Child Development

DR. REDAB AL-GHAWANMEH

- Introduction
- Principles of development
- Domains of development
- Developmental assessment
- Screening tools
- Red flags

- Development is the individual level of functioning, a child is capable of, as a result of maturation of the nervous system.
- Developmental assessment, milestones acquisition occur at a specific rate and in an orderly and sequential manner

↳ يعني بمشي فيهم بالترتيب ، واحد ورا التاني ما بصير اشي قبل التاني.

4

* from the beggining of pregnancy, the baby development begins, meaning that any abnormality can happen at any stage.

*principles of development :-

- Development is continuous process from conception to maturity
- Sequence of development is same in all children but rate varies → e.g. walking has a range of 10months – 18 m → so if the baby is 15m & still can't walk → this is Normal, but if >15m → abnormal
- Development intimately related to maturation of CNS
- Proceeds in a cephalocaudal direction ↳ from his head down to his legs.

Child Development [Gross Motor]

① good head control (No head lag) → 3-4 months

② set without support → 8-10m

* setting needs shoulder support → then truncal → then pelvic support

⇒ so a baby who sets with pelvic support is more advanced than a baby who sets with shoulder support.

③ Then the baby stand when you pull

④ Then stand with (chair) support.

⑤ Then walk → 10 m - 18 m

⑥ Then after 3-4m of walking, the baby starts to Run

⑦ Then starts to get up stairs (getting up is so easier than going down stairs!)

⑧ Going up & down stairs → on 2.5 years

⑨ stand on 1 foot, can use tricycle → 3years

⑩ * Hopping (bi) → 4 years

⑪ skipping → 5years.

---

* premitive reflexes : are reflexes than begin at birth and related to early development of CNS 5

↳ you should test these reflexes if present or abscent, & check for symetricity..

- Certain primitive reflexes, should be lost before corresponding voluntary movement occurred
- Genetic and environmental factors contribute positively and negatively

* These reflexes should be present at age, and disappear in 4-6m

↳ e.g → Moro reflex → لما ترفع راس البيبي شوي وتنزله فالتك

بحصل عنده abduction & extension of the arms, opening of hands → then adduction of the arms & flexion of elbows.

↳ Moro reflex begins in 28w - 30 weeks of age → so even if preterm baby, he'll have Moro reflex.

↳ It disappears at 4-6m → so if it persisted for >6month → This indicates abnormal development of brain.

6

* If a baby has fever, he's 2m old, with absent Moro → think of sepsis, like meningitis → sth series that suppressed the normal reflexes.

Acquisition of a key skill

– Median age : age at which half population acquire the skill

– Limit : age at which a skill should have been achieved, - 2SD from the mean

* If baby has assymetrical (→ focal deficit) Moro (ايد بترتفع وثانية لا) → Think of nerve injury (brachial plexus injury), or fracture → Leads to ipsilateral injury.

↳ If central Problem → contralateral

7

↳ The early intervention → The better the outcome !

* you should regularly investigate & examine the baby & don't wait till their parents note the problem.

- Developmental milestones serve as the basis of most standardized assessment and screening tools
- Developmental monitoring not only should be aimed at identifying children who have low function but at directing the focus of anticipatory guidance to help promote normal development

8

*Domains of Development *

- Gross motor
- Fine motor → coordination, associated with vesion.
- Language
- Social, cognitive

important for fine moto development

**Vision and hearing developmental assessment

Delay in specific domain or global developmental delay

* If the delay was in 1 domain only → Single delay
* If its delay in 2 or more skills → Global delay
↳ e.g on global → speech delay is ass/ with social delay

- ▶ Developmental delay? → the baby can't do what he's supposed to be doing
- ▶ Developmental regression? → means loss of acquired skill
- ▶ What is the value of developmental screening?

- e.g → on regression → the baby used to talk but he lost it!, he used to walk, but now he doesn't! ⇒ This is alarming!

*why is it necessary ?

- Reassure if normal development pattern and timings
- Spot ***regression***
- Any genetic disorder to make?
- Identify those with specific areas of impairment or global concerns

- ▶ Allows early support or interventions eg. hearing aids, physiotherapy

* corrected age → used to calculate developmental age of Premature babies

↳ for e.g → If he still has head lage on 5 months (normally it shouldn't be there), we calculate his corrected age.

↳ suppose he was ↓ born 10 weeks earlier → This means 2.5 months =>

5m − 2.5m = 2.5m

is his corrected age

=> Its means he still have time!

* when to suspect abnormalities in development?

- ▶ Hx from parents, (majority of patients)
- ▶ Examination:
  - during routine examination and developmental screening
  - by follow up examination in high risk babies
    - ↳ preterm babies

*

Risk factors for possible developmental problems in Hx :-

- ▶ Prenatal: use of drugs or alcohol, viral infections, ..
- ▶ Perinatal: prematurity, LBW, obstetric complications
- ▶ Neonatal: encephalopathy, infections, hyperbilirubinemia..
- ▶ Post natal: encephalitis, sever epilepsy..
- ▶ Family hx: consanguinity, inherited disorders..
- ▶ Social hx: ability to deal with a disabled child..

*Also ask about mode of delivery → If baby had stress during vaginal delivery → ischemic injury that may be related to his neurological problem.

* Developmental screening:-

every baby should have a development file untill 5years of age.

- The AAP recommends that all children be screened for developmental delay and disabilities at well child doctor visit at:

1. 9 months
2. 18 months
3. 24 or 30 months
4. Additional screening might be needed if a child is at high risk for developmental problem, eg: preterm, low birth weight and others

- Different tools, eg. Denver II scale, commonly used.
- Checked in regular well-child clinic visit
- Parents usually, not always, the first to pick up possible developmental delay

* The baby should be comfortable, well awake before examination.

*Examination :-

- Should take in a place in a room with toys appropriate for child
- With one or both parents but with no helping
- Chair and table
- Child s behavior and interaction with parents during hx taking should be observed prior to p/e
- Hearing and vision assessment

*prerequisties:-

- Infant or child in a good temper
- Should not be hungry , tired, had convulsion prior or under effect of sedative drugs

* Examine pt in different positions → while supine, standing, prone, ...

*Examination:-

- General, growth parameters,(HC), dysmorphic features, neurologic exam
- child placed in different postures
- Hearing and vision
- Muscle tone, landau reflex
- Primitive reflexes
- Consider the corrected age in preterm babies

* This is Landau reflex → when you hold the baby like this, he hold his head up & slightly flex his legs

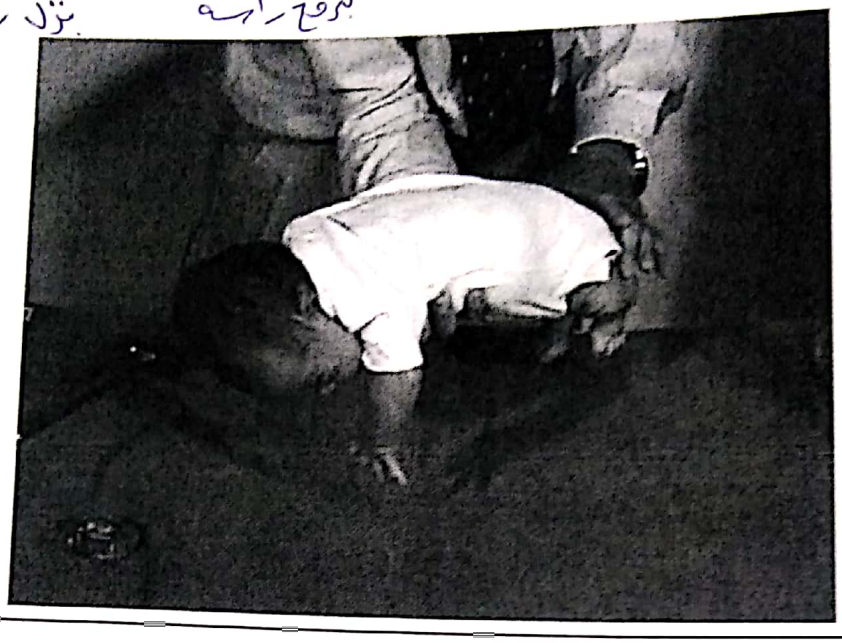
↳ They appear at 3m & remain for 18m

↳ If They can't do it → This indicates hypotonia

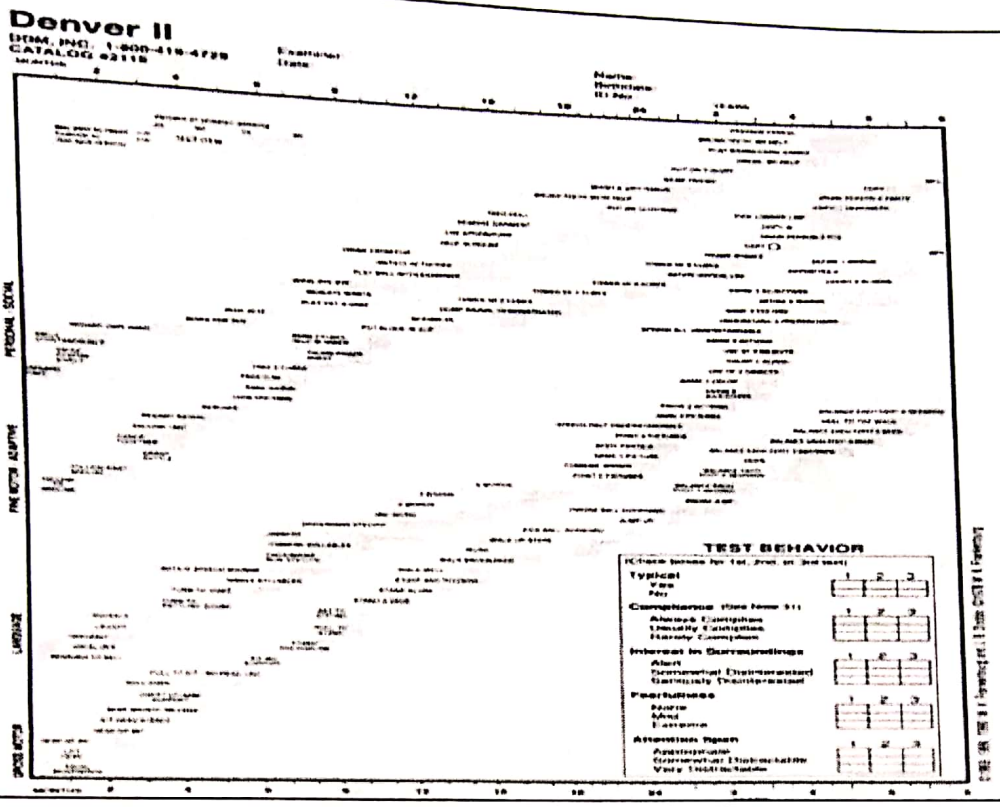
(زي اللي بيطير)

* This is ventral suspension, for infants.

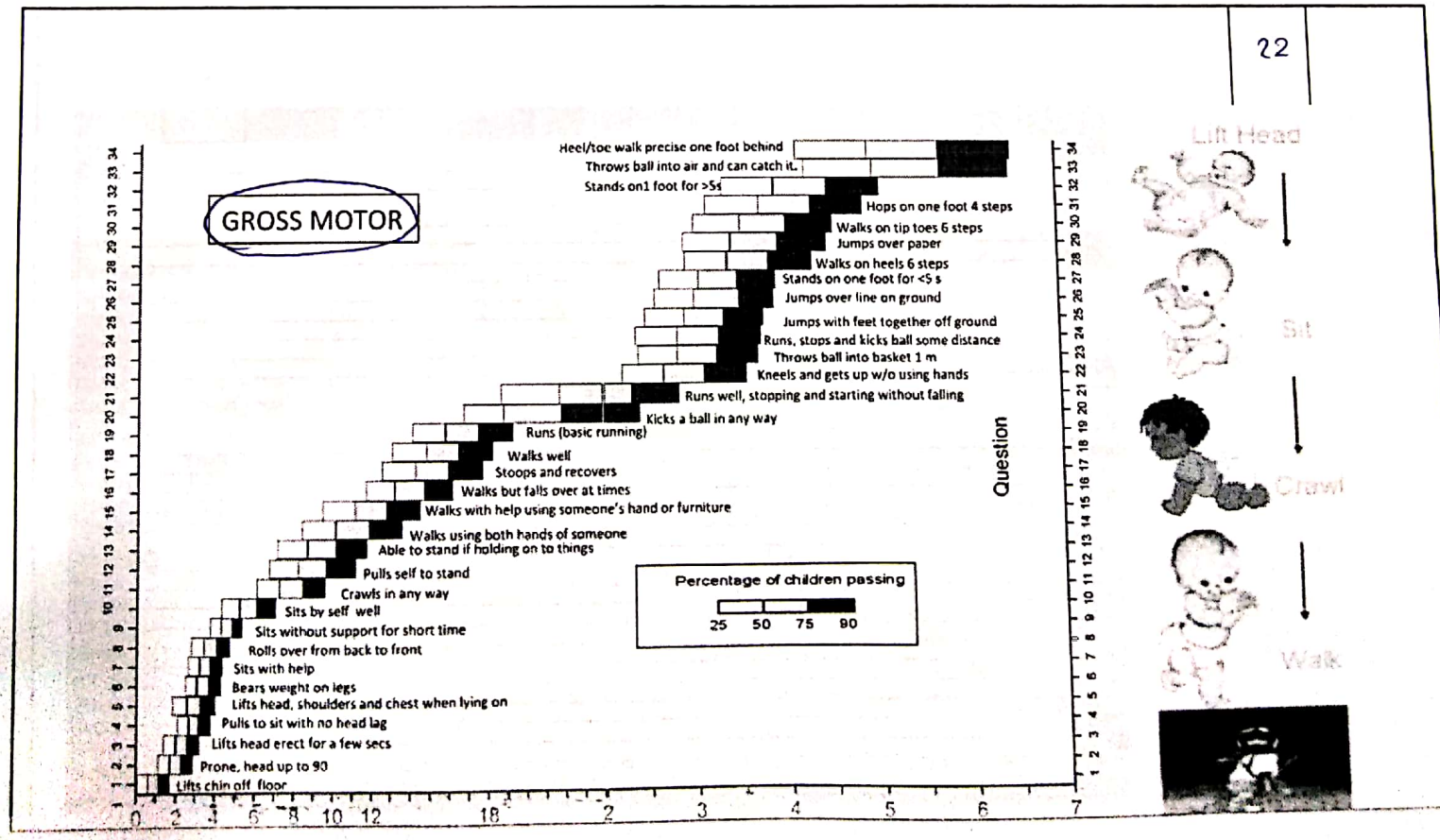
↳ on 1 month (نزل راسه), 2 months (يرفع راسه), 3 months (→ يرفع راسه وكتافه ايديه عليه ورجله)

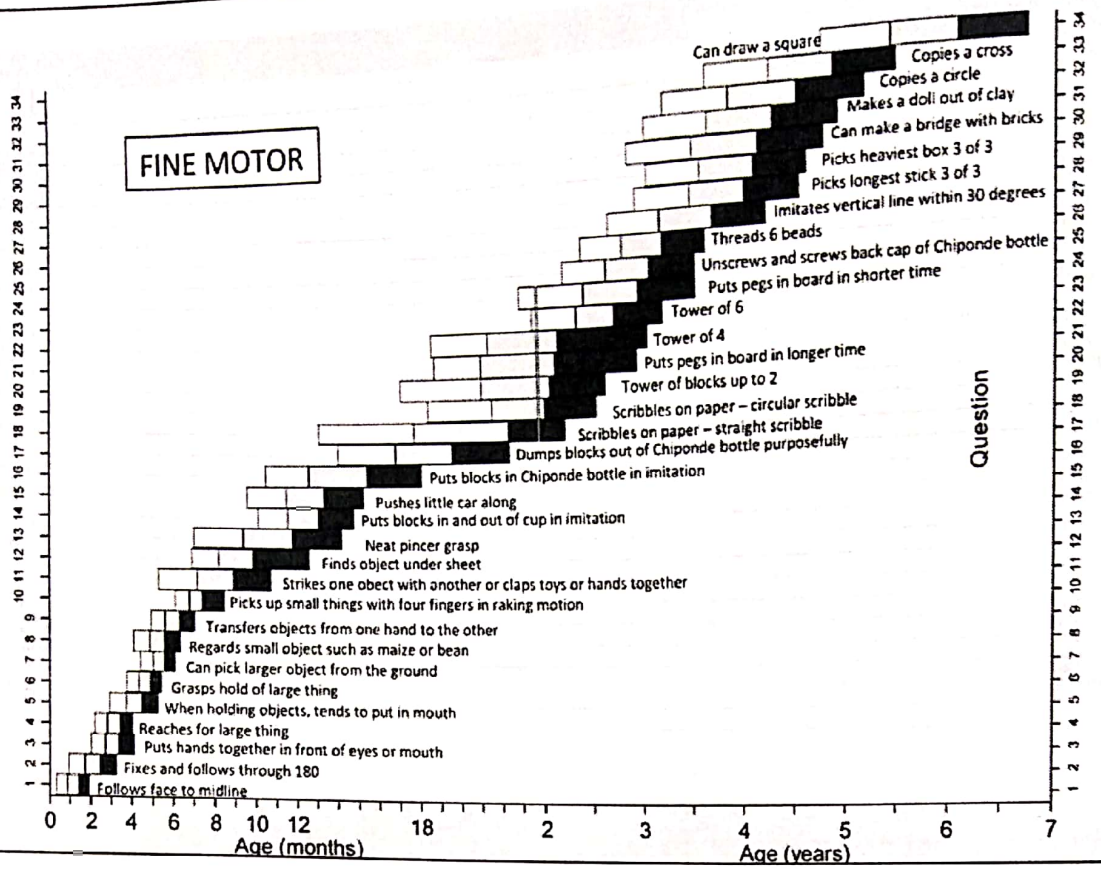


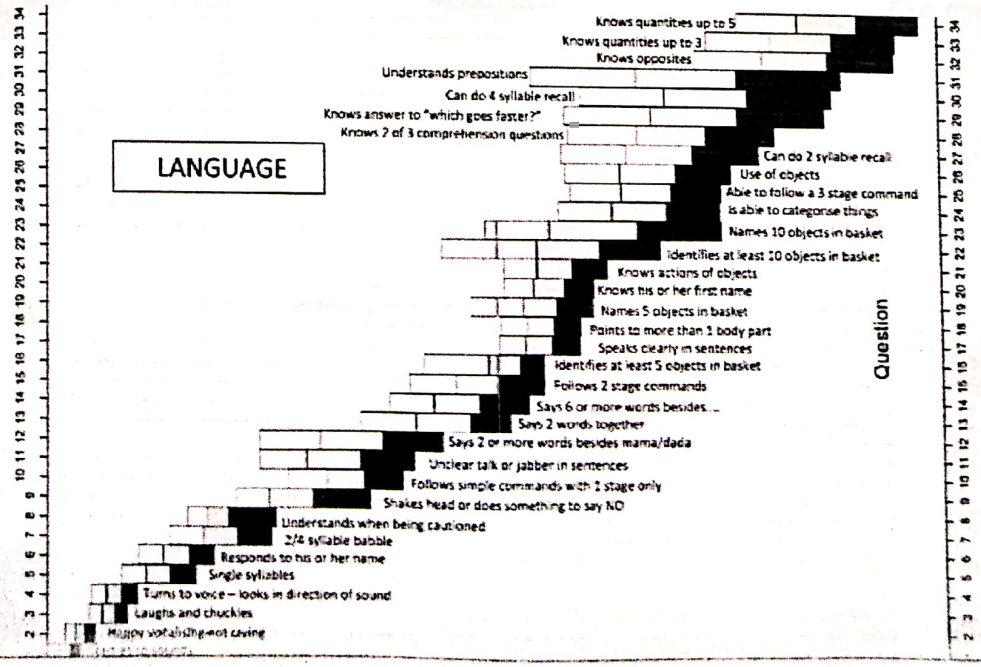
* Traction Response → for head Lag.



.[* milestones, are from Nelson textbook, not essential]







Fine Motor

↳ ass wl vesion

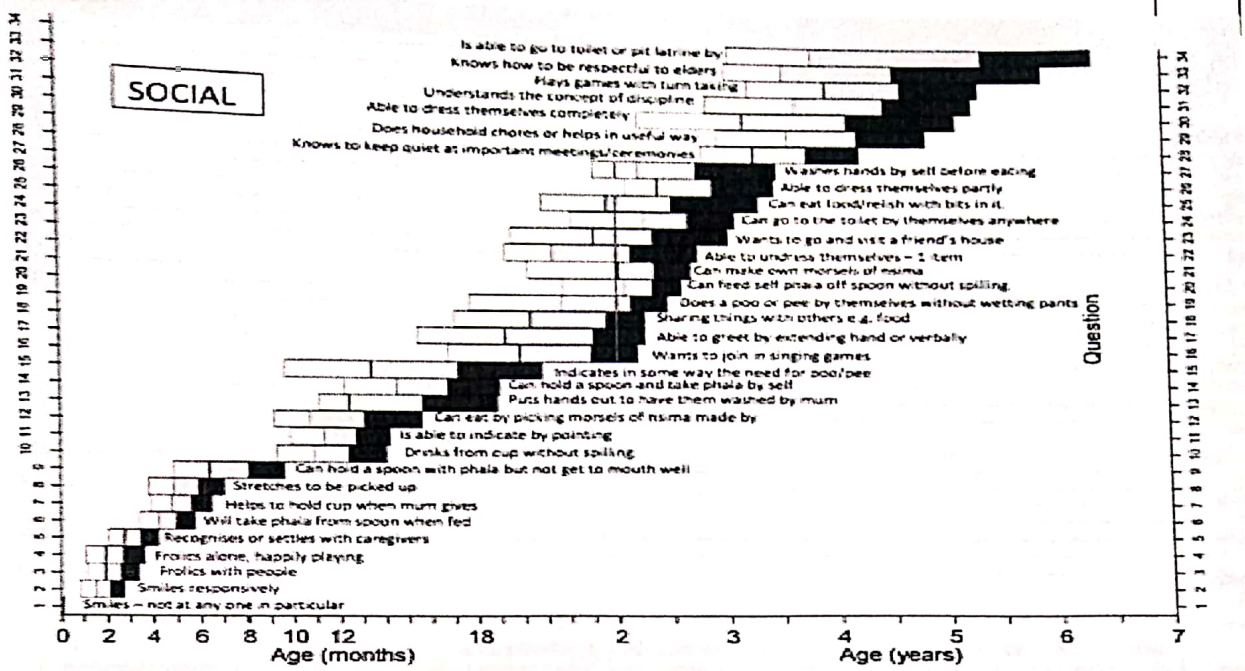
① يرفع عيونه in. درجة 180 → 2m
② يتابع بعيونه in a circular motion → 3m
③ fisting (يعضل مسكر ايده) → untill 3 m
④ opens his hand (تفتح ايده) → after 3m
↳ If still fisting after 3m → This indicates early spasticity.
⑤ Immature grasping (reaches for objects) → 4m
⑥ Mature grasp → 10m
⑦ Draws a circle → 3 years
square → 4 years
triangle → 5 years

Language

① homosyllibus → ba, Ma → 6m
② Bisyllibus → baba, Mama → 9 m
③ Say baba, Mama, 1, 2, 3 → 1 year

Social

① social smile (reactive) → 2m
② cooing → 3m
③ Laugh loudly → 4m



1st year

Table 10-2 Emerging Patterns of Behavior During the 1st Yr of Life

NEONATAL PERIOD (1ST 4 WK)

Prone:	Lies in flexed attitude; turns head from side to side; head sags on ventral suspension
Supine:	Generally flexed and a little stiff
Visual:	May fixate face on light in line of vision; "doll's-eye" movement of eyes on turning of the body
Reflex:	Moro response active; stepping and placing reflexes; grasp reflex active
Social:	Visual preference for human face

AT 1 MO

Prone:	Legs more extended; holds chin up; turns head; head lifted momentarily to plane of body on ventral suspension
Supine:	Tonic neck posture predominates; supple and relaxed; head lags when pulled to sitting position
Visual:	Watches person; follows moving object
Social:	Body movements in cadence with voice of other in social contact; beginning to smile

AT 2 MO

Prone:	Raises head slightly farther; head sustained in plane of body on ventral suspension
Supine:	Tonic neck posture predominates; head lags when pulled to sitting position
Visual:	Follows moving object 180 degrees
Social:	Smiles on social contact; listens to voice and coos

AT 3 MO

Prone:	Lifts head and chest with arms extended; head above plane of body on ventral suspension
Supine:	Tonic neck posture predominates; reaches toward and misses objects; waves at toy
Sitting:	Head lag partially compensated when pulled to sitting position; early head control with bobbing motion; back rounded
Reflex:	Typical Moro response has not persisted; makes defensive movements or selective withdrawal reactions
Social:	Sustained social contact; listens to music; says "aah, ngah"

1st year, cont...

AT 4 MO
Prone: Lifts head and chest, with head in approximately vertical axis, legs extended
Supine: Symmetric posture predominates, hands in midline; reaches and grasps objects and brings them to mouth
Sitting: No head lag when pulled to sitting position, head steady, tipped forward, enjoys sitting with full truncal support
Standing: When held erect, pushes with feet
Adaptive: Sees raisin, but makes no move to reach for it
Social: Laughs out loud, may show displeasure if social contact is broken; excited at sight of food

AT 7 MO
Prone: Rolls over; pivots; crawls or creep-crawls (Knobloch)
Supine: Lifts head; rolls over; squirms
Sitting: Sits briefly, with support of pelvis; leans forward on hands; back rounded
Standing: May support most of weight, bounces actively
Adaptive: Reaches out for and grasps large object, transfers objects from hand to hand; grasp uses radial palm; rakes at raisin
Language: Forms polysyllabic vowel sounds
Social: Prefers mother; babbles; enjoys mirror, responds to changes in emotional content of social contact

AT 10 MO
Sitting: Sits up alone and indefinitely without support, with back straight
Standing: Pulls to standing position, "cruises" or walks holding on to furniture
Motor: Creeps or crawls
Adaptive: Grasps objects with thumb and forefinger; pokes at things with forefinger; picks up pellet with assisted pincer movement; uncovers hidden toy; attempts to retrieve dropped object; releases object grasped by other person
Language: Repetitive consonant sounds ("mama," "dada")
Social: Responds to sound of name; plays peek-a-boo or pat-a-cake; waves bye-bye

AT 1 YR
Motor: Walks with one hand held; rises independently, takes several steps (Knobloch)
Adaptive: Picks up raisin with unassisted pincer movement of forefinger and thumb; releases object to other person on request or gesture
Language: Says a few words besides "mama," "dada"
Social: Plays simple ball game; makes postural adjustment to dressing

1 - 5 years

Table 11-1 Emerging Patterns of Behavior from 1-5 Yr of Age

15 MO
Motor: Walks alone; crawls up stairs
Adaptive: Makes tower of 3 cubes; makes a line with crayon; inserts raisin in bottle
Language: Jargon; follows simple commands; may name a familiar object (e.g., ball); responds to his/her name
Social: Indicates some desires or needs by pointing; hugs parents

18 MO
Motor: Runs stiffly; sits on small chair; walks up stairs with 1 hand held; explores drawers and wastebaskets
Adaptive: Makes tower of 4 cubes; imitates scribbling; imitates vertical stroke; dumps raisin from bottle
Language: 10 words (average); names pictures; identifies 1 or more parts of body
Social: Feeds self; seeks help when in trouble; may complain when wet or soiled; kisses parent with pucker

24 MO
Motor: Runs well, walks up and down stairs, 1 step at a time; opens doors; climbs on furniture; jumps
Adaptive: Makes tower of 7 cubes (6 at 21 mo); scribbles in circular pattern; imitates horizontal stroke; folds paper once imitatively
Language: Puts 3 words together (subject, verb, object)
Social: Handles spoon well; often tells about immediate experiences; helps to undress; listens to stories when shown pictures

30 MO	
Motor:	Goes up stairs alternating feet
Adaptive:	Makes tower of 9 cubes; makes vertical and horizontal strokes, but generally will not join them to make cross; imitates circular stroke, forming closed figure
Language:	Refers to self by pronoun "I"; knows full name
Social:	Helps put things away; pretends in play
36 MO	
Motor:	Rides tricycle; stands momentarily on 1 foot
Adaptive:	Makes tower of 10 cubes; imitates construction of "bridge" of 3 cubes; copies circle; imitates cross
Language:	Knows age and sex; counts 3 objects correctly; repeats 3 numbers or a sentence of 6 syllables; most of speech intelligible to strangers
Social:	Plays simple games (in "parallel" with other children); helps in dressing (unbuttons clothing and puts on shoes); washes hands
48 MO	
Motor:	Hops on 1 foot; throws ball overhand; uses scissors to cut out pictures; climbs well
Adaptive:	Copies bridge from model; imitates construction of "gate" of 5 cubes; copies cross and square; draws man with 2-4 parts besides head; identifies longer of 2 lines
Language:	Counts 4 pennies accurately; tells story
Social:	Plays with several children, with beginning of social interaction and role-playing; goes to toilet alone
60 MO	
Motor:	Skips
Adaptive:	Draws triangle from copy; names heavier of 2 weights
Language:	Names 4 colors; repeats sentence of 10 syllables; counts 10 pennies correctly
Social:	Dresses and undresses; asks questions about meaning

Red flags

↳ when to worry ?

Any loss of skills at any age.

▶ 0-3m, nearly spasticity.

- persistent fisting after 3m - failure to respond to environmental stimuli, evaluate for hearing loss

▶ 4-6m

-poor head control, evaluate for hypotonia

-failure to reach for objects by 5m, evaluate for motor or visual deficit

▶6-12m

-Persistent of primitive reflexes

-Absent babbling by 6m

-Inability to recognize sounds by 10m

* parachot reflex → its a primitive reflex that begins at 9-10m of age & remain for life

↳ It happens when you hold the baby as if you throw him on a surface
⇒ In response to this he'll extend his arms to protect his face.

(hand pref)

early side preferance (before 18m) is abnormal → It indicates weakness of the other side!

▶ 12-24m

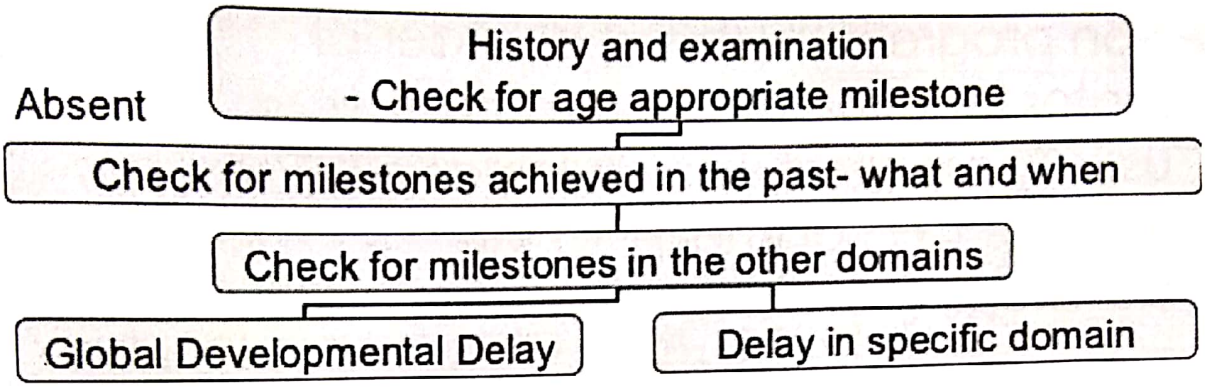
-Hand preference before 18 m

-Inability to walk up and down stairs by 24m

-Advanced non communicative speech, eg. Echolalia, evaluate for pervasive developmental disorders

▶ Delayed language development require hearing assessment in all ages

Approach



*cereberal palsy * CP*

- Its astatic disorder, not progressive disorder.
- It causes a motor problem, ataxic, movement prob.
- If a pt used to speak but then lost his speech → Not CP.
- If he has speech delay only → Not CP (should have motor problem).

cereberal palsy

- Non progressive(static) disorder of motor function and movement, usually manifest early in life as a result of CNS damage to the developing brain

Risk factors

- Prenatal: infection, multiple births, placental thrombosis, maternal metabolic dis. Eg. DM, intrauterine exposure to toxins
- Perinatal: hypoxic ischemic encephalopathy, periventricular leukomalacia, strock, hyperbilirubinemia
- Postnatal: strock, trauma, infection

* Twins have higher risk than single babies & Triplets have higher risk than Both!

* monoplegic → only 1 limb is affected.
* hemiplegic → upper & lower right /or left side.
* diplegic → Both lower limbs.

37

* Classification :-

▶ According to extremity involved:

spastic (90%) [Monoplegic, hemiplegic, diplegic, quadriplegic → all 4 limbs.

▶ According to neurological dysfunction:

Spastic (most common), ataxic, dyskinetic] 10% (dystonic, chorioathetoid), mixed

* Some patients can begin with hypotonia then become spastic

*

38

* Diagnosis : Hx & PE

▶ The usual presentation is delay in motor milestones

▶ No loss of function by hx, disease is not progressive

▶ On exam: hypotonia (→ truncal (head lag)), spasticity, persistent primitive reflexes, underdevelopment of parachute reflex

▶ Serial examinations may be necessary to assure the diagnosis of CP, esp. when hx is not reliable.

→ يعني لما ماتكون الامور واضحة لازم نضل نفحص المريض
عطول لحتى نتأكد من التشخيص

39

* Associated conditions :-

- ▶ MR
- ▶ epilepsy
- ▶ Ophthalmological defects
- ▶ Hearing impairments
- ▶ Speech and language disorders

* The more severe the type → the worse the complications.

↳ eg → pt wl quadriplagia has higher risk of epilepsy

40

* Eraluation:-

- ▶ Detailed hx and p/e
- ▶ Neuroimaging , MRI preferred
- ▶ Screen for associated conditions
- ▶ Monitor for nutrition, growth swallowing problems
- ▶ Testing for coagulation disorders considered in hemiplegic CP
- ▶ Genetic and metabolic testing, not routinely, in atypical cases
- ▶ EEG, if convulsion

* usually CP doesn't run in family hx

↳ Its due to ischemic insult

* Mangment :-

- Multidisciplinary team:

-physiotherapy, occupational therapy, speech therapy, special education, orthopedic, psychological counselling, nutrition

- Goal of trt: to maximize function and optimize development

* Complications

↳ bcuz they're always spastic, can't brush their teeth.

- Dental caries, GER with aspiration → due to GERD pneumonia, constipation, bronchial dysplasia, skin ulcers and bed sores, join contractures hip dislocation and scoliosis, strabismus and decrease visual acuity, hearing loss

Increase incidence of ADHD, depression

* Their Biggest Morbidity is Respiratory (aspiration)

↳ most causes of death are chest infections.