

## **CONVULSIONS in small children:**

**In infants between the ages of one month and one year convulsions are usually, associated with fever.**

- If there is no fever, epilepsy should be considered, which is more prolonged and requires long term treatment, as compared to convulsions associated with fever which usually, stops by 5-6 years.
- Fits can be divided into generalized – that means involving the whole body or partial seizures --which involves only a particular function or part of the human body.
- Generalized seizures include tonic-clonic that means the body oscillates before, suddenly, becoming stiff and rigid with temporary cessation of respiration and then followed by sudden jerky movements of the limbs and the face accompanied by unconsciousness and frothing from mouth, usually.
- fits are those where there is sudden contraction of a muscle.
- Partial seizures include focal and temporal lobe fits. During some episodes partial seizures may be followed by generalized seizures.
- Generalised tonic-clonic fits are the most common type. The child may appear irritable or show other unusual behavior, for a few minutes, before an attack. Sudden loss of consciousness occurs during the tonic phase, which lasts 20–30 seconds and is accompanied by temporary cessation of respiratory movements and central cyanosis. The clonic phase follows and there are jerky movements of the limbs and face.
- The movements, gradually, stop and the child may sleep for a few minutes before waking, confused and irritable.
- Although a typical tonic-clonic attack is easily recognized, other forms of fits may be difficult to diagnose from the history provided by the mother.
- Infantile spasms may begin with momentary episodes of loss of tone, which can occur in bouts and be followed by fits in which the head may suddenly drop forward or the whole infant may move momentarily, like a frog.
- Recurrent episodes with similar features, whether they are changes in the level of consciousness or involuntary movements, should raise the possibility of fits.

### **Differential diagnosis**

Convulsions must be differentiated from blue-breath holding attacks, which usually begin at 9–18 months' of age. Immediately, after a frustrating or painful experience infants cry vigorously and suddenly, hold their breath, become cyanosed, and in the most severe cases lose consciousness. Rarely, their limbs become rigid and there may be a few clonic movements, lasting a few seconds. Respiratory movements begin again and infants gain consciousness, immediately. The attacks diminish with age with no specific treatment. The mother may be helped, to manage these extremely frightening episodes, by being told that the child will not die and that she should handle each attack consistently by putting the child on his side. Rigors may occur in any acute febrile illness, but there is no loss of consciousness.

## **Febrile convulsions**

**Definition:** A febrile convulsion is a fit occurring in a child aged from six months to five years, precipitated by fever, arising from infection outside the nervous system, in a child who is otherwise, neurologically, normal.

Convulsions with fever include any convulsion in a child of any age with fever, of any cause.

It may be the benign type "febrile convulsion " which improves over the time or it may be a feature of serious involvement of the brain and it's covering i.e. meninges also presenting with fever and convulsion.

Among children who have convulsions with fever involving the brain (pyogenic or viral meningitis, encephalitis) such children will have prolonged fits lasting for more than one hour and even after the fits have stopped the child does not appear to be normal.

Most of the fits that occur between the ages of six months and five years are simple febrile convulsions and have an excellent prognosis.

By arbitrary definition, in simple febrile convulsions the fit lasts less than 20 minutes, there are no focal features, and the child is aged between six months and five years and has been developing, normally.

Often fever is recognized only when a convulsion has already occurred. Febrile convulsions are usually of the tonic-clonic type. The objective of emergency treatment is the prevention of a prolonged fit (lasting over 20 minutes), which may be followed by permanent brain damage, epilepsy, and developmental delay.

An electroencephalogram (EEG) is not a guide to diagnosis, treatment, or prognosis.

## **Emergency treatment**

A child who, has fever should have all his clothes removed and should be covered with a sheet only. He should be nursed on his side or prone with his head to one side because, vomiting with aspiration is a constant hazard.

Rectal diazepam (0.5 mg/kg) produces an effective blood concentration of anticonvulsant, within 10 minutes. The most convenient preparation resembles a toothpaste tube. Early admission to hospital or transfer to the intensive care unit should be considered if, a second dose of anticonvulsant is needed.

All children who have had a first febrile convulsion should be admitted to hospital to exclude meningitis and to educate the parents, as many fear that their child is dying, during the fit. Physical examination, at this stage, usually, does not show a cause for the fever, but a specimen of urine should be examined, in the laboratory, to exclude infection and a blood glucose test should also be performed. Blood should be taken for blood culture and plasma glucose and calcium estimations.

Most of these children have a generalised viral infection with viraemia. Occasionally, acute otitis media is present, in which case an antibiotic is indicated, but most children with febrile convulsions do not need an antibiotic. A pupuric rash suggests meningococcal septicaemia and the need for antibiotic like penicillin to be given immediately, either intravenously or intramuscularly.

**Features of a tonic clonic convulsion:**

<i>A Tonic</i>	<i>B. Clonic</i>
<i>A1. Cry</i>	<i>B1. Repetitive limb movement (rate can be counted)</i>
<i>A2. Loss of consciousness</i>	
<i>A3. Rigidity</i>	
<i>A4. Apnoea (Cessation of respiration)</i>	

**Dangers of Convulsion:**

- Inhalation of vomit;
- Hypoxaemia (Lack of oxygen);

**Breath holding attack**

- Usually, preceded by Pain or frustration;
- Immediately, after a frustrating or painful experience infants cry vigorously;
- Age usually, 6-18 months;
- Sudden stoppage of respiration and child turns blue;
- Limbs do not become rigid;
- Improves with time;

**Simple febrile convulsions consist of all of the following:**

- Duration less than 20 minutes;
- Child milestones and development, is normal;
- No focal features;
- Six months to five years;
- No developmental or neurological abnormalities;
- Not repeated in the same episode;
- Complete recovery within one hour;

**Management of fever** – There is no evidence that antipyretic treatment influences the recurrence of febrile convulsions, but fever should be treated to promote the comfort of the child and to prevent dehydration. The child’s clothes should be taken off and he should be covered only with a sheet . The child should be given a good bath with tap water.



**Paracetamol** is the preferred antipyretic and adequate fluid should be given.

**Anticonvulsant drugs** – Rectal diazepam should be used, as soon as possible, after the onset of the convulsion. The parents should be advised not to give it if the convulsion has stopped.

The indications for long term anticonvulsant prophylaxis have changed and the sole indication – frequent recurrences, which should be treated with phenobarbitone – is rare. There is no evidence that, in the minority of children, who later develop epilepsy, the prophylactic use of anticonvulsant drugs would have prevented it.

**Immunization: Should continue normally in children with febrile convulsion but after counselling the parents, regarding management of fever.**

As routine immunization is given to children 2–4 months old, this schedule is usually completed, before febrile convulsions occur. Babies having convulsions with fever, aged less than six months, should be assessed by a pediatrician.

Children who have febrile convulsions before immunization against diphtheria, pertussis, and tetanus because the immunization has been delayed should be immunized, after their parents have been instructed, about the management of fever and the use of rectal diazepam.

Measles, mumps, and rubella immunization should be given, as usual, to children who have had febrile convulsions, with advice about the management of fever to the parents. Rectal diazepam should be made available, for use, should a convulsion occur.

### **Prognosis:**

Unless there is clinical doubt about the child's current developmental or neurological state, parents should be told that prognosis for development is excellent. The risk of subsequent epilepsy after a single febrile convulsion with no complex features is about 1%. With each additional complex feature the risk rises to 13%, in those children with two or more complex features. Only about 1% of children, with febrile convulsions, are in this group.

The risk of having further febrile convulsions is about 30%.

This risk increases in younger infants and is about 50% in infants aged under one year, at the time of their first. A history of febrile convulsions, in a first degree relative, is also associated with a risk of recurrence of about 50%. A complex convulsion or a family history of epilepsy is, probably, associated with an increase in the risk of febrile convulsion.

### **Information for parents**

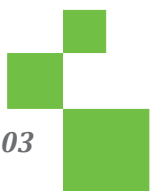
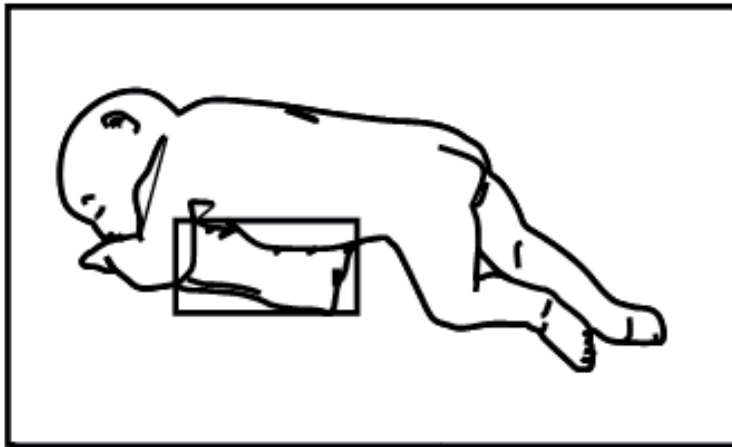
Information for parents should include:

- An explanation of the nature of febrile convulsions, including information about the prevalence and prognosis;
- Instructions about the management of fever, the management of a convulsion, and the use of rectal diazepam;
- Reassurance;

### Basic life support in the community

Basic life support (BLS) should be given immediately whenever an infant stops breathing, even if no specialized equipment is available. It may be life saving.

Position should be on the side or prone with the head to one side:



# Developmental delays and Disability

## Questionnaire on Developmental delays including disability:

1. What percentage of children face, development delays
  - (a) 1%
  - (b) 10%
  - (c) 25%
  - (d) 50%
2. Which of the following is an example of fine motor activity
  - (a) Walking
  - (b) Running
  - (c) Thinking
  - (d) Writing
3. A child with Autism will have the following signs
  - (a) No big smiles, or other warm, joyful expressions by six months of age or thereafter
  - (b) No back and forth, sharing of sounds, smiles or other facial expressions by nine months or thereafter
  - (c) No babbling and no back and forth gestures such as pointing, showing, reaching or waving by 12 months
  - (d) All of the above
4. A male child has problem with inattentiveness, over activity and impulsivity. He is, most likely to be, suffering from
  - (a) Autism
  - (b) Attention Deficit Hyperactivity Disorder (ADHD)
  - (c) Learning disorder
  - (d) None of the above
5. A child of eight months age is not able to point in a direction using index finger, what skills are we evaluating
  - (a) Fine motor
  - (b) Gross motor
  - (c) Learning disorder
  - (d) Speech delay

***\*The trainer should ask the participants to go through the questionnaire before the beginning of the session and note down their responses. The answers of these questions should be covered during the training session.***

## Discussion:



### Care for Child Development:

(Based on WHO counsel the family cares for child development)

Decide whether each of the statements below is true or false.

Your facilitator may lead the group discussion using a card for each statement.

S/n	Statement	True or false
1	A toddler's brain is much less active than the brain of a college student	
2	The brain develops more rapidly, when the child first enters school than at any other age	
3	The experiences you have before, age three have a limited impact on later development	
4	A secure relationship with a primary caregiver especially the mother creates a favorable context for early development and learning	
5	A father should talk to his child, even before the child can speak	
6	Before a child speaks, the only way she communicates is by crying	
7	A mother does a better job when she feels confident about her activities to provide care	
8	Young children learn more by trying things out and copying others than by being told what to do	
9	A baby can hear at birth	
10	A baby cannot see at birth.	
11	A child should be scolded when he puts something into his mouth	
12	A child drops things just to annoy his father and mother	
13	A child begins to play when he is old enough to play with other children	
14	Talking to your child, while breastfeeding will distract the child from feeding	
15	Children can learn by playing with pots and pans, cups, and spoons.	
16	How a brain develops depends primarily on the genetic material you got from your parents who gave you birth	

## Answers to Above Statements:

S/n	Statement	True or false
1	A toddler's brain is much less active than the brain of a college student.	F
2	The brain develops more rapidly when the child first enters school than at any other age	F
3	The experiences you have before age three have a limited impact on later development	F
4	A secure relationship with a primary caregiver esp. the mother creates a favorable context for early development and learning	T
5	A father should talk to his child, even before the child can speak	T
6	Before a child speaks, the only way she communicates is by crying.	F
7	A mother does a better job when she feels confident about her activities to provide care	T
8	Young children learn more by trying things out and copying others than by being told what to do	T
9	A baby can hear at birth	T
10	A baby cannot see at birth.	F
11	A child should be scolded when he puts something into his mouth	F
12	A child drops things just to annoy his father and mother	F
13	A child begins to play when he is old enough to play with other children	F
14	Talking to your child, while breastfeeding will distract the child from feeding	F
15	Children can learn by playing with pots and pans, cups, and Spoons.	T
16	How a brain develops depends primarily on the genetic material you got from your parents who gave you birth	F

### Explanations for the above statements-

**Question 5:** \*And even before the child is able to speak, he delights in being able to communicate through sounds and movements.

**Question 9 & 10:** From birth, babies can see and hear. The mother's face is the favorite thing the young baby wants to look at. The baby sees the mother's face and loves to respond to her smiles and sounds. A mother should begin to talk to her child from birth. Your baby starts learning from birth, with the environmental stimulation.

**Question 7:** Children need consistent loving attention from at least one person.

**Question 8:** Children learn by playing and trying things out, and by observing and copying what others do.

**Question 16:** Does a brain develop depending on the genetic material you got from your biological parents who gave you birth.

**Answer:** True/False (Answer: False)

How a brain develops hinges on a complex interplay between the genes you are born with and the experiences you have in the early years of life i.e. first three years of life. It is the early environment that shapes an individual and his or her personality as an adult, without which the genetic material is of no use.



**Question 3:** The experiences you have before age three have a limited impact on later development.

**Answer:** True/False (Answer: False)

Early experiences have a decisive impact on the architecture of the brain, and on the nature and extent of adult capacities

**Question 4:** A secure relationship with a primary caregiver esp. the mother creates a favorable context for early development and learning.

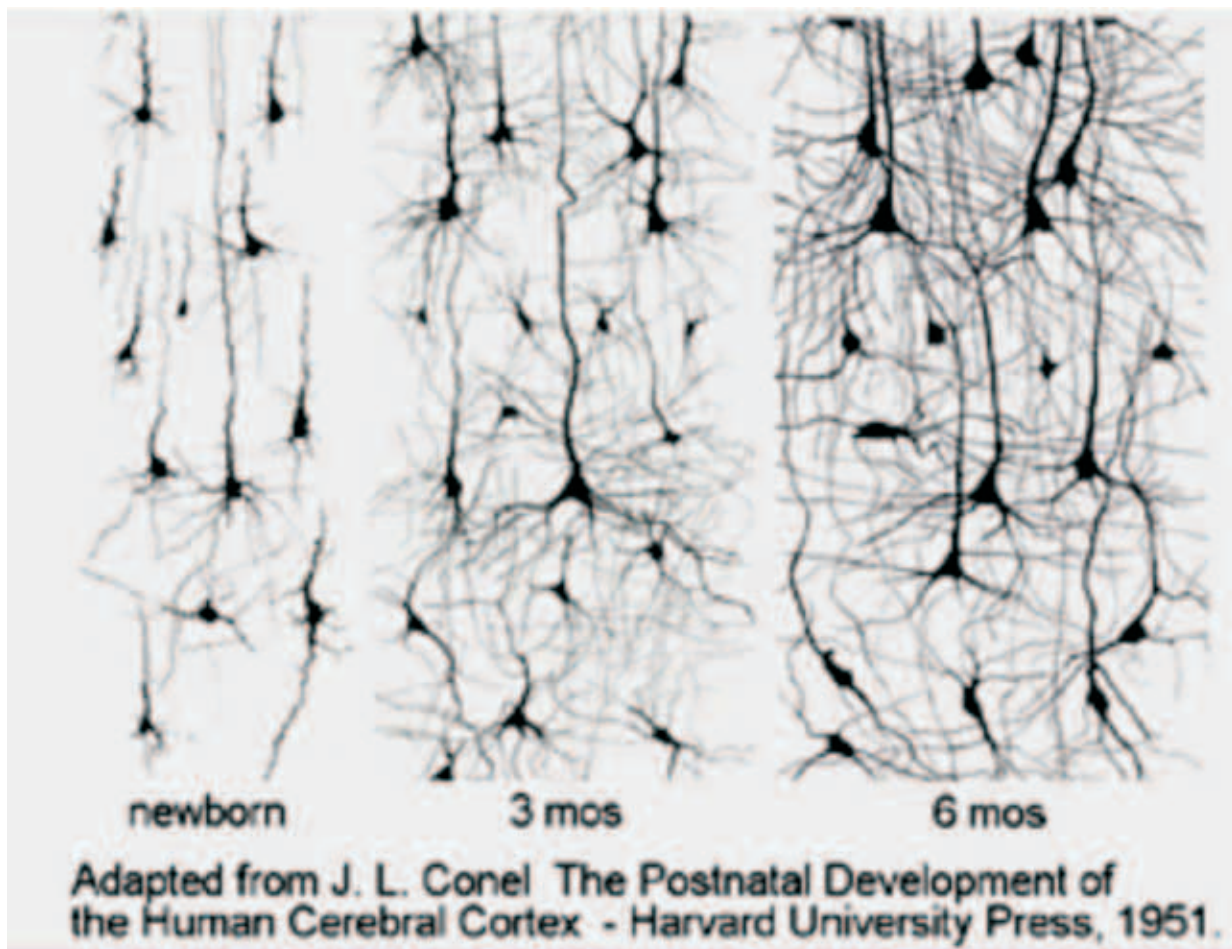
**Answer:** True/False (Answer: True)

Early interactions don't just create the context; they directly affect the way the brain is "wired".

**Question 1:** A toddler's brain is much less active than the brain of a college student.

**Answer:** True/False (Answer: False)

**True. One billion wires are getting connected just after birth**



**Participants are supposed to know how to use the following materials in the field visit-**

1. Screening tool cum Referral card for 0-6 years-Use of this tool will help in identifying children with developmental delays in the areas of vision, hearing, speech & language, cognition, motor and autism. Tool is included in the job aids. 0-2 year milestones are also supplemented with a Pictorial tool for quick identification of the developmental delays.
2. Developmental deviation or neuro-motor impairment including cerebral palsy-A pictorial tool depicting developmental deviation as compared with normal development.
3. Vision-Identification of vision related problems for 0-6 years. A pictorial tool depicting vision related problems.
4. Hearing and language for detailed assessment tool developed by CDC-LEST.
5. Cognitive tool-simple pictorial tool for identifying problems in cognition-  
This will help in identification of the impairment/disorder in respective domains.

Vision Impairment
Hearing Impairment
Neuro-Motor Impairment
Motor Delay
Cognitive Delay
Language Delay
Behaviour Disorder (Autism)
Learning Disorder
Attention Deficit hyperactivity Disorder

# Child Development

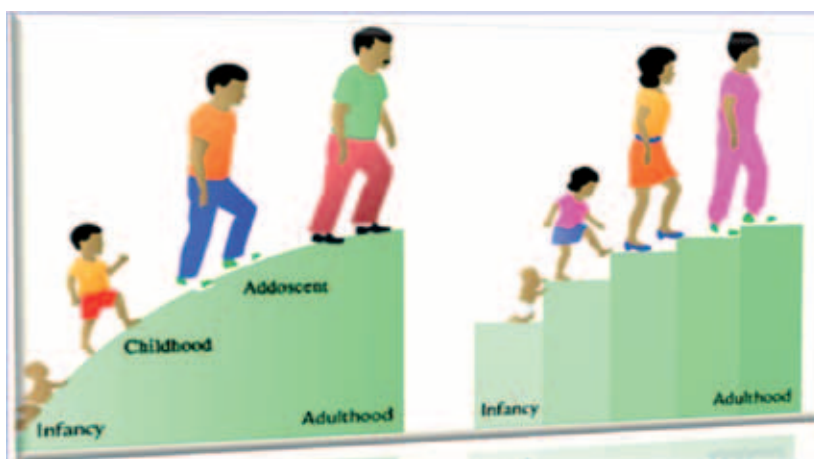
## a. Definition, Process and Characteristics:

### Who is a Child?

As per the Convention on the Rights of the Child (CRC), a child means every human being below the age of 18 years.

### What is Child Development?

Child Development is the ability of the child to do more complex things, over a period of time and extends from the moment of birth till adulthood. Development starts right from the conception. Environment and learning experiences from the society, have a major role in child development.



Let us take the example a six month old child trying to pick up a pea or kismis (raisin) from the floor. Initially he or she would not succeed in the mission, but the same child at 9 to 10 months will easily pick up a small object holding it between his or her thumb and the index finger. This is development of the child’s hand grip. If one is concerned about any child’s development, one will have to check the Developmental Delay of the Child.

Growth refers to the child getting only bigger in size.	Development refers to acquiring skills and abilities to perform finer and more complex tasks
<ul style="list-style-type: none"> <li>Growth refers to quantitative changes i.e. increase in body size, proportion and structure, which can be measured through increase in height, weight and size of internal organs.</li> </ul>	<ul style="list-style-type: none"> <li>It includes qualitative and quantitative changes related to functioning of a body. These changes are progressive, orderly, long lasting and coherent. Growth is one aspect of larger process of development.</li> </ul>
<ul style="list-style-type: none"> <li>Growth stops at a particular age.</li> </ul>	<ul style="list-style-type: none"> <li>Development is a continuous process that begins during the prenatal period and continues even when the physical changes are not visible.</li> </ul>

**b. Stages of child hood :**


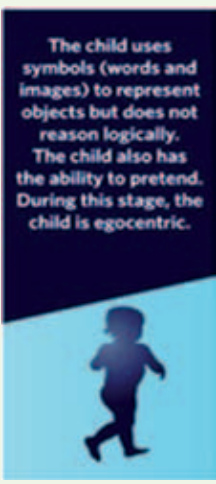

Childhood is divided into four major stages:

Each of the four stages are characterized by differences in Physical, Mental, Language, Social and Emotional abilities of an individual.

These are:

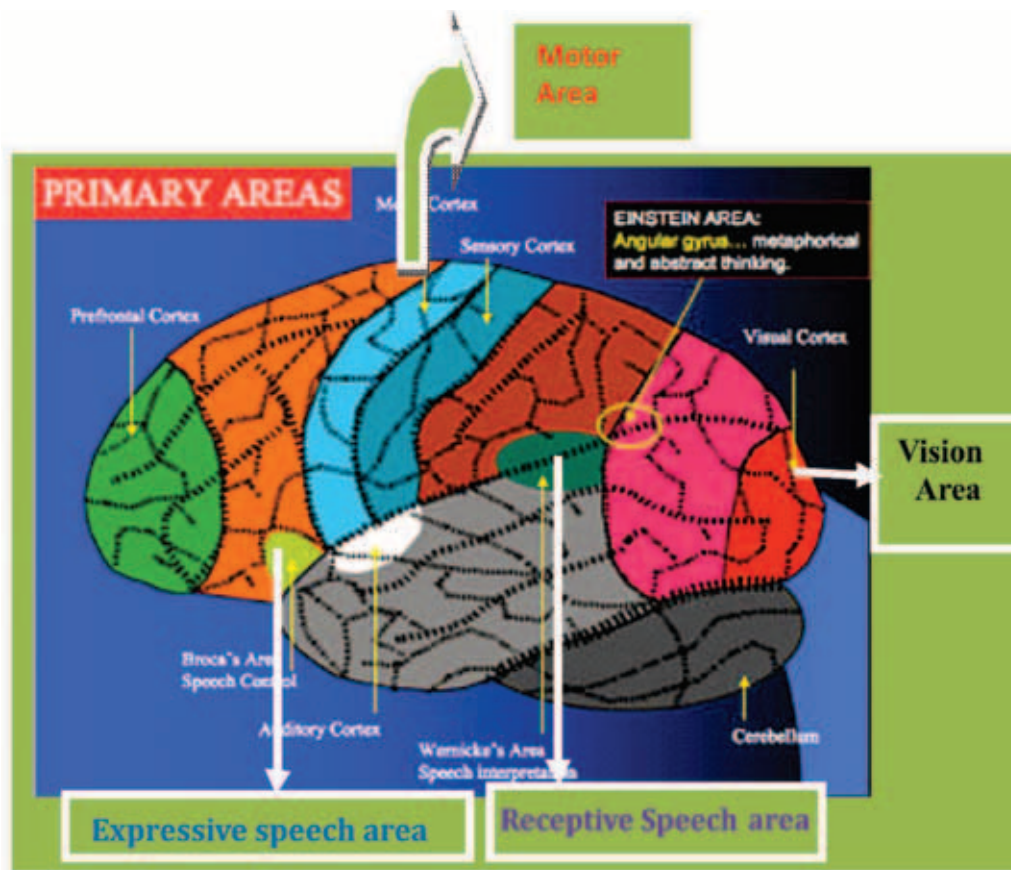
- Prenatal – Conception to birth.
- Infancy – birth to 2 years (Sensorimotor stage)
- Childhood – 2–12 years : 2-6 years and 6-12 years.
- Adolescence – 10–18 years.

Change from one stage to the other is a gradual and a continuous process

Sensor motor (Birth -2 years)	Preoperational (2-6 years)	Concrete Operational (6-12 years)	Formal operational (12 years –adult)
<p>The infant explores the world through direct sensory and motor contact. Object permanence and separation anxiety develop during this stage.</p> 	<p>The child uses symbols (words and images) to represent objects but does not reason logically. The child also has the ability to pretend. During this stage, the child is egocentric.</p> 	<p>The child can think logically about concrete objects and can thus add and subtract. The child also understands conversation.</p> 	<p>The adolescent can reason abstractly and thinks in hypothetical terms.</p> 
RBSK is to examine a child at:			
Birth to two years: Anganwadi center	Two to six years: Anganwadi center	Six to eighteen years: At School	

**c. Areas of the Brain with their function:**

Brain has different parts and these different parts of the brain perform different functions. A child learns through various senses including vision, hearing, touch, smell and taste. Cognition is the cumulative result of these sensory organs sending messages. Even if one part is affected the others areas of brain can be used for development.



The mobile team has to identify a child with such developmental delay, in any of these domains, and timely, refer to the DEIC, for intervention. At District Intervention center, the multidisciplinary team can specifically intervene in a particular domain but, at the same time other team members can stimulate other areas of the brain controlling different domains to help the child to accomplish normal development trajectory.

In a child with congenital cataract i.e. cataract since birth, the child's cognition is also affected. While to rectify the vision the ophthalmic surgeon needs to operate however, at the same time the child would require support in catching up cognition delay. In a room, to get light, if we are unable to open one of the closed windows, we must try to use other windows

### Pattern of Child Development and the Characteristics:

***Understanding of pattern of child development and its characteristics help understand the process of child development***

#### Pattern of Development:

- All children follow a predictable pattern of development
  - A. Development Spreads over the Body, from Head to Toe. For example head region is the first to develop followed by trunk & then limbs. Child first learns head holding and then to sit and this is followed by standing and walking. Head to Toe or Cephalo- Caudal.





**Flexed posture at birth**



**Extended at one month**



**Extension up to thoracic spine**



**Extension up to lumbar spine**



### **Cephalo-caudal development**

B. Development proceeds from midline (centre) of the body to the distal parts. In midline we have head and neck, shoulder, trunk and pelvis. Arms and legs are the distal parts of the body. In essence, a child develops control over his/her head and shoulder, trunk and pelvis that is followed by his/her ability to reach out and hold objects with hands. Head and trunk control, always, precedes ability to grasp and release.



**Yellow arrow head shows the distal part i.e. hand.**

**Trunk and head are proximal parts of the body**

- C. Development Proceeds from Flexion to extension. Flexion is bending of the limb and extension is straightening of the limb or stretching out of a limb after it has been bent and the position attained. Child is born with all the four limbs bent and if they are not so, it is a sign of worry. Slowly, through development the limb stretches out and becomes straight.
- D. Development Proceeds from Involuntary to Voluntary i.e. from spontaneous /automatic / uncontrollable to controllable. Let us take, for example, palmar grasp in a newborn: if we stimulate by placing our finger into the baby's palm the newborn responds by grasping the object and in this case, the finger. This grasp is very different from a 4 month old child reaching out, to a toy, and grasping it. The first is not in the control of the child so known as Involuntary reflex or uncontrollable (\*known as primitive palmar grasp) whereas, the latter is voluntary and in the control of the child. He/she is attracted to the toy and hence, stretches the arm to hold it. Primitive Palmar grasp reflex in a newborn disappears by 2-3

months, after birth, as this is involuntary and must be replaced by a matured voluntary palmar grasp. A newborn can walk, known as stepping reflex but this is involuntary. Later on, this is replaced by voluntary walking.

Reflex	Onset	Elicitation	Disappears by :
Palmer grasp reflex (grasp response)	Birth	A finger or small object placed in the infant's palm elicits an involuntary flexion or grasp. Attempts to remove the object produce an even tighter grasp.	<ul style="list-style-type: none"> <li>• Suppressed by about 2 to 4 months of age.</li> <li>• Should disappear by about 6 months of age.</li> <li>• Abnormal, if asymmetric or persistent. Often seen in hemiplegic.</li> </ul>

- E. Development Proceeds from Undifferentiated to Differentiated. Let us take the example of a two month old child who wishes to get a toy. The child would move all the limbs; use its facial expression and its, whole, body to explain to the mother to get the toy (Undifferentiated). But, a one year old child will do the same by pointing out, with a finger, to get the object. This ability to use the finger, in isolation of the hand or body requires Differentiated development.
- F. Development Proceeds from Ulnar Palmar to Radial Digital Grasp (Voluntary Palmar grasp/ Voluntary release).

i. Age 4-5 months: Crude Ulnar Palmar Grasp



Observe the grasp of the object in the ulnar side of the palm and the lack of thumb involvement in this grasp. The picture, on the right, shows where on the palm an object is placed while using a crude palmar grasp.

ii. Age 5-6 months: Palmar Grasp





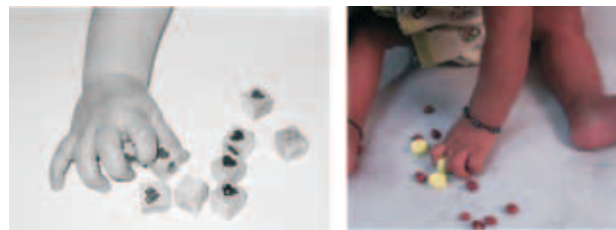
The object is secured in the center of the palm, in the palmar grasp. Again, there is lack of thumb use. Although the object is quite small, this infant has grasped it with the whole hand because he or she does not yet have the ability to use more precise movements. Note that now the object is in the center of the palm.

iii. Ages 6-7 Months: Radial Palmar Grasp



The object is secured in the radial side of the palm. Note the flexion of the ulnar fingers for stability and the thumb that is beginning to oppose and actively press the object into the palm.

iv. Ages 7-8 months: Raking Grasp



Note the flexion of the radial fingers to bring the objects into the palm while using the raking grasp.

v. Ages 8-9 months: Radial Digital Grasp (First two fingers and thumb)



Observe the full opposition of the thumb to help secure the object, and the flexion of the ulnar fingers for stability while using the radial digital grasp.

vi. Also Ages 8-9 months: Inferior Pincer Grasp



Note the adduction of the thumb to secure the object against the extended index finger while using the, inferior, pincer grasp.

vii. Ages 10-12 months: Pincer Grasp











**Note:** the full opposition of the pad of the thumb and the pad of the index finger to secure the object while using the pincer grasp. This is differentiated from the neat pincer grasp, in that the pad of the finger secures the object in the pincer grasp; whereas the tip of the finger secures the object in the neat pincer grasp.

- A. Development is continuous and progressive. And, over a period of time, simple skills are replaced by finer and complex skills, through learning and practice. Crawling on 4 legs is replaced by walking on two legs;
- B. Development follows Similar and Orderly Pattern. All children follow similar pattern of development with one stage leading to the next and it is always in order., e.g. all babies stand before they start walking. They cannot walk without standing first;
- C. Development of each Child is Unique. Each child is unique and different from others due to his genes and environmental experiences. E.g., sister and brother, in spite of being brought up in the same family, both are different in looks, nature and habits.
- D. Rate of development differs from one child to another. There are individual differences in rate of development due to heredity & environment influences, e.g. one child may walk at the age of 9 months and the other may do so at the age of 13 months. Both are normal. Hence we have normal range. Once it is outside, the normal range then, we say there is developmental delay and requires further evaluation, in details.

**Understanding of pattern of child development and its characteristics helps us to understand the process of child development and help the child.**

**Exercise: Cover the right side and try to suggest the age of the child:**

<p>Radial-palmar grasp of cube Pulls round peg out</p>		<p><b>6-7 month</b></p>
<p>Inferior scissors grasp of pellet; rakes object into palm</p>		
<p>Scissors grasp of pellet held between thumb and side of curled index finger Takes second block; holds 1 block in each hand</p>		<p><b>8 month</b> (Four fingers against the thumb)</p>
<p>Radial-digital grasp of cube held with thumb and finger tips</p>		
<p>Inferior pincer grasp of pellet held between ventral surfaces of thumb and index finger</p>		<p><b>8-9 months</b></p>

<p>Isolates index finger and pokes Clumsy release of cube into box; hand rests on edge</p>		<p><b>10-11 months</b></p>
<p>Pincer grasp, held between distal pads of thumb and index finger</p>		
<p>Fine pincer grasp of pellet between finger tips Marks with crayon Attempts tower of 2 cubes Precise release of cube Attempts release of pellet into bottle</p>		<p><b>11-12 months</b> (Fine pincer grasp)</p>



## Introduction to Developmental Milestones:

- Child's progress on the path of development across definite stages is marked by certain indicators called Developmental Milestones.
- Milestones are like guideposts for various stages of development, through which every normal child passes.
- Milestones indicate the age at which children are expected to perform tasks which are also called developmental tasks.



- For every child there is a normal range for completion of a 'milestone'. But each child reaches a 'milestone' or performs the expected 'developmental task' at his own pace and in his or her own way.
- If the child seems slow in reaching the mileposts within the stipulated time, increase stimulation of the child by talking and playing. If the child is still slow, take the child to the doctor.
- Sometimes, a developmental stage is skipped or another one is delayed or there is developmental deviations, but this need not be a cause for alarm. If accomplishment of 'milestones' is unduly delayed, it is a signal that a child should be medically examined and not labelled as disability or handicap.

## Domains of mile stones:

- Thus, when we talk about normal development, we are talking about developing skills like:
  - **Motor development** which helps in any form of movement. There are two categories within the area of motor skills: Gross motor and Fine motor.
    - **Gross motor:** using large groups of muscles to sit, stand, walk, run, etc., keeping balance, and changing positions.
    - **Fine motor:** using hands to be able to eat, draw, dress, play, write, and do many other things.
  - **Speech and language:** speaking, using body language and gestures, communicating, and understanding what others say.
  - **Cognitive: Learning and Reasoning.** It includes, understanding, problem-solving, and remembering.
    - **Social:** Interacting with others, having relationships with family, friends, and teachers, cooperating, and responding to the feelings of others. Social (use of social skills), Emotional (emotional control). This includes the interaction the child develops initially with his or her mother and at a later stage with his friends.
    - **Adaptive Development:** needs to be assessed mostly when a delay has been confirmed and we need to start therapy. It basically deals with child's Self-care skills required for daily activities.
    - **Vision Problem** usually manifests during the first three years but rarely diagnosed and treated
    - **Hearing Problem** would manifest as speech and language delay

Domains
Gross-Motor
Fine-Motor
Language
Social
Vision
Hearing

However, all the sensory organs are like windows to the brain. Sensory experiences enter through this window and help in wiring of the brain and developing intelligence.

### **Some highlights of the developmental milestones in motor area:**

- 3-4 months- holds head upright
- 6 months- rolls from back to stomach
- 8-9 months- sits without support
- 9-10 months – crawls on arms and knees
- 12-15 months- stands alone
- 15-18 months – walk alone
- 2 years – jumps in place and runs well
- 3 years – walk upstairs and downstairs

### **Teeth and Teething as Mile stones**

Although Parents (especially mother) consider that the eruption of the first tooth is a milestone in development, the age at which this occurs is of no practical importance. The first teeth to appear, at 6–12 months, are the lower incisors.

From the age of a few weeks, infants normally put their fingers, and later anything else that comes to hand, into their mouths and mothers often wrongly ascribes this to teething.
















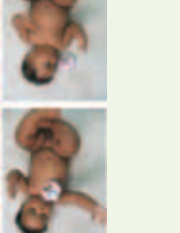


Teething produces only teeth. It does not, contrary to common belief, cause convulsions, bronchitis, or napkin rash.

Some parents insist their infants are particularly irritable when they are teething, but it is important to examine the infant to exclude disease such as otitis media or meningitis before accepting the mother's explanation.

Dummies temporarily affect the growth of the mouth but there are no objections to using them. They should not be dipped in honey. Severe dental caries also follows the use of "comforters" or "feeders", which are filled with fluid containing sugar or honey.

Tetracycline or its derivatives should never be given to children less than eight years of age, as permanent brownish yellow staining of the teeth may occur.



Age in months	Gross Motor	Fine motor	Speech & Language	Vision	Social/emotional (play)	Cognition
2	<p>Starts lifting the Head, occasionally, while on tummy (45 degree);</p> 	<p>Opens hand, intermittently;</p> 	<p>Make Coos laughs, throaty sounds like gargling cooing;</p> 	<p>Can see large size objects;</p> 	<p>Social smile begins Responds to mother's facial expressions, after being talked;</p> 	<p>Eye to eye contact;</p> 
4	<p>Holds head up, lifts the head and chest with support on fore arm; Sitting with support; head held steadily;</p> 	<p>Reaches for and grasps an object; Brings both hands in mid line and is able to play around with both hands;</p> 	<p>Turns eyes to sound; Laughs aloud or squeals, with laughter;</p> 	<p>Eyes can follow the toy; Stares at own hand; No crossed eye;</p> 	<p>While sitting, in mother's lap, smiles back, at mother and holds head steadily;</p> 	<p>Looks at objects, it is holding (observe the toy);</p> 
6	<p>Able to sit, with support; Can roll over, from prone (lying on tummy) to supine (lying on back);</p> 	<p>Holds object using thumb side (radial palmer grasp); Transfer object from hand to hand (begin);</p> 	<p>Monosyllabic early balling 'ba' 'ba'; 'ma' Turns head to sound;</p> 	<p>Can look for a dropped spoon; Shifts gaze from one object to another;</p> 	<p>Stretches arm, to be picked up;</p> 	<p>Moves to look for a fallen object; Child pays attention to a person and an object;</p> 

Age in months	Gross Motor	Fine motor	Speech & Language	Vision	Social/emotional (play)	Cognition
9	<p>Sits without arm support</p> <p>Reciprocal (alternate hands and legs movement) crawling</p> 	<p>Holds object like marble between thumb and first two fingers</p> <p>Transfer object from hand to hand (mature)</p> 	<p>Polysyllabic babbling 'ma ma ma ma'</p> <p>Non-specific mama dada</p> 	<p>Avoids bumping into objects while moving</p> 	<p>Plays peek a boo</p> <p>Responds to his/her name</p> 	<p>Looks for a toy that is completely covered</p> 
	<p>Able to stand alone and walk while holding the parents hand</p> 	<p>Able to pick up small object with thumb and finger tip</p> 	<p>Can say at least one meaningful word clearly and specifically like 'papa'; 'mama'; 'dada' Understand the word 'No'</p> 	<p>Looks alternately at near and far object</p> 	<p>Waves good bye</p> <p>Hugs doll or any one (express emotion of affection/joy/anger/fear like kissing, cuddling, crying etc.)</p> <p>Gives object on request</p> <p>Able to deliver toys to the father or mother (15 months)</p> 	<p>Looks for a toy that is completely covered</p> <p>Puts block into cup</p> 
12						



Age in months	Gross Motor	Fine motor	Speech & Language	Vision	Social/emotional (play)	Cognition
15	<p>Begins to walk alone, walking pattern is wide based, Creeps on the stairs</p> 	<p>Pointing with index finger (where is the bottle) Scribbles in imitation, Turns 3-4 pages at a time and tower of 2 blocks, Manipulation exploration of toys in hand</p> 	<p>Points to common object (in the picture book) when named, Can speak 4-6 words</p> 	<p>Can put a circular shape in a puzzle Looks for a toy that was displaced</p> 	<p>Pretends play like feeding the doll,</p> 	<p>Follows simple instruction – 'give me the ball': 'come here''sit down'</p> 
18	<p>Child walks steadily even while holding or pulling a toy Begins to run Walks upstairs with help</p> 	<p>Spontaneously scribbles, Turns 2-3 pages at a time, Build tower of 3-4</p> 	<p>Has expressive vocabulary of 10-20 words • Can listen and respond to simple directions</p>	<p>Usually play beside other children but not with them</p> 	<p>Identifies at least one or two body parts when asked</p> 	

Age in months	Gross Motor	Fine motor	Speech & Language	Vision	Social/emotional (play)	Cognition
24	Runs well Able to jump, Walks up and down stairs without help (2 feet steps)	 Open the bottle by turning cap Turn pages one at a time Imitates vertical or circular stroke with pencil, Build tower of 7-8 cubes	Speaks in two words combination – "mama milk"	 Identifies a picture in a book or points to his own photo	 Imitates every day activity like sweeping washing cloths	Opens lid of container to obtain a sweet Stack rings on a peg in order Mentions six body parts 
	Hops one to three times on one foot Can climb up and down stairs Able to go down stairs with alternating feet without holding 	Mimic straight line and circle, Tower of 9 cubes or bridge 	Is able to ask 'what is this' Speak simple sentences and three word sentences	Able to give the name of one to two colors 	Able to play together with other friends (cross play) 	Matches blocks that are of same colors Puts square triangle on the form board. Differentiate between cup plate Big and small 
36						

## Developmental delay

Developmental delay is a descriptive term used, when a young child's development is delayed in one or more areas, compared to other children.

These different areas of development may include:

- I. Gross motor development;
- II. Fine motor development;
- III. Speech and language development;
- IV. Cognitive/intellectual development;
- V. Social and emotional development;

Parents and others become aware of delay when the child does not achieve some or all of the milestones, at the expected age. Other children may present, with behavior problems which may be associated with delayed development.

The term developmental delay is often used, until the exact nature and cause of the delay is known. The significance of the delay is often only, determined by observing the child's development, over time.

An assessment is often needed, to determine what area or areas are affected.

What are the causes of developmental delay?

Disorders, which cause persistent developmental delay are often termed developmental disabilities. *Examples are cerebral palsy, muscle disorders, language disorders, autism, emotional problems and disorders of vision and hearing. All these conditions can cause developmental delay. However, one of the most common causes is an intellectual disability.*

Based on the domains or area of developmental delay the child may be placed in:

**Focal delay:** Delay in one area or domain;

**Global delay:** Delay in more than one area;

Area :	Diagnosis
Motor area or Domain	Neuro-motor impairment, like Cerebral palsy or others;
Cognitive area or Domain	Isolated Intellectual Disability or Mental retardation, either mild or severe;
Communication area including speech and language delay (Both Expressive and Receptive abilities. Receptive ability is the ability to receive sound i.e. ability to hear Expressive ability is to express through talking or gestures):	a) Hearing problems or Deafness; b) Expressive language delay or speech problems; c) Articulation problems like stammering;Autism, which is also Communication Deficit but, also have social interaction problem and a repetitive stereotypical behavior patterns;
Visual Impairment.	These are children diagnosed with partial to complete visual impairment;
Epilepsy or convulsions	
Problems at School going age	a) Attention-deficit/hyperactive disorder (ADHD); b) Learning disorder ( LD) among school children ( 6-9 years);

### **Range of disabilities, common among children**

Speech and language impairment are (approximate prevalence 6%);

Learning disabilities (8%);

Attention deficit disorder (7%);

Less common conditions include:

Mental retardation (1%–2%);

Cerebral palsy (0.2%);

Autism and autism spectrum disorders (0.5%);

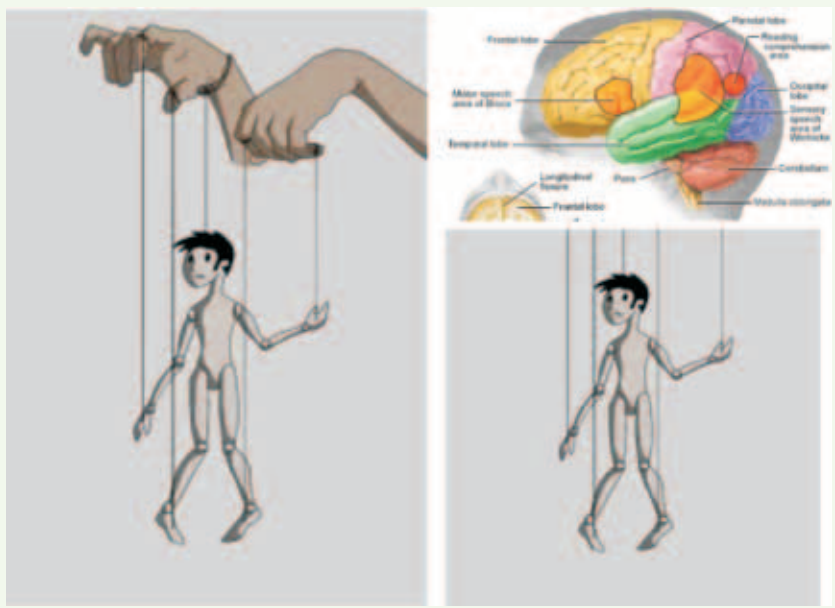
According to the US Department of Education, 13.2% of school-age children are in special education, most of them diagnosed with learning disabilities or mental retardation;

# 1 Neuro-motor Impairment

## A) Background

Neuro-motor- has two Parts: Neuron and Motor.

Neurons are the cells of the brain which, through spinal cord and the peripheral nervous system, control the muscles and its function i.e. the movements. This is very much like the puppet master, who in this case is the Brain. Brain through wires controls the functioning of the muscles and also guides the movements of the body (puppet). For smooth and matured movement, the brain, on one hand, has to pull and relax the correct wires and at the same time message has to go, from the muscles and joints, to the brain informing him of the position of the limbs. In children, this system is not matured and through repeated actions and learning, by the brain, it acquires enough skill to perform the role of a matured puppet master.

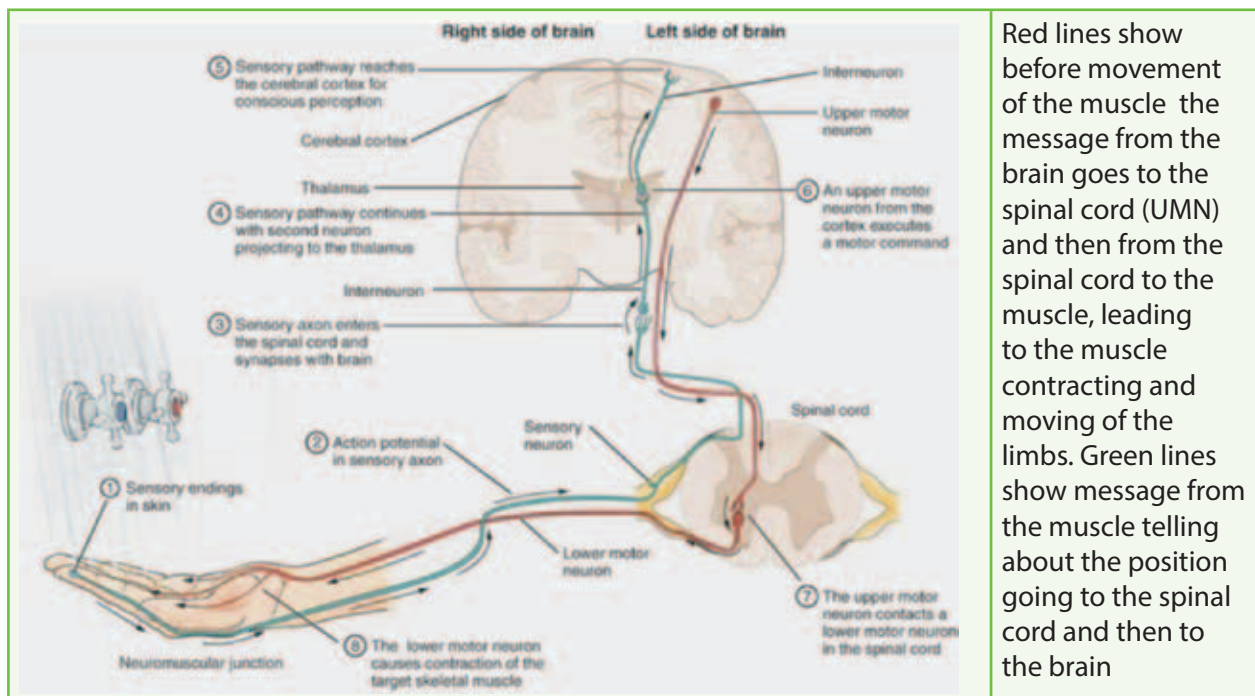
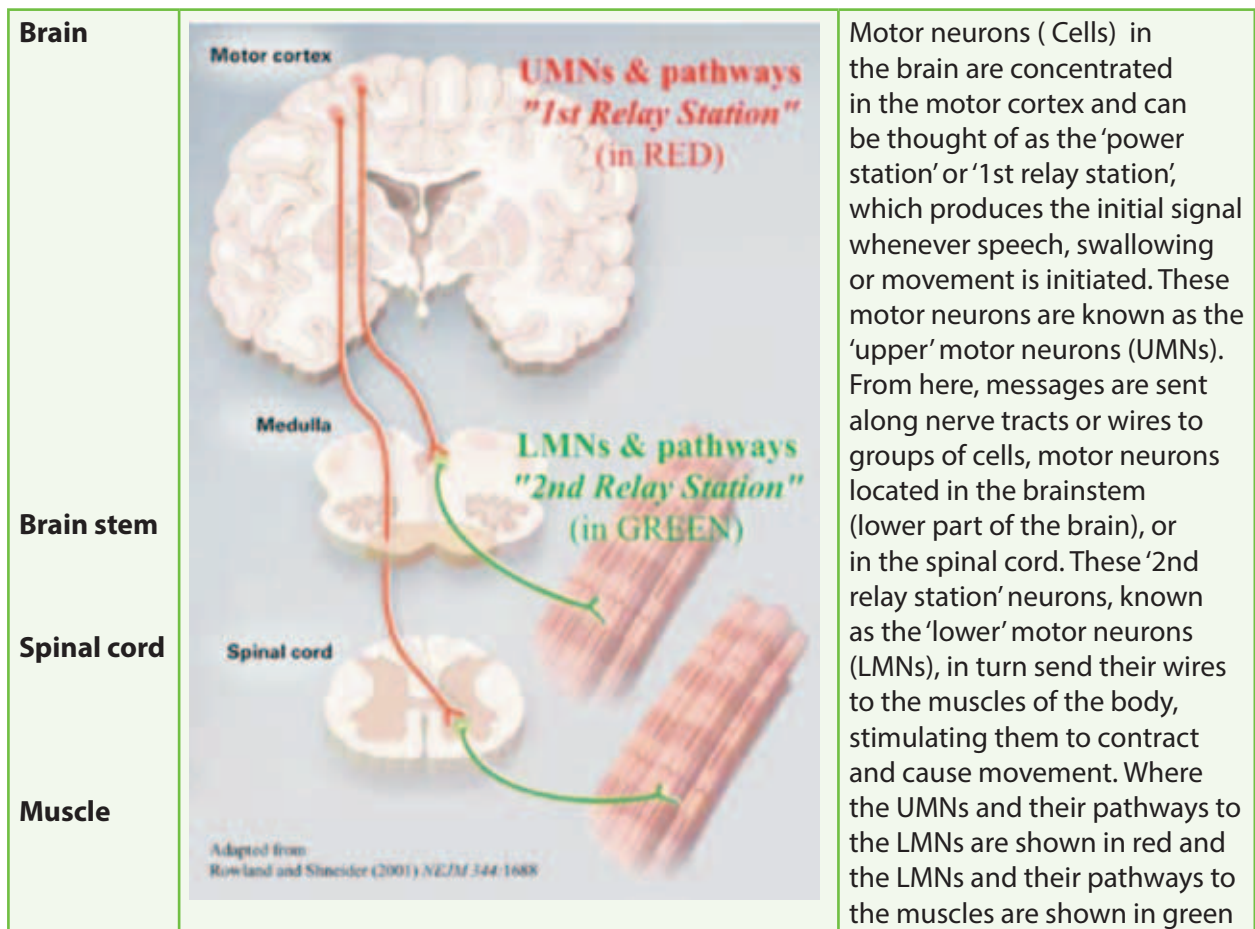


- Puppet master = Brain
- Spinal cord and the peripheral nervous system = wires from the brain
- Muscles = learn and can perform mature function, provided the puppet master pulls the correct wires.
- Correct information must go to the puppet master from the periphery, as the position and movement of the limbs of the puppet.

Development of skills in a child occurs as the brain matures through myelination i.e. covering of the wires and better connectivity among the neurons.

Any, adverse, condition, that affects the normal functions of the brain and spinal cord, may cause disorder of movements that restricts movements and daily activities of a child.





## B) Definition: Neuro-motor Impairments:

- **Neuro-motor impairment** is caused by neurological (brain/spinal cord/muscle) damage that affects child's ability to move one or more body parts;

- This injury could be one time insult or progressive;
- Onset of this injury could be either before two years or after 2 years;
  - In children it usually, refers to the brain insult/injury at the time of birth or just before birth but that is a one-time insult and usually does not progress.
  - As the child grows older, the brain matures, and therefore the child improves in motor function with time.
- Neuromotor impairments can be broadly, divided into three groups:
  1. **Cerebral palsy (CP)** which is one time injury i.e. Non progressive brain injury before the age of 2 years.
  2. **Neuromuscular disorders (NMD)** which is injury to the cells of the lower part of brain (lower motor neurons) and their connections up to the muscle.
  3. Others include progressive degenerative diseases usually, above the age of 2 years.

Diagnosis of Neuro-Motor impairment		
A	Static or progressive difficulty in performing activities related to movements of the limbs or coordinated movements of the body	
B	Any one of the following : a) findings, suggestive of progressive lesions usually of brain or spinal cord, age above 2 years: If yes should be included in the third group of neuron muscular impairment: Other NMI.	
	b) findings, suggestive of static lesions usually, of the nerve cells in the lower part of brain known as lower motor neurons and their connections up to the muscle: If yes should be included in the second group of neuron muscular impairment: NMD under NMI.	
	c) findings, suggestive of non progressive lesions, onset before 2 years, cerebral in origin (upper motor neurons): If yes should be included in the first group of neuron muscular impairment: CP under NMD.	

Cerebral Palsy is characterized by, all of the following:		
1	Age of onset before 2 years	Manifestation appears before the age of 2 years;
2	Non progressive in Nature	One time damage of the brain, no progressive damage;
3	Cerebral in origin	(Brain is involved);
4	Predominant motor impairment with abnormalities of: a) tone b) posture c) movement;	

## Postural tone

Muscles, in our body, are always in a state of contraction (tension) whether at rest or during movement. This is the tone and since this allows us to maintain our posture it is also known as postural tone.

It is due to the tone, of the muscles, that we maintain our posture and move about, against gravity i.e. we can sit, stand and walk.












Damage can be at level of the 1) Brain, 2) Spinal Cord, 3) Connection between the spinal cord and the Muscle or 4) Muscle itself.

- 1) **Brain:** Damage to those areas of the brain that regulate tone of the muscles alters normal tone.
- 2) **Connection between the spinal cord or brain stem and the Muscle or Muscle itself:** Damage to the connection between the spinal cord and muscle or the muscle itself leads to less tone. The child looks like a ragged doll, unable to lift his head, unable to sit without support or cannot walk or walks with wide gait. As a result, it becomes difficult to sit, stand and walk, for the child, or able to follow the age appropriate mile stones.

Abnormal tone affects every voluntary muscle in the body, that influences postures and movement. Abnormal postural tone is the common factor in all types of cerebral palsy.

### Illustration of Low tone or Hypotonia.



		<p>Ragged doll unable to sit either requires support of the wall or sits with both legs spread behaves like a child with low tone</p>
		
<p>This picture is of a newborn with low tone sleeping like a frog</p>	<p>Normal child with legs bent (Flexed) showing normal tone</p>	<p>This picture is of a newborn with low tone sleeping like a frog</p>
		
<p>Head falling to the side at 6 months</p>	<p>Head falling to the front</p>	<p>Head falling to the back at 6 months</p>
		
<p>Sitting with legs apart and round back because of low truncal tone</p>	<p>Walking with legs apart because of low tone</p>	<p>Stands with support with head falling on one side because of low tone</p>



## Assessment and Clinical Clues of a Possible Motor Disorder

### I Observe posture

1) **Hypotonia (floppiness)** of the trunk: The baby lies in a frog like position .The baby slips through the hands when held under the arms in a vertical position.



2) **Plantar flexed feet** (highlighted with the red ring)



3) **Hands held habitually in a fisted position** (highlighted with the red ring)



4) **Non-sequential Motor Development** like:

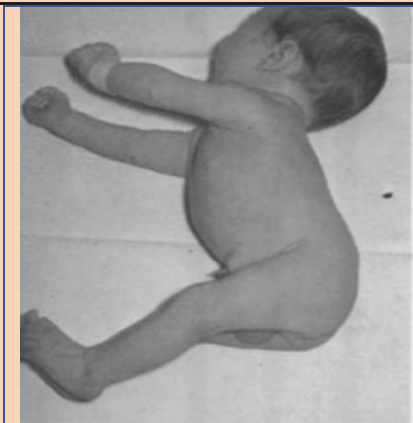
a) Early rolling by 3 months (rolls as a piece)

b) Brings head and chest up on forearms in- prone- position prior to developing good head control

c) Preference for early standing prior to sitting

d) Preference for using one hand more than the other before 3 years

(a)



5) Qualitative **Differences in Motor Development** commonly **reported** by parents and caregivers

a)Startles easily; **jittery**



b)Does not like to cuddle; seems "**stiff**" (difficult to carry the child)

c)**Arches back** frequently



d)Baby seems "**floppy**" ( Baby slips through the hands when held under the arms in an erect position)

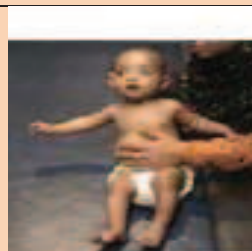


c)**Infrequent or limited** variety of **movement**

d)**Favors one side** of body more than the other

e)**Feeding problems**, particularly **after 6 months**

f)**Falls backward** in a sitting position



g) Crawls in a "bunny hop"



i) "Scissors" legs while standing



h) Walks on tiptoes



j) Sits with legs in "w" position (reversed tailor position)



## II Observations of Movement

a) Rolling as a unit (**log rolling**) after the age of 6 months



b) **Hyperextension of head and neck** when prone in conjunction with significant head lag when pulled to sit



Significant head lag when pulled to sit and Hyperextension of head and neck

c) Readily lifts head and neck when prone, but **arms are kept extended along trunk**

d) When pulled to sit from lying down position, comes to standing instead of sitting position

### III Observe in sitting position :

One or more of the following occurs in the sitting position:

a) Hips and knees are flexed and hips are adducted

b) Legs are positioned in a reverse tailor or "w" posture



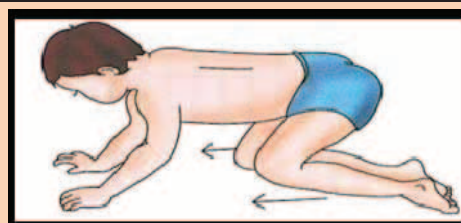
c) A tendency to thrust trunk backward while sitting



### IV Observe in crawling position :

One or more of the following is observed during crawling:

a) Legs are moved as a unit resulting in "bunny hop" movements





b) Hips are excessively adducted, reciprocal movements of legs are done very slowly, and movements are "Jerky" in appearance

c) Legs are kept extended and adducted while child creeps (pulls body forward with arms)

One or more of the following is observed during standing:

a) In a supported standing posture, legs are excessively extended and adducted, and child stands on toes.



**V Observe in walking position :**  
One or more of the following is observed during walking:

a) Crouched gait (hips are flexed and adducted, knees are flexed, and feet are pronated)



Red arrow- Flexion of hips, Yellow arrow- Flexion of knees, Blue arrow – Pronated feet

b) Intermittent tiptoe gait and overextension of the knees



Intermittent Tiptoe gait  
Red arrow – Overextension of the knee Hyperextension of the knees  
Yellow arrow- Tiptoe



In order to detect, Neuro-motor impairments, ask the following questions and observe the child: **(only for child > 2 years)**

1. Does your child have difficulty in any one of the following?	<input type="checkbox"/>
a) Sitting	<input type="checkbox"/>
b) Getting up from floor	<input type="checkbox"/>
c) Standing	<input type="checkbox"/>
d) Running	<input type="checkbox"/>
2. Did your child start performing the following activities later than children of his or her age?	<input type="checkbox"/>
a) Started sitting without support beyond his or her birthday	<input type="checkbox"/>
b) Started walking without support beyond his or her second birthday	<input type="checkbox"/>
3. Does your child any of the following?	<input type="checkbox"/>
a) Toe-walking	<input type="checkbox"/>
b) Abnormal posture of any limb	<input type="checkbox"/>
c) Decreased or unequal use of any limb	<input type="checkbox"/>
d) Frequent falls	<input type="checkbox"/>
4. Does your child have difficulty in performing any of the following activities?	<input type="checkbox"/>
a) Bathing /cleaning himself or herself	<input type="checkbox"/>
b) Toileting	<input type="checkbox"/>
c) Dressing	<input type="checkbox"/>
d) Feeding self	<input type="checkbox"/>



In order to detect Neuro-motor impairments ask the following questions and observe the child: **(Only for child <2 years)**

1. Does your child move all the limbs equally when awake i.e. both hands and legs equally or he has any difficulty? (alternate/ both legs together)
2. Does your child after the age of 3 months keep the fist tightly closed most of the time or hold the thumb adducted across the palm during wakefulness?
3. Does your child sleep with the shoulder, hip and thighs of child remaining flat on the mat, with very little spontaneous movement? (like a frog)
4. Does the child keep the hands and feet close to the body in a stiff posture with scissoring of legs?
5. Does the child keep his or her head stretched backwards and the entire spine stretched like a bow with toes pointing straight?
6. Did your child start performing the following activities later than children of his or her age?
  - a) Started Head holding beyond 4 months: while on mothers shoulder or when on tummy lifting the head
  - b) Started sitting without support beyond 9 months
  - c) Started standing without support beyond 18 months
  - d) Started walking without support beyond his or her second birthday
7. Does your child do any of the following?
  - a. Toe-walking
  - b. Abnormal posture of any limb
  - c. Decreased or unequal use of any limb
  - d. Frequent falls



## **Cerebral palsy**

Cerebral palsy is defined as 'a disorder of movement and posture due to a defect or lesion of the immature brain' (Bax 1964). It may occur in utero, during birth, or within three years after birth. Although it is essentially a motor disorder, it is often associated with cognitive deficits, visual and hearing disturbances, and seizure disorders. The lesion in the brain remains static and non-progressive but the motor and functional abilities may deteriorate, as age progresses.

Cerebral palsy causes variable impairment of the coordination of muscle action, with resulting inability of the child to maintain normal postures and perform normal movements.

### **Associated problems of Cerebral palsy**

- Cognitive and perceptual disorder;
- Inadequate habituation and state control (inconsolable cry, unable to maintain sleep);
- Emotional disturbances;
- Visual impairment;
- Speech and language disorder;
- Hearing impairment;
- Seizure disorder;
- Feeding difficulties (uncoordinated lip, tongue and jaw movements, swallowing problems);
- Orthopaedic problems (contractures, deformities, spinal deformities);
- Dental problems;

### **Incidence of Cerebral Palsy**

The current prevalence of cerebral palsy is estimated to be one to three per 1000 children of early school age.

### **Causes of Cerebral Palsy**

- Preterm brain injury (certain areas of the brain more affected);
- Term brain injury due to lack of Oxygen or circulation of blood to the brain or both. (certain areas of the brain are destined to suffer most);
- High level of newborn jaundice not treated properly leading to damage of certain areas of the brain;
- Brain malformations since birth;

### **Impact on the child and the Family**

CNS dysfunction has mild to severe impact on motor development which, in turn influences cognitive and sensory processing. The resulting movement and functional limitations due to brain lesions depend on area and extent of damage. There may be associated health problems

like recurrent lung infections, inadequate nourishment due to feeding difficulties, and improper digestion of food due to poor posture and lack of mobility, constipation and others. Concurrent seizure disorder requires medications that also cause diminished alertness and further reduce movements and learning. They, therefore, require continuous medical support for one reason or the other.

Due to movement restrictions, children with neuro-motor disability are unable to explore their environment that, almost invariably, affects social and emotional development. Avenues of learning using different sensory organs suffer greatly, due to disorders of movements and locomotion, and are further compromised if there are associated deficits of hearing, sight, tactile processing and/or perception. Thus, it is the combined effect of organic damage and the resultant deprivation of exploration, due to movement restrictions, that affects the overall development of the child. Some children having continuous involuntary movements and facial twitching and no speech may appear to have intellectual disability which, they actually may not have.

Having such a child in the family makes the parents handicapped in many ways. A considerable amount of financial resources of the family is spent for the wellbeing of the child and transportation to avail therapy and medical services, procuring furniture and aids and appliances, and medications, if needed. Due to motor disability of the child, it becomes physically impossible for the parents to carry the child and move about which, indirectly, restricts them to attend social functions, family gatherings, and visit to the neighbors. Inadequate number of mobility aids like wheelchairs in public places -- like bus terminus and railway station, lack of wheelchair accessibility on public transport system, and above all public apathy, towards the need of the child all add woes to the family's plight, having a child with motor disability.

### **Early Recognition of Cerebral Palsy**

The following are the early indicators of cerebral palsy:

#### ***In supine:***

- Asymmetrical posture (head and trunk are not aligned);
- Asymmetrical tone and movement patterns, e.g., flexor hypertonicity in arms and extensor hypertonicity of legs;
- Opisthotonic posture (head and trunk stiffly hyperextended in supine posture);
- Head lags when pulled to sit, unable to anchor at the pelvis;
- Unable to lift head, to an upright position, either from falling forward or backward when held, in a sitting position;
- Frog posture in supine with no movement against gravity;
- Asymmetrical tonic neck reflex with involvement of trunk;

*In prone:*

- Unable to lift head, even momentarily, in prone, cannot clear airway;
- Persistence of flexion due to increased tone;
- Fully rounded trunk with head hanging forward, due to Hypotonia;

*In sitting:*

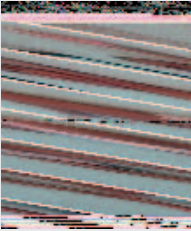













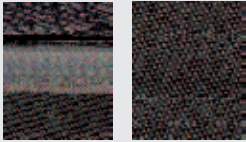
- Unable to hold upright posture, due to Hypotonia;
- Head thrown back, due to intermittent spasm;
- Asymmetrical weight bearing with flexed one arm (due to increased tone) and internal rotation and adduction of the affected hip (hemiparesis);

*Standing:*








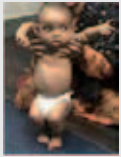
- Pushes head backward, cannot conform in standing position;
- Unable to put weight through legs (hypotonia);
- Stands on toes with internal rotation of hips (increased extensor hypertonicity);
- with foot, flat in one leg and the foot is plantarflexed with hip, internally, rotated and knee flexed of the affected side (hemiparesis);

**Exercise: spot the abnormality.**



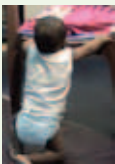



Normal Development	Deviated Development
<b>At Birth</b>	
<ul style="list-style-type: none"> <li>at birth flexed posture in supine:</li> </ul> 	<ul style="list-style-type: none"> <li>Stiff legs</li> <li>Legs extended as compared to bend legs seen normally</li> </ul> 
<ul style="list-style-type: none"> <li>At birth, flexed in prone posture</li> </ul> 	<ul style="list-style-type: none"> <li>Pushes back, head to one side (arching of back)</li> <li>Frog position</li> </ul>  
<b>At 1 month</b>	
<ul style="list-style-type: none"> <li>Slowly the bend (flexor) posture is straightening up</li> </ul> 	<ul style="list-style-type: none"> <li>Cannot lift head Unable to clear the breathing passage when put in prone position</li> </ul> 
<b>At 3 month</b>	
<ul style="list-style-type: none"> <li>Lifts head up in prone</li> </ul> 	<ul style="list-style-type: none"> <li>Cannot lift head up in prone</li> </ul> 
<ul style="list-style-type: none"> <li>Head control</li> </ul> 	<ul style="list-style-type: none"> <li>No head holding</li> </ul> 
<ul style="list-style-type: none"> <li>Can lie straight with head and trunk aligned in supine</li> </ul> 	<ul style="list-style-type: none"> <li>One arm and leg bent, the other arm and leg straight</li> </ul> 
<ul style="list-style-type: none"> <li>Brings two hands together</li> </ul> 	<ul style="list-style-type: none"> <li>Cannot bring hands together</li> </ul> 



Normal Development	Deviated Development
<b>By 6 months</b>	
<ul style="list-style-type: none"> <li>Lifts head and chest up</li> <li>Weight bearing on straight arms in prone</li> </ul> 	<ul style="list-style-type: none"> <li>Cannot lift head and trunk up,</li> <li>Cannot bear weight through arms</li> </ul> 
<ul style="list-style-type: none"> <li>Sits leaning on hands</li> </ul> 	<ul style="list-style-type: none"> <li>When made to sit cannot lift head, rounded back</li> </ul> 
<ul style="list-style-type: none"> <li>Takes weight on feet when held in standing</li> </ul> 	<ul style="list-style-type: none"> <li>Child arches back when made to sit</li> <li>Head falls back when pulled to sit</li> <li>Arms pull back</li> </ul>  
<ul style="list-style-type: none"> <li>Holds object using thumb side (radial palmer grasp)</li> <li>Transfer object from hand to hand (begin)</li> </ul> 	<ul style="list-style-type: none"> <li>Tiptoe standing</li> <li>Stiff legs, pointed toes</li> </ul>  
	<ul style="list-style-type: none"> <li>Stiff legs which are crossed like scissors</li> <li>Stiff arms and fisted hands</li> </ul>  
<b>By 9 months</b>	
<ul style="list-style-type: none"> <li>Sits alone; reaches out</li> </ul> 	<ul style="list-style-type: none"> <li>Round back, Poor head lifting requires support still unable to sit properly</li> </ul> 

Normal Development	Deviated Development
<ul style="list-style-type: none"> <li>Supports self when placed in standing</li> </ul> 	<ul style="list-style-type: none"> <li>Poor use of hands for play as they are engaged in support;</li> <li>Abnormal postures</li> </ul> <div style="display: flex; justify-content: space-around;">    </div> <p style="text-align: center;">Hypertonia      Hypotonia      Fluctuating Tone</p> <div style="display: flex; justify-content: space-around;">    </div> <p style="text-align: center;">Sitting</p> <ul style="list-style-type: none"> <li>Does not take weight on legs</li> </ul> 




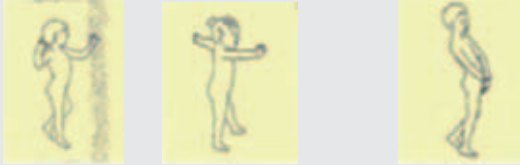

**By 12 months**

<ul style="list-style-type: none"> <li>Crawls well</li> </ul> 	<ul style="list-style-type: none"> <li>Cannot crawl, drags both legs together (bunny hopping)</li> <li>Uses only one side of the body or drags self by only using arms</li> </ul> 
<ul style="list-style-type: none"> <li>Pulls to stand holding something</li> </ul> 	<ul style="list-style-type: none"> <li>Difficulty pulling to stand</li> <li>Stiff legs, pointed toes</li> </ul> 

**By 18 months**

<ul style="list-style-type: none"> <li>Stands and walks alone, moves in and out of sitting</li> </ul> 	<ul style="list-style-type: none"> <li>One arm stiff and bent</li> <li>Poor standing balance</li> <li>Uses only one hand to play</li> <li>One leg may be stiff</li> <li>Sits with weight on one side</li> </ul> <p style="text-align: center;">Unable to hold head Straight</p> 
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Normal Development	Deviated Development
<ul style="list-style-type: none"> <li>Sits straight</li> </ul> 	<p>Abnormal postures</p> 
<ul style="list-style-type: none"> <li>Uses both hands</li> </ul> 	<ul style="list-style-type: none"> <li>Requires support to stand</li> <li>Tiptoe walking on one side</li> </ul> 
<ul style="list-style-type: none"> <li>Turn pages one at a time</li> <li>Imitates vertical or circular stroke</li> </ul> 	<ul style="list-style-type: none"> <li>Hypertonia</li> <li>Hypotonia</li> <li>Fluctuation Tone</li> </ul>

**Gross Motor:**

- I. Pictorial tool for Gross motor development
- II. Tool for screening cases suspected to have gross motor problems









<p><b>0 - 3 months Gross Motor</b></p>  <p>Raises the head      Moves arms &amp; legs</p>	<p><b>3 - 6 months Gross Motor</b></p>  <p>Lifts head and trunk      Rolls over</p>
<p><b>6 - 12 months Gross Motor</b></p>  <p>Sits alone      Crawls      Pulls up &amp; takes steps when supported</p>	<p><b>12 - 18 months Gross Motor</b></p>  <p>Takes steps      Climbs      Walks well</p>



<b>Birth to 3 months</b>	<b>Raises head</b>	<b>Moves arms and legs</b>	
3 to 6 months	Lifts head and trunk	Rolls over	
6 to 12 months	Sits alone	Crawls	Pulls up and takes steps when supported
12 to 18 months	Takes steps	Climbs	Walks well
3 to 4 years	Walks on toes	Can jump forward	Can throw and receive ball

**Tool for screening cases, suspected to have gross motor problems:**

**Pathways.org** **Recognizing Early Motor Delays**  
 A Comparison Examination of 2 Month Old Infants

	Typical	Atypical
<b>Supine</b> <ul style="list-style-type: none"> <li>• Maintains head in midline for brief periods</li> <li>• Locates objects visually and tracks from left to right</li> <li>• Begins to show antigravity movements of upper and lower extremities</li> <li>• Not yet able to reach and grasp toys</li> </ul>		<ul style="list-style-type: none"> <li>• May show more asymmetrical movement with predominance of head to one side, or strong asymmetrical tonic neck reflex (ATNR)</li> <li>• Difficulty visually tracking, may only track to one side or only to midline</li> <li>• Decreased ability to generate upper and lower extremity antigravity movements</li> <li>• Longer periods of inactivity</li> </ul> 
<b>Sidelying</b> <ul style="list-style-type: none"> <li>• Able to lift head and upper trunk during facilitated roll, showing lateral headrighting</li> <li>• Begins to balance activity of trunk flexor and extensor muscles</li> <li>• Ability to change from predominant use of flexors to use of extensors as position requires</li> </ul>		<ul style="list-style-type: none"> <li>• May be unable to right head during facilitated rolling</li> <li>• May look more competent in sidelying, therefore important to observe baby in all eight positions</li> </ul> 
<b>Prone</b> <ul style="list-style-type: none"> <li>• Head lifting to 45 degrees and extension through upper thoracic spine</li> <li>• Hips and knees begin to move from flexed "newborn" posture into extended, abducted position, which allows head and trunk lifting</li> <li>• Elbows typically not directly under the shoulders until 3 months</li> </ul>		<ul style="list-style-type: none"> <li>• Posture looks more like a newborn; infant does not show hip extension, hips and knees remain in flexed abducted posture</li> <li>• No independent head lifting; can move head only with assistance</li> </ul> 
<b>Pull to Sit</b> <ul style="list-style-type: none"> <li>• Head-lag is typical until the infant is about 15 degrees from upright</li> <li>• Uses shoulder elevation and elbow flexion to assist</li> <li>• Able to engage neck muscles to sustain midline head control when upright</li> <li>• Good extension through the cervical and upper thoracic spine</li> </ul>		<ul style="list-style-type: none"> <li>• May exhibit head-lag through the entire pull to sit maneuver</li> <li>• Poor head control when in upright sitting</li> <li>• Little muscle activity in the upper extremities or cervical spine</li> <li>• When upright, rounding of the thoracic and lumbar spine</li> </ul> 

## Recognizing Early Motor Delays

### A Comparison Examination of 2 Month Old Infants

	Typical	Atypical
<b>Sitting</b>	<ul style="list-style-type: none"> <li>• Head is aligned with ear directly over the shoulder</li> <li>• Holds and sustains posture with assistance</li> <li>• Head turning may or may not be present at 2 months, but should be seen by 3 months</li> </ul>	<ul style="list-style-type: none"> <li>• Needs more support to sustain sitting posture</li> <li>• Inability to achieve and sustain head lifting in upright position</li> <li>• Little to no antigravity arm activity</li> </ul>
<b>Horizontal Suspension</b>	<ul style="list-style-type: none"> <li>• Able to activate adequate neck and trunk extension to sustain posture</li> <li>• Can maintain brief periods of head control, but may not be able to hold the head in midline</li> </ul>	<ul style="list-style-type: none"> <li>• Difficulty or inability to activate neck or upper thoracic extensors to lift head</li> <li>• May try to use arm and leg movements to sustain posture</li> </ul>
<b>Protective Extension</b>	<ul style="list-style-type: none"> <li>• Aware of being tilted forward; increases head and neck extension</li> <li>• Will not be fully able to bring arms forward for full protective response until 6 months</li> </ul>	<ul style="list-style-type: none"> <li>• Unable to generate antigravity head and trunk activity</li> </ul>
<b>Standing</b>	<ul style="list-style-type: none"> <li>• Able to sustain weight on lower extremities with support at the trunk</li> <li>• Typically shows intermittent bouts of extension and flexion</li> <li>• Good vertical alignment from head through trunk and feet</li> </ul>	<ul style="list-style-type: none"> <li>• May support little if any weight on feet</li> <li>• Little or no intermittent muscle activity to attain or maintain standing</li> </ul>



## Recognizing Early Motor Delays

A Comparison Examination of 4 Month Old Infants

Typical

Atypical

Sitting

- Shows good head control and chin tuck, with head in midline
- Requires support only at hips and pelvis; has extension to mid-thoracic spine
- Begins to move in anterior-posterior planes and comes back from forward flexion at the hips into upright sitting



- Does not sustain head lifting; cannot turn head to look side-to-side
- Must be held high under the armpits for support
- Uses extremity posturing to compensate for decreased proximal strength



Horizontal Suspension

- Able to keep neck and trunk extended with head upright to 45 degrees, steady and in midline
- Shows trunk extension into lumbar spine and scapular adduction
- Freely moves arms and legs



- Able to hold head up briefly but cannot maintain it in midline
- Cannot sustain thoracic trunk extension and does not show hip extension
- Cannot maintain trunk extension while moving arms and legs



Protective Extension

- Displays extension through neck, trunk and hips that is maintained during forward tilting
- Cannot bring arms fully forward to surface because they are being used to sustain extension



- Unable to sustain strong neck, trunk and hip extension during forward tilting
- Uses excessive asymmetry and flexed arms to sustain extension to avoid hitting his head



Standing

- Keeps hips just behind shoulders
- Has active extension into lower thoracic and lumbar spine, but no full hip extension
- Can sustain standing posture; requires minimal support at lower-trunk to aid in balance











- Requires support in the upper thoracic area to sustain standing
- Intermittent extension used to produce head lifting
- Shoulders remain well forward of hips
- Lacks adequate hip and trunk control for sustained weight bearing



# Recognizing Early Motor Delays


## A Comparison Examination of 4 Month Old Infants

	Typical	Atypical
<b>Sitting</b> <ul style="list-style-type: none"> <li>Shows good head control and chin tuck, with head in midline</li> <li>Requires support only at hips and pelvis; has extension to mid-thoracic spine</li> <li>Begins to move in anterior-posterior planes and comes back from forward flexion at the hips into upright sitting</li> </ul>		<ul style="list-style-type: none"> <li>Does not sustain head lifting; cannot turn head to look side-to-side</li> <li>Must be held high under the armpits for support</li> <li>Uses extremely posturing to compensate for decreased proximal strength</li> </ul> 
<b>Horizontal Suspension</b> <ul style="list-style-type: none"> <li>Able to keep neck and trunk extended with head upright to 45 degrees, steady and in midline</li> <li>Shows trunk extension into lumbar spine and scapular adduction</li> <li>Freely moves arms and legs</li> </ul>		<ul style="list-style-type: none"> <li>Able to hold head up briefly but cannot maintain it in midline</li> <li>Cannot sustain thoracic trunk extension and does not show hip extension</li> <li>Cannot maintain trunk extension while moving arms and legs</li> </ul> 
<b>Protective Extension</b> <ul style="list-style-type: none"> <li>Displays extension through neck, trunk and hips that is maintained during forward tilting</li> <li>Cannot bring arms fully forward to surface because they are being used to sustain extension</li> </ul>		<ul style="list-style-type: none"> <li>Unable to sustain strong neck, trunk and hip extension during forward tilting</li> <li>Uses excessive asymmetry and flexed arms to sustain extension to avoid hitting his head</li> </ul> 
<b>Standing</b> <ul style="list-style-type: none"> <li>Keeps hips just behind shoulders</li> <li>Has active extension into lower thoracic and lumbar spine, but no full hip extension</li> <li>Can sustain standing posture; requires minimal support at lower trunk to aid in balance</li> </ul>		<ul style="list-style-type: none"> <li>Requires support in the upper thoracic area to sustain standing</li> <li>Intermittent extension used to produce head lifting</li> <li>Shoulders remain well forward of hips</li> <li>Lacks adequate hip and trunk control for sustained weight bearing</li> </ul> 




# Recognizing Early Motor Delays

## A Comparison Examination of 6 Month Old Infants

	Typical	Atypical
<b>Supine</b> <ul style="list-style-type: none"> <li>• Able to symmetrically lift and sustain upper and lower extremities against gravity</li> <li>• Demonstrates increased antigravity control of the muscles of the trunk and increased freedom of extremity movement</li> <li>• Exhibits quick visual-motor response of looking, reaching, grasping and transferring objects</li> </ul>		<ul style="list-style-type: none"> <li>• Shows improved ability to hold head and trunk in midline, but still without adequate antigravity movement</li> <li>• Has excessively abducted and externally rotated upper and lower extremities, with movement primarily on the surface</li> <li>• Appears visually interested in objects but unable to reach and grasp</li> </ul> 
<b>Sidelying</b> <ul style="list-style-type: none"> <li>• Rolls independently and easily from supine through sidelying into prone in either direction</li> <li>• Shows active head righting and upper extremity pushing against the surface to raise body while reaching with the other hand</li> </ul>		<ul style="list-style-type: none"> <li>• Requires assistance from examiner in rolling from supine to sidelying</li> <li>• Unbalanced neck, shoulder and back extension prevents use of the arm to assist in the rolling maneuver</li> </ul> 
<b>Prone</b> <ul style="list-style-type: none"> <li>• Bears weight on extended arms and forearms, with extension into the lumbar spine and lower extremities</li> <li>• Shows emerging upper extremity control in weight shifting for reaching, grasping and playing</li> <li>• Grasp toy towards thumb side of palm</li> </ul>		<ul style="list-style-type: none"> <li>• Does not choose prone position for play due to decreased head, shoulder and trunk control</li> <li>• Has decreased upper extremity power, preventing weight shift towards the pelvis necessary for freedom in the upper extremities</li> <li>• Positions elbows behind shoulders, preventing head and trunk lifting</li> </ul> 
<b>Pull to Sit</b> <ul style="list-style-type: none"> <li>• Responds quickly and assists in the maneuver by actively flexing neck and lifting head</li> <li>• Also uses activity in the upper extremities and abdominals to assist</li> <li>• Shows good symmetry in the head, neck and upper extremities</li> </ul>		<ul style="list-style-type: none"> <li>• Assists minimally in the pull to sit maneuver</li> <li>• Demonstrates complete head lag until the upright position</li> <li>• Does not assist with upper extremity pulling</li> </ul> 

# Recognizing Early Motor Delays

A Comparison Examination of 6 Month Old Infants

	Typical	Atypical
Sitting	<ul style="list-style-type: none"> <li>Shows stable head and trunk control with active extension through the thoracic spine</li> <li>Reaches with one arm at a time, using a wide base of support in the lower extremities</li> </ul> 	<ul style="list-style-type: none"> <li>Struggles to maintain head upright and in midline; cannot activate vision or explore because so much effort is required to remain upright</li> <li>Must be supported high up in the chest for stability</li> <li>Exhibits decreased trunk extension and freedom to reach</li> </ul> 
Horizontal Suspension	<ul style="list-style-type: none"> <li>Demonstrates full, sustained extension in the neck and upper thoracic spine, down through the hips and legs</li> </ul> 	<ul style="list-style-type: none"> <li>Lifts head in midline and extends through the upper thoracic spine only briefly</li> <li>Does not exhibit extension through the spine and hips</li> </ul> 
Protective Extension	<ul style="list-style-type: none"> <li>Easily and quickly brings arms forward in a full protective response when tipped toward the surface</li> <li>Props immediately on one upper extremity when reaching for a toy</li> </ul> 	<ul style="list-style-type: none"> <li>Does not bring upper extremities forward to the surface in a protective response</li> <li>Displays inadequate antigravity neck and trunk strength to free the arms to come forward</li> </ul> 
Standing	<ul style="list-style-type: none"> <li>Exhibits immediate sustained weight bearing on extended lower extremities; turns head freely to look around</li> <li>Keeps hips slightly flexed and somewhat behind the shoulders</li> <li>Uses upper extremities to assist in stabilizing the trunk</li> </ul> 	<ul style="list-style-type: none"> <li>Fails to initiate or sustain active weight bearing when placed in supported standing</li> <li>Lacks necessary antigravity head and trunk control</li> <li>Unable to align head, trunk, hips, knees and feet in the vertical</li> </ul> 

## 2 Cognition:

- I. Pictorial tool for cognitive development;
- II. Tool for screening cases, suspected to have cognitive problems;






Birth to 3 months	Follows moving objects or sounds	Discovers hands	
3 to 6 months	Grabs nearby objects	Shows interest in small objects	
6 to 12 months	Looks for objects that are hidden	Pushes and rolls toys	Looks in mirror & smiles at self
12 to 18 months	Names 2 to 4 parts of the face	Pulls an object to reach for something	Interested in everything it sees





18 to 24 months	Knows/ can name 2-3 body parts	Understands “yes” and “no”	Plays with many objects
2 to 3 years	Knows colours	Knows difference between large and small	Imitates animals
3 to 4 years	Can match, similar objects	Knows purpose of objects	Can name 10 body parts
5 to 6 years	Can tell about the, purpose of, body parts	Can tell sequence	Can order objects by size

### Tool for screening cases suspected to have cognitive problems

		
Slow reaction: responds slowly to what others say and to what happens in her surroundings. Sometimes do not respond at all	Absence of clarity: they cannot express clearly their thoughts, needs and feelings	Inability to learn fast: cannot learn anything new and different as easily as others. They are slow in learning.



What is this?

Inability to understand quickly: cannot understand easily what they see, hear, touch, smell or taste



Inability to decide: cannot take even simple decisions. Do not know what to do, say, and so on



Lack of concentration: cannot give continuous attention to one person or one activity. Some of them have difficulty in changing from one activity to another



Short temper: some find it difficult to control their feelings. May throw things all over, injure themselves or others



Inability to remember: some can remember only for a short time of what they are told. Sometimes they do not remember at all



Lack of coordination: some have difficulty in sucking, chewing or eating, use of hands or moving from place to place

**Features of Mental retardation :**

1. Slow Reaction
2. Absence of Clarity
3. Inability to Learn fast
4. Inability to Understand quickly
5. Inability to Decide
6. Lack of Concentration
7. Short Temper
8. Inability to Remember
9. Lack of Coordination
10. Delay in Development

# 3 Vision Impairment

## Vision Screening for Infants and Children

Good vision is essential for proper physical development and educational progress, in growing children. The visual system in the young child is not fully mature. Equal input, from both eyes, is required for proper development of the visual centers in the brain. If a growing child’s eye does not provide a clear focused image to the developing brain, then permanent, irreversible, loss of vision may result. Early detection provides the best opportunity for effective, inexpensive treatment.

### Age of screening:

- I. Vision screening at District facility for preterm children: objective for Retinopathy of prematurity;
- II. Vision screening from 0-3 years: “S” subjective and by history mainly;
- III. Vision screening from 3-6 years: “S” subjective and by history mainly;
- IV. Vision screening from 6-18 years: “O” objective by appropriate standard testing method;

Age of screening	Place of screening	Tools for screening	Person
Newborn esp. Preterm	Facility, District Hospital	Indirect ophthalmoscope	Ophthalmologist
0-3 years	Anganwadi center	1) Questionnaire 2) Torch 3) Toy 4) Occluder 5) Raisins	Mobile team
3-6 years	Anganwadi center	Do	Mobile team
6-18 years	School	Snellen’s chart	Mobile team

### Vision screening from 0-3 years

#### I. OBJECTIVES:

After reviewing this chapter and having successfully completed, a training session, the screener will be able to:

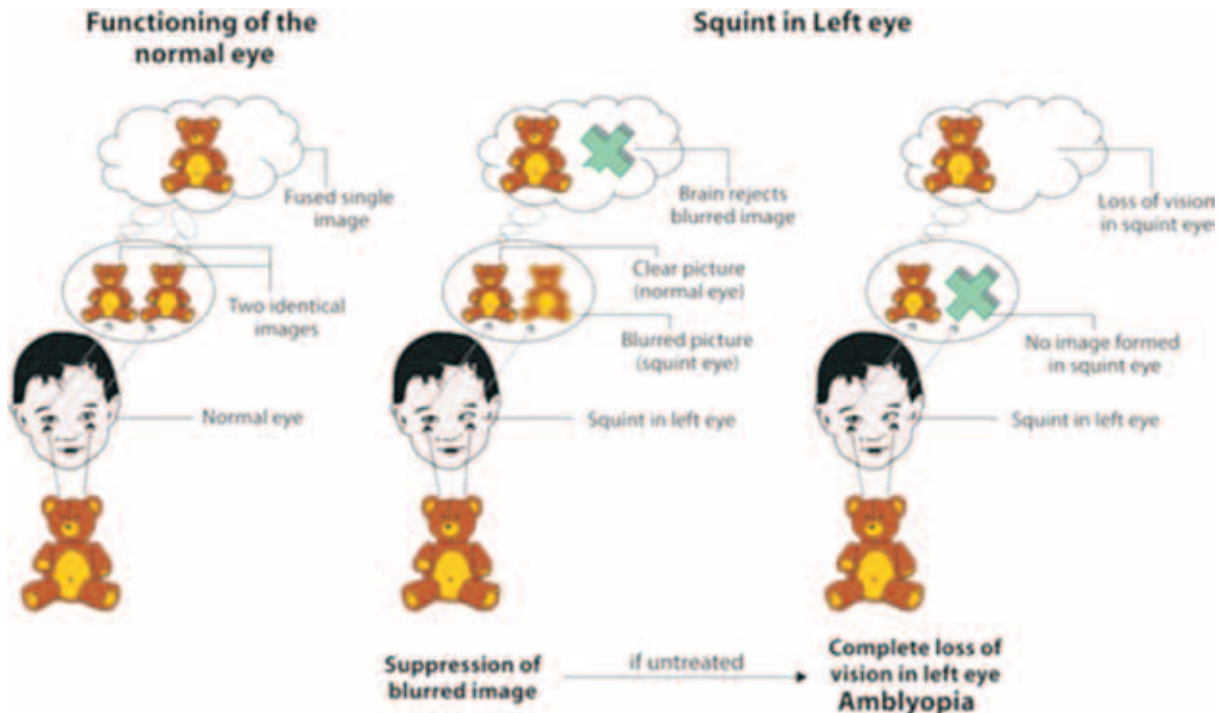
1. Understand the vision screening services offered, to the preschool age and/or kindergarten population, by the Health Authorities.
2. Understand the purpose of the screening procedures for Nasal lacrimal duct obstruction, refractive errors/visual acuity, to avoid amblyopia.
3. Accurately, carry out the screening procedure.
4. Record and interpret the results of the screening procedure.
5. Make appropriate referrals, if indicated, and liaise with other professionals involved in follow up (e.g. eye doctors, teachers etc.).
6. Make immediate advices to the caregivers.



## VISION DISORDERS THAT MAY BE DETECTED BY SCREENING from 0-3 years:

Courtesy: Arvind eye hospital, Madurai for Pediatric Ophthalmology and Strabismus

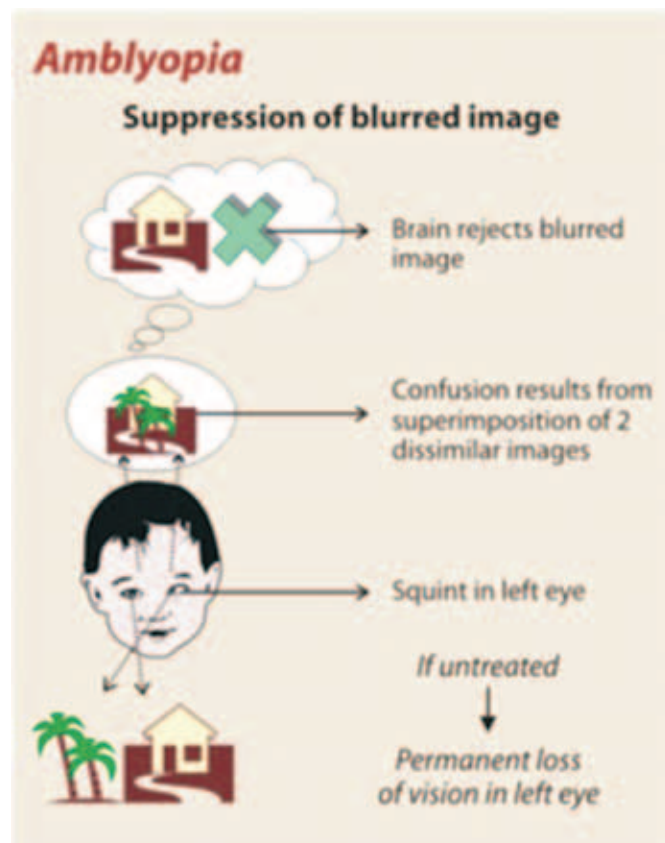
The purpose of vision screening is to detect vision disorders, such as refractive errors, amblyopia and strabismus, at an early age (less than 6 years.)



Courtesy: American Association for Pediatric Ophthalmology and Strabismus

## AMBLYOPIA:

A common vision problem in children is amblyopia, or "lazy eye." It is so common, that it is the reason for more vision loss, in children, than all other causes put together. Amblyopia is a decrease in the child's vision that can happen even when there is no problem with the structure of the eye. The decrease in vision results when one or both eyes send a blurry image to the brain. The brain then "learns" to only see blurry with that eye, even when glasses are used. Only children can get amblyopia. If it is not treated, it can cause permanent loss of vision. Eyes are the windows to the brain through which visual stimulation reaches the brain along the visual pathway. If, for some reason, there is prolonged



visual deprivation to the portion of the brain serving the eye, it may lead to failure of its development.

Amblyopia affects approximately 2% of all children. If untreated, amblyopia can cause irreversible visual loss. The best time for treatment is in the preschool years. Improvement of vision after the child is 8 or 9 years of age is rarely achieved.

**There are several different types and causes of amblyopia:**

1) **Strabismic amblyopia or crossed eye or eyes are not looking straight:**

Strabismic amblyopia develops when the eyes are not straight. One eye may turn in, out, up or down. When this happens, the brain “turns off” the eye that is not straight and the vision subsequently drops, in that eye.

2) **Deprivation amblyopia:** when light cannot pass through the eyes e.g. cataract.

Deprivation amblyopia develops when cataracts or similar conditions “deprive” young children’s eyes, of visual experience. If not treated very early, these children can have very poor vision. Sometimes this kind of amblyopia can affect both eyes.

3) **Refractive amblyopia:**

When there is a large or unequal amount of refractive error (glasses strength) in a child’s eyes.

The end result of all forms of amblyopia is reduced vision in the affected eye(s). Usually the brain will “turn off” the eye that has more far-sightedness or more astigmatism. Parents and pediatricians may not think there is a problem because the child’s eyes may stay straight. Also, the “good” eye has normal vision. For these reasons, this kind of amblyopia in children may not be found until the child has a vision test. This kind of amblyopia can affect one or both eyes and can be helped if the problem is found, early.

**Strabismus** is misalignment of the eyes in any direction. This should not be seen after 3 months. Amblyopia may develop when the eyes do not align. If early detection of amblyopia secondary to strabismus is followed by effective treatment, then excellent vision may be restored.

The eyes can be aligned in some cases with glasses and in others with surgery. However, restoration of good alignment does not assure elimination of amblyopia.

**Refractive errors** cause decreased vision, visual discomfort (“eye strain”), and/or amblyopia. The most common form, near-sightedness (poor distance vision) is usually seen in school-age children and is treated effectively, in most cases, with glasses. Far-sightedness can cause problems with focusing at nearby objects and may be treated with glasses. Astigmatism (imperfect curvature of the front surfaces of the eye) also requires corrective lenses, if it produces blurred vision or discomfort. Uncorrected refractive errors can cause amblyopia particularly if they are severe or are different between the two eyes.

**Myopia:** image is focused anterior to the retina therefore, patients are nearsighted (i.e. have better near vision than distance vision).

**Hyperopia:** image is focused posterior to the retina therefore the patient is farsighted (i.e. has better distance vision than near vision). High degree of Hyperopia is a common cause of amblyopia and accommodative esotropia.

**Astigmatism:** a type of refractive error caused by a cornea that is not perfectly spherical therefore the eye has 2 focal points. (Blurred vision) A patient can have problems with both near and distance vision.

**Tool 1: From Birth to three years**

**Child Vision Development Checklist for Parents/Caregivers**

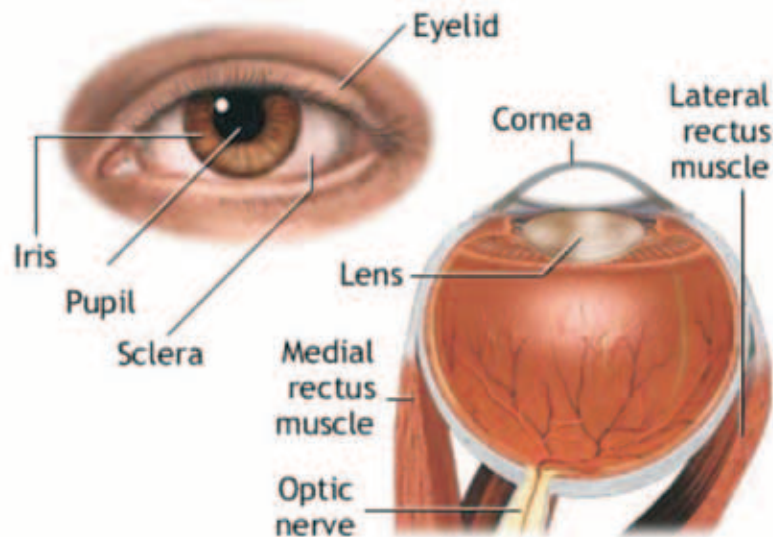
- 1) During the first month of life, does your child?
  - a. Look towards the face of the person holding them?
  - b. Closes eyes to sudden, bright light?
- 2) When your child is 2 months, does your child?
  - a. Follow a moving object? Follow light past midline?
  - b. Look at the eyes of the person, holding it ?
  - c. Switch gaze between two people or objects?
- 3) When your child is 4 months, does your child?
  - a. Reach towards an object and grasp it?
  - b. Fixate on a close object, with eyes not crossing?
  - c. Respond to the full range of colors?
  - d. Show visual interest to close and distant objects?
- 4) When your child is 6 months, does your child?
  - a. Enjoy looking in a mirror?
  - b. Sustain visual interest at close and distant objects?
  - c. Maintain fixation on stationary object, even in the presence of competing moving stimuli?
  - d. Begin, to demonstrate, hand-eye coordination?
- 5) When your child is 7-12 months, does your child?
  - a. Notice small objects such as breadcrumbs?
  - b. Smile back at another person reciprocal smile?
  - c. Recognize objects that are partially hidden?
  - d. Scan eyes, around the room, to see what is happening?



- 6) When your child is 18 months, does your child?
- a. Point to objects or people using words “look or see”?
  - b. Look for and identify pictures in books?
  - c. Play with simple puzzles?
- 7) When your child is 24-36 months, does your child?
- a. See small pictures well, with both eyes?
  - b. Show ability to arrange similar pictures, in groups?
  - c. Watch and imitate, other children (30-36 months)?

Child's Name \_\_\_\_\_ DOB/AGE \_\_\_\_\_

Parent/Caregiver Name \_\_\_\_\_



From six years to 18 years

#### Teacher and Child Vision Pre-Screening Worksheet

**Purpose:** To identify eye or vision problems, throughout the year. Child is asked to report any complaint about his/her eyes. Teachers would be informed by the mobile team to report any abnormal visual behaviors or any visual complaints, as expressed by the child, whenever they occur and give report, prior to screening especially tilting his/her head while looking at the blackboard or holding the book very close to face.

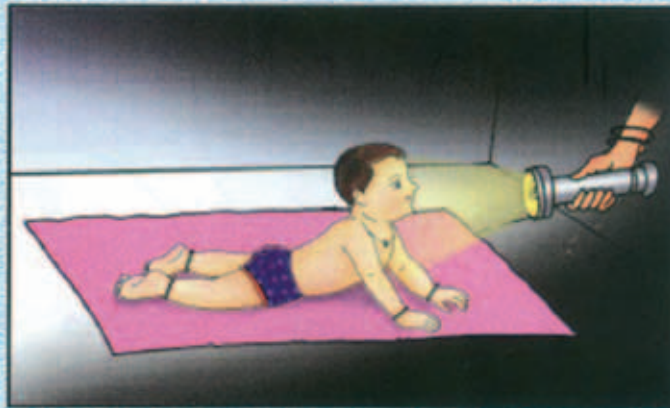


## **NORMAL VISUAL DEVELOPMENT**

The following is the sequence of normal visual development in children.

The child's capabilities at different ages is also indicated.

### **Birth to 3 months**



Child looks at and follows light with eyes



Child looks at objects and human faces

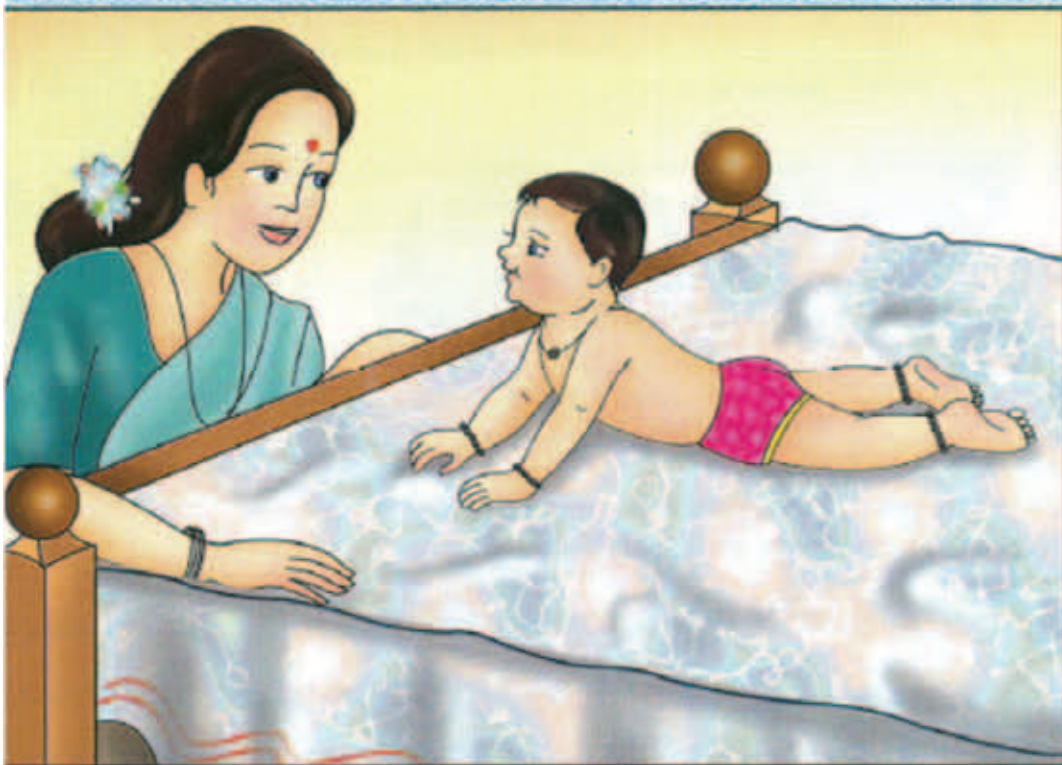


Child looks towards the source of sound

3-6 months



Child reaches with hands to toys shown to him



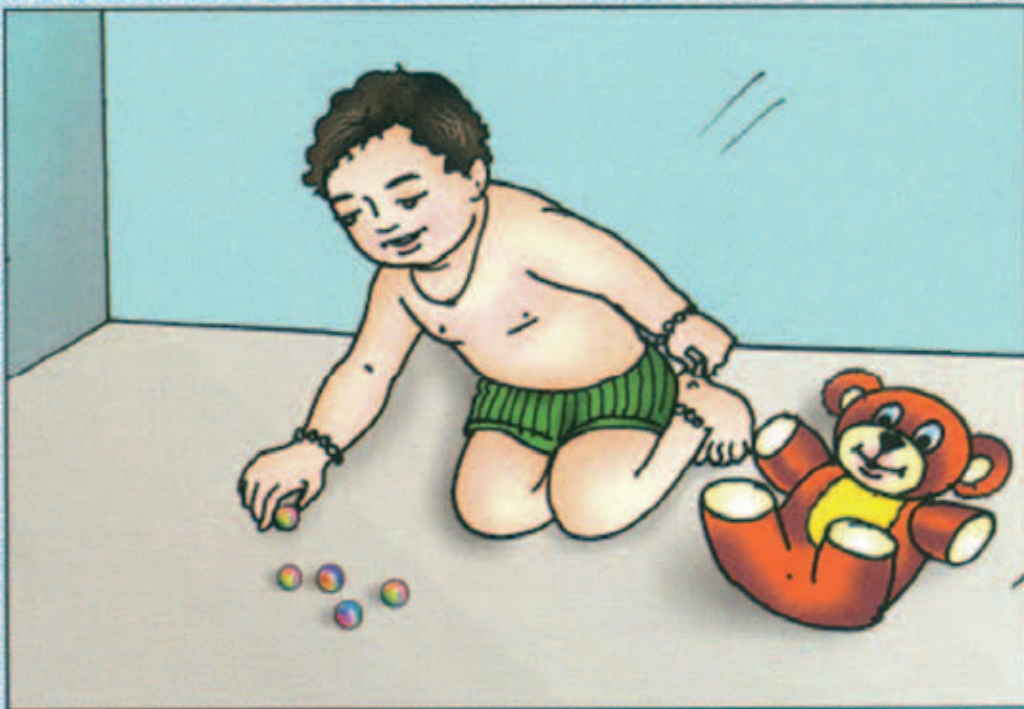
Child maintains eye contact during face to face interaction



6-9 months



Child smiles at mirror image of himself.



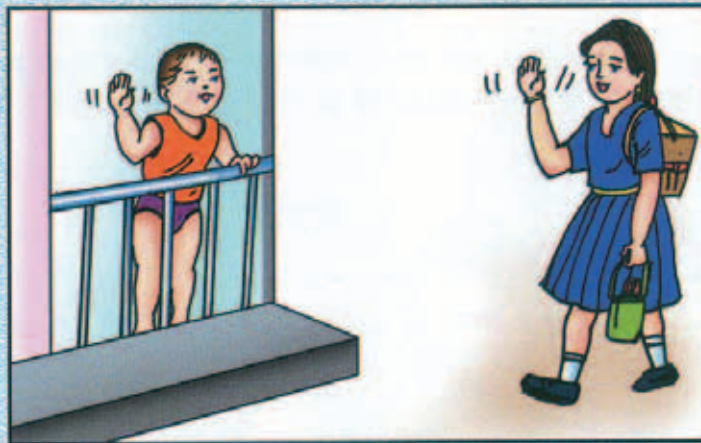
Child picks up small objects like beads & marbles on looking at them



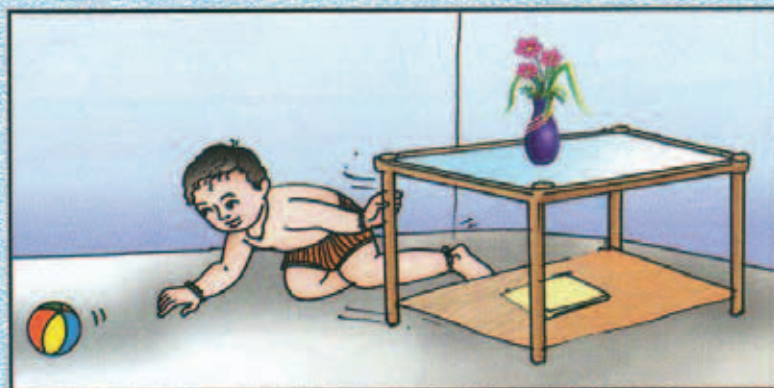
9-12 months



Child manipulates objects in hand and looks for details



Child imitates simple actions like Namaste or bye-bye



Child moves about (while crawling or walking) avoiding obstacles

# 4 Hearing, Speech/language delays and disorders

## Objectives:

- 1) What are speech and language delay and disorders?
- 2) Describe the key milestones, in the development of language and speech.
- 3) List indicators, for further evaluation or referral, of language and speech delays.
- 4) Differentiate global delays, autism and specific language impairment.

Speech and language development begins long before a child utters the first recognizable word. Since birth a child listens to speech sounds and attaining the communication skills on which future language development will depend. The timely attainment of communication skills, speech and language milestones, sets the foundation for a child's subsequent academic and social success. You can watch for speech and language milestones beginning with the earliest well child visits.

## What are speech/language delays and disorders?

- Speech is the sound that comes out of our mouths. When it is not understood, by others, there is a problem. Speech problems could be inability to speak at all or have problems such as stuttering and mispronunciation, which can be very frustrating to the child. Ability to hear is essential for speech. **Speech is speaking ability**
- Language also has to do with meanings, rather than sounds alone. **Language is both Hearing/listening and Understanding ability.** It deals with Hearing/listening and Understanding the meaning of words, one hears. At times, Language is also used as a measure of intelligence. Language delays are more serious than speech problems.

Language delay is when a child's language is developing in the right sequence, but at a slower rate. Speech and language disorder describes abnormal language development. Delayed speech or language development is the most common developmental problem. It affects five to ten percent of preschool children. These children may have trouble producing speech sounds, using spoken language to communicate, or understanding what other people say. Speech and language problems are often, the earliest sign of a learning disability.

## Language has two components: Receptive and Expressive

**LANGUAGE - RECEPTIVE:** Hearing and Understanding. It deals with Hearing and Understanding meaning of words one hears. It also refers to, simply as Language. The components are:

- 1) Hearing;
- 2) Understanding the meanings of words;
- 3) Understanding and communicating the Body parts;
- 4) Understanding and following directions;

**LANGUAGE - EXPRESSIVE:** Talking. It deals with Speaking or vocalizing. It also refers to, simply as speech.

- 1) Expressive vocabulary;
- 2) Communicating with others either by a) Gesture or b) verbally;

**What causes speech and language problems?**

- 1) **Hearing loss** is often overlooked, and easily identified. If your child seems to be suffering from speech/language delay, its hearing should be tested.
- 2) **Intellectual or cognitive disability** a common cause of speech and language delay.
- 3) **Extreme environmental deprivation** can cause speech delay. If a child is neglected or abused and does not hear others speaking, they will not learn to speak.
- 4) **Prematurity** can lead to many kinds of developmental delays, including speech/language problems.
- 5) **Auditory Processing Disorder** describes a problem with decoding, speech sounds. These kids can improve with speech and language therapy.
- 6) **Neurological problems like cerebral palsy** and traumatic brain injury can affect the muscles needed for speaking.
- 7) **Autism** affects communication. Speech/language/communication problems are often an early sign of autism.
- 8) Structural problems like **cleft lip or cleft palate** can interfere with normal speech.
- 9) Selective mutism is when a child will not talk, at all, in certain situations, often at school.

**What should my child be able, to do?**

**Up to 12 months:**

Hearing and Understanding	Talking
<p><b>Birth-3 Months</b></p> <ul style="list-style-type: none"> <li>• Startles to loud sounds;</li> <li>• Quietens up or smiles when spoken to;</li> <li>• Seems to recognize your voice and quietens up, if crying</li> <li>• Increases or decreases sucking behavior, in response to a sound;</li> <li>• Smiles when spoken to,by you;</li> </ul>	<p><b>Birth-3 Months</b></p> <ul style="list-style-type: none"> <li>• Makes pleasure sounds (cooing, gooing);</li> <li>• Cries differently, for different needs;</li> <li>• Smiles, when sees you;</li> </ul>
<p><b>4-6 Months</b></p> <ul style="list-style-type: none"> <li>• Moves eyes in the direction of sounds;</li> <li>• Responds to changes in tone, of your voice, e.g. angry voice</li> <li>• Notices toys that make sounds or looks around to dog barking;</li> <li>• Pays attention to music;</li> </ul>	<p><b>4-6 Months</b></p> <ul style="list-style-type: none"> <li>• Babbling sounds more speech-like with many different sounds, including <i>p, b and m</i>(6m);</li> <li>• Chuckles and laughs (4m);</li> <li>• Vocalizes excitement and displeasure (4m);</li> <li>• Makes gurgling sounds, when left alone and when playing with you (4m);</li> </ul>



### 7 Months-12 months

- Enjoys games like peek-a-boo and pat-a-cake;
- Turns and looks in direction of sounds, when you call his or her name;
- Listens, when spoken to;
- Recognizes words for common items like “cup”, “shoe”, “book”, or “juice”;
- Begins to respond to requests (e.g. “Come here” or “Want more?”)

### 7 Months-12 months

- Babbling has both long and short groups of sounds such as “tata upup bibibibi”;
- Uses speech or non-crying sounds to get and keep attention;
- Uses gestures to communication (waving, holding arms to be picked up);
- Imitates different speech sounds;
- Has one or two words (hi, dog, dada, mama) around first birthday, although sounds may not be clear;

## What should my child be able to do?

12 months to 24 months:

Hearing and Understanding	Talking
<ul style="list-style-type: none"><li>• Point to pictures, in a book, when named.</li><li>• Point to a few body parts, when asked;</li><li>• Follow simple commands and understands simple questions (“Roll the ball,” “Kiss the baby,” “Where’s your shoe?”);</li><li>• Listen to simple stories, songs, and rhymes;</li></ul>	<ul style="list-style-type: none"><li>• Say more words every month;</li><li>• Use some one- or two- word questions (“Where doggy?” “Go bye-bye?” “What’s that?”);</li><li>• Put two words together (“more milk,” “no water,” “mummy book”);</li><li>• Use many different consonant sounds at the beginning of words;</li></ul>

## What should my child be able to do?

24 – 36 months

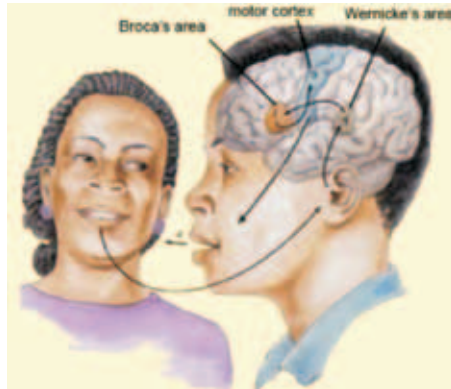
Hearing and Understanding	Talking
<ul style="list-style-type: none"><li>• Understand differences in meaning (“go-stop,” “in-on,” “big-little,” “up-down”);</li><li>• Follow two requests (“Get the book and put it on the table”);</li><li>• Listen to and enjoy hearing stories, for longer periods of time;</li></ul>	<ul style="list-style-type: none"><li>• Has a word for almost everything, introduced to;</li><li>• Use two- or three- words to talk about and ask for things;</li><li>• Use k, g, f, t, d, and n sounds;</li><li>• Speech is understood, by familiar listeners, most of the time;</li><li>• Often ask for or direct attention to objects, by naming them;</li></ul>

## Language development

Language is one of the most amazing things, that we are capable of. It may even be that we the Homo sapiens are the only creatures on the planet who have it. In animals, only the dolphins show any indication of language development, although, we are, as yet, unable to understand them.

We seem to be “built” to speak and understand a language. The specialized areas of the brain, such as Broca’s (**Expressive speech area**) and Wernicke’s areas (**Receptive speech area**), suggest that genetics provides us with, at the very least, the neurological foundations for language.





#### Receptive language:

Voice > External Ear > Middle ear > Inner ear > Receptive speech area > Understands

#### Expressive language :

Expressive speech area starts pronunciation > motor cortex > muscles that help in articulation > finally speaks

When a child hears any voice, sound waves pass through the ear and go to the Receptive speech area, where the meaning of the word is understood and associated with past accumulated learning. When the child wants to speak back, this message then passes to the Expressive speech area which plans the pronunciation process. Lastly, this information is routed to the motor cortex, which controls the muscles that one uses to pronounce the word such as the tongue, palate and jaw.

#### Thus, for proper production of speech, we require:

- 1) External Ear: It has to receive the sound. (Improper formation of external ear may affect hearing and hence speech);
- 2) Sound needs to be conducted through the middle ear to the inner ear. (In recurrent pus discharge from the ear this conduction may be interrupted leading to hearing problem);
- 3) Sound from the inner ear reaches the Receptive speech area of the brain. (In case the child has congenital deafness of neural origin, no sound reaches the brain, again hearing is affected leading to speech problems);
- 4) Receptive speech area makes meaning of the sound or words taking help from past learning. (Children who have experienced a damage, to this part of the brain, could speak, but their speech is often incoherent and makes no sense, as they can hear but cannot understand, the meaning of the words);
- 5) The message from the receptive area reaches the Expressive speech area;
- 6) Expressive speech area plans the pronunciation process. If, this part of the brain is damaged, then the child cannot speak, though he can hear and understand the spoken language;
- 7) From the Expressive speech area the message reaches the motor area, from which the muscles, required to produce the sound, are controlled. (Damage to this area leads to improper coordination of the muscles leading to problem of articulation);
- 8) Finally we require a structurally intact palate, lip for producing the proper pronunciation (cleft lip or palate leads to defective speech);

In general, women's overall reading abilities are better than men's, and this gender difference often makes itself apparent when children are still at primary school. Girls also seem to be better at spelling. The explanation here might be that females use both hemispheres of the brain in processing sounds, while males tend to use mainly the left side. If girls are therefore better at isolating the various sounds, in a word, it would make sense that they would also be better at decoding it and spelling it.

## Hearing, Speech and Language Milestones:

S. No.	Activity	Age in months	Yes/No	Red Flag
1	Baby responds to sound or voice by startles, blinks, quietens up or wakes up;	Birth		1) *Does not startle to or awaken to loud sounds. Suspect hearing impairment at any age;
2	Baby turns towards the source of sound (localisation);	3-6 months		1) *Does not responds to changes in tone of voice; 2) Pooresound localization or lack of responsiveness by 6 months (delay or impaired hearing)

## Language:

S. No.	Activity	Age in months	Yes/No	Red Flag
1	Baby startes making sounds other than crying like "ooh" or "ng"? Baby startes laughing out aloud, belly laughing or squealing sound?	3-6 months		If not making sounds, other than crying, by 6 months
2	Child makes sound like ma-ma, da-da.-bababa, duhduhduh(babbling polysyllabic); Responds to name;	6-9 months		*Loss of ability to coo or babble, by 9 months * Is still making only vowel sounds with no speech like consonants e.g. "aaa", instead of occasional "mmm" or "bah", by 9 months
3	Child understands simple word like no, bye-bye, and go to sleep?	9 -12 months		1) No babbling by 12 months; 2) Does not respond to own name or common words like "no" or bye or bye, by 12 months; 3) Does not utter one meaningful word, by 12 months;
4	Child says at least some single meaningful word like mama, dada, just to label the appropriate parent;	15-18 months		Is not using pointing or gesturestocommunicate,by 15 months; If by 15 months child is not speaking at least two meaningful words and if by 18 months child is not speaking at least five meaningful words;
5	Child consistently combining words in short phrases like mama water, mama milk, papa shirt;	18-24 months Expressive speech		If by 24 months: the child is not combining 2 words into phrases e.g. mummy go , daddy ball; If by 24 months the child does not follow simple commands " get me the ball" *does not point to body parts, named or pictures;

## Conclusion:

Defect in hearing and understanding i.e. **Receptive speech**. Refer for hearing related problems to DEIC, for further assessment and management.

Defect in "Talking" i.e. Expressive speech. Refer for speech/language related problems problem to DEIC, for further assessment and management.

\*Refer to **Language Evaluation Scale Trivandrum** (0-3 years) at Annexure V

## Recap: Speech and Language

<b>By 6 Months: Does the child-</b>	Startle in response to loud noises?
	Turn to where a sound is coming from? (Orients to sound)
	Make different cries for different needs (hungry, tired)?
	Watch your face as you talk to him/her?
	Smile/laugh in response to your smiles and laughs?
	Imitate coughs or other sounds such as ah, eh, buh?
	Utter consonant sounds like "p", "b" "m"?
<b>By 9 Months: Does the child-</b>	Respond to his/her name?
	Reach to be picked up?
	Play social games with you (Peek-a-boo)?
	Babble and repeat sounds such as babababa or duhduhduh?
<b>By 12 Months: Does the child-</b>	Follow simple one step directions? (Sit down)?
	Look across the room to a toy when adults point at it?
	Consistently use 3-5 words?
	Use gestures to communicate (waves hi/bye, shakes head for No?)
	Get your attention using sounds, gestures and pointing while looking at your eyes?
<b>By 24 Months: Does the child-</b>	Understand being told NO?
	Understand the meaning of in and out, off and on?
	Point to more than 2 body parts when asked?
	Use atleast 20 words consistently?
	Respond with words or gestures to simple questions? (Where's ball? What's that?)
	Demonstrate some pretend play with toys (feeding a doll)
	Make atleast four different consonant sounds (p, b, m, n, d, g, w, h)?
	Enjoy being read to and sharing simple books with you?
Point to pictures using one finger?	
<b>By 30 Months: Does the child-</b>	Understand the concepts of size (big/little) and quantity (a little/a lot more)?
	Use some adult grammar (two biscuits, bird flying)?
	Participate in some turn-taking activities with peers, using both words and toys?
	Combine several actions in play (feeds doll and puts her to sleep, puts block in the train and drives the train, drops the blocks off?)

<b>By 36 Months: Does the child-</b>	Understand who, what, where and why questions?
	Create long sentences using five to eight words?
	Talk about past events (trip to Dadi's house, day at park)?
	Tell simple stories?
	Show affection for favorite playmates?
	Engage in multi-step pretend play (pretending to cook a meal, repair a cycle)?
	Have an understanding of the function of print (menus of remote control, lists, signs)?
	Show interest in, and awareness of, rhyming words?

### Recap: Hearing:

<b>By Birth: Does the child-</b>	Listen to speech?
	Startle or cry at noises?
	awaken at loud sounds?
<b>By 3 Months: Does the child-</b>	Smile when spoken to?
	Seem to recognize your voice and quieten up, if crying?
<b>By 4-6 Months: Does the child-</b>	Respond to changes in your tone, of voice?
	Look around for new sounds, eg the doorbell?
	Notice toys that make sounds?
<b>By 7-12 Months: Does the child-</b>	Recognize words, for common items?
	respond to requests ("Come here")?
	Turn or look up, when you call his or her name?
<b>By 12-24 Months: Does the child-</b>	Point to pictures, in a book ,when they are named?
	Follow commands and understand simple questions?
	Listen to simple stories, songs and rhymes?
<b>By 24-36 Months: Does the child-</b>	Understand differences in meaning ("Go-stop")?
	Continue to notice sounds (mobile ringing)?
	Follow 2 requests (get the ball and put it on table)?
<b>By 36-48 Months: Does the child-</b>	Hear you, when you call, from another room?
	Hear TV, at the same volume, as others?
	Answer simple who, what, where, why questions?



# 5 Autism

## What are Autism Spectrum Disorders?

Autism spectrum disorders (ASDs) are a group of developmental disabilities caused by a problem with the brain. The exact cause is not known. People with ASDs have serious impairments with social, emotional, and communication skills. ASDs can impact a person's functioning at different levels, from very mildly to severely. A child with ASD will look like any other child. There is usually nothing about how a person with an ASD looks that sets them apart from other people, but they may communicate, interact, behave, and learn in ways that are different from most people. The thinking and learning abilities of people with ASDs can vary – from gifted to severely, challenged.

## What are some of the signs of ASDs?

Personwith ASDs have serious impairments with social, emotional, and communication skills.

### A) Social Skills

Social impairments are one of the main problems in all of the autism spectrum disorders (ASDs). People with ASDs do not have merely social "difficulties", like shyness. These social problems are often combined with the other areas of deficit, such as communication skills and unusual behaviors and interests. For instance, the inability to have a back-and-forth conversation is both a social and a communication problem.

#### Normal Infants:

Typical infants are very interested in the world and people around them. By the first birthday, a typical toddler tries to imitate words, uses simple gestures such as waving "bye-bye," grasps fingers, and smiles at people. One-way very young children interact with others is by imitating actions—for instance, clapping when mom claps.

#### Autistic Infants:

But the young child with autism may have a very hard time learning to interact with other people. Children with ASDs may not show interest in social games like peek-a-boo or pat-a-cake. Although the ability to play pat-a-cake is not an important life skill, the ability to imitate is. They might not make eye contact and might just want to be alone. Many children with ASDs have a very hard time learning to take turns and share.

### B) Communication

Each person with an ASD has different communication skills. Some people may have relatively good verbal skills, with only a slight language delay with impaired social skills. Others may notspeakat all or have limited ability or interest in communicating and interacting with others. About 40% of children with ASDs do not talk, at all. Another 25%–30% of children with autism have some words at 12 to 18 months' of age and then lose them.[1] Others may speak, but not until later in childhood.



### **C) Repetitive behaviors and routines**

Unusual behaviors such as repetitive motions may make social interactions difficult. Repetitive motions are actions repeated over and over again. They can involve part of the body or the entire body or even an object or toy. For instance, people with ASDs may spend a lot of time repeatedly flapping their arms or rocking from side to side. They might repeatedly turn a light on and off or spin the wheels of a toy car, in front of their eyes. These types of activities are known as self-stimulation or “stimming.”

People with ASDs may have problems with social, emotional, and communication skills. They might repeat certain behaviors and might not want change, in their daily activities. People with ASDs often thrive on routine. A change in the normal pattern of the day—like a stop on the way home from school—can be very upsetting or frustrating to people with ASDs. They may “lose control” and have tantrum, especially, if they’re in a strange place.

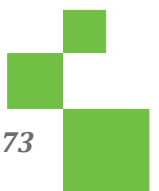
Also, some people with ASDs develop routines that might seem unusual or unnecessary. For example, a person might try to look in every window he or she walks by, in a building or may always want to watch a video, in its entirety—from the previews, at the beginning through the credits, at the end. Not being allowed to do these types of routines may cause severe frustration and tantrums.

***It is very important to begin this intervention as early as possible in order to help your child reach his or her full potential. Acting early can make a real difference.***

#### **Possible Red Flags for Autism Spectrum Disorders :**

**Children with an autism spectrum disorder might:**

- Not play “pretend” games (pretend to “feed” a doll);
- Not point at objects to show interest (point at an airplane flying over);
- Not look at objects when another person points at them;
- Have trouble relating to others or not have an interest in other people, at all;
- Avoid eye contact and want to be alone
- Have trouble understanding other people’s feelings or talking about their own feelings;
- Prefer not to be held or cuddled or might like to be cuddled only when they want to;
- Appear to be unaware when other people talk to them but, respond to other sounds;
- Be very interested in people, but not know how to talk to, play with, or relate to them;
- Repeat or echo words or phrases said to them, or repeat words or phrases in place of normal language (echolalia);
- Have trouble expressing their needs using typical words or motions;
- Repeat actions over and over again;
- Have trouble adapting to changes in routine;
- Have unusual reactions to the way things smell, taste, look, feel, or sound;
- Lose skills they once had (for instance, stop saying words they were once using);
- Talk to your child’s doctor if your child loses skills, at any age.



Today, the main research-based treatment for ASDs is intensive structured teaching of skills, often called behavioral intervention. It is very important to start this intervention as early as possible to help your child reach his or her full potential. Acting early can make a real difference.

**CHILDREN from the age of 1-year onwards:**

- I. Explore the environment;
- II. Use body purposefully to reach or acquire objects;
- III. Explore and play with toys;
- IV. Move from one toy to another or from one activity to another;
- V. Seek Pleasure and avoid pain;

PLAYING WITH CAR / TOY



**Exploration of environment in an autistic child:**

- I. Remains fixated on a single item or activity;
- II. Performs strange actions, like rocking, hand flapping;
- III. May show no sensitivity to burns or bruises;

# 6 Learning disability: For school going children aged 6 years to 9 years

## What is a learning disability?

Some individuals, despite having an average or above average level of intelligence, have real difficulty acquiring basic academic skills. These skills include those needed for successful reading, writing, listening, speaking and/or mathematics (difficulty in counting and calculations). These difficulties might be the result of a condition - Learning Disability (LD).

- “Specific learning disability” means a disorder in one or more of the processes involved in understanding or in using language, spoken or written, which may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations.
- Disorders included, such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia.
- Disorders not included, a learning problem that is primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage.

- A learning-disabled is a child with average intelligence whose vision, hearing, motor ability is normal, yet he or she does not perform well, at the school.
- It does not include children with mental retardation, visual problems, hearing problems or neuro-motor impairment.

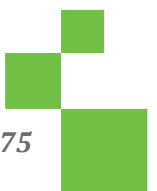
Many children with LD have to struggle with reading. The difficulties often begin with individual sounds. Students may have problems with rhyming, and pulling words apart into their individual sounds and putting individual sounds together to form words (blending). This makes it difficult to decode words accurately, which can lead to trouble with fluency and comprehension. As students move through the grades, more and more of the information they need to learn is presented in written (through textbooks) or oral (through lecture) form. This exacerbates the difficulties they have, succeeding in school.

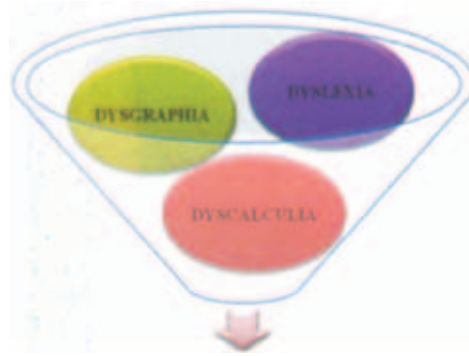
Other related categories include disabilities that affect memory, social skills, and executive functions such as deciding to begin a task.

## Types of learning disabilities:

LD is a broad term. There are many different kinds of learning disabilities. Most often, they fall into three broad categories:

- Reading disabilities (often referred to as dyslexia) difficulty in reading;
- Written language disabilities (often referred to as dysgraphia) difficulty in writing;
- Math disabilities (often called dyscalculia) difficulty in calculating;





## Signs and symptoms

A child with LD would:

- Have trouble learning the alphabet, rhyming words, or connecting letters to their sounds;
- Make many mistakes, when reading aloud, and repeat and pause often;
- Not understand what he or she reads;
- Have to struggle with spellings;
- Have very messy handwriting or hold a pencil, awkwardly;
- Struggle to express ideas in writing;
- Learn language late and have a limited vocabulary;
- Have trouble remembering the sounds, that letters make, or hearing slight differences, between words;

Dyslexia	<ul style="list-style-type: none"> <li>• Letter and word recognition;</li> <li>• Understanding words and ideas;</li> <li>• Reading speed and fluency;</li> <li>• General Vocabulary skills;</li> <li>• Remembering sound;</li> </ul>
Dysgraphia	<ul style="list-style-type: none"> <li>• Neatness &amp; consistency of writing;</li> <li>• Accurately copying letters &amp; words;</li> <li>• Spelling consistency;</li> <li>• Writing organization &amp; coherence;</li> </ul>
Dyscalculia	<ul style="list-style-type: none"> <li>• Difficulty learning mathematical concepts;</li> <li>• Memorizing mathematical facts;</li> <li>• Difficulty organizing numbers;</li> <li>• Poor 'Number sense';</li> </ul>

## Dyslexia (difficulty reading)

Dyslexia is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. Reading disabilities affect 2 to 8 percent of elementary school children. To read successfully, one must:

- Focus attention on the printed symbols;
- Recognize the sounds associated with letters;

- Understand words and grammar;
- Build ideas and images;
- Compare new ideas to what you already know;
- Store ideas in memory;

A person with dyslexia can have problems in any of the tasks involved, in reading.

### **Dysgraphia (difficulty writing)**

Writing too, involves several brain areas and functions. The brain networks for vocabulary, grammar, hand movement, and memory must all be in good, working order. A developmental writing disorder may result from problems in any of these areas. For example, a child with a writing disability, particularly an expressive language disorder, might be unable to compose complete and grammatically correct sentences. Such a child would be presented as one who has difficulty in

- Neatness & consistency of writing;
- Copying letters & words, accurately;
- Spelling consistency;
- Writing organization & coherence;

### **Dyscalculia (difficulty with mathematics)**

Arithmetic skills involve recognizing numbers and symbols, memorizing facts, aligning numbers, and understanding abstract concepts like place value and fractions. Any of these may be difficult for children with developmental arithmetic disorders, also called dyscalculia. Problems with number or basic concepts are likely to show up early. Disabilities that appear in the later grades are more often tied to problems in reasoning.





## 7 Attention Deficit Hyperactivity Disorder (ADHD)

Attention-deficit/hyperactivity disorder (ADHD) refers to a constellation of inappropriate behaviors found in many children and adults. The essential feature of ADHD is a persistent pattern of inattention and/or hyperactivity-impulsivity. These features are more frequently displayed and more severe than typically observed in a child, at a comparable level of development.

A child with ADHD may be unusually, active and/or impulsive for their age and has trouble sustaining attention in various settings, like at school, at home or at work. He often fails to give close attention to details or makes careless mistakes, does not wait for his term during sports, is talkative and does not sit quiet, for long, at places where he is expected to (for e.g., in a classroom). These behaviors may contribute to significant problems in social relationships and learning. For this reason, children with ADHD are sometimes seen as being “difficult” or as having behavior problems.

The symptoms should be inconsistent with developmental level and should have persisted for at least six months, to a degree that is maladaptive and inconsistent with developmental level and causes impairment.

Diagnosis and management of children with ADHD have been controversial but behavioral therapy, medications and counselling are usually attempted.

## 8 Adolescent Health

Adolescence (10-19 years) as defined under RCH programme, Ministry of Health & Family Welfare, is a phase of life which has recently gained recognition, as a distinct phase of life, with its own special needs. This phase is characterized by acceleration of physical growth and, psychological and behavioral changes thus, bringing about transformation from childhood to adulthood.

This module defines adolescence and it aims at generating an understanding of what is special about adolescence and provides an overview, of important matters, concerning adolescent health and development. It examines the perceptions of adolescents and of adults regarding adolescents' health concerns and explores the rationale for investing in adolescent health. This module is a foundation for all the subsequent modules wherein issues pertaining to adolescent health and development have been dealt with, in greater depth.

Facilitators are to make necessary arrangements for these sessions, like preparing flip charts/slides.

India is the largest democracy, in the world. In absolute terms, India is the fastest growing country globally, with 18 million people added, annually. The number of adolescents (age 10-19) is increasing and comprises over one-fifth of the population.

**Adolescence: "Adolescence" covers ages 10-19 years in the RCH-programme.**

### Activity 1

Divide the participants into 3 groups and give them the following group work:

**Group1:** List physical changes that occur during adolescence in boys and girls;

**Group2:** List sexual developmental changes in girls and boys;

**Group3:** List emotional and social changes that occur during adolescence both, in, girls and boys;

Give participants 10 minutes for group work to discuss among themselves and come up with their respective list.

Give blank flip charts and markers to each group.

After the small groups complete their lists, make the entire group to sit together and have one person, from each group, to present the group work (each group 5 minutes). Ask all the group members to come forward while their representative is presenting their response. After each group's presentation, ask the other two groups if they want to add more points to the list or need any clarification. The charts with all points, collated, may look as following:

## Physical events/changes

Boys	Girls
<ul style="list-style-type: none"> <li>• Growth spurt occurs</li> <li>• Muscles develop</li> <li>• Skin becomes oily</li> <li>• Shoulders broaden</li> <li>• Voice cracks</li> <li>• Under arm and chest hair appears</li> <li>• Pubic hair appears</li> <li>• Facial hair appears</li> <li>• Penis and testes enlarge</li> <li>• Ejaculation occurs</li> </ul>	<ul style="list-style-type: none"> <li>• Growth spurt occurs</li> <li>• Breasts develop</li> <li>• Skin becomes oily</li> <li>• Hips widen</li> <li>• Under arm hair appears</li> <li>• Pubic hair appears</li> <li>• External genitals enlarge</li> <li>• Uterus and ovaries enlarge</li> <li>• Menstruation begins</li> </ul>

## Now put up the prepared flip chart

Boys	Girls
<b>Physical events/changes</b>	
<ul style="list-style-type: none"> <li>• Growth spurt occurs</li> <li>• Muscles develop</li> <li>• Skin becomes oily</li> <li>• Shoulders broaden</li> <li>• Voice cracks</li> <li>• Underarm and chest hair appears</li> <li>• Pubic hair appears</li> <li>• Facial hair appears</li> <li>• Penis and testes enlarge</li> </ul>	<ul style="list-style-type: none"> <li>• Growth spurt occurs</li> <li>• Breasts develop</li> <li>• Skin becomes oily</li> <li>• Hips widen</li> <li>• Underarm hair appears</li> <li>• Pubic hair appears</li> <li>• External genitals enlarge</li> <li>• Uterus and ovaries enlarge</li> </ul>

## Sexual Development

- Sexual organs enlarge and mature
- Erections in boys
- Sexual desire
- Sexual attraction
- Menarche, Ovulation
- Sperm Production, Ejaculation
- Initiation of sexual behaviors

## Emotional and Social Changes

- Preoccupied with body image
- Want to establish own identity
- Fantasy / daydreaming
- Rapid mood changes, Emotional instability
- Attention seeking behavior
- Sexual attraction
- Curious, Inquisitive
- Full of energy, Restless
- Concrete thinking
- Self-exploration and evaluation
- Conflicts with family over control
- Seek affiliation to counter instability
- Peer group defines behavioural code
- Formation of new relationships

Show the following chart/slide to participants. The changes during adolescence are correlated with the complaint/concerns, adolescents, mostly, are bothered and might present, to you. These expressions have possible health implications.

### Changes in adolescents and possible health implication

Changes during Adolescents	Health Implications
<b>Physical Changes</b>	
Normal growing-up	Anxiety and tension
Increase in height and	Increase nutrition requirement–if inadequate, under-nutrition and anemia
Breasts Development	Stooping of shoulders, poor posture, back pain
Skin becomes oily	Acne
Desire to be thin, have a good	Protein-energy malnutrition, anemia, Stunting
<b>Sexual Development</b>	
Desire to have sex	Unsafe sex leading to unwanted pregnancy, STIs, HIV; Need of health education and services
Ejaculation	Fear, guilt, myths-emotional problems
Menstruation	Dysmenorrhea, Menorrhagia-Anemia, Poor menstrual hygiene may lead to RTIs
<b>Emotional changes and Social development</b>	
Development of identity	Confusion, moodiness, irritation
Very curious	Experimentation, Risk taking behaviour
Peer pressure	Effect on lifestyles
	<ul style="list-style-type: none"> <li>• Unhealthy eating habits – leading to obesity</li> <li>• Smoking and alcohol use leading to ill health</li> <li>• Speed driving, accidents</li> </ul>

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. It is generally considered that adolescents are a healthy section of our population. While they no longer have diseases like pneumonia, diarrhea, measles etc. that are common during childhood, adolescents have a different set of problems. To have a health problem, it is not necessary for the adolescent to be sick. Even normal growth and development processes can cause health problems in adolescents. Many of these have an impact on National demographic and health indicators.

### Vulnerability of Adolescents:

#### **Adolescents are vulnerable by virtue of**

- Normal developmental processes
- Family/Peer/Environmental influences
- Lifestyle patterns;



And are “At Risk” because of certain behaviors.

Within adolescents there are some special attention groups

- “Out of school” adolescents and street adolescents
- Sexually abused adolescents
- Commercial sex workers
- Adolescents with mental and physical disabilities
- Orphan Adolescents, those in institutions
- Adolescents in conflict with the law
- Working Adolescents

Adolescents in general and especially, the above mentioned special attention groups even more, are vulnerable and need special attention. The various issues related to adolescence-growing up, new behaviours etc. have not only a huge socio-economic impact just by their sheer numbers but also impact the National Health indicators.

### **Facts about Adolescents, in India**

- Adolescents comprise about 22% of India’s population.
- Girls make up 47% of adolescent population.
- Anemia and Stunting are widely prevalent, especially in girls.
- 50% girls are married by 18 years (NFHS 2).
- Adolescents (15-19 years) contribute 19% of TFR (NFHS 2).
- High Maternal mortality among adolescent mothers.
- Un met need for contraception (15-19 years) 27% (NFHS 2).
- Contraceptive use is 8% and contraceptive use of modern methods is 5%.
- Premarital sexual relations are increasing.
- RTIs are common in young women.
- Misconceptions about HIV/AIDS are wide spread.
- 40% start, taking drugs & substance abuse between 15-20 years (UNODC, 2002).
- Nearly, one out of three in 15-19 years is working. 21% as main workers and 12% as marginal workers (Census 2001).
- Girls and rural adolescents are disadvantaged.



### **Facilitator emphasize that**

- A. Adolescents make up 1/5(22%)of the total population of India and investing in them will yield rich dividends;
- B. These facts suggest that major risks which adolescents face, in India are because of early pregnancy, childbirth and risk of HIV, STIs, and substance use;
- C. The adolescents who fall in the special attention groups are more at risk of identity crisis and low self-esteem, guilt, frustration and mental health problems.

However adolescents are a group who can be molded and helped to change their erratic behaviors to more responsible ones to improve their self-worth and esteem.

Many people and groups including health workers, teachers, social workers, religious leaders, and, of course, parents have important contributions to make to the health of adolescents. People who interact with adolescents on a regular basis (parents, teachers) and people who do not interact with adolescents on a regular basis (policy makers, administrators) have different perspective for adolescents and perceived priorities of adolescent issues.

<b>Adolescents issues: Different Perspectives</b>	
<b>Parents' Perspective</b>	Examination marks, Growth, Career, Happiness, Good citizen, Marriage
<b>Teacher's Perspective</b>	Examination marks, all round development, career, civic sense, safe behaviour
<b>Health Sector's Perspective:</b>	Growth, Health protection and promotion, Safety, early pregnancy, HIV/STI
<b>Administrator's/Policy makers' Perspective</b>	Healthy and productive population
<b>Adolescents themselves</b>	Body image, Career, Sexual concerns, general health

Many adolescents give high priority to issues like how they look (bodyimage), acne, education and career issues in addition to sexuality issues (menstruation, masturbation etc.), which may not match the perspective of the other people who decides what adolescents needs. This results in barriers for adolescent information and service access.



### **Priority Health Problems of adolescents**

- Sexual and reproductive health problems
- Nutritional problems
- Substance abuse
- Injuries and accidents
- Acute and chronic diseases (like asthma, TB, Diabetes, etc.)

### **Clustering of problems is common**

What adolescents do today will have an influence on their health as adults and on the health of their children, in future. Improvements in the health of adolescents will increase their achievements in school and will lead to greater productivity. Investing in Adolescents, Health will reduce the burden of disease during this stage and in late life. It is during adolescence that behaviors are formed which often last a lifetime. These are formative years, where physical, emotional and behavioral patterns are set. A healthy adolescent becomes a healthy adult.

It is important to influence the health seeking behavior of adolescents as their situation will be central in determining India's health, mortality, morbidity and population growth scenario. Adolescent pregnancy, excess risk of maternal and infant mortality, reproductive tract infections, sexually transmitted infections, and the rapidly rising incidence of HIV/AIDS in this age group are some of the public health challenges. Adolescents have the right to information, knowledge about reproduction, sex, contraception, health issues, options/choices available, make decisions, and access to safe services. Reasons for investing in adolescent health and development are

- To develop capacity of adolescents to cope with daily life situations and deal with them effectively;
- To inculcate healthy habits and lifestyles;
- To reduce morbidity and mortality in adolescents;
- To impact National indicators like high TFR, MMR & IMR, arrest HIV epidemic;
- A healthy adolescent grows into a healthy adult, physically, emotionally and mentally-maximize potential and productivity;
- Economic benefits increased productivity, averting future health costs of treating AIDS, tobacco related illness, life-style related illness;
- As a human right, adolescents have a right to achieve optimum level of health;

# Communicating with adolescents

Adolescents may gather a lot of information on sexual reproductive health and their concerns from peers and/or from other sources. These may not always be accurate. Inaccurate communication on sexual and reproductive health matters among adolescents (peers), and inadequate communication between them and their parents and other adults around them results in inadequate access to the reproductive health information and services, by adolescents.

Communicating with adolescents may be perceived difficult because they are not willing to talk to adults about their worries and apprehensions of life due to the lack of confidence in themselves and in others. They have not been able to build relationships with adults around them. In order to provide adolescents with the health services they “need”, we need to re-look at conventional “blindness” (perceived notion of right and wrong) which may limit our vision and imagination.

For effective communication it is important to know what Adolescents need. Under RBSK the mobile health team may ensure the following to attract attention of adolescents. Adolescent-in turn look for ‘friendly’ Providers defined as:

- Provider who is aware of adolescent issues;
- Provide correct and complete information;
- Respect and empathy for adolescent’s needs and concerns;
- Increase self-confidence in adolescents;
- Ensures privacy and confidentiality;
- Non-judgmental friendly attitude;
- Good communication and counseling skills;
- Help develop life skills;
- When adolescents approach to seek help on such issues the health care provider should use this opportunity to promote their health and development holistically.



## How to be youth friendly

The Government of India has a special responsibility in strengthening the abilities of health service providers to be youth friendly, and so this group has been identified as a priority. The RBSK Mobile Health Teams are reaching out to adolescent girls and boys in schools and this gives us an opportunity to interact with them and help adolescent guiding them to Adolescent Friendly Health Centers for appropriate actions. The RBSK mobile teams have an important role to play to bridge between the AFHCs and the adolescent in the community by being sensitive to the needs of the adolescents.

Services for adolescents must demonstrate relevance to the needs and wishes of young people. Establishing trust, encouraging friendly and non-judgmental attitude of provider, and ensuring confidentiality helps build effective communication channels. Inadequate communication on sexual and reproductive health matters and social taboos attached to them, along with the way adolescents feel, when visiting service providers, makes communication, with them, rather challenging. Effective communication is a skill, to be practiced. Following are some examples which the RBSK team need, to know and do differently.

### Non-verbal Communication

- Friendly - welcoming/ smiling
- Non-judgmental/ empathetic
- Listens/attentive/ nods head to encourage and acknowledge client's responses
- Allows client, enough time to talk

### Verbal Communication

- Greets client
- Tells clients about their choices/options

### Explains what to do

- Language was simple and brief, when the team speaks with adolescents. It is important to use. Simple language, which is understood by the adolescent.

### Privacy and confidentiality

- It is ideal that Male MO is interacting with male adolescents and Female MO with female adolescents.
- In case, both the MO of the team are males, ensure, that the female member of the team is present during discussion with female adolescent and vice versa.
- Ensure, that, when you are discussing adolescent health issues with an adolescent client not more than the required person/s are present, in the room or enter the room.
- Explain to the adolescents that the discussion between the adolescent and the RBSK team member is kept confidential and no information and name would be shared with anybody. Data is maintained without any mention of name.

We all use verbal and non-verbal skills while communicating with others. Similarly Health Service providers use them to communicate with patients and similarly should do with adolescent clients. Sometimes, without realizing it, you may communicate one message verbally, while communicating the opposite message non-verbally. Non-verbal actions may also be "positive" or "negative". RBSK team must avoid negative nonverbal actions while dealing with adolescent clients.

Example of negative non-verbal actions	List of positive non-verbal actions
Leaning away from the client	<b>Leaning towards the client</b>
Sitting with arms crossed	<b>Smiling without showing tension</b>
Glancing at ones watch obviously and more than once	<b>Facial expressions which show interest and concern</b>
Not making or maintaining eye contact	<b>Maintaining eye contact with the client</b>
Frowning	<b>Encouraging supportive gestures such as nodding ones head</b>
Fidgeting	<b>Avoiding nervous mannerisms</b>
Flipping through papers or documents	
Yawning or looking bored	<b>Appear attentive and listening</b>

**Facilitators to emphasize: Adolescents are extremely aware of and sensitive to non-verbal messages. Improving communication and counselling skills will contribute to quality services, for adolescents. It is important for RBSK teams to be conscious of their interactions with adolescents. It is also important to make young clients comfortable, during the visit.**

#### Examples of adolescent problems and suggestive actions of RBSK teams

Problem Cards	What is the cause of the problem?	How would you deal with it if such a case comes to you?
<b>Kajal is a 14 year old girl. She is worried since she has not started having her periods.</b>	There is wide range of normalcy in age of onset of menstruation and varies from individual to individual and depends both on physiological, nutritional aspects.	Reassure her, ask her to follow weekly IFA supplementation regime of WIFS or National Iron plus initiative. If anemic send her to PHC. Tell her to report if no periods by age 16.
<b>Lakshmi is 16 years old and has normal periods. She is very worried because her breasts are not as developed as her friends'.</b>	Human body develops differentially and is dependent on various factors. Her periods are normal, which is an indication of start of secondary sexual development. Her breasts may develop gradually.	Reassure her, counsel her to take balanced diet.
<b>Saroj, a 15 year old unmarried girl complains of foul smelling vaginal discharge, accompanied by itching in the genital region. Her periods started six months back and she is not sexually active.</b>	It may be a case of infection of the reproductive tract.	Refer to AFHC/ Gynecology Department at DH



<b>Problem Cards</b>	<b>What is the cause of the problem?</b>	<b>How would you deal with it if such a case comes to you?</b>
<b>Babita is 13 years old and has a lot of thin, white discharge from vagina.</b>	White discharge with no infection is normal development.	Reassure her that it is normal at this age and is not an infection/disease.
<b>Fatima is 16 years old and has a lot of bleeding and pain in the abdomen during periods, every month. She feels very weak.</b>	It is a menstrual disorder which is common in girls. Her weakness may be due to anemia because of excessive loss of blood.	Reassure her that it is not a disease, for weakness due to bleeding, ask her to follow weekly regime of IFA iron supplement under WIFS or National Iron Plus Initiative.
<b>Kamla is 15 years old and started her periods 2 years ago . She has not had her period for the last 2 months.</b>	Enquire whether she is sexually active.	If yes, do not be judgemental (tone or gesture), she needs to be referred to ARSH clinic
	If she is not sexually active	Counsel that girls of her age do miss their periods. She will have her periods spontaneously.

For more details refer Orientation Programme for ANM/LHVs to provide Adolescent-Friendly Reproductive and Sexual Health Services: Handouts, MoHFW, GoI available at <http://nrhm.gov.in/about-nrhm/guidelines/nrhm-guidelines/adolescent-reproductive-and-sexual-health-arsh.html>.

Ministry of Health & Family Welfare  
Government of India  
Nirman Bhawan, New Delhi