

# Clinical Application of Growth pattern

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- Growth is a dynamic process with a stable pattern of changes resulting in the increase in physical size and mass during its course of development.

- Thus, growth is a three-fold process:
  - SELF-MULTIPLICATION,
  - DIFFERENTIATION,
  - ORGANIZATION
- each according to it's own kind.
- A fourth dimension is TIME.

- Development is progress towards maturity.
- Development refers to all the naturally occurring unidirectional changes in the life of an individual from its existence as a single cell to its elaboration as a multifunctional unit terminating in death.
- Thus, it encompasses the normal sequential events between fertilization and death

- The first important feature of growth corresponds to Pattern it reflects proportionality.
- The physical arrangement of the body at any one time is a pattern of spatially proportional parts.
- There is higher level pattern of growth which refers to changes in these spatial proportions over time

## NORMAL GROWTH PATTERN

- Not all tissue systems of the body grow at the same rate.
- Muscular and skeletal elements grow faster than the brain and CNS.
- PREDICTABILITY: The proportional relationships can be specified mathematically and the difference between a growth pattern is the addition of a time dimension.
- VARIABILITY : Variability in growth and development can be expressed quantitatively to categorize people as normal or abnormal. It is usually assessed with peer group of children.

# TIMING

- Its final major concept in physical growth & development
- Variation in timing arises because the same event happens for different individuals at different TIME
- The biologic clocks of different individuals are set differently.

# Cephalo-caudal Gradient of Growth

- This simply means increase in growth from head to feet.
- Foetal head size - 50% of total body length.  
Head & face size - 30% Adult head size



## RHYTHM AND GROWTH SPURTS

- The rate of growth is most rapid at beginning of cellular differentiation which increases until birth and decreases thereafter.
- Post-natally growth does not occur in a steady manner.
- There are periods of sudden rapid increases which are termed as growth spurts

# Three types of growth spurts

- 1. Infantile / childhood growth spurt Female 3 years Male 3 years
- 2. Mixed dentition /Juvenile growth 6-7 years spurt 7-9 years
- 3. Prepubertal / adolescent growth spurt 14-15 years 11-12 years

# Developmental milestones

Age	Motor	Speech	Vision and hearing	Social
1–1.5 months	When held upright, holds head erect and steady.	Cooes and babbles at parents and people they know	Focuses on parents.	<ul style="list-style-type: none"> <li>•Loves looking at new faces</li> <li>•Starts to smile at parents</li> <li>•Startled by sudden noises</li> </ul>
1.6–2 months	When prone, lifts self by arms; rolls from side to back.	<ul style="list-style-type: none"> <li>•Vocalizes</li> <li>•Cooes (makes vowel-like noises) or babbles.</li> </ul>	Focuses on objects as well as adults	<ul style="list-style-type: none"> <li>•Loves looking at new faces</li> <li>•Smiles at parent</li> <li>•Starting to smile</li> </ul>

# Developmental milestones

Age	Motor	Speech	Vision and hearing	Social
2.1–2.5 months	<ul style="list-style-type: none"><li>•Rolls from tummy to side</li><li>•Rests on elbows, lifts head 90 degrees</li><li>•Sits propped up with hands, head steady for short time</li></ul>	<ul style="list-style-type: none"><li>•Changes sounds while verbalizing, "eee-ahhh"</li><li>•Verbalizes to engage someone in interaction</li><li>•Blows bubbles, plays with tongue</li><li>•Deep belly laughs</li></ul>	<ul style="list-style-type: none"><li>•Hand regard: following the hand with the eyes</li><li>•Color vision adult-like.</li></ul>	<p>Serves to practice emerging visual skills. Also observed in blind children.</p>

# Developmental milestones

Age	Motor	Speech	Vision and hearing	Social
3 months	<ul style="list-style-type: none"><li>•Prone: head held up for prolonged periods</li><li>•No grasp reflex</li></ul>	Makes vowel noises	<ul style="list-style-type: none"><li>•Follows dangling toy from side to side</li><li>•Turns head around to sound. Follows adults' gaze (joint attention)</li><li>•Sensitivity to binocular cues emerges.</li></ul>	<ul style="list-style-type: none"><li>•Squeals with delight appropriately</li><li>•Discriminates smile. Smiles often</li><li>•Laughs at simple things.</li><li>•Reaches out for objects.</li></ul>

# Developmental milestones

Age	Motor	Speech	Vision and hearing	Social
5 months	<ul style="list-style-type: none"><li>•Holds head steady</li><li>•Goes for objects and gets them</li><li>•Objects taken to mouth</li></ul>	Enjoys vocal play	<ul style="list-style-type: none"><li>•Able to reach hanging objects and grab them</li><li>•Noticing colors</li></ul>	<ul style="list-style-type: none"><li>•Adjusts hand shape to shape of toy before picking up</li></ul>

# Developmental milestones

Age	Motor	Speech	Vision and hearing	Social
6 months	<ul style="list-style-type: none"> <li>•Transfers objects from one hand to the other</li> <li>•Pulls self up to sit and sits erect with supports</li> <li>•Rolls over from tummy to back</li> <li>•Palmar grasp of cube hand to hand eye coordination</li> </ul>	<ul style="list-style-type: none"> <li>•Double syllable sounds such as 'mumum' and 'dada'</li> <li>•Babbles (consonant-vowel combinations)</li> </ul>	<ul style="list-style-type: none"> <li>•Localises sound 45 cm (18 in) lateral to either ear</li> <li>•Visual acuity adult-like (20/20)</li> <li>•Sensitivity to pictorial depth cues (those used by artists to indicate depth) emerges</li> </ul>	<p>May show stranger anxiety</p>

# Developmental milestones

Age	Motor	Speech	Vision and hearing	Social
9–10 months	<ul style="list-style-type: none"><li>•Wiggles and crawls</li><li>•Sits unsupported</li><li>•Picks up objects with pincer grasp</li></ul>	Babbles tunefully	Looks for toys dropped	Apprehensive about strangers
1 year	<ul style="list-style-type: none"><li>•Stands holding furniture</li><li>•Stands alone for a second or two, then collapses with a bump</li></ul>	Babbles 2 or 3 words repeatedly	Drops toys, and watches where they go	<ul style="list-style-type: none"><li>•Cooperates with dressing</li><li>•Waves goodbye</li><li>•Understands simple commands</li></ul>



Age	Motor	Speech	Vision and hearing	Social
18 months	<ul style="list-style-type: none"> <li>•Can walk alone</li> <li>•Picks up toy without falling over</li> <li>•Gets up/down stairs holding onto rail</li> <li>•Begins to jump with both feet</li> <li>•Can build a tower of 3 or 4 cubes and throw a ball</li> <li>•Supinate grasping position usually seen as first grasping position utilized.</li> </ul>	<p>'Jargon': (slang) Many intelligible words</p>	<p>Be able to recognise their favourite songs, and will try to join in.</p>	<ul style="list-style-type: none"> <li>•Demands constant mothering</li> <li>•Drinks from a cup with both hands</li> <li>•Feeds self with a spoon</li> </ul>

Age	Motor	Speech	Vision and hearing	Social
2 years	<ul style="list-style-type: none"> <li>•Able to run</li> <li>•Walks up and down stairs using two footsteps per stair step</li> <li>•Builds tower of 6 cubes</li> </ul>	<ul style="list-style-type: none"> <li>•Joins 2–3 words in sentences</li> <li>•Able to repeat words that they hear.</li> <li>•Gradually build their vocabulary.</li> </ul>	<ul style="list-style-type: none"> <li>•Able to recognize words</li> </ul>	<ul style="list-style-type: none"> <li>•Parallel play</li> <li>•Daytime bladder control</li> </ul>

- **Holistic development** sees the child in the as a whole person - physically, emotionally, intellectually, socially, morally, culturally and spiritually.
- Learning about child development involves studying patterns of growth and development, from which guidelines for 'normal' development are interpreted.
- One way to identify pervasive developmental disorders is if infants fail to meet the development milestones in time or at all.