

Development History

Growth is quantitative and development is qualitative changes in the body.

RULES/LAWS OF DEVELOPMENT

- Continuous process
- Cephalocaudal—head control develops first
- Proximodistal—arms before fingers
- Parallelism—sequence same across ethnic groups
- Dissociation—rates differ between children
- Mass activity → specific responses
- Primitive reflexes disappear with maturity
- Influenced by CNS maturation + environment

$$\text{Developmental quotient (DQ)} = \frac{\text{Developmental age (DA)} \times 100}{\text{Chronological age (CA)}}$$

GROSS MOTOR

3 months	Neck holding/head control
5–6 months	Rolls over
6 months	Sits with support
8 months	Sits without support
9 months	Stands with support/crawls/cruising around furniture
12 months	Stands without support
15 months	Walks

Contd.

18 months	Runs
2 years	Walks upstairs (2 feet/step)/backward walking
3 years	Walks upstairs (1 foot/step)/downstairs (2 feet/step)/rides tricycle/jumps
4 years	Walks upstairs/downstairs (1 foot/step)/hop
5 years	Skip

FINE MOTORS

4 months	Bidextrous grasp		Hand regard
6 months	Unidextrous grasp	Transfer of objects	Mouthing
9 months	Immature pincer grasp		
12 months	Mature pincer grasp		
15 months	Imitates scribbling	Tower of 2	
18 months	Scribbling	Tower of 4	Feeds with spoon without spillage
2 years	Vertical and circular strokes	Tower of 6	Undress completely
3 years	Draw a circle	Towers of 9	Buttons/unbuttons
4 years	Draw a square	Builds bridge	Handedness
5 years	Draw a triangle	Steps	Ties shoelaces

PERSONAL SOCIAL

Newborn	Spontaneous smile	
2 months	Social smile	
3 months	Recognises mother	
6 months	Stranger anxiety	
9 months	Waves bye/bye	Casting/object permanence (constancy)
12 months	Obeys simple command	
15 months	Pointing	Kisses pictures
18 months	Mimicking	Pretend play
2 years	Toilet training	Indicates 6 body parts

Contd.

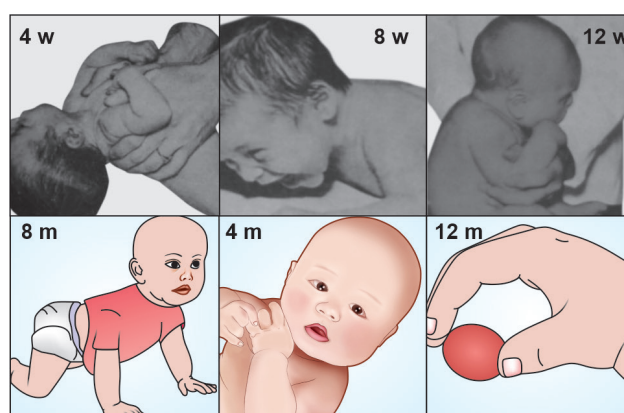
3 years	Knows name/age/gender	Knows 2 colours/dry by day
4 years	Plays with several children	Role play/knows 4 colours
5 years	Understands opposites (e.g. fat and thin)	Dry by night

LANGUAGE—RECEPTIVE/EXPRESSIVE

3 months	Cooing
4 months	Squeals/laugh loud
6 months	Monosyllables
9 months	Bisyllables
12 months	1–2 words with meaning
18 months	10–20 words with meaning
2 years	100 words/can join two words/I/Me/you
3 years	Sing rhymes/speak in small sentences
4 years	Tell stories
5 years	Ask meaning of words/questions

Note: If child has ability to follow command (receptive language) and other component of milestones are normal, child may start speaking later. Speech delay need not be a language delay.

Tongue tie or multilingual exposure do not cause delay.



HEARING

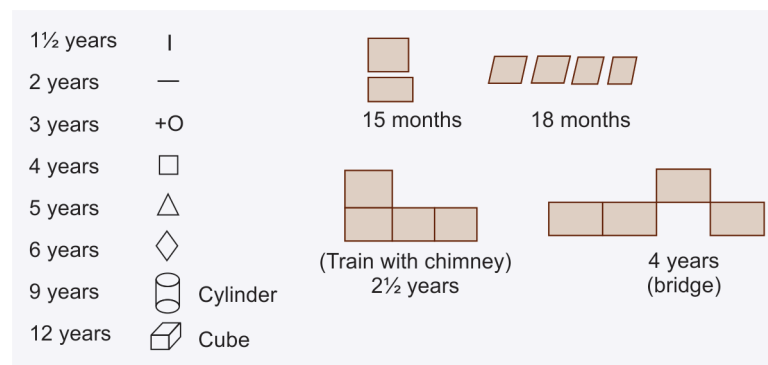
Newborn	Startle reaction, facial grimace, change in HR
4 months	Turns head towards the source of sound
6 months	Can imitate sounds
8 months	Can respond to name
10 months	Turn the head diagonally, directly towards the source of sound
1 year	Localise the sound source like adults

VISION

Newborn	Monocular fixation in response to visual stimulus
1 month	Can follow an object up to 60°
2 months	Follow the objects/mother
3 months	Can follow an object up to 180°
4 months	Binocular vision well established
6 months	True coordination of the eyes and hands
3 years	Can identify basic colours. Vision screening using an illiterate "E" chart
>7 years	Stereoacuity (Titmus fly test)

Note: Always adjust milestones for prematurity till 2 years.

Say _____ years old child with global development delay/dissociative delay (delay in _____ field) DQ is _____, functional age comes to _____ years



Mnemonic—LOC STD: Line (1½ years), Oval (2 years), Circle (3 years), Square (4 years), Triangle (5 years), Diamond (6 years).

REMEMBER

At 6 months—Turning over, Transfer of object

At 10 months—Crawling/Creeping/Cruising/Casting and Pivoting/Pincer grasp/Permanence (constancy)

9-month-old child standing, holding finger of his/her Mom with two fingers saying MAMA bye bye (**9 months GM**—standing with support, **FM**—immature pincer grasp, **Lang**—bisyllables, **PS**—waving bye bye)

3-year-old child came down from the stairs, jumped, started riding a tricycle, made a circle, sang rhymes, removed his shirt and said Hi to a girl
GM: Coming down 2 feet each step/rides tricycle/jumps.

FM: Draw a circle/buttoning/unbuttoning

Lang: Sing rhymes/speak in small sentences

PS: Knows name/age/gender

1 at 1, 2 at 2, 3 at 3 → 1 word at 1 years, 2-word phrase at 2 years, 3-word sentence at 3 years

Red Flag Signs

If vision and hearing is normal (2, 4, 8, 12 rule)

Milestones	Not achieved by
Social smile	2 months
Head control	4 months
Sit without support	8 months
Stand without support	12 months

DENTITION

- Primary dentition has 20 teeth, erupt 6 mo–2½ years
- Secondary dentition

1st molar	6 years
Incisors	8 years
Canine and premolar	10 years
2nd molar	12 years
3rd molar	>18 years

Delayed dentition = no teeth by 13 months

- Constitutional delay, hypopituitarism, hypothyroidism, rickets, PEM
- Teeth are absent in ectodermal dysplasia

PERIOD OF GROWTH

Terminology	Period
Ovum	<14 days
Embryo	2–9 weeks
Foetus	9 weeks of gestation to birth
Perinatal period	22 weeks of gestation to 7 days after birth
Newborn	First 28 days of life
Infancy	First year
Toddler	1–3 years
Preschool	3–6 years
School age	6–12 years
Adolescent	10–19 years (female) 12–20 years (male)

Test for Screening of Development

1. Denver Development Screening Test (DDST II)
2. Bayley's Scale of Infant Development (BSID)
3. Development Observation Chart (DOC)
4. Trivandrum Development Screening Chart (TDSC)

Test for Assessment of Intelligence

1. Draw-a-man test

IQ AND INTELLECTUAL DISABILITY

Intelligence quotient—measure of child's ability to perform cognitive tasks.

$$IQ = (\text{Mental age} / \text{chronological age}) \times 100$$

Grading	IQ
Intelligent	>110
Normal	90–109
Borderline	70–89
Mild intellectual disability	51–69
Moderate	36–50
Severe	20–35
Profound	<20

PICA: Repeated and chronic ingestion of non-nutritive substances for >1 month, e.g. uncooked rice, mud, wall plaster

Trichotillomania: Hair pulling

Bruxism: Teeth grinding

Attention Deficit Hyperactivity Disorder (ADHD)

- **Core triad:** Inattention, hyperactivity, impulsivity
- **Epidemiology:** 5–7% of school-age children; M:F = 3:1
- **Types (DSM-5)**
 - Predominantly inattentive
 - Predominantly hyperactive–impulsive
 - Combined
- **Clinical features**
 - Inattention → careless mistakes, poor focus, forgetful, distractible
 - Hyperactivity → fidgets, leaves seat, “on the go”, talks excessively
 - Impulsivity → blurts answers, cannot wait turn, interrupts others
- **Diagnosis:** DSM-5 criteria (≥6 symptoms, ≥6 months, present before 12 years, in 2 settings, functional impairment).
- **Comorbidities:** Learning disorder, oppositional defiant disorder (ODD), anxiety, sleep disorders.
- **Management**
 - Non-pharmacological (first-line in <6 years): Parent training, behaviour therapy
 - Classroom modification.
 - Pharmacological (>6 years if severe) (*see* page no. 196)
 - *Stimulants:* Methylphenidate (first-line), amphetamines.
 - *Non-stimulants:* Atomoxetine, guanfacine.

Autism Spectrum Disorder (ASD)

- **Neurodevelopmental disorder** with persistent deficits in social communication/interaction and restricted, repetitive behaviours.
- **Epidemiology:** ~1%, M:F = 4:1.

- **Clinical features** (Diagnostic and Statistical Manual of Mental Disorders—DSM-5):
 - Social communication deficits—poor eye contact, no pointing/gestures, failure to develop peer relationships.
 - Restricted/repetitive behaviours—stereotypies (hand-flapping), rigid routines, fixated interests, unusual sensory responses.
- **Early red flags:** No babbling by 12 mo, no words by 18 mo, no 2-word phrases by 24 mo, regression at any age.
- **Screening:** Modified Checklist for Autism in Toddlers, Revised with Follow-up (M-CHAT-R/F)—at 18 and 24 mo.
- **Management** (see page no. 198).
 - Early intervention → improves outcome (start by 2–3 years).
 - Behavioural therapies: Applied behaviour analysis (ABA), speech and occupational therapy.
 - Medications: No cure; only for associated problems (risperidone for aggression/irritability, melatonin for sleep, SSRIs for anxiety).
- **Comorbidities:** Intellectual disability, epilepsy, ADHD, anxiety.
- **Prognosis:** Better with early language, higher IQ, early intervention.

M-CHAT-R™			
Please answer these questions about your child. Keep in mind how your child usually behaves. If you have seen your child do the behavior a few times, but he or she does not usually do it, then please answer no. Please circle yes or no for every question. Thank you very much.			
1.	Have you ever wondered if your child might be deaf?	Yes	No
2.	Does your child make unusual finger movements near his or her eyes? (For example, does your child wiggle his or her fingers close to his or her eyes?)	Yes	No
3.	Does your child get upset by everyday noises? (FOR EXAMPLE, does your child scream or cry to noise such as a vacuum cleaner or loud music?)	Yes	No
4.	If you point at something across the room, does your child look at it? (For example, if you point at a toy or an animal, does your child look at the toy or animal?)	Yes	No

Contd.

M-CHAT-R™			
5.	Does your child play pretend or make-believe? (For example, pretend to drink from an empty cup, pretend to talk on a phone, or pretend to feed a doll or stuffed animal?)	Yes	No
6.	Does your child like climbing on things? (For example, furniture, playground equipment, or stairs)	Yes	No
7.	Does your child point with one finger to ask for something or to get help? (For example, pointing to a snack or toy that is out of reach)	Yes	No
8.	Does your child point with one finger to show you something interesting? (For example, pointing to an airplane in the sky or a big truck in the road)	Yes	No
9.	Is your child interested in other children? (For example, does your child watch other children, smile at them, or go to them?)	Yes	No
10.	Does your child show you things by bringing them to you or holding them up for you to see not to get help, but just to share? (For example, showing you a flower, a stuffed animal, or a toy truck)	Yes	No
11.	Does your child respond when you call his or her name? (For example, does he or she look up, talk or babble, or stop what he or she is doing when you call his or her name?)	Yes	No
12.	When you smile at your child, does he or she smile back at you?	Yes	No
13.	Does your child walk?	Yes	No
14.	Does your child look you in the eye when you are talking to him or her, playing with him or her, or dressing him or her?	Yes	No
15.	Does your child try to copy what you do? (For example, wave bye-bye, clap, or make a funny noise when you do)	Yes	No
16.	If you turn your head to look at something, does your child look around to see what you are looking at?	Yes	No
17.	Does your child try to get you to watch him or her? (For example, does your child look at you for praise, or say "look" or "watch me"?)	Yes	No

Contd.

M-CHAT-R™			
18.	Does your child understand when you tell him or her to do something? (For example, if you do not point, can your child understand “put the book on the chair” or “bring me the blanket”?)	Yes	No
19.	If something new happens, does your child look at your face to see how you feel about it? (For example, if he or she hears a strange or funny noise, or sees a new toy, will he or she look at your face?)	Yes	No
20.	Does your child like movement activities? (For example, being swung or bounced on your knee)	Yes	No
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- At risk answers

Questions At risk response

1, 2, 3 Yes

Rest No

- Total No. of at risk answers → M-chart-R score

Score Interpretations

0–2 Low risk

3–7 Medium risk

8–20 High risk

Enuresis

Urinary incontinence >4 years daytime, >6 years nighttime, treat >7 years only.

Encopresis

Faecal incontinence >4 years (non-organic).

Specific Learning Disorders (SLD)

Significant unexpected, specific, persistent difficulties in the acquisition and use of efficient:

- Reading (dyslexia)
- Writing (dysgraphia)
- Mathematical (dyscalculia).

Breath Holding Spells

- Paroxysmal self-limiting events
- provocation → crying → holding breath (noiselessness) → change in colour (blue) → loss of consciousness (with or without change in body tone)
- Occurs in 10% healthy children
- 6 months to 6 years
- Parent education, iron therapy helps.

Screen Time—3 6 9 12 Rule

Excessive screen exposure in <2 years is associated with language, social delays, sleep problems, temper tantrum, risk of obesity and inattention later.

- <3 years—no screen
- <6 years—no personal games
- <9 years—no internet
- <12 years—supervised internet