

Stepping Stones of Development

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Definition: Development refers to spontaneous acquisition of increasingly effective pattern of activities and behaviors on the part of the growing child that cannot be measured but can be assessed.

Principles of development: Always craniocaudal as well as proximal to distal directions.

Holistic development: The complete development of the child encompassing both growth and mental development is termed as 'holistic development'.

Primitive reflexes: The reflexes that are present at birth usually disappear by 8-12 weeks (2-3 months)

Early childhood development: The period from conception to age 5 years is the key to subsequent growth, development and ultimate productivity. The development process that a child goes through during this period is termed as 'early childhood development'.

Intelligence: It is the ability of a person to cope in the new situation from past experience.

Cognition: It is the awareness of object of thought or perception that includes all aspect of perceiving, thinking, remembering and adaptation to a changing situation.

Knowledge: Means learning by reading

Skill: Means learning by doing

Attitude: Means style of application of knowledge and skill

Amentia/ Mental retardation: It is defined as failure of development of mind.

Dementia: It is defined as disintegration of fully developed mind.

Quotient means number acquired by division

IQ (Intelligence Quotient): $\text{Mental age} / \text{Chronological age} \times 100$ (IQ score; 99 correspond to median that is in 50th centile, 70 correspond to in 3rd centile, and 129 correspond to 97th centile, 1 SD equal to score 15)

DQ (Developmental Quotient): $\text{developmental age} / \text{Chronological age} \times 100$, Such as $\text{Motor age} / \text{Chronological age} \times 100$; if score >85 means normal (domain is considered normal), score 70-85 gray area border line require close follow up and score < 70 indicate abnormal.

Mental Retardation is a condition characterized by limitation in performance that result from significant impairment in measured intelligence and adaptive behavior.

Diagnosis by 1) IQ- <70

2) 2 or more adaptive skill deficit (adaptive skills are communication, self care, home living, social skill, community use, self direction, healthy and safety ness, functional academic, leisure and work)

Primitive Reflexes:

Sl No	Reflexes	To elicit	Appear	Disappear
1	Moro	Sudden movement of neck	At birth (28wks)	3 months (upto 6 months)
2	Palmer grasp (1 st reflex onset, utero)	Placing a finger or object in open hands	At birth (28wks)	2-3 months
3	Planter grasp	Placing a finger or object in soles near the toes	At birth	2-3 months
4	Rooting (snout)	Touch the corner of the mouth	At birth	less prominent after 1 month
5	Walking	Sole of the feet pressed against the coach	At birth	2 month
6	Placing (stepping)	Leg below the knee or arm below the elbow contact with edge of the table, child will lift the limbs over the edge	At birth	6 weeks
7	Tonic neck: Asymmetric	When the baby at rest supine, turn the head one site; extension of arm on the facing site and flexion of arm other site	1 month fully developed	3 months
	Tonic neck: Symmetric	When the head in extension then both arm become extended and on flexion of the head then both arm become flexed	At birth	3 months
8	Startle	Similar to Moro reflex- initiated by sudden noise, here elbow are flexed and hand remain closed	At birth	3 month
9	Landau	On ventral suspension, when head spine and legs extend if head is flexed then hip, knee, elbow are flexed	3 months	1 year
10	Parachute	On ventral suspension over the coach suddenly lower down then arm as defensive reaction		Throughout life
11	Tendon	Different jerk	9 months	Throughout life
12	Planter response	Flexor in normal newborn	At birth	
13	Neck righting	Rotate the head at one site- body will also rotate that site		24 months
14	Crossed adductor (adductor spread of knee jerk)	Contraction of both hip adduction when one knee jerk is elicited	4-6 month	7 months
15	Galant reflex	Pressing and move the finger through Para vertebral area leads to curving of vertebra that side	At birth	Life
16	Perez reflex	Pressing and moving the finger over the spine leads to extension of the spine	At birth	Life
17	Doll's eye phenomenon	To see the movement the eye even in preterm baby	At birth	

Domains of development

Gross motor skills:

- Head up in prone- 1 mo
- Head lag partial- 2 mo
- Neck control- 3 mo
- Sit with support - 5 mo
- Sits, props on hand- 6 mo
- Rolls front to back- 6 mo
(Prone to supine)
- Sits unsupported- 7 mo
- Commando crawls- 7 mo
- Rolls back to front- 7 mo
(Supine to prone)
- Creeps on hands and knees- 8 mo
- Can stand on holding furniture- 9 mo
- Cruises around furniture- 10 mo
- Walks with two hands held- 10 mo
- Stand alone and walk with one hand held- 11 mo
- Independent step- 12 mo
- Walks a few steps- 13 mo
- Walks well independently- 14 mo
- Can get into standing position from sitting- 15 mo
- Broad base gait- 15 mo
- Creeps up stair- 16 mo
- Running- 18 mo
- Throws ball with out falling- 18 mo
- Walk up stairs two feet per step with assistant- 21 mo
- Goes up and down stairs alone two feet per step- 24 mo
- Jumps on both feet- 2½ years
- Kicks on a large ball- 2½ years
- Goes up stairs one foot per step- 3 years
- Can goes down stair two feet per step- 3 years
- Ride tricycle- 3 years
- Can stand on one leg- 3 years
- Goes up and down stair one foot per step- 4 years
(Alternating steps)
- Can run on toes: skips on alternate feet- 5years



Fine motor skills (Manipulation):

- Hand tightly fist (strong grasp reflex)- 1 month
- Hand unfisted mostly (grasp reflex slight or absent)- 2 months
- Hand unfisted (grasp reflex absent)- 3 months
- Ulnar approach to grasp large object- - 3 months
- Hand regards- 3 months
- Transfer object from hand to mouth-5 months
- Palmer approach to grasp large object- 5 months
- Transfer large object from hand to hand- 6 months
- Radial palmer approach to hold large object- 7 months
- Radial-digital grasp of large object (Cube)-8/9 months
- Pincer grasp by pulp of the finger, index and thumb- 9 months
- Poking of index finger- 10 months
- Fine pincer grasp by tip of the finger- 12 months
- Release object in examiner hand- 12 months
- Precise release- 15 months
- Attempt to make tower of 2 cubes-12 months
- Tower of two cubes- 14 months
- Precise release and putting object in & out of container- 15 months
- Use cup-15 months
- Imitate scribble- 15 months
- Tower of 3 cubes- 16 months
- Tower of 4 cubes- 18 months
- Turn 3 or 4 pages at a time-18 months
- Can use cup and spoon with some spilling- 18 months
- Tower of 6 cubes- 22 months
- Imitate* vertical stroke- 2 years
- Cylindrical holding by palm of pen or pencil- 2 years
- Turn book page singly- 2 years
- Spoon feeding with out spilling-2 years
- Tripod holding of pencil- 3 years
- Can eat with fork and spoon- 3 years
- Adult way tripod holding of pencil- 4 years
- Can dress and undress- 4 years
- Can tie shoe laces- 5 years

*Imitate: Means child can perform by seeing the examiner doing it in front of the child.

Cognitive skills (Adaptive):

In 1929, the Swiss psychologist, Piaget elaborated the most comprehensive theory about cognitive development. Cognitive development is the result of interaction between the individual and the environment. Piaget described two ways schemas and operational ways of development and four phases of development: sensorimotor (0-2 years), preoperational (2-7 years), concrete operational (7-12 years), and formal operational 12 years and onward). Cognitive development is involved in five senses and with increasing age, not only quantity rather quality of each item of development improved.

- Turn eyes toward human voice- 1 week
- Recognize mother, smile at mother-1 month
- Recognize parent voice- 4 months
- Hidden toy could not search- 6 months
- Hidden toy will search- 9 months (Object permanence- object will not be lost even it may be invisible)
- Respond to own name- 9 months
- Understand cause and effect - 15 months
(blow into whistle and it produces sound)
- Follow two steps request- 2 years
(bring the ball & give it to me)
- Knows own name- 3 years
- Can count upto 10 – 3 years
- Copy 3 bricks bridge- 3 years
- Copy horizontal line————— and circle  - 3 years
- Copy '+' plus- 3½ years
- Copy cross 'X'- 4 years
- Can draw man with head leg and trunk- 4 years
- Can give name, age and address- 4 years
- Copy square  - 5 years

- Can name common coins- 5 years
- Can draw recognizable man- 5 years
- Copy triangle- 'Δ'- 6 years
- Copy diamond '◇'- 7 years

*Copy: Means child can perform by seeing the previously done things not drawn in front of the child.

*Imitate: Means child can perform by seeing the examiner doing it in front of the child.

Language and communication skills (hearing, speech and vision):

- Can follow dangling toy or human face $< 90^\circ$ in supine posture- 1 month
- Eyes fixation- 2 months
- Fix and follow 180° - 3 months
- Babbling and coos- 4 months
- Only horizontal localization of sound- 5 months
- Horizontal and turn upward toward sound- 7 months
(Angular vision)
- Direct single vision toward sound- 9-10 months
(Diagonal vision)
- Says 'Da' 'Ba' 'Ka'- 6 months
- Combine syllable- Dada, Baba- 7 months
- Dada, mama appropriately- 10 months
- Meaningful word:
 - 1 word- 11 months
 - 2 words- 12 months
 - 3 words- 13 months
 - 4 words- 15 months
 - 5-10 words- 16 months
- Join two words- 22 months (noun and noun)
- Use 2-3 word sentence-24 months (noun and verb)
- Echolalia- 2 years
- 4-5 words sentence- 3 years
- Constantly asking question- 3 years
- Use proper sentence- and describe recent expression- 4 years
- May know letter used alphabet, read simple word- 5 years
- Describe people in details- 5 years

Psychosocial skills (emotional and social)/ autonomy:

- Social smile- 4 weeks
- Cries on hunger- 2 weeks
- Shows anger when some one tries to take away his toes- 4 months
- Laugh when head is hidden in towel in Peep-boo game- 6 months
- Preference for given person- 8 months
- Stranger anxiety- 9 months
- Separation anxiety- 9 months
- Wave bye-bye- 9-10 months
- Play pats a cake (clapping hands)- 10 months
- May kiss on request- 12 months
- Seek constant attention- 13 months
- Point 2-3 parts of the body - 18 months
- Kiss with puckers- 18 months
- Bowel control- 18 months
- Imitate mothers works at home- 24 months
- Tolerate separation- 24 months
- Dry by day - 2 years
- Give name- 2½ years
- Dry by night- 3 years
- Express sadness and happiness on facial expression-3 years
- Play with peers- 4 years
- Cooperate more with friends and accept rules of games- 5 years
- Can name colours- 5 years

How to assess stepping stones of development?

Steps of assessment:

1. History from parent
2. Observation
3. Fix and follow, hearing and speech assessment
4. Manipulation skills assessment
5. Motor domain assessment

Scoring system for diagnosis Paediatric Tuberculosis

<u>Features</u>	<u>0</u>	<u>1</u>	<u>3</u>
1. Duration of illness	<2 weeks	2-4 weeks	>4weeks
2. Nutritional status	>80%	60-80%	<60%
3. Family h/o Tb	None	Family h/o Tb	Proved sputum +ve

Score for other features if present

<u>Features</u>	<u>Score</u>
1. Positive MT	3
2. Large painless lymph node	3
3. Unexplained fever, night sweating, no response to malarial treatment	2
4. Malnutrition, not improving after 4 wks	3
5. Angle deformity of the spine	4
6. Joint swelling, bone swelling or sinus	3
7. Unexplained abdominal mass or ascitis	3
8. CNS changes in temperament, fit or coma	3

Interpretation: If total score is ≥ 7 , treat the case as Tb

