Child Development

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Introduction:

- Child development involves a range of milestones and key moments.
- There is a continuum of normal ranges.
- It is important to identify those children at risk of delays earlier than others in order to assist the family in rapidly helping those with delays.
- Many children have underlying causes which need assessment and support.
- These children need full support for their family.

Gross motor development: Head Control

- Newborn: Head lag on pulling to sit, head extension in ventral position.

- 6 – 8 weeks: Lifts head on lying prone and move from side to side.
- 3 months: Infant holds head upright when held sitting.

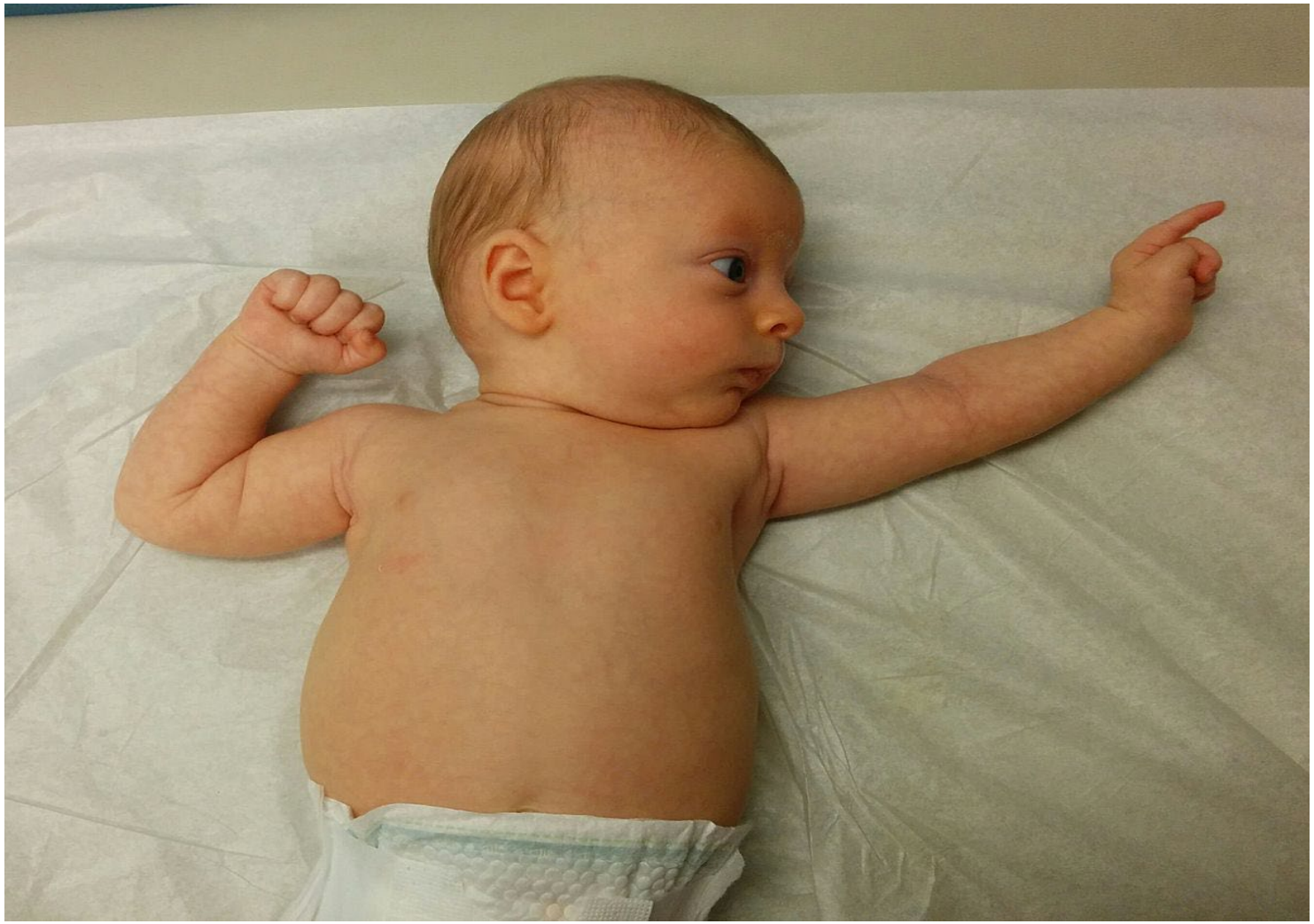
Primitive Reflexes:

- Moro reflex: Sudden extension of the head leads to symmetrical extension of the limbs followed by flexion.
- Grasp reflex: fingers/toes grasp on an object or finger on the palms and soles.
- Rooting reflex: head turns towards tactile stimulus placed near the mouth.
- Stepping reflex: Infant held vertically: Then steps on a surface if foot is placed on it, followed by an upstep by the other foot.
- Asymmetrical neck reflex: lying supine, if head turned, a “fencing posture” is adopted with the arm on the head is turned to outstretched.

- These reflexes disappear by 4 – 6 months in normal development.

Moro Reflex:

Asymmetrical Neck Reflex:



Stepping Reflex:

Sitting:

- By age 6 – 8 months an infant can sit without support.
- Any child unable to do this at 9 months is likely to have some kind of developmental delay.

- In order to sit, the child must have the 2 reflexes:

1. Propping or parachute reflex in response to falling.
2. Righting reflex to position head and body back to the vertical on tilting.

Locomotor Skills:

- Initial mobility is crawling, but some bottom-shuffle and others commando crawl/creep.
- Bottom-shufflers generally walk a little later – so some may not crawl.
- By 10 months, most infants are usually cruising around the edge of furniture.
- By 12 months, 50% infants are walking independently but the age range of this is very broad.

- **Any child not walking by 18 months needs further evaluation.**

Fine Motor Development:

- Beware that fine motor skills are assessed alongside visual skills as the two are interdependent.
- Early visual alertness:

1. Newborn: Fix and follow a near face or light moving across the field of view.
2. 6 weeks: More alert and turns head through 90 degrees to follow and object.
3. By 3 -4 months: Baby watches hands a lot (hand regard) – starts to play with hands more.

Early Fine Motor Skills:

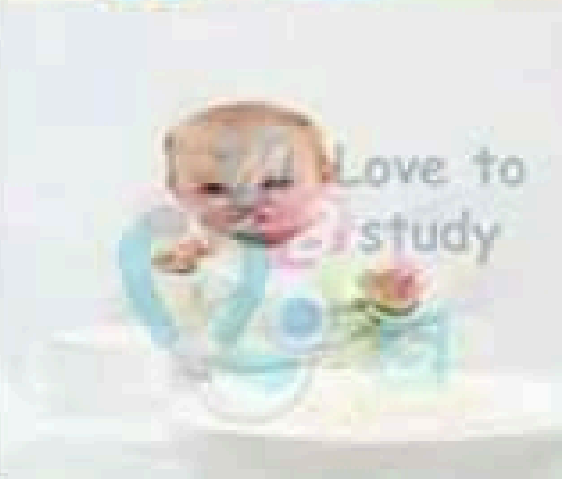
- As primitive grasp reflexes disappear the infants begin to reach for objects:
- 6 months: Grip with whole palm (palmar grasp). Objects held with both hands and banged together, being transferred between hands.
- 10 months: Thumb and finger develop a pincer grip.
- 12 months: Index finger points to objects.

Preschool motor skills:

- 18 months: Can scribble with a pencil.
- 2 years: Builds 6 brick tower.
- 2 ½ years: Copies circle and build 8 brick tower.
- 3 years: Circle.
- 4 Years: Cross.
- 5 years: Square and triangle.

Fine motor developmental milestones

Age	Milestone
4 months	Bidextrous reach
6 months	Unidextrous reach; transfer object
9 months	Immature pincer grasp; probes with forefinger
12 months	Pincer grasp mature
15 months	Imitates scribbling; tower of 2 blocks
18 months	Scribbles; tower of 3 blocks
2 years	Tower of 6 blocks; vertical and circular stroke
3 years	Tower of 9 blocks; copies circle
4 years	Copies cross; bridge with blocks
5 years	Copies triangle



Fine motor delays:

- Delays often very similar in cause to gross motor delays.
- Next session will involve more detailed assessment of the reason for delays.
- Ensure that vision is assessed as for all children and that this may be a cause for visual loss.

Speech and Language

- This should be assessed with hearing and causes of hearing loss also considered as hearing loss can lead to speech delays.

- Early signs of normal hearing and vocals:

- Newborn: quietens to voices and startles if loud.
- 6 weeks: responds to mother’s voice.
- 12 weeks: Vocalize alone or when spoken to, also coos and laughs.

Early language development:

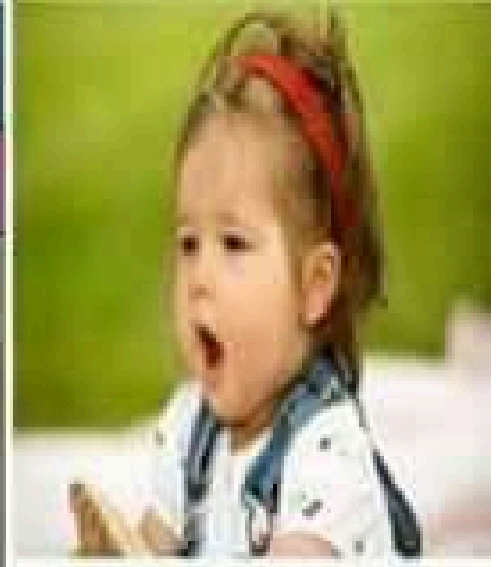
- 6 months: Consonant monosyllables e.g. Ba or Da.
- 8 months: 2 syllable babble: mama or dada.
- 13 months: Starts to understand single words e.g. no.
- 18 months: Vocabulary of 10 words, demonstrates 6 parts of the body.

Phrases and conversation development:

- Sentence development usually in the 2nd year of life.
- 24 months: combines 2 words, then 3 words by age 2 years e.g. give me toy.
- 36 months: Knows name, colours and age.

language 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



Social and behavioural development:

- Early stages:

- 6 weeks: Smiling and a little responsiveness.
- 10 months: Separation anxiety when removed from parent and increased stranger wariness.
- 10 – 12 months: Waves goodbye.

Self-help skills development:

- 8 months: Feed self using fingers.
- 12 months: Drink from a cup.
- 18 months: Feeds self using a spoon.
- 2 years: Removes clothes and begins dressing self.

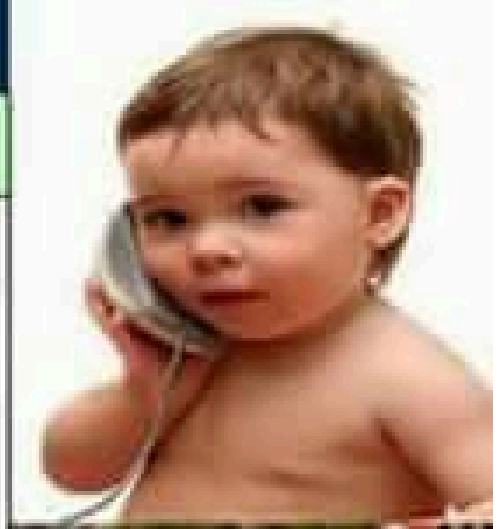
Further developments:

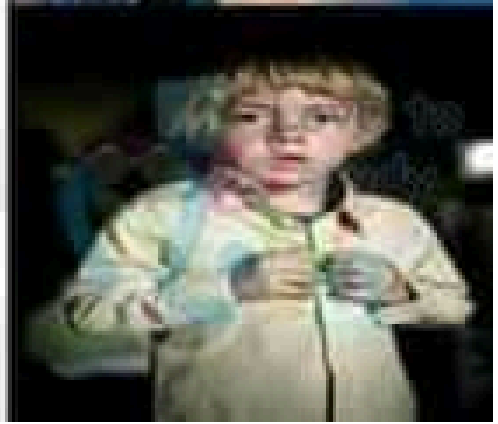
- Bladder and bowel training is very variable.
- Some children are potty trained by 2 years, others take much longer to develop this behaviour.

- 10% 5 year olds still wet the bed at night.

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





Symbolic play and cognitive function:

- 24 months: Copy actions and activities seen around.
- 2nd year: Learn to play alongside others or alone.
- 3 years onwards: Interactive play with taking turns and following rules.

- Cognitive function: Pre-school: thought processes are pre-operational (child at centre of world).
- Junior age: Operational, processes more orderly and practical.
- Teenage years: formal operational thought developed including reasoning and abstract thought.

Developmental delays:

- Important to establish the nature of the delay.
- Global vs localised.

- Establishing the cause has a big impact on next steps, advice and management.

Delayed walking:

- Remember the milestones!
- Children not walking by 18 months should be given contact with a physiotherapist and assessed further.
- Also consider this if not crawling at the appropriate age.

- Causes as below:

Cerebral Palsy:

- Chronic disorder of movement/posture presenting before 2 years and continuous throughout life.
- Usually a static injury to the developing brain.
- Risk of impaired vision, hearing, speech, learning and epilepsy.
- Some children may present with spasticity or ataxia.

- CP is a descriptive term, not the cause. Need to establish the cause, is there a history of prematurity, infections as a neonate, cerebral malaria etc?

CP: History taking:

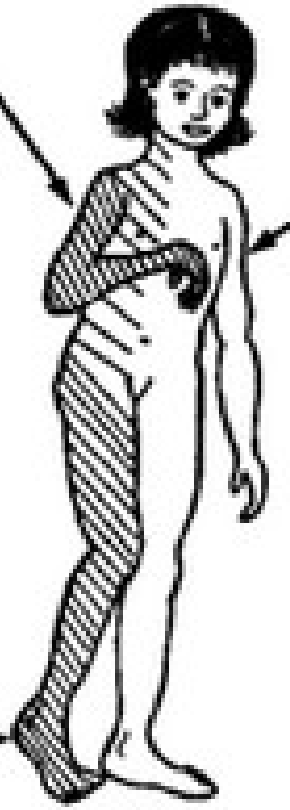
- Is there anything different about your baby?
- How are they moving?
- Were they born on time, late or early?
- How were they born?
- Any problems since birth – neonatal sepsis, malaria?
- Any new medications stopped or started?
- Speech or sounds?

Spastic CP:

- Commonest.
- Many subtypes: Hemiplegic, Diplegic or quadriplegic.
- Increased resistance to passive stretch.
- Disruption to the spinal reflex arc as a result of upper motor neuron damage is the hallmark.

- Features include: Clasp-knife phenomenon (catch on stretching tendons), ankle plantar flexion, foot deformity, hip often flexed and internally rotated.
- Wrist and elbow flexed, shoulder adducted.

ARM AND LEG ON ONE SIDE (HEMIPLEGIC)



arm bent; hand spastic or floppy, often of little use

this side completely or almost normal

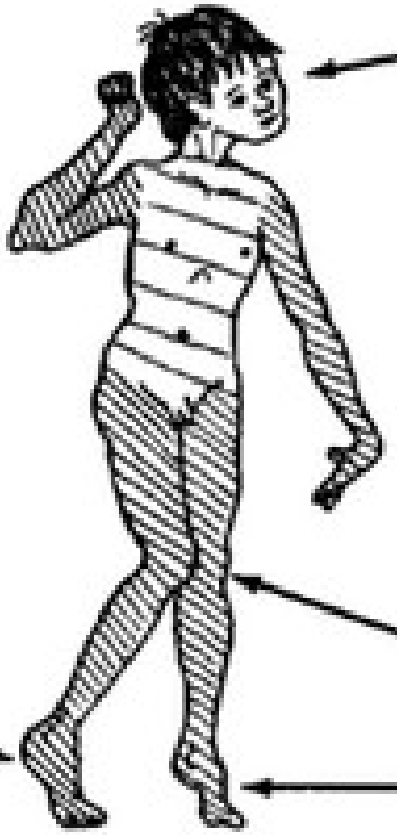
She walks on tiptoe or outside of foot on affected side.

BOTH LEGS ONLY (PARAPLEGIC) or with slight involvement elsewhere (DIPLEGIC)

upper body usually normal or with very minor signs

Child may develop contractures of ankles and feet.

BOTH ARMS AND BOTH LEGS (QUADRIPLEGIC)



When he walks, his arms, head, and even his mouth may twist strangely.

Children with all 4 limbs affected often have such severe brain damage that they never are able to walk.

The knees press together.

legs and feet turned inward

Choreoathetosis:

- 4-limb disorder with increased tone while awake and less so whilst asleep.
- Patients do not have stretch related response or increased reflexes.
- May get extensive overlap with spastic CP.
- As the child matures, there will be fixed reduction in the range of joint movement with signs difficult to distinguish from spastic cerebral palsy.
- Almost always bulbar problems with swallowing difficulty.

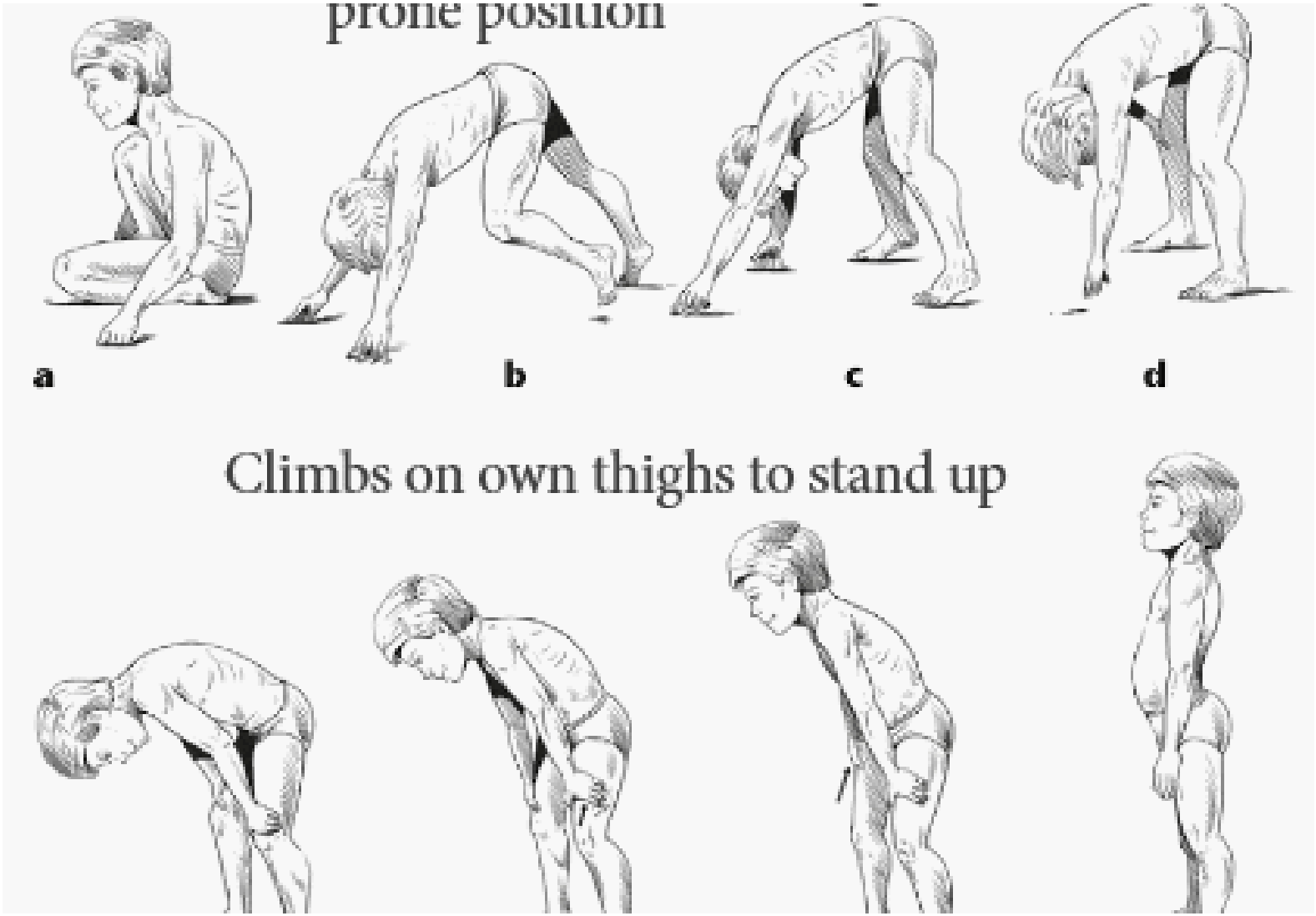
Management:

- Good history essential to the diagnosis.
- Ideally a brain MRI can indicate a cuse.
- Patients need complex MDT input.
- Need physiotherapy with occupational therapy to continue to support the treatment.
- Wheelchairs and other walking aids generally very helpful.

Muscular Dystrophy:

- Duchenne: Usually presents within the first 4 years of life, delayed motor milestones and mild speech delay.
- X-linked recessive.
- Examination: Waddling lordotic gait with calf hypertrophy and weakness in the limb girdles (Gower’s sign).
- Sparing of facial, extra-ocular and bulbar muscles.
- Can be diagnosed by a raised creatinine kinase.
- Management generally supportive and prognosis is poor.

Gower’s sign:



Delayed Speech:

- Familial: Family history of language delay where parents are late in developing language.
- Hearing impairment: Chronic otitis media (glue ear) v common.
- Environmental: No one talking to the child, deprived surroundings.
- Neuropsychological: global delays including autistic spectrum disorder.

- Always check hearing and ears!

Global Developmental Delay:

- This indicates a delay to all areas of a child's development, including speech, motor and other areas.
- Multiple causes, many of which are hard to treat.
- Common prenatal:

1. Teratogens e.g. alcohol/other substances.
2. Congenital infections such as rubella, CMV or toxoplasmosis.
3. Hypothyroidism.

Perinatal insult:

- Complications as a result of extreme prematurity e.g. intraventricular haemorrhage, periventricular leucomalacia.
- Birth asphyxia.
- Metabolic disorder e.g. hypoglycaemia or hyperbilirubinaemia.
- Sepsis.

Post-natal problems:

- Brain injury: Trauma, anoxia as a result of suffocation or drowning.
- CNS infection e.g. encephalitis or meningitis.
- Hypoglycaemic episodes untreated.

Genetic disorders and congenital brain disorders:

- To be covered more in the next session!
- But may include microcephaly, hydrocephaly and metabolic syndromes.
- Also genetic disorders such as Down’s syndrome.