tr> <td>Pincer grip</td> <td>12 months</td> </tr> </tbody> </table>	Vision and fine motor	Red flag ages	Fixes and follows visually	3 months	Reaches for objects	6 months	Transfers	9 months	Pincer grip	12 months		
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Hearing, speech and language development	<ul style="list-style-type: none"> <li>Sound recognition, vocalization</li> <li>Babbling</li> <li>Single words, understands simple requests</li> <li>Joining words, phrases</li> <li>Simple and complex conversation</li> </ul>	<table border="1"> <thead> <tr> <th>Hearing, speech and language</th> <th>Red flag ages</th> </tr> </thead> <tbody> <tr> <td>Polysyllabic babble</td> <td>7 months</td> </tr> <tr> <td>Consonant babble</td> <td>10 months</td> </tr> <tr> <td>Saying 6 words with meaning</td> <td>18 months</td> </tr> <tr> <td>Joins words</td> <td>2 years</td> </tr> <tr> <td>3-word sentences</td> <td>2.5 years</td> </tr> </tbody> </table>	Hearing, speech and language	Red flag ages	Polysyllabic babble	7 months	Consonant babble	10 months	Saying 6 words with meaning	18 months	Joins words	2 years	3-word sentences	2.5 years
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Social, emotional, behaviour development	<ul style="list-style-type: none"> <li>Smiling, socially responsive</li> <li>Separation anxiety</li> <li>Self-help skills, feeding, dressing, toileting</li> <li>Peer group relationships</li> <li>Symbolic play</li> <li>Social/communication behaviour</li> </ul>	<table border="1"> <thead> <tr> <th>Social behaviour</th> <th>Red flag ages</th> </tr> </thead> <tbody> <tr> <td>Smiles</td> <td>8 weeks</td> </tr> <tr> <td>Fear of strangers</td> <td>10 months</td> </tr> <tr> <td>Feeds self/spoon</td> <td>18 months</td> </tr> <tr> <td>Symbolic play</td> <td>2-2.5 years</td> </tr> <tr> <td>Interactive play</td> <td>3-3.5 years</td> </tr> </tbody> </table>	Social behaviour	Red flag ages	Smiles	8 weeks	Fear of strangers	10 months	Feeds self/spoon	18 months	Symbolic play	2-2.5 years	Interactive play	3-3.5 years
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Figure 3.9 Development domains with red flag ages.

## Summary

Table 3.1 Developmental milestones by median age

Age	Gross motor	Vision and fine motor	Hearing, speech, and language	Social, emotional, and behavioural
Newborn	Flexed posture	Follows face or light by 2 weeks	Startles to loud noise	Smiles by 6 weeks
7 months	Sits without support	Transfers objects from hand to hand	Turns to voice	Finger feeds
1 year	Walks independently	Pincer grip (10 mo)	Polysyllabic babble	Fears strangers
15-18 months	Walks independently and steadily	Points	2-3 words	Drinks from cup
2½ years	Runs and jumps	Immature grip of pencil	Understands name	Waves
		Random scribble	6-10 words	Feeds self with spoon
		Draws	Points to two body parts	Beginning to help with dressing
			3-word to 4-word sentences	Parallel play
			Understands two joined commands	Clean and dry

Table 3.2 Overview of Healthy Child Programme in UK provided by integrated local services (2021)

Age	0-2 years	2-10 years	10-19 years
<b>Screening</b>	Antenatal health promoting visit Newborn infant physical examination (NIPE) <72 hr old Newborn blood spot (biochemical) screening, day 5 Repeat NIPE (newborn infant physical examination) at 6-8 weeks	Preschool vision screening (and hearing in some areas) National Child Measurement Programme (4-5 years)	National Child Measurement Programme (10-11 years)
<b>Immunization</b>	See Childhood Immunization Schedule, Chapter 15	See Childhood Immunization Schedule, Chapter 15	See Childhood Immunization Schedule, Chapter 15
<b>Developmental screening reviews</b>	New baby review (by 14 days) 6-8 week check 7-10 month review	2 years (Ages and Stages Questionnaire) Preschool review	Health review at school entry and age 10-11 years (questionnaire)
<b>Health Promotion</b>	Feeding, weaning, safety at home and in cars, passive smoke, SIDS prevention and safe sleeping Personal child health record	Nutrition, obesity prevention, injury prevention, emotional health, psychological wellbeing	Encourage physical activity, emotional health, psychological wellbeing and mental health, reduction of risk-taking behaviour, sexual health

Note: SIDS, sudden infant death syndrome.

# Book



- At different ages, different developmental domains are dominant and this helps guide initial developmental questioning. Thus, for a child aged:

Less than 18 months	Gross motor abilities, acquisition of vision and hearing skills then hand skills
18 months to 2.5 years	Speech and language, fine motor skills with only brief questioning about gross motor skills
2.5 to 4 years	Speech and language, social, emotional and behavioral development

- Development screening, Ages and Stages Questionnaire (start at age of 4 months and ending at 60 months)
- IQ tests can be compromised by cerebral palsy
- By 25-26 weeks gestation, a fetus responds to noises and voice
- At birth, a baby startles to loud sounds
- There two tests for hearing: Automated otoacoustic emission (AOAE) and Automated Auditory Brain Response (AABR).
- AOAE must be offered before a baby leaves the hospital and if abnormal, we perform AABR
- **Risk factors for hearing loss:**

Family history of hereditary hearing loss
Genetic syndromes with hearing loss, e.g. Down syndrome
Craniofacial anomalies of ear (including cleft lip and palate)
<b>Admission to NICU (&gt;48 h). Why?</b> may have experienced mechanical ventilation, severe hyperbilirubinemia, ototoxic drugs, e.g. <b>gentamicin</b> , hypoxic-ischaemic encephalopathy, complications of prematurity. <i>Those babies should have both AOAE &amp; AABR!!!</i>
Congenital infection, e.g. CMV (cytomegalovirus), rubella.
Bacterial meningitis

**Hearing screening of newborn infants**

**(a) Automated otoacoustic emission (AOEA)**

Newborn infant having automated otoacoustic emission hearing test

**Advantages:**

- simple and quick to perform, though is affected by ambient noise
- used to screen all babies

**Disadvantages:**

- misses auditory neuropathy as function of auditory nerve or brain not tested
- relatively high false-positive rate in first 24 hours after birth as vernix or amniotic fluid are still in ear canal
- not a test of hearing but a test of cochlear function

**(b) Automated auditory brainstem response (AABR)**

Auditory stimulus via earphones

Signal via ear and auditory nerve to brain

Auditory brainstem waveforms - computerized analysis determines if normal or abnormal

**Advantages:**

- screens hearing pathway from ear to brainstem
- low false-positive rate
- used if no clear response to AOAE or was on NICU

**Disadvantages:**

- affected by movement, so infants need to be asleep or very quiet, so time consuming
- complex computerized equipment, but is mobile
- requires electrodes applied to infant's head, which parents may dislike

**Figure 3.10** Universal neonatal hearing screening is usually performed using (a) automated otoacoustic emission testing or (b) automated auditory brainstem response audiometry.

## When to refer to audiology?

- Abnormal AABR
- Having a risk factor for hearing loss (look above)
- If any parental or professional concern about hearing
- Speech and language delay
- After significant head injury or skull fracture particularly basal skull fracture
- Following bacterial meningitis (URGENT REFERRAL)
- Genetic syndrome associated with hearing loss
- Congenital infection, particularly congenital CMV

# Book



- Newborn visual acuity at birth is poor because fovea is immature and the optic nerve is unmyelinated. It improves to normal adult level by about 5 years of age
- By 6 weeks, babies may have transient squint

## Vision screening indications:

- Birth, for structure of eye and red reflex (cataract impede a red reflex)
- 6-8 weeks check red reflex for cataract; fixing and following
- Preschool vision screening by orthoptist: checks visual acuity and eye alignment

## Vision testing:

Age	Test
Birth	Aware of light Fixes on a face and begins to follow horizontally contrasting black and white patterned image or dangling coloured ball
6–8 weeks	Face fixation and follows objects to either side
6 months	Fixates on 2.5-cm brick Visually directed reach Responds to preferential looking tests of acuity (e.g. Keeler or Teller cards)
12 months	Fixates 1-mm objects e.g. 'hundreds-and-thousands' cake sprinkle
1–2 years	Preferential looking tests of acuity (e.g. Cardiff cards)
2–3 years	Names or matches pictures in linear array (e.g. Kay pictures or Lea symbols). Distant and near
3 years +	Names or matches letters (e.g. Sonksen logMAR, or logMAR crowded). Distant and near

*Note:* single letters/pictures should not be used as they overestimate acuity and will miss significant interocular differences (i.e. miss amblyopia). At all ages: observe the child's eyes. Is eye contact established? What is the child looking at? How does the child respond to what is apparently seen?

# MCQS



- In the exam they will bring milestone and they will ask you what is the appropriate age

**Q1: The Child who is able to walk upstairs with one hand , build a tower of 3 blocks and scribbling , his age :**

A - 15 months B - 18 months C - 24 months D - 36 months

Answer B

**Q2: you are seeing a child 9 months old in well baby clinic , she started to say spontaneously mama and dada , she is able to crawl , the most important statement you will share with the parents is :**

- A- She has a delay in the gross motor skill
- B- She has a delay in the language skill
- C- Her development is appropriate for her age
- D- She has a delay in the fine motor skill

Answer C

**Q3: The mom of 4 months old baby complain she never sleep at night because her baby Want her to rock her all night long even if she wakes up at night she continue to-ask the mom to rock-her ,what is the most common problem at this age group**

- A- Nightmare
- B- Primary sleep disorder
- C- Sleep onset association
- D- Early signs of ADHD

Answer C

**What is Object permanence ?**

Object permanence describes a child's ability to know that objects continue to exist even though they can no longer be seen or heard.

**Which age they developed it ?**

By age on 9 months



## APGAR SCORES EXPLAINED

Indicator	0 Points	1 Point	2 Points
<b>A</b> Appearance (skin color)	Blue; Pale	Pink Body; Blue Extremities	Pink
<b>P</b> Pulse	Absent	Below 100 bpm	Over 100 bpm
<b>G</b> Grimace (reflex irritability)	Floppy	Minimal Response to Stimulation	Prompt Response to Stimulation
<b>A</b> Activity (muscle tone)	Absent	Flexed Arms and Legs	Active
<b>R</b> Respiration	Absent	Slow and Irregular	Vigorous Cry



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## Screen Time and Young Children

The American Academy of Pediatrics recommendations for screen time use.

www.papromiseforchildren.com

<b>18</b> Months and younger	Avoid use of screen media other than video-chatting.
<b>18 to 24</b> Months	Parents who want to introduce digital media should choose high-quality programming and watch it with their children to help them understand what they're seeing.
<b>2-5</b> Years	Limit screen use to one hour per day of high-quality programs. Parents should co-view media with children to help them understand what they are seeing and apply it to the world around them.
<b>6+</b> Years	Place consistent limits on the time spent using media, and the types of media, and make sure media does not take the place of adequate sleep, physical activity and other behaviors essential to health.



Be the example. Children watch what happens around them to learn what they should or shouldn't do. Be aware of when you reach for your screen. Put down your screen and engage with your child.

Play and engage with your child. Engaging in play with your child helps them learn language skills, fine and large motor skills and more. These skills lay the foundation for ones they will need later in their interactions with friends, teachers, and eventually employers! You don't need fancy or expensive toys for your child to play. [When I Play, I Learn](#) has ways to use common items—like a box—in your child's play.

Help your child join every day activities. Every child can join in with activities, like preparing a meal, folding laundry, grocery shopping and more. [Every Day I Learn Through Play](#) (for infants and toddlers) and [Learning is Everywhere](#) (for children birth to kindergarten) has tips for ways to use every day activities as a way to help your young child learn.



Dr. Nouf mentioned screen time multiple times, it is good to know (: