PSYCHOMOTOR RETARDATION IN CHILDHOOD

Causes, diagnosis, management

CHILD DEVELOPMENT

- Child development- abilities acquired by child from birth to 5 yr

- Psychomotor development - skills acquired by the child until its level of cognitive function is advanced enough that they can be assessed independently from the motor development.

PSYCHOMOTOR DEVELOPMENT

- The term "psychomotor development" refers to the first 2-3 years of age.
- Developmental delay is a group of symptoms, not the diagnosis.
- That means slow skill acquisition.

DEFINITION

The delay is when a child does not reach the milestones in expected time, taking into account the two deviations from mean.

MILESTONES

- This is the most important skill development
- It always refers to the age of the child, and preterm infants to the adjusted age

MILESTONES

- Median age – when half the population acquire a skill; serves as a guide to normal pattern of development
- Limit age – when a skill should have been acquired; further assessment is indicated if not achieved, it is determined as two deviations from the mean
- In the limited age many children with LBW, ELBW develop

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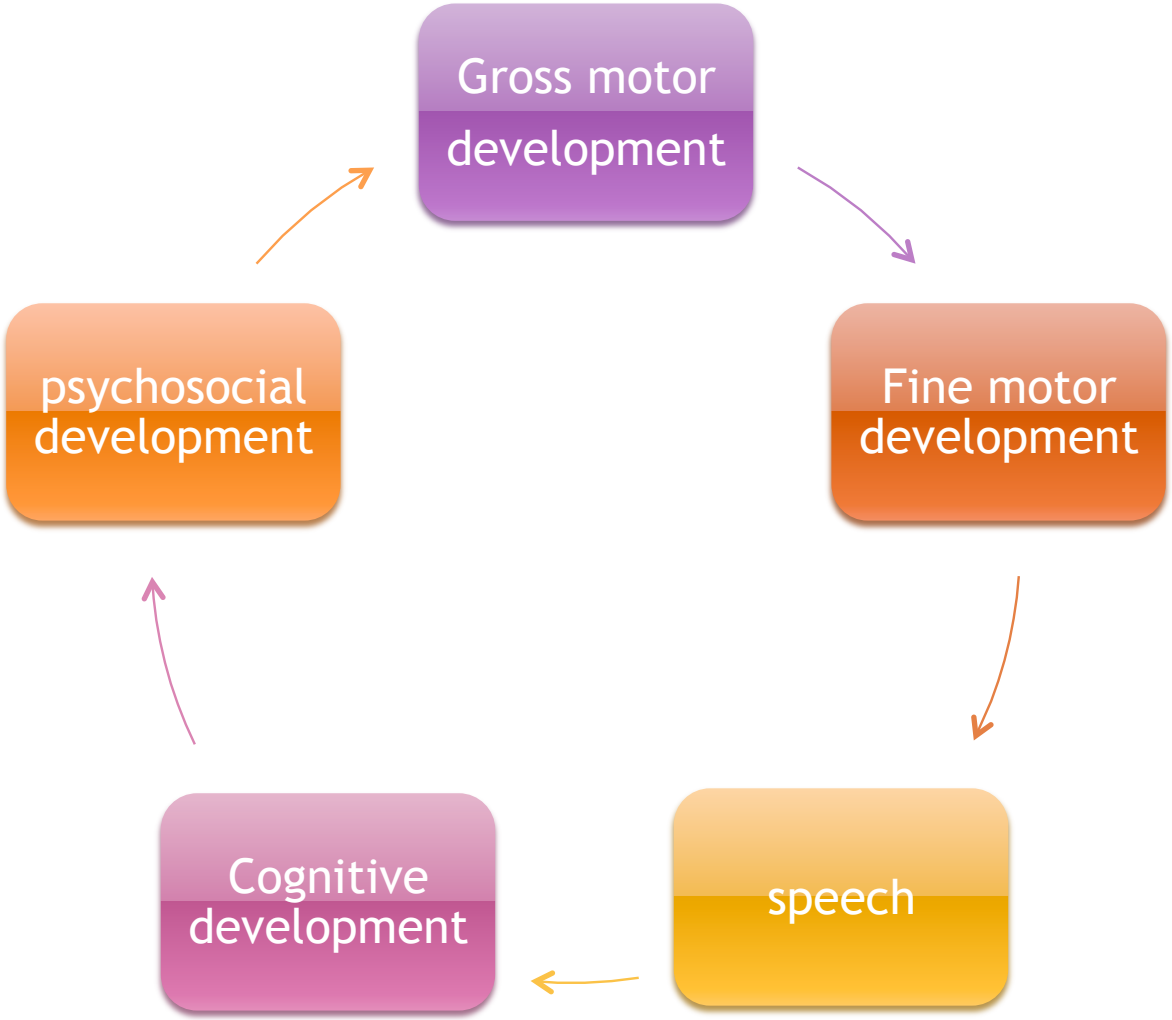
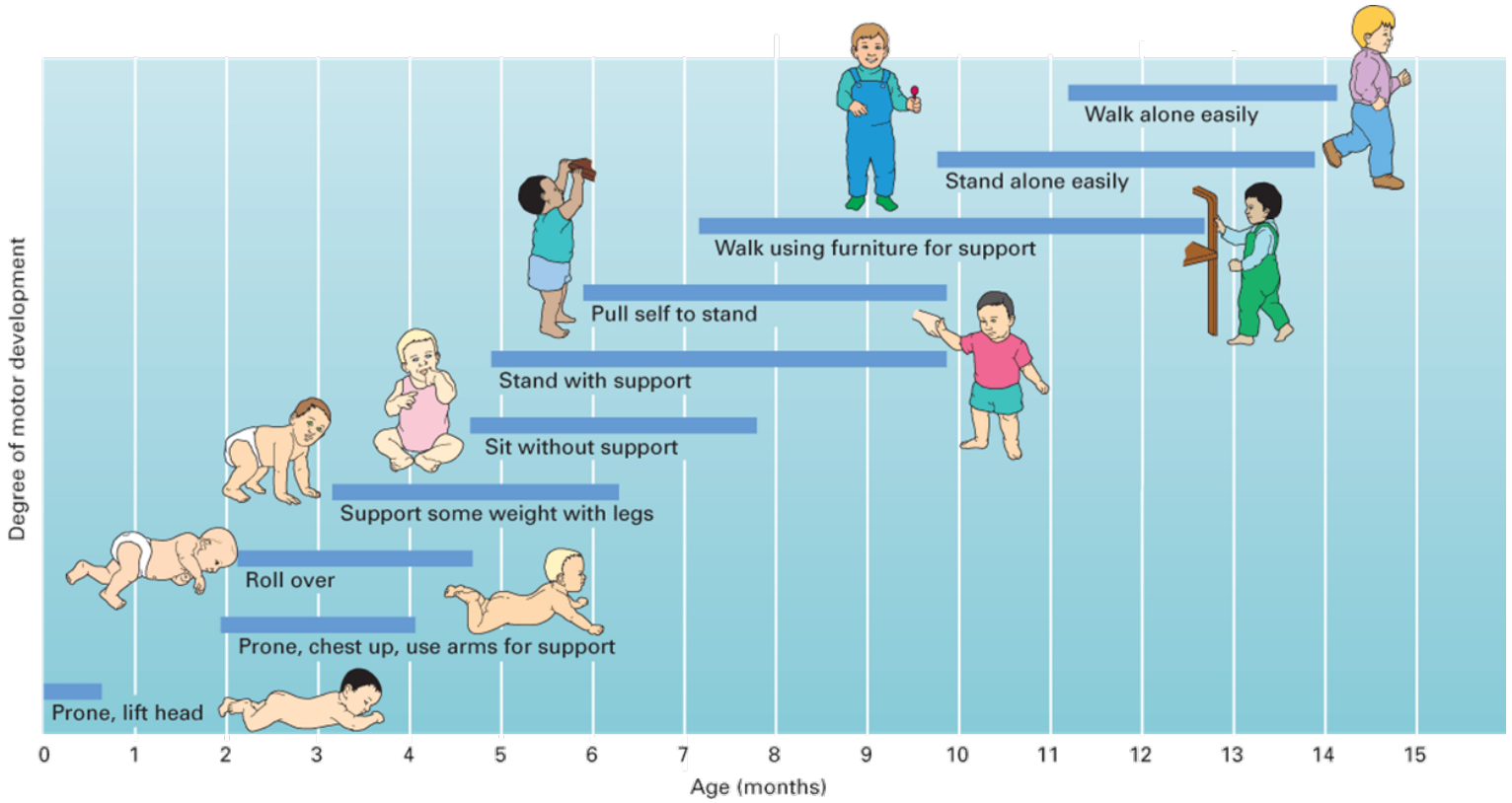


MILESTONES- GROSS MOTOR DEVELOPMENT



MILESTONES- VISION, FINE MOTOR DEVELOPMENT

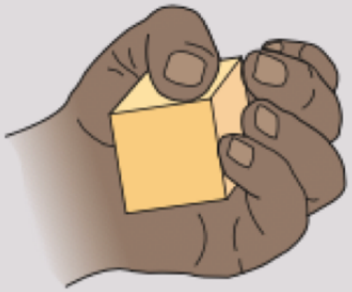
6 weeks

Follows moving object or face by turning the head (illustrated).

4 months

Reaches out for toys

4–6 months



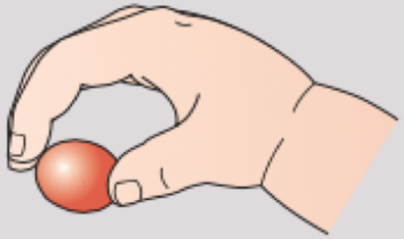
Palmar grasp

7 months

Transfers toys from one hand to another

MILESTONES- VISION, FINE MOTOR DEVELOPMENT

10 months

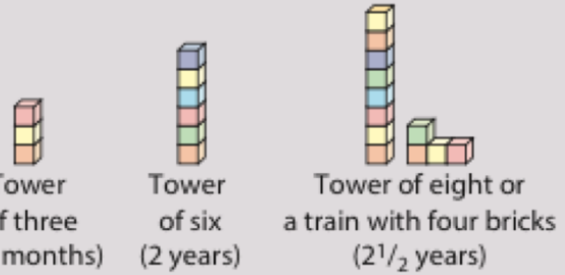


Mature pincer grip

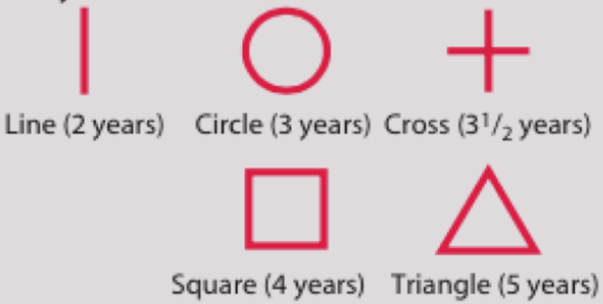
16–18 months

Makes marks with a crayon

14 months–4 years



2–5 years



Ability to draw without seeing how it is done. Can copy (draw after seeing it done) 6 months earlier.

HEARING, SPEECH AND LANGUAGE

NEWBORN

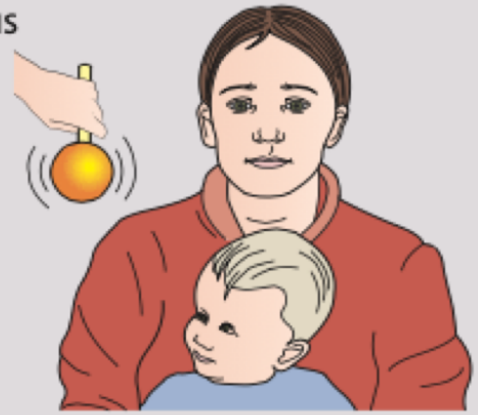
Startles to loud noises

3–4 MONTHS

Vocalises alone or when spoken to, coos and laughs

(b)

7 MONTHS



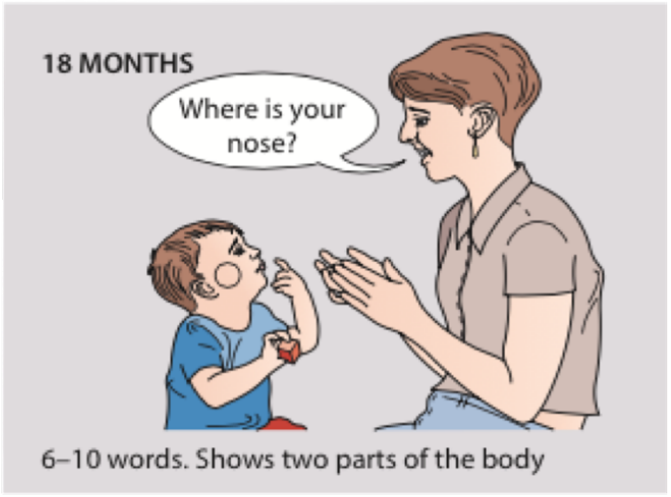
Turns to soft sounds out of sight

7–10 MONTHS

At 7 months, sounds used indiscriminately. At 10 months, sounds used discriminately to parents

(d)

HEARING, SPEECH AND LANGUAGE



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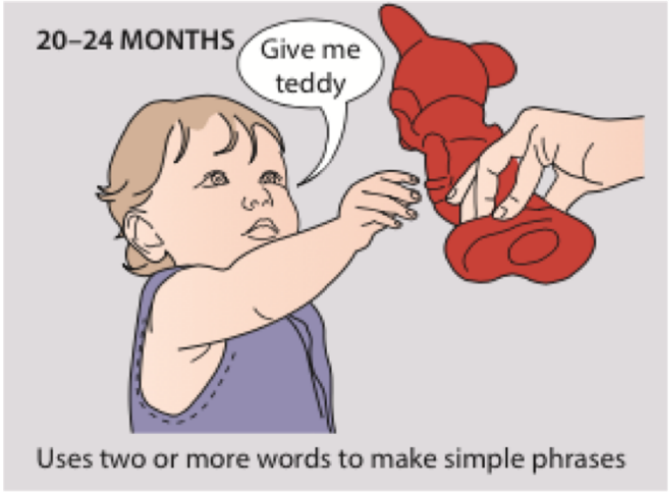

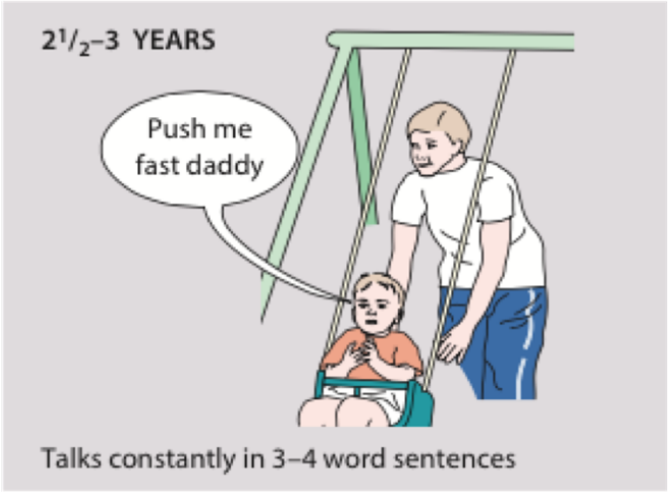

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MILESTONES OF SPEECH DEVELOPMENT

Language, Speech milestones	
Age	**Milestone**
1 months	Alerts to sound
3 months	Coos
4 months	Laugh loud
6 months	Monosyllables
9 months	Bisyllables
12 months	1-2 words with meaning
18 months	8-10 words vocabulary
2 years	2-3 words sentence, use pronouns ”I”, “me”, “you”
3 years	Ask questions; knows full name and gender
4 years	Says song or poem; tells stories
5 years	Asks meaning of words

PSYCHOSOCIAL DEVELOPMENT, BEHAVIOUR

6 WEEKS

Smiles responsively

6–8 MONTHS

Puts food in mouth

10–12 MONTHS

Waves bye-bye, plays peek-a-boo

12 MONTHS

Drinks from a cup with two hands

PSYCHOSOCIAL DEVELOPMENT, BEHAVIOUR

18 MONTHS

Holds spoon and gets food safely to mouth

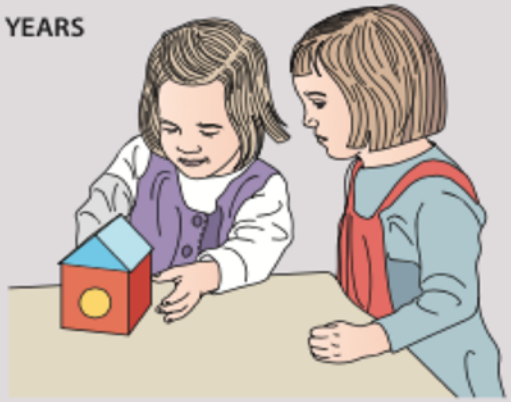
18–24 MONTHS

Symbolic play

2 YEARS

Dry by day. Pulls off some clothing

2.5–3 YEARS



Parallel play. Interactive play evolving. Takes turn

PSYCHOSOCIAL DEVELOPMENT- MILESTONES

Social and adaptive milestones	
Age	**Milestones**
2 months	Social smile
3 months	Recognizes mother; anticipates feeds
6 months	Recognizes strange/ stranger anxiety
9 months	Waves 'bye-bye'
12 months	Comes when called; plays simple ball game
15 months	Jargon
18 months	Copies parents in task
2 years	Asks for food, drink, toilet; pulls people to show toys
3 years	Shares toys; knows full name and gender
4 years	Plays cooperatively in a group; goes to toilet alone
5 years	Helps in household tasks; dresses and undresses

MILESTONES

Age	Gross Motor	Visioon&Fine Motor	Hearing, Speech&Language	Social, emotional&behavioural
Newborn	Flexed posture	Fixes and follows face	Stills to voice Startles to loud noise	Smiles by 6 weeks
7 months	Sits without support	Transfer objects from hand to hand	Turns to voice, Polysyllabic babble	Finger feeds Fears strangers
12 months	Stands independently	Pincer grip (10 months), Points	1 -2 words Understand name	Drinks from the cup Waves
15-18 months	Walks independently	Immature grip of pencil, Random scribble	6 -10 words Points to four body parts	Feeds self with a spoon Beginning to help with dressing
2 ½ years	Runs and jumps	Draws	3 -4 word sentences Understands two joined commands	Parallel play Clean and dry

RED FLAGS

Gross motor development

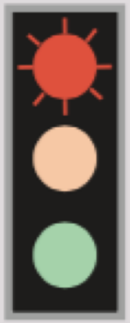
- Acquisition of tone and head control
- Primitive reflexes disappear
- Sitting
- Locomotor patterns
- Standing, walking, running
- Hopping, jumping, peddling

Gross motor	Limit ages
Head control	4 months
Sits unsupported	9 months
Stands independently	12 months
Walks independently	18 months

Vision and fine motor development

- Visual alertness, fixing and following
- Grasp reflex, hand regard
- Voluntary grasping, pincer, points
- Handles objects with both hands, transfers from hand to hand
- Writing, cutting, dressing

Vision and fine motor	Limit ages
Fixes and follows visually	3 months
Reaches for objects	6 months
Transfers	9 months
Pincer grip	12 months

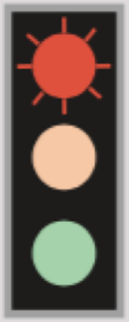


RED FLAGS

Hearing, speech and language development

- Sound recognition, vocalisation
- Babbling
- Single words, understands simple requests
- Joining words, phrases
- Simple and complex conversation

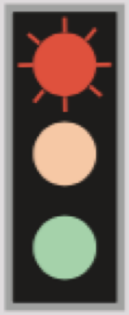
Hearing, speech and language	Limit ages
Polysyllabic babble	7 months
Consonant babble	10 months
Saying 6 words with meaning	18 months
Joins words	2 years
3-word sentences	2.5 years



Social, emotional, behaviour development

- Smiling, socially responsive
- Separation anxiety
- Self-help skills, feeding, dressing, toileting
- Peer group relationships
- Symbolic play
- Social/communication behaviour

Social behaviour	Limit ages
Smiles	8 weeks
Fear of strangers	10 months
Feeds self/spoon	18 months
Symbolic play	2–2.5 years
Interactive play	3–3.5 years



PSYCHOMOTOR DEVELOPMENT DELAY

- The universal definition and classification of developmental delays is not established.
- The development level lower than the average may be present in one or more areas.
- The global developmental delay it is a significant delay in at least two of its areas

PSYCHOMOTOR DEVELOPMENT DELAY

- Development, regardless of its speed, it can be harmonious or disharmonious
- Disharmonious development of individual skills is often observed in healthy children

PSYCHOMOTOR DEVELOPMENT DELAY

Delays in a very narrow range (e.g. only manual skills or hand-eye coordination) is called specific development deficits efficiency

PSYCHOMOTOR DEVELOPMENT DELAY

It is proposed that "global delay development" replace more diagnostic the term "early developmental disorders": persistent, significant limitations in at least two areas in children under 5 years, which currently can not be given other diagnose.

ASSESSMENT OF PSYCHOMOTOR DEVELOPMENT

Developmental screening allows to capture global or fragmentary developmental delays in most cases.

ASSESSMENT OF PSYCHOMOTOR DEVELOPMENT

In problematic/ borderline cases standard diagnosis will be more certain if it is established on several sources:

- standardized interview
- direct observation
- psychological examination
- speech evaluation

ASSESSMENT OF PSYCHOMOTOR DEVELOPMENT

- There is no universal rating scale which assess the development
- The most commonly used is the scale of Denver
- There are standardized tests to evaluate the infants and toddlers: the scale of the development of the infant Griffiths or Bailey

ASSESSMENT OF PSYCHOMOTOR DEVELOPMENT

Psychomotor delay is suspected when the development is slower then mean:

- First 6 months of life- more then 1 month
- 6-12 months of life – more then 2 months
- 1-1,5 years- more then 3 months

PSYCHOMOTOR DEVELOPMENT DELAY

Diagnosis should be made at least in age of 9 years old.

INCIDENCE

- Approximately 25% children in outpatient clinic is observed developmental delay
- 5–10% is diagnosed with some neurodevelopmental disorders
- Most of these "grows" from their problems spontaneously or with a little help

INCIDENCE

Global developmental delay and associated with it intellectual disability occures at least 3% of children in the group to 5 years old.

DELAY AND REGRESION

Regress - the loss of acquired skills

It can occur in a child previously properly developing and in children, the development of which was already delayed

REGRESION- CAUSES

- epilepsy
- progessive hydrocephalus
- proliferative process CNS
- Vascular diseases
- Infetious diseases
- Inflammatory diseases
- Autoimmunologic diseases (HIV, SSPE- subacute sclerosing panencephalitis, ADEM- Acute Disseminated Encephalomyelitis)
- Drugs side effects
- Psychiatric disorders
- autism

CAUSES AND DIAGNOSIS OF THE DEVELOPMENTAL RETARDATION

- retardation may be either isolated or present with the other disorders
- the reasons for the delay of development is impossible to determine in 40-60% of children

CAUSES AND DIAGNOSIS OF THE DEVELOPMENTAL RETARDATION

- family history (3 generations)
- pregnancy and perinatal period
- evaluation of the current development
- evaluation of the results of basic research
- pediatric study
- neurological examination

Help find the cause of about 30% of delays development

CAUSES AND DIAGNOSIS OF THE DEVELOPMENTAL RETARDATION

- the primary reason for the delay of development is often masked by prematurity and / or hypoxic-ischemic encephalopathy

- always have to take into account the impact of the toxic factors to the fetus - alcohol, nicotine, lead, phenylalanine in the mother with undiagnosed, untreated phenylketonuria

The greatest chance of success gives diagnostic team work:

pediatrician

neurologist

psychologist

clinical geneticist

neuroradiologist

specialist in metabolic diseases

LABORATORY TESTS

Blood tests:

karyotype, fragile X

Complete blood acount

Creatine kinase

TSH/fT4

lactates, amino acids, ammonia

VLCFA, carnitine, homocysteine

toksoplasmosis, CMV

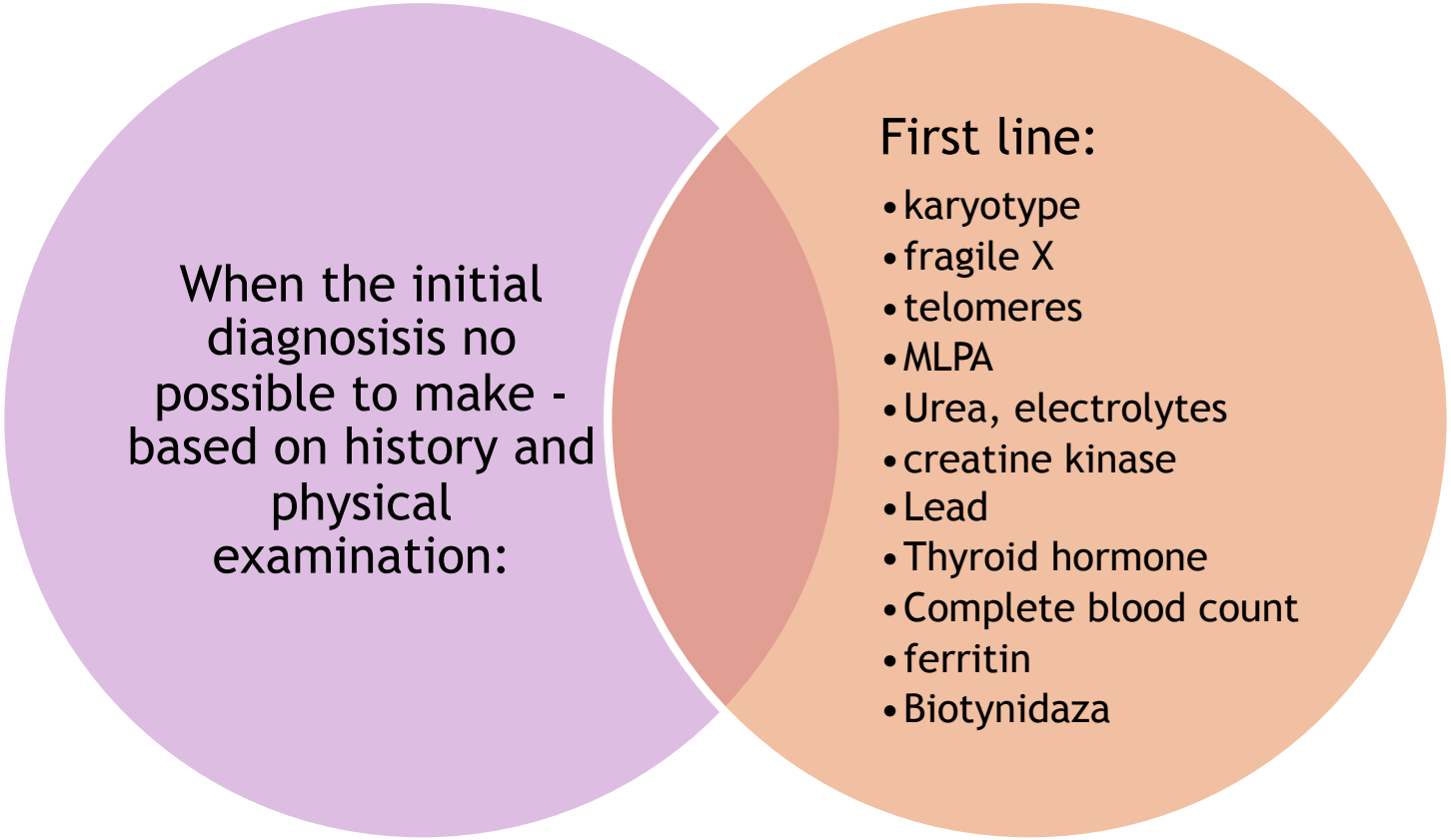
rubella, HIV

Urine test:

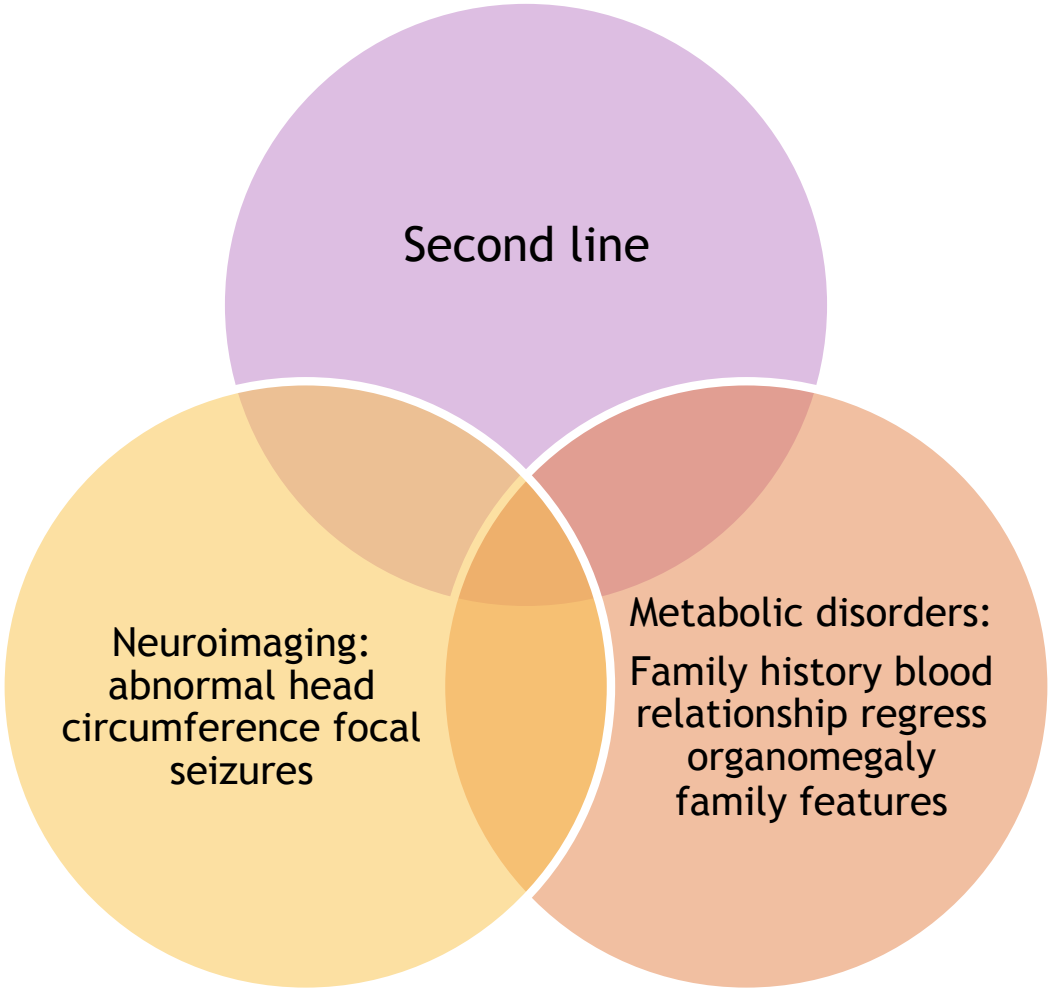
- CMV
- organic acids
- orotic acid
- mucopolysaccharides

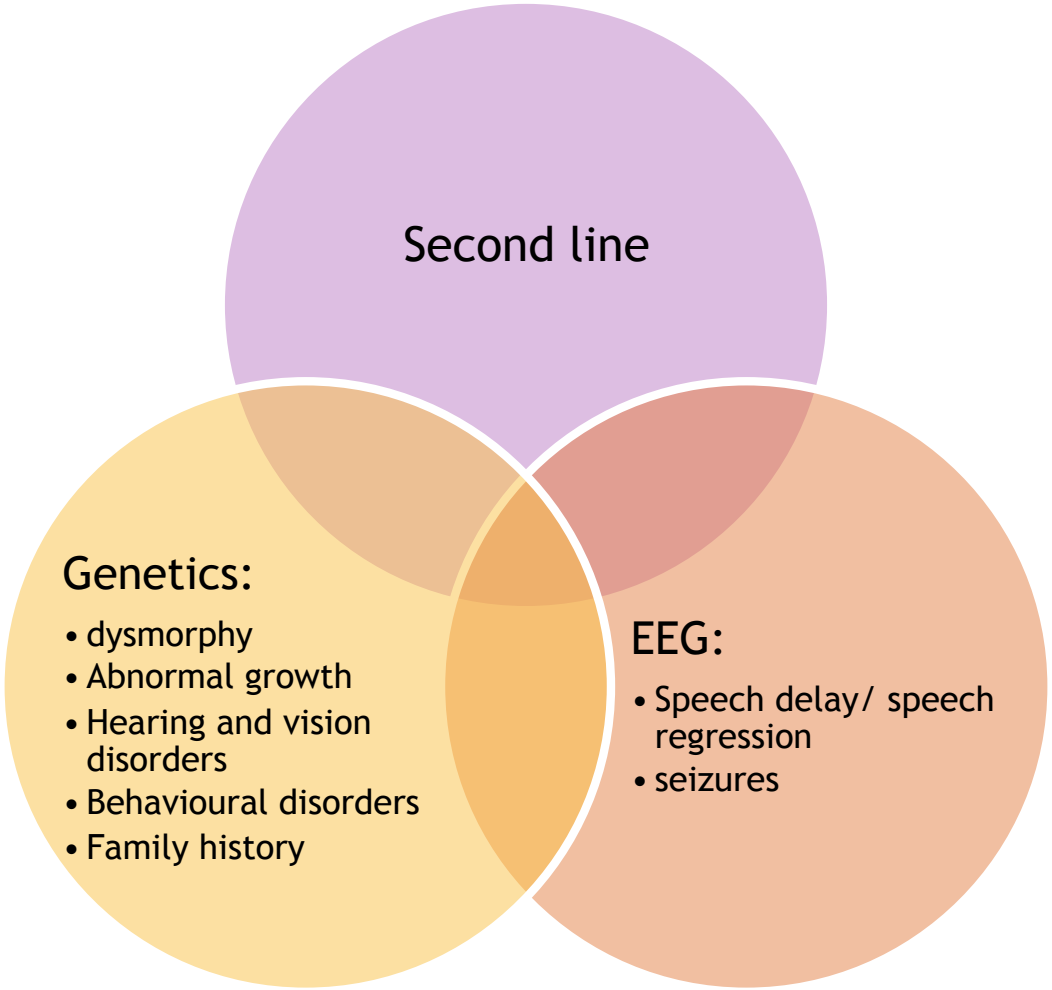
Skin test in Wood lamp

DIAGNOSTIC SCHEME

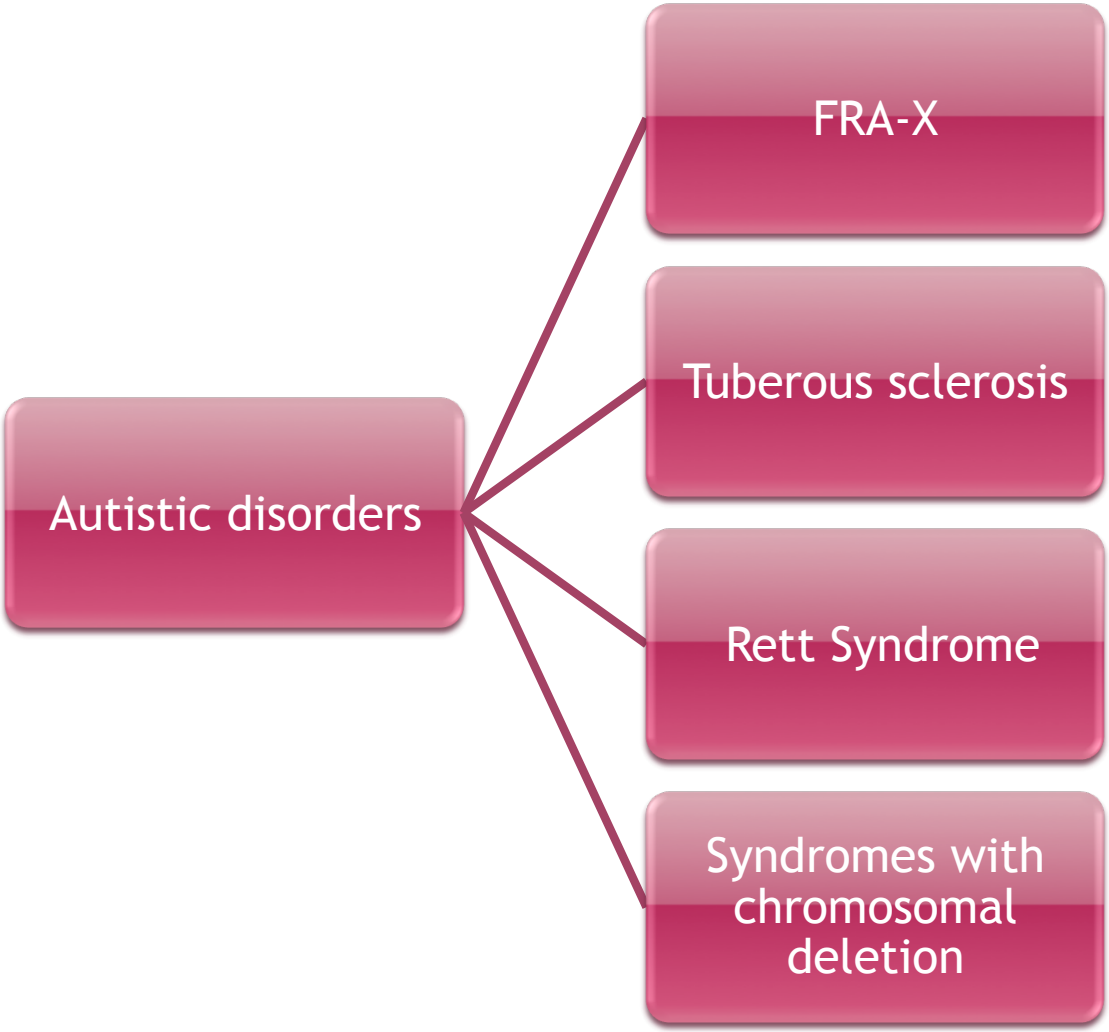


DIAGNOSTIC SCHEME




Second line
Genetics:
• dysmorphy
• Abnormal growth
• Hearing and vision disorders
• Behavioural disorders
• Family history
EEG:
• Speech delay/ speech regression
• seizures

GENETIC SYNDROMES WITH DEVELOPMENTAL DELAY



GENETIC SYNDROMES WITH DEVELOPMENTAL DELAY

Mikrocefalia

- Zespół Retta lub mutacja MECP2
- Zespół Angelmanna
- Zaburzenia Rett-like (mutacje CDKL5 i FOXG1)
- Zespoły z delecją chromosomów
- Zespół Pitta-Hopkins
- Zespół Mowata-Wilsona
- Zespół SLO
- Zespół Cornelii de Lange
- Zespół Cohena

Makrocefalia

- Zespół Sotosa
- FRA-X
- Zespół Costello
- Zespół Lujana
- PTEN
- Mutacje w RAB39B i oPHN1

SYMPTOMS SUGESTING METABOLIC DISEASE OR NEURODEGENERATIVE DISEASE

Neurologic disorders

- hypotonia
- convulsions
- Ataxia
- paroxysmal disorders of the concoiusness
- extrapyramidal disorders

Irregulatories in biochemistry tests:

- acidosis
- hyperammonemia
- hyperuricaemia
- relapsing hypoglycemia
- hipertransaminazemia, cholestasis

SYMPTOMS SUGESTING METABOLIC DISEASE OR NEURODEGENERATIVE DISEASE

Physical disorders

- Lack of appetite
- Vomiting

Organomegaly

- hepatomegaly, splenomegaly
- cardiomiopathy

Eyeballs

- Retinopathy
- cataract
- corneal opacity

The winding, rough, brittle hair and

- impairment deep, significant laxity of the skin, light skin

SYMPTOMS SUGESTING METABOLIC DISEASE OR NEURODEGENERATIVE DISEASE

Bone anomalies

- Dysostosis multiplex
- chondrodysplazja
- severe bone pain

Skin rashes, ichthyosis, and

- Mental impairment, epilepsy

Dysmorphism features

- thickening face features
- features like Down syndrome
- features like FAS

THERAPY

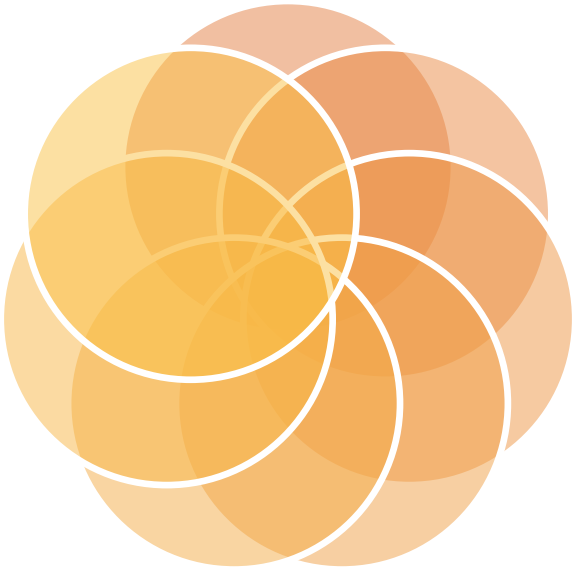
In any case of delayed development it is necessary to use the symptomatic treatment or/and causal treatment.

THERAPY

Anaemia treatment

Defect of vision

Vitamins deficiency



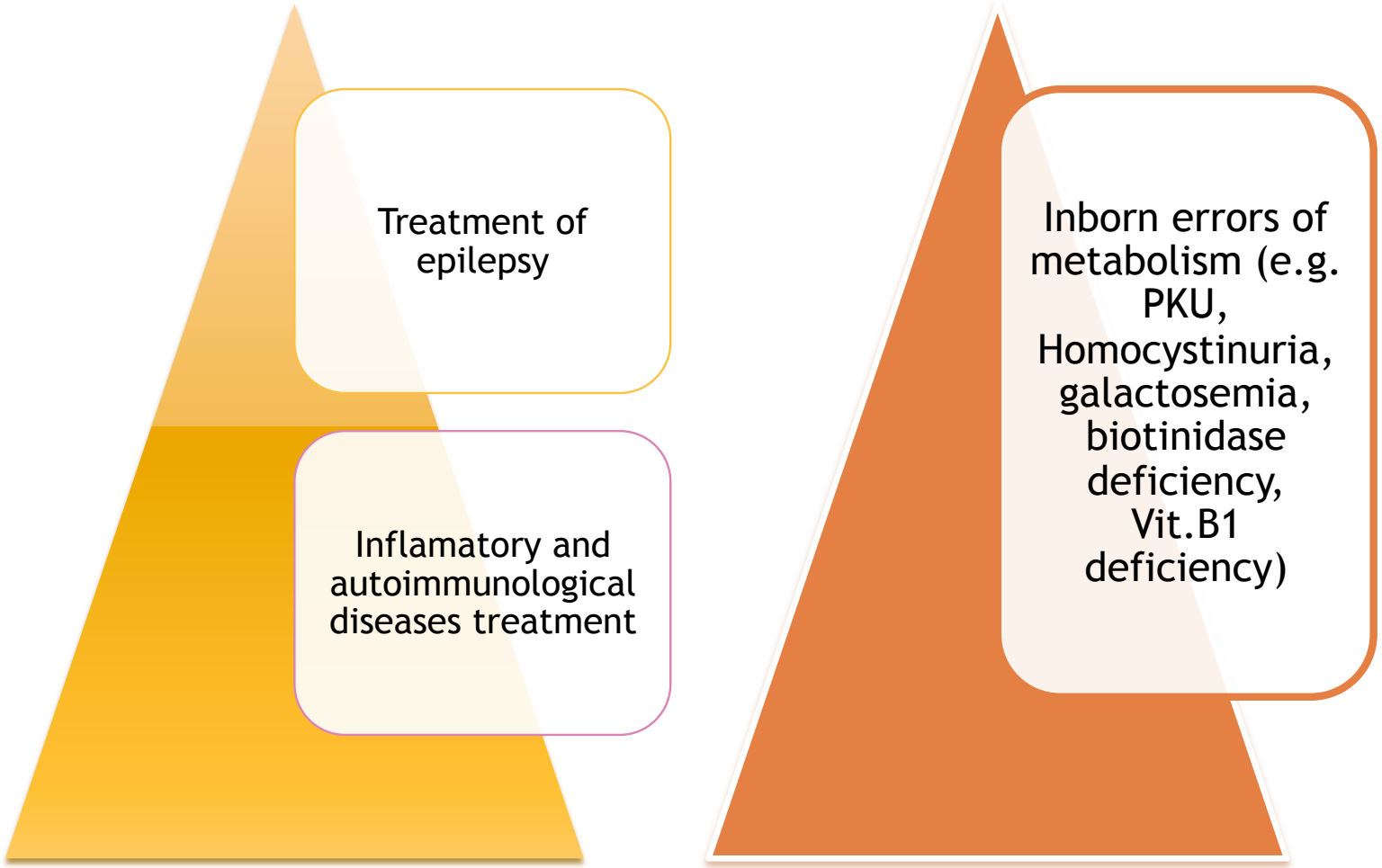
Hearing disorders

hypothyroidism

Active hydrocephalus

Active TORCH infections

THERAOY


Treatment of epilepsy
Inflamatory and autoimmunological diseases treatment
Inborn errors of metabolism (e.g. PKU, Homocystinuria, galactosemia, biotinidase deficiency, Vit.B1 deficiency)

THERAPY

1. Children are targeted for rehabilitation (early intervention / early intervention program development).
2. In children at risk of developmental disorders early intervention is associated with improved cognitive development in infancy and preschool.
3. The most important in the intensive health care is family.
4. Children with a slight developmental delay can be observed by a pediatrician.
5. Parents is granted briefing care during meetings with physiotherapist, speech therapist, psychologist.

THERAPY

Early intervention should always be considered in children exposed to sensory deprivation for social reasons:

poor environmental conditions

abandonment

depression in the mother

THERAPY

1. In children moderately and significantly delayed - early intervention is needed and effective at the right time and in a manner adapted to the needs and abilities of the child.
2. Early intervention is not always - immediate.
3. Critical periods for the development of most of the functions continues throughout childhood.
4. Only the processes of vision and hearing are relatively short (one year old).

THERAPY

We rehabilitate child, only if it requires it.

The appearance of the function (ability) decides the period of overproduction of synapses in the brain region, which responds for it.

Stimulating skills before the period overproduction of synapses does not make sense.

It may even be harmful, because it interferes with the natural compensatory mechanisms and influence on the for the process brain plasticity in wrong way.

THERAPY

A prerequisite for the existence of plastic processes is the presence of connections between neurons (sending and receiving centers).

If in some region of the brain connections not arise or be destroyed irreversibly (porencefalic pit), and the brain does not produce alternative routes, the early intervention will be ineffective.

REFFERENCES AND SOURCES

1. Standardy postępowania diagnostyczno-terapeutycznego w schorzeniach układu nerwowego u dzieci i młodzieży pod red. B. Steinborn
2. Illustrated Textbook of Paediatrics, 4th ed., T.Lissauer, G.Clayden
3. osesek.pl; maluchy.pl