

Normal Development and Behaviour

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Ped 474

what is a developmental skill? gaining skill stepwise, developmental progress as we growing older e.g: motor skill: using large muscle to move around to do the different task this is what we call it different skill and can be different domains ranging from using big muscle to using small muscle to cognition, language use, ability to depend on themself dressing and undressing, eating, writing so this is what we call it developmental skill

Growth VS Development

- **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

Growth Parameters

- Parameters of average growth: Weight; gain of 20-30 g/day since newborn period

then • Double by 4-5 months of age Triples at 1 year

then Quadruples at 2 years

- Height: increases by 50% in the first year At 2 years reaches 1/2 of adult height

- Doubles by 3-4 years Triples by 13 years

then you start to have other tissues develop

- mid-childhood; lymphoid tissue

at age of

- puberty; gonads for maturation and transfer to adulthood

your going to develop

Development

- Change in function, including those influenced by the emotional and social environment.
skill

Brain Growth

- The brain is smooth at 28 weeks.
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.

the brain slow down

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)

e.g • Thinking, judgment and cognition is in the frontal lobe. & prefrontal lobe

Child Development

- The skills acquired by children between birth and about 5 years of age. we call it child development skill
- Fields of development include: there are many domains of child development the most important for "OSCE & MCQs" are:

1 ➤ Gross motor for mobility: the most obvious initial area e.g: rolling, sitting, crawling, walking....

2 ➤ Fine motor and Vision:
grouped together as vision is necessary for fine motor development
hand function e.g holding toys, spoon, writing, coloring

using the small muscle of the hand to do the different delicate tasks.

why do they grow together" fine motor and vision"? we need to make sure the child can see very well to assess the fine motor skill. If he had a problem we have to fix his vision first and do an ophthalmological evaluation then assess his fine motor skill.

Child Development

you can't talk if you're not hearing " you need to have good hearing to be able to communicate to be able to catch language and develop your language skill.

- 3 ➤ **Hearing, speech and language:** Normal speech and language development is dependent on good hearing skills to be able to communicate

- 4 ➤ **Social, emotional and behavioral: A spectrum of psychological development** & self-dependence skill like dressing and undressing, eating, bathing and different daily function that child should do it on his own at certain age group.

- **A deficiency in any one skill area can have an impact on other areas and may result in global developmental delay**

e.g: if you have an infant at 9 months of age & he has a delay in gross motor skill, gross motor skill at 9 months: he supposed to sit alone without support, if this child unable to sit alone independently & he's sitting with support or leaning forward on his arm to give him support, would he be able to hold anything with his hand? No, so his fine motor skill subsequently will be delayed because his hands will be busy keeping his balance & using his hands for gross motor skills, so his hands are not free so he could use them to develop other fine fine motor skills.

Child Development

Knowledge of normal growth and development of children is important:

➤ To help children achieve their maximum potential

➤ To recognize abnormal deviations from normal pattern to:

✓ 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.

If I have a child that has no language by the age of 2 years so you have to look for the reasons why he's not able to have any language or any words to communicate so definitely you're going to do a hearing test. A hearing test is treatable, reversible you can evaluate hearing problems like recurrent otitis media or genetic like sensorineural hearing loss & manage accordingly. treat early so you can help the child to develop other potentials of language & can communicate as well as his cognition because language is cognition.

and if there's any problem

Influences on development

- Child development is the result of an interaction of heredity (which determines the potential of the child, genetic) and the environment of the developing brain. [genetic syndrome like trisomy 21](#)
- In terms of the environment, 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.
- Physical and psychological needs vary according to age
- Development can be impaired if the environment fails to meet the child's needs.

[Factors affecting child development:](#)

[1. Environmental: developmental stimulation: anybody interaction with a child or just his needs been meet & he's just staying alone spending many hours on TV and nobody interact with him it is called environmental deprivation & the child will have a lot of developmental delays specifically in his language skill & subsequently in his cognition & learning later on, so this is environmental or socioeconomic status like the parent is working long hours & they are not around most of the day or neglect. 2. Postnatal problems. 3.CNS Infection.](#)

[so you need to cover in the history: genetic & environmental factors.](#)

Developmental assessment

Normal development is monitored via:

- Parents
- Regular child health surveillance
- Whenever a child is seen by a healthcare professional (brief opportunistic overview)

like 12, 18, 36 months you have to ask the family about any concern even if they didn't talk about any concerns about the child they just coming for vaccine and they think the child is typical we have to ask them certain questions to find out high risk & work on them earlier, so it's very important to pick up a high-risk group & refer them to intervention.

Indications for developmental assessment:

- During immunization visits.
- Difficulty in pregnancy, labor or newborn period and whether it had an effect on the baby.
- Hypoxic symptoms: convulsions or meningitis early in life (first 2 years of life) might affect the growing brain and may lead to cerebral palsy.
- Presence of unusual behavior or physical feature (dysmorphic features) like on examination you find out abnormal features of the face, eyes, nose
- Part of routine examination of infant; used to diagnose conditions for which treatment is available (deafness) if reversible you can pick it up early & treat it you stop the effect of the inability to hear on other developmental milestones.

Developmental Screening

- Knowing the normal spectrum
- History, physical and developmental examination
- Concentrate on each field of development separately, then assess whether the child is developing at similar rate through each skill field or if one (specific developmental delay) or more (global developmental delay) lag behind
- Lastly, we relate the developmental achievements to the chronological age. If the delay is affecting 2 or more developmental fields it is termed global delay.

In OSCE you're going to have a history of the child you don't know his age & they ask you to do the developmental assessment? So you're going to start with history: ask the mom -> what your child doing now in all different domains then according to his ability to do his skill you're going to suggest a range for this age group.

#Chronological age: means the age the child was born at, how old he's since he was born." depend on his date of birth".

Developmental age is the ability to do different developmental skills. " skill at current time".

Developmental History

So including the developmental history in any OSCE station, you have to ask:

- Prenatal (Pregnancy) risk factors:

- Maternal infections:

Certain infections affect the mother and the fetus & might result in global developmental delay
TORCH; Toxoplasmosis, Rubella, CMV, Herpes virus (Other: Syphilis)

or any infection

(Screening test, U/S and history of any febrile illness or skin rash during pregnancy)

History

- **Perinatal factors:**

- Perinatal fetal distress, Hypoxic Ischemic insult
- APGAR score (the status of the fetus at birth) after observing the newborn you give a score
 - Normal birth: when the baby cries immediately, breathes spontaneously and can take the breast or bottle within the first 24 hours
- Ability to swallow is a good indication. that this child did not suffer from hypoxic-ischemic insult.

If the mother did not remember the APGAR score, ask her if the child was able to cry immediately after birth? breathing was Ok? Did he need to be admitted to the ICU for any support or any help after birth?

History

- **Postnatal development:**

- Birth weight and duration of gestation

(preterm babies have different problems than full term babies, they have tendency to have periventricular hemorrhage) Small for gestational age; tend to have hypoglycemia. which is a risk factor for developmental delay.

the mode of delivery was it C-section or normal delivery.

- Sucking or swallowing difficulties

- Fever, lethargy, irritability, CNS infection

- Major illnesses:

A congenital heart disease, Congenital liver or renal failure.

#preterm baby: was born less than 37 weeks there is not full term.

#Small for gestational age: A full-term but birth weight is smaller than what expected from full term.

History

➤ Emotional deprivation:

A child born into an orphanage will not have the same intellectual ability as a child who is born into a family with a mother and father, because of the environmental stimulation, which is very important for human development.

History

after you finish with pregnancy prenatal, antenatal, postnatal you have to make sure that you have an idea about the developmental pattern of the child, whether the child has previously developmental skill he lost it we call it: developmental regression e.g he was talking then he lost his word, so we need to look for medical "organic" reasons for losing skill what we call it neurodevelopmental regression or that child to start with he did not develop any skill so he was a delay to start with them he starts to catch-up we call it accelerated development.

- **Developmental Patterns:**
Accelerated development?
For example, a child was not able to sit at 6 months but he sat by 8 months. He could not walk by 1 year but walked by 2 years, Accelerated development. So he is delayed but gaining function, might be the result of cerebral palsy
- **Loss of the previously acquired developmental skills (Developmental regression) which might indicate neurodegenerative disorder .**

Physical Examination

- Dysmorphic features, craniofacial and lip deformities
Congenital heart disease
- Skin hyper- or hypo- pigmentations [Café au lait spots](#)
- Subluxation or dislocation of the hip leads to abnormal gait; wobbling gait, treatable condition.
- Growth parameters: [weight](#), [height](#)
Head circumference, plotted on head circumference chart

There is no value of this number unless you plot the number on the chart & see where this circumference fits on the chart where there is going on the 5th, 10th, 20, 90 centiles and then try to find out what the reasons for the child small head (microcephaly) or the child big head (macrocephaly) and these are a very common station in the OSCE. Common OSCE station: developmental assessment, head examination, Lower limbs examination.

e.g. you have a child who is 18 months old.

Do head examination: important point in OSCE.

1. Introduce yourself to mom.
2. Explain what you are doing.
3. Take permission.
4. Provide privacy.
5. Go to the right side of the bed.

Then ->

Inspection:

the child lying comfortably in bed, with nothing connecting to him like IV line & O2.

look for:

Deformities,

The shape of the head.

Scars.

Dysmorphic features, or any abnormality in the face like nose, ears, eyes.

Face & head asymmetry any abnormal swelling or bulging.

hypo & hyper-pigmentation of the face.

Dominant veins.

Palpation:

1. Fontanelle (anterior & posterior), you expect to be closed by 4-6 months for the posterior fontanelle and 18 months for the anterior fontanelle. " the reasons for delay closure for fontanelle: hydrocephalus, increased ICP, rickets " Very important: hold the child a little bit upright 45 degrees while palpating the fontanelle you hold his head on one hand and the other hand feels the anterior fontanelle for bulging and abnormal sensation and pulsating "e.g: babies with hydrocephalus have a v-p shunt you need to evaluate the v-p shunt whether efficient, functioning, or not functioning" and the size of fontanelle.

2. Palpate for overriding sutures like: craniosynostosis: when the brain closes early and before developing brain so it will result in developmental skill delay because the brain did not have a space to grow, and the brain size will grow within the first 2 years of life.

Then:

Measuring the head circumference: you need to do 3 measures of head circumference taking the max head circumference size. then you take the average of your own reading then you plot it in the head circumference chart.

Ask about the head circumference chart.

Auscultation anterior fontanelle and carotid.

Examine the: Eye, ears, nose.

Back examination: for any abnormality, deformity, hair tuft, skin dimpling e.g: spina bifida.

Lower limbs examination. .

P/E

Requirements for P/E:

- Stethoscope for the heart and lungs
- Patellar hammer for jerks
- Non-stretch tape for skull circumference + head circumference chart
- Scales for weighing + weight and height chart
- Developmental assessment tools:
 - To assess child's skills by play and facilitating observer assessment like toys
 - It allows a quick screening of mobility, hand skills, play, speech and language.

P/E

- One-inch block or cubes
- Blunted end pencil or crayon and paper
- Picture card or book
- Bell for hearing assessment
- A ball, doll.

Domains

- explore 4 areas of development
 - Gross motor development: crawling, walking, sitting...
using big muscle
 - Fine motor development “hand function” and vision
 - Language development to communicate
 - Social development to interact & adaptive skills

Developmental assessment

When the developmental assessment is done:

Newborn

6 weeks

4 months

6 months

1 year

18 months

2 years.

then 3 years and 4 years

By 2 years most of the brain has grown.

the most common station in OSCE: 36 months or 4 years because it is easier to deal with, easier to talk to with child and do a different developmental task, it very unlikely to bring newborn, 4 or 6 months even if there is no real child so you need to focus on developmental domains and skill and how to do an assessment from the age of 2 years and forward. However, you have to know all developmental skills for children less than 2 years for MCQs.

Assessment

For young babies (less than 6 months):

first ➤ Prone.

- whether he can raise his head up
(typically, no head control in child is less than 3 months of age)

then ➤ In supine position
Pull the baby to sitting

after 3 months of age, you expect to have head control and the ability to hold their head above the spine level.

➤ Reaction to moving objects or humans, vision

➤ After 6 months, you give the blocks and assess the language

Assessment

- After 12 months: give blocks, pencil or crayon and paper

Newborns

- On Prone, the pelvis is high, knees are under the abdomen.
- On ventral suspension the head is not in the plane of the body
- The hips are not extended. In the newborns even if you extend the legs it will come back, Why this position/posture? Intrauterine this is his position due to the small area.
- He loses it after 6 weeks of birth.

4 months

- Gross Motor:
 - In the sitting position there is no head lag on pulling to sitting position
- Hand functions start;
 - Reach out for gross objects and brings them to the mouth
- Language:
 - Turns head towards sounds
- Adaptive:
 - They laugh with sound

6 months

- Gross motor: Tripod sit: Sit on the floor, hands forward for support, can't sit independently leaning on their hands with their backs rounded.
- Rolls from prone to supine position
- Fine motor skills: transfer one cube from one hand to another.
- Language: babbles
- Stanger Anxiety [if you have any strange visitor he will be scared.](#)

A child comes for a vaccine and the mother has no concerns, take an appropriate developmental history and tell me what is the child's age.

Doctor: what is he doing now?

Mom: Ahmad is able to go up and down the stair and able to ride a tricycle without help and running.

Doctor: How about his speech ability and interaction.

Mom: He has 18 words, but he can't put 2 words in a sentence.

Doctor: Can he hear you clearly?

Mom: Yes

Doctor: Can he write or draw?

Mom: his handwriting is not so good, and he is not able to do coloring.

Doctor: Does he smile back at you, and make eye contact, does he respond to his name? dependent on his self like dressing, undressing, eating (social & adaptive skill)

Just memorize 2 skills under each domains.

#Then go back & cover pregnancy:

1.How was the pregnancy? any complications?

2.during delivery any problem? oxygen? delay?

Does he need to be admitted to the NICU?

3. Postnatal: Did you notice any things different from other kids?

4.Ask about: Birth weight.

5.Ask about: APGAR score.

This child:

for cross motor skill -> 3 years.

other areas -> 12-24 months.