Manual on Early Intervention to Infants and Toddlers with Developmental delay - Series-2

Gross Motor and Fine Motor

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FOREWORD

Prevention of disability is the foremost important agenda for any professional engaged in the area of Disability Rehabilitation. However, there are many reasons wherein the situations go out of the purview of the professionals. In such instances, early intervention is the first and vital step for reducing the intensity and severity of the condition of children at-risk and the children having disabilities. NIMH, since its inception has been giving focused attention to extend services for children falling under the category of early intervention i.e., 0 to 3 years. The experiences from the services provided gave us the thrust to develop two academic programmes - P.G.Diploma in Early Intervention and M.Sc. in Disability Studies (Early Intervention). It is expected that the professionals trained in the above academic courses will be able to extend therapeutic services as well as creation manpower.

Further to the above actions, NIMH has established Early Intervention Cetnres in some districts of the country as a pilot project to gain first hand information to gauge the actual need at grassroot level. In addition to this we have been conducting short term training programmes for various levels of service providers from personnel to professionals. To support all these programmes NIMH prepared and published training materials to augment the efficiency of the trainees. However, the magnitude of the requirement, considering the wide spread population, particularly in the rural areas of India has always been a challenge to meet with. It was felt that there is an acute demand for a suitable curriculum with transdisciplinary approach to enhance the skills of the professionals, therapists and specialists working in the existing network of health, women and child development and disability rehabilitation. The early intervention team of NIMH felt the need for developing training manuals to address this lacunae to reach the unreached, resulting in the completion of a series of `Manuals on Early Intervention to Infants and Toddlers with Developmental Delay' with the following titles:

Series-1 : Cognition, Audition and Vision
Series-2 : Gross Motor and Fine Motor
Series-3 : Speech, Language, Communication and Social

These manuals will be a ready reference source for professionals in the field. With appropriate training programs in early intervention and instructions on usage of the manual, many more personnel will be able to provide services enhancing the human resources in the field.

I, sincerely, appreciate the efforts put in by the research team headed by Dr. Amar Jyothi Persha who was heading the Department of Medical Sciences at NIMH to produce this "Service Manual" which is an outstanding contribution in the field of early intervention.

This manual, already with other publications of NIMH on Early Intervention: RAPID (Reaching and Programming for Identification of Disabilities), Low cost stimulation material, Positioning and stimulation activities for infants and young children with motor problems, Kids-Play (A pathway to learning), Early Intervention - A service model and Posters and pamphlets/information brochures will form a comprehensive intervention package for early intervention.

I strongly believe that with this package, NIMH can certainly take Early Intervention Service to every nook and corner of our country.

Date : 1st March 2011
Place : Secunderabad

(T.C. SIVAKUMAR)

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PREFACE

Preparation of this manual is undertaken keeping in view the requirements of professionals therapists and specialists on other areas of development apart from their own specialists. Information is provided which is basic along with technical back ground for easy understanding which will enable the professional to provide early intervention services. However the reader should note that each section is comprehensive enough to render services but does not make one an expert in those specific fields other than their own. Therefore the need to consult the specialist for expert opinion and guidance is inevitable.

The intervention package is for infants and toddlers who are at risk, or have developmental delays and or disabilities. Since it is meant for professionals and therapists the content and language includes technical terminology which is presented in as simple terms as possible. The content is fortified with ample illustrations and line drawings. The problems and disabilities are highlighted by a red flag mark. The different disabilities are represented by icons visual, hearing, and CP, against which the adaptations are detailed.

The manual has sections on two areas of development Gross motor and Fine motor.

Each sections has two parts. In the I part there is brief introduction followed by development (Stages or Milestones) importance of that stage characteristic features of deficits, delays and abnormalities and their effect on child's development. In the II part the skills to be achieved and the intervention technique. The intervention techniques are amply illustrated by figures for clear understanding. Wherever modifications and adaptation are required necessary changes are indicated.

Gross Motor : A brief introduction is followed by listing of grass motor developmental milestones upto 36 months. Some of the principles of motor development are enumerated for the basic understanding of the reader. Few of the clinical features which characterize the motor system abnormalities are mentioned followed by the behavioral indicators of motor deficits. The way the motor deficits have an impact on the overall development of the child are indicated in this section. Few suggestions to be followed by the interventionist to promote motor skills are listed. Correct positioning and handling lifting, carrying of the child are integral part of intervention which are clearly enumerated and illustrated.

In the section on intervention items 1-23 are enumerated. Each item has dealt with its Normal development its importance in development; problems, delays and abnormalities

are indicated at the red flag sign. The steps and techniques of intervention are given in details. In cases of associated impairments and disabilities indicated by specific icons the required adaptations are mentioned.

In conclusion some play activities for children with cerebral palsy are suggested.

Fine Motor : The introductory note focuses on the importance of hand as a tool for fine motor skills performed. It explains the pre requisites for hand function. The basic pattern of hand skills and the complex interaction of its components are mentioned. The normal development of fine motor skills as per chronological age is tabulated. Few basic principles in fine motor development are given in brief.

Different fine motor skills and their evolving stages are explained with diagrammatic representations, signs of fine motor delay and abnormalities and their behavioral indicators are enumerated. The impact of fine motor deficits on cognition, communication of social development are highlighted. Some important adaptations while intervening and activities to improve fine motor skills are listed.

The intervention package in this section describes Normal development, its importance, problems of abnormalities at a red flag sign and intervention details of 22 items. Each intervention item is accompanied by detailed illustrations Deficits and adaptations are indicated at the specific icons.

The intervention package has total of 12 items for each item the normal development and its importance are discussed. For the enhancement of development and the existing problems the interventionist are prescribed.

- Dr. Amar Jyothi Persha
- N.C. Srinivas
- R.C. Nitnaware

INTRODUCTION

Early Intervention in the field of disability means offering guidance, support and implementation of intervention plans in very young infants and toddlers who are at risk or have developmental delays and disabilities. Even though early intervention services are being given in our country over few decades by service oriented and dedicated personnel, there is paucity of global and quality services. There are too few trained professionals with expertise limited to their own specific professional field.

Early intervention in the field of mental retardation and cognitive deficits is a complex area as development of cognition and evolving of intelligence has contributions from all other developmental areas like motor, speech language communication, sensory systems (vision, auditory etc) and socialization. Psychosocial factors like families, home environment, socio economic factors, culture and beliefs also have a great impact on the child's development. Hence the field of early intervention requires professional and technical input from various professionals like medical professionals, therapists like Physiotherapists, Occupational therapists, Speech therapists and audiologists, Child development specialists, Psychologists, Social workers and Nursing staff and many others.

Target Population : The Target Population includes infants and toddlers who are at risk or who are developmentally delayed or disabled. This group forms a highly heterogenous group with children having variable presentations, clinical features, diagnosis, disabilities, functional levels, associated conditions, complications, progression, prognosis and outcome. Hence their interventional requirements also vary accordingly. Early intervention requires a holistic approach and therefore involvement of specialists and professionals.

Professional and highly specialized services of this field are available only in apex institutions or urban specialized centres. 70% of our countries population lives in rural areas. In such a scenario the majority of the target population may not have access to these services, where it is of utmost importance and of high priority. To consider all these factors and plan and implement early intervention programmes is a great challenge.

Curriculum : There are various curricula available in this field focusing on different target like child, family, home etc. The child is at the centre point intervention and learning. Basically the interventions all are meant to enhance child's development, acquisition of new skills, independent functioning and prevention of secondary handicaps.

Each curriculum basically contains what the child should learn and in the most, appropriate way of doing it. While planning a curriculum we must keep in mind that each individual child differs in characteristic features, development and related problems.

Therefore the intervention plan is individualized with provision for modifications and adaptations as per the child's needs.

The curricula differ as per the requirement of the end user. Professionals or non-professionals, apex level, intermediary or grass root level workers and parents. It also depends on its site of usage. Ex - home setting, or at a centre, rural or urban areas. The curricula should not be highly structured and a degree of flexibility is essential.

The persons working in early intervention programs are expected to know basic information on normal child development and deviations from norms. The curricula should cover the areas of child development like motor, cognition, speech language and communication sensory development and socialization and play. Different areas of development may be considered separately for convenience and for the sake of dealing child development with ease but the underlying interdependence of the areas should be well understood and followed.

There are a number of curricula available for use by the grass root level workers or itinerary teachers. Many of them are instructional manuals for easy understanding and providing of interventions. They often cater to at risk children or those functioning with mild to moderate developmental delays. Most of them do not have adaptations and flexibility is highly limited. The basics of the therapeutic interventions are justifiably omitted. The grass root level worker are able to transfer these instructions to the caregiver in a simple manner after appropriate training.

Transdisciplinary Approach : In order to enhance the quality of services and take services to a higher level, professional services are very essential. Since the field of early intervention requires the professional input from various fields a multidisciplinary approach is considered as a norm. However this approach does not ensure accessibility, provide services under one roof and is not cost effective. Hence the most desired approach is a change from Multidisciplenary to Transdisciplinary approach. Here one professional or a member of the multidisciplinary team assumes the responsibility of providing intervention to the child with vital inputs of intervention goals, techniques and mode of execution from different professionals and specialists. This approach curtails the costs and provides basic interventions to the child with guidance and support of other professionals without losing precious time and critical periods of learning while awaiting professionals interventions. This the transdisciplinary approach is accessible, acceptable and cost-effective.

Site : Early intervention services can be provided in Hospitals, Paediatric clinics, child guidance clinics, rehabilitation institutes and centres, special early intervention centres etc.

Reaching out early intervention services to the infants and toddlers especially in the rural areas, it is convenient and cost effective to utilize the already existing net working systems and infrastructures such as health services, woman and child welfare services and disability, rehabilitation services.

Personnel : Since parents and family, approach a medical professional first for all their child's concerns and problems and medical doctors and as they are avialable at PHC and District Centres, they form ideal persons to be trained as early intervention providers. Other professionals, and therapists like Physiotherapists, Occupational therapists, Speech language therapists, Audiologists, Rehabilitation professionals, child development specialists and qualified nursing staff with basic knowledge of child development are all eligible to serve as early interventionists. Some of them are available in District centres though to a limited extent. Their professionals background and knowledge can be utilized with further training inputs in Early Intervention to make them the service providers.

Training : Targeting these professionals as Early Intervention service providers requires a short term training program to orient them on Early Intervention and provide a curriculum which will enhance their skills in service provision. Hence this curriculum is prepared keeping in view their training needs. However these personnel are required to consult specialists and seek their guidance when and where required. The manual can help in intervention formulation and be a ready referral to guide service providers.

GROSS MOTOR

GROSS MOTOR

Introduction

Motor development is a process of change in motor behavior, that is related to the age of the individual. It is dynamic nonlinear process occurring within a self organizing system. Development proceeds in continuous, spiral, rather linear fashion in realtion to periods of stability and instability.

Motor development has sensitive periods which means there are, times when the individual is more sensitive to certain kinds of stimulation. Normal development may be hindered if a child fails to receive proper stimulation during these sensitive period.

Gross Motor Developmental Milestones

- 3-4 months - able to lift head up on his own
- 4-5 months - can roll over
- - can sit propped up without falling over on tummy, lifts head and turns to both sides.
- 6-8 months - is able to sit up without support, rolls over, both directions - back to stomach and stomach to back
- 9-11 months - begins to stand while holding on to things for support
- 9-11 months - sits independently; moves from sit to hands and knees and back again
- 10-12 months - can begin to walk, still using support
- 11-13 months - is able to momentarily stand on her own without support, crawls on hands and knees; pulls self up to stand at sturdy surface
- - can stand alone with more confidence
- - begin walking alone without support, stands alone 2-3 seconds; walks with one hand held; cruises at a rail
- - can walk backward without support
- 13-15 months - walks alone well
- 16-18 months - can walk up steps with little or no support
- 18-20 months - able to manipulate objects with feet while walking, such as kicking a Ball, stand -stoop-return to stand without holding on; kicks a ball; up/down stairs holding on to rail.
- 24 months - runs; jumps; throws ball towards a target
- 26-30 months - beginning catching of ball; up/down stairs independently; stands on one foot 1-2 seconds.
- 36 months - runs around obstacles, walks on a line,balances on one foot for five to ten seconds, hops on one foot

Sequence of Motor Development:

Motor development is a very important aspect of growth. It tends to proceed in a characteristic direction like cephalocaudal, proximol to distal, gross to fine and undifferentiated to specific. Each movement as it emerges, it and is practiced in a slightly different way from what was learned before. Motor activities help the children to learn and use their bodies,to gain confidence as they master these skills.

Cephalocaudal:

The term is used to describe the developmental direction from head to foot. It is related to the observation that head control precedes trunk control and then the control of lower extremities.

Proximal to Distal:

Developmental change is observed to be from a proximal to distal direction, with reference to the midline of the body. Because a body is a linked structure, the midline region must provide a stable base for head, eye and extremity movement. The trunk is a stable base for the head above as well as the lower extremities below, and the arms projecting outward to the world. Control of the trunk is requirement for control of the shoulder or pelvic girdles. Shoulder girdle control is in turn required for controlled use of the upper extremity and the control of pelvis is necessary for the controlled use of the lower extremities. Although the same degree of proximal control appears to be prerequisite for the requirement of distal control, this is not cause and effect relationship. Although proximal stability and control does not cause the development of distal skill, there is a fundamental relationship between proximal and distal function.

Undifferentiated to specific:

The infant first moves the entire body in response to the stimulus before a most specific response emerges. When the arms will move separately from each other and arm movement will occur with associated motions with the trunk or head. This breaking up the mass pattern is called dissociation.

All human movements characterized by stability and mobility.The functional contribution of both mobility and stability allow for such motor activities as reaching accurately while prone, stabilized with one extremity with the stable head or trunk.

INDICATORS OF MOTOR PROBLEMS: (Terminology explained at appropriate areas)

- Lordosis or any compensative for hip flexion
- Valgus feet
- Clenched hands
- Stiff body due to increased tone
- Rounded back & flexed head
- Bottom shuffling
- Persistence of reflexes
- Toe standing
- Bunny hopping
- Mermaid's creeps
- Log rolling

- Kyphotic posture
- W-sitting/sacral sitting
- Poor head control
- Scissoring of legs
- Wind swept deformities
- Clonus
- Ribs flaring
- Poorly developed arch of the hand due to lack of arm weight bearing and manipulation of objects

Behavioral indicators:

- Inability to maintain erect posture due to low tone
- Poor proximal control
- Decreased range of motion due to hyper tonicity
- Inability to lift the head up
- Inability to perform segmental rolling
- Poor reach and grasp
- Delay in reaching for objects
- Inability to roll over to supine from prone, or creep on abdomen, on elbow or with various movements of both arms and kegs.
- Inability to rise from prone on hands and knees.
- Delay in reciprocal crawling.
- Inability to lift hand towards mouth.
- Delay in gradual overcoming of head lag on pull to sitting.
- Breathing difficulties due to weak thoracic musculatures.

IMPACT OF MOTOR DEFICIT ON OTHER AREAS OF DEVELOPMENT

Sensory development:

- **Poor sensory perception**
  Poor visual acuity
  Poor depth perception
- **Poor tactile discrimination**
- **Reduced body awareness**
- **Decreased oral sensitivity**
- **Oral aversion**
- **Oral dyspraxia**

Speech and language:

- Lips and cheeks immobility
- Tongue retraction which is common in hyper tonicity
- Jaw thrust
- Jaw instability
- Diminished oro motor reflexes.

Feeding skills:

- Difficulty in chewing, and swallowing.
- Difficulty in mouth closure.

Cognition:

- Delay in sensory motor learning
- Poor adaptive response.
- Inability to learn basic concepts of self and the environment

Major Motor skills:

- Head control,
- Rolling,
- Sitting,
- Creeping,
- Crawling,
- Standing,
- Walking,
- Climbing,
- Running,
- Jumping,
- Hopping.

Here are a few suggestions to promote motor skills.

- Remember always to give children a safe place to play and lots of repetition to learn and master skills.
- While playing, hold toys about 8 inches from baby's face. Move the toys slowly from side to side.
- Observe the baby follow the toy with his eyes and reach for the toy.
- The best exercise for the baby is to play on the floor.
- Baby walker's do not provide exercise or promote walking and can be a safety hazard. However, if you use this equipment limit time in the walker to 10 - 15 minutes a day.
- Playing with "play dough" helps to promote hand skills and texture tolerance.
- Activities like swinging, climbing, walking on different surfaces, running around are important for promoting body awareness, strengthening and overall coordination.

- Arts and crafts, like holding crayons with thumb and fingers, painting with wrist actions, making dots, lines etc can help to promote hand skills, sequencing, problem solving and foster a sense of creativity.
- Scribbling is the first step to write, which helps the child to learn how to hold writing pencils.
- Do not force children with gross motor dysfunctions to participate in competitive sports.
- Do not redicule at being clumsy.
- Help children to see motor activities as forms of entertainment and gratification rather than emblems of overall competency.
- Provide balance of activities and exposing child to many experiences.
- Use non-competitive, repetitive exercises and activities to enhance motor development.
- Handling and positioning are to be considered very important for many children with physical disabilities.
- Proper handling and positioning is necessary which give many children the best control possible over their own movements
- Positioning and handling methods are necessary throughout the child's day and not merely during a *therapy period.*
- The position should be selected to make the child comfortable as well as the child's functions should be promoted.
- It is important to see that children spend time in a number of different positions each day.
- It prevents physical problems and it also gives the children a chance to view things from a number of different angles.
- It also allows the child to use all of his/her muscles. The child's position should be changed every half an hour.
- Positioning may be a means to obtain a goal, but positioning itself is not a goal.

POSITIONING

Positioning a Child in a Side Lying Position

- Roll the child on his/her side and up against something (e.g., a couch, wall, etc).
- Bend the child's upper leg to a 90 degree angle at both the hip and knee.
- Place a pillow or wedge under the head and bend the head forward (toward the chest).
- Bend the lower arm to a comfortable position, and move the upper arm forward so it is free to move around.

Placing a Child in Supported sitting (from a lying position upward)

- Roll the child on her/his side.
- Place your arm across the child's back, holding the child's head and shoulders.
- Place your other hand on the child's hip (which is pointing upward).
- Push down on the child's hip (moving her/his bottom to the floor) while lifting the upper body forward into a sitting position.
- Give the child the smallest amount of help needed to keep her/his balance.
- Do not let the child slump forward or backward; do not let her/him drop her/his head backward. If this happens, ask her/him to fix the problem (e.g., "Head up!").

Placing a Child over a Wedge (bolster, etc)

- Place the child on her/his stomach.
- Lift the child's upper body by placing your arm across the child's chest and holding your arm further away from you.
- Place the child over the wedge so that both arms are free. Move the child forward so that the forearms touch the floor.
- Side lying: bend the child's upper leg to 90 degrees or more at the hip and knee, bend the child's head forward, and place the upper arm so it is free to reach.

"INTERVENTION PACKAGE"

(This Package is in accordance with the checklist appended in ***Appendix A***

The interventions are addressed for each of the items, which can be followed if the child has not developed it normally.)

Problems Involved

Intervention:

Intervention

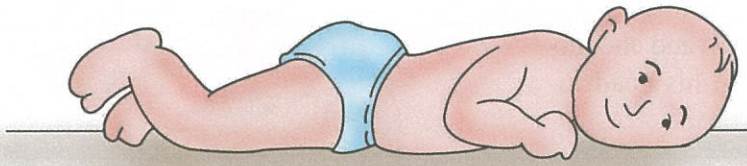
Visually Impaired

Hearing Impaired

GROSS MOTOR

ITEM 1 Turns head to sides while on stomach Age: 0-1 month

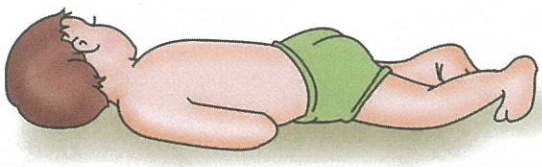
NORMAL



At birth, when the child is placed in prone (on stomach), he immediately turns head to one side to clear the breathing passage.

IMPORTANCE

This is a basic survival/protective instinct, exhibited right from birth. The neonate turns the head in order to clear the nasal passage. This activity is a head start for the strengthening of neck extensors. This is the first activity in which child tries to raise the head and neck against gravity

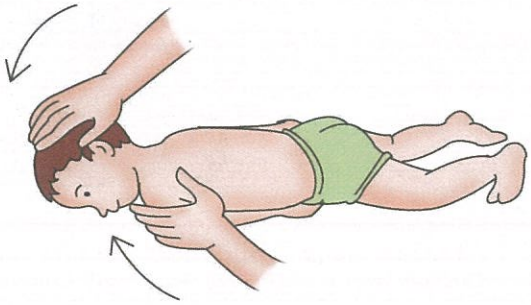


Problems Involved

Unable to clear the breathing passage when put in prone position

Intervention:

- Place the child on stomach Hold one shoulder of the child, turn the head towards the same side by gently holding the head with other hand.



- Place the child on stomch. Apply firm finger strokes or patting on the muscles at the base of the skull and in between the shoulder blades. It will activate the neck muscles to turn as well as raise the head.

- Place the child on mother lap. Show a toy from sides and encourage the child to turn his head towards the toy.

- Place the child on his back (supine), speak to the child or dangle a moving colourful toy or ring a bell, or noise making toy on the side to which you want the child to turn. Assist the child to turn towards the object. Repeat all activities on both sides so the child can turn equally well in both directions.

- Introduce a tactile stimuli like a whisp of cotton or a turkey towel on the child's face when he is lying in supine so that the child turns to the side to avoid the stimulus.

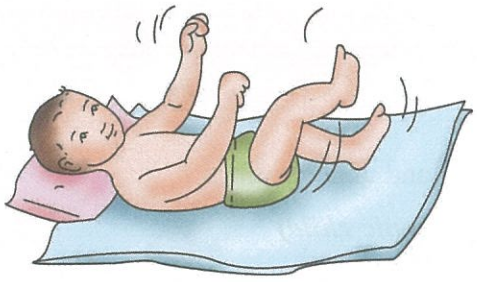
Motivate the child to turn the head towards one side by using noise making toys and mother voice. Reward the child by gently patting and stroking. Continue to talk to the child once he has turned towards you.

ITEM 2 Kicks legs and thrusts arms in play
Age: 0-2 Months

NORMAL

Generally Children by the age of one month move their arms and legs against gravity, If the child is born premature then we need to give them, extra time to initiate this activity.

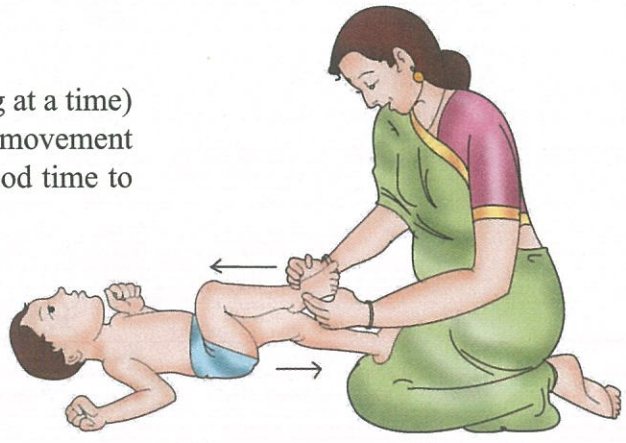
IMPORTANCE



This is an activity in the primitive stage that later represent itself in walking and crawling patterns in life (reciprocal use of arms and legs). By kicking the legs and arms, the child learns about the various parts of own body, and the effect it can create on the environment. Eye hand coordination, hand to mouth coordination, feet to mouth coordination are initiated by these primitive movements. As such this activity is the first play way method of learning about the cause and effect phenomenon for the infants. (eg: kicking at the mobile on crib.)

Intervention:

- Slowly flex the child's hips & knees (one leg at a time) till the knee touches the chest alternate the movement with each leg. Diaper changing time is a good time to play this bicyclepattern game.



- Tie attractive sound making anklets and bracelets with bells on child's hands and legs. The child will be encouaged to move his legs and hands as the bells makes sound.

- Suspend a crib gym across the child's bed so that his kicking feets will strike it and produce a noise and movement which encourage the child to repeat the movement activity.

Delayed acquisition and abnormalities

Frog position (Hypotonic child)

Arms and legs are extended out and lie with retraction of shoulder girdle and abduction at hips. This position is usually seen in children with low tone.

Intervention:

Put the child in supine position place a roll of turkey towel or a cylindrical small pillow below the shoulder blade, hips and knees, to bring the arms closer by protracting the shoulder. Bring the hips/ legs close by internal rotation and flexion of hips and flexion of knees in order to make the child perform the kicking movement with ease.

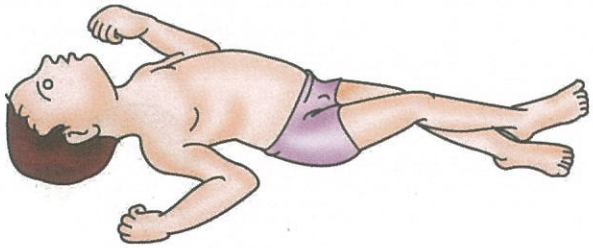
To position the child in supine, place pillows/ rolled towels below both shoulder blade and both the sides of the knees to prevent retraction at shoulder girdle and abduction at hips.

Note: For children with decreased tone, movements of the arms and legs need to be done more briskly. Can couple this activity with compression to proximal joints (shoulder and hips)

Delayed acquisition and abnormalities

Hypertonia (scissoring / crossing Of legs)

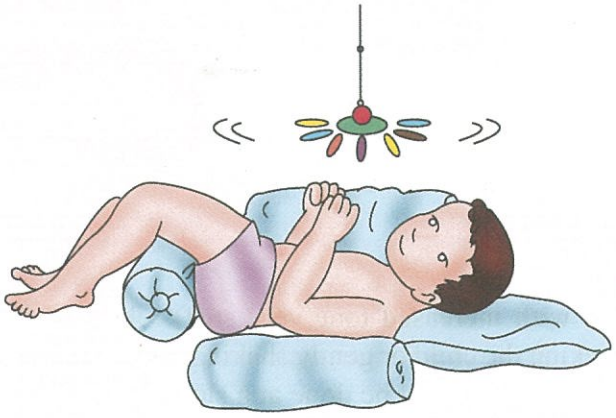
- Hand and feet are held close to the body in a stiff manner. In severe cases scissoring of legs might occur.



Intervention:

- Place the child's knees and hips flexed in supine in order to decrease crossing of legs.

  This will decrease the adduction of hips.this will make the child hold legs apart.



- The child is made to lie on one side with back supported, legs are widely spread by placing a bolster or a folded towel in between the legs.

- Place the child on inflated tube with child's head and neck bent legs are bent at hips and knees.

- Passively move his legs in a cycling fashion at a slower pace.

Note: For children with increased tone(very stiff) relax the child before you attempt to move by slowly rocking the child or gently shaking his legs in a rythmic manner. movements of arms and legs passively should be done at a slower pace.

ITEM 3 Holds head steady in midline while on stomach or when held at shoulder

Age : 1-3 months

NORMAL

Head control in a child starts with ability of the child to raise the head against gravity and then child's ability to hold the head in midline. Usually the child will exhibit head in midline in supported sitting and in supine, later in prone lying.

IMPORTANCE

Midline orientation is the ability to hold the head and trunk in midline, ability to use hands in midline and move in and out of midline with ease.

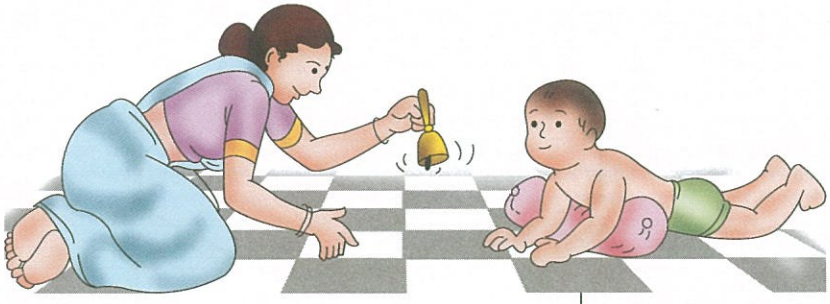
This skill forms the basis for learning activites of daily living like feeding,combing,etc in later life.

Problems Involved

Inability to hold the head steadily in midline.

Intervention:

- Put the child in prone lying (on stomach), place a small bolster or a towel under the child's chest to raise the head and chest slightly. Assist the child to lift the head, if the child is unable to do it. Encourage the child to lift the head by showing colourful, noise making toys slightly above eye level.



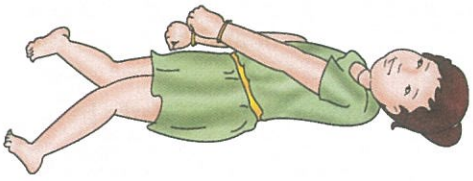
- Continue the above activity and interact with the child or give an attractive toy to focus on. Thus increase the length of time you expect the child to hold the head from the supporting surface.

- To maintain the straight alignment of head, back and limbs and also to improve midline orientation place the child in side lying with back support. Keep some attractive toys in front of the child.

Use strong auditory cues (your vioce or noisy toy as an additional incentive).

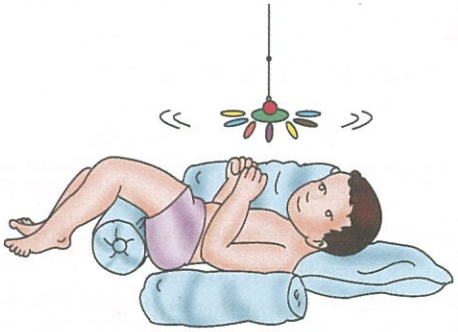
Problems Involved

Child places head in hyperextension.



Intervention:

- Place the child in supine lying and place pillows below both the shoulder blades on either sides. to bring protraction of shoulder and head to midline. As far as possible place the child in semi inclined position.



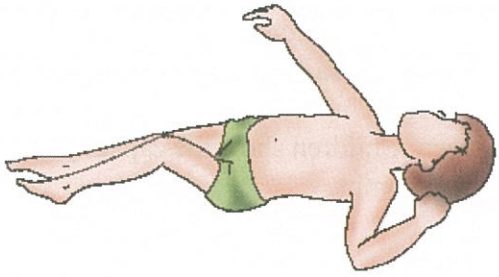
- A cloth cradle may be a suitable option.

Note: Never place your hand at the back of the child's head at the occiput as this becomes a stimulus for the child to push against it and exaggerate the hyperextension at the neck.

Problems Involved

Some children keep head always towards one side due to some pathology (persistence of ATNR)

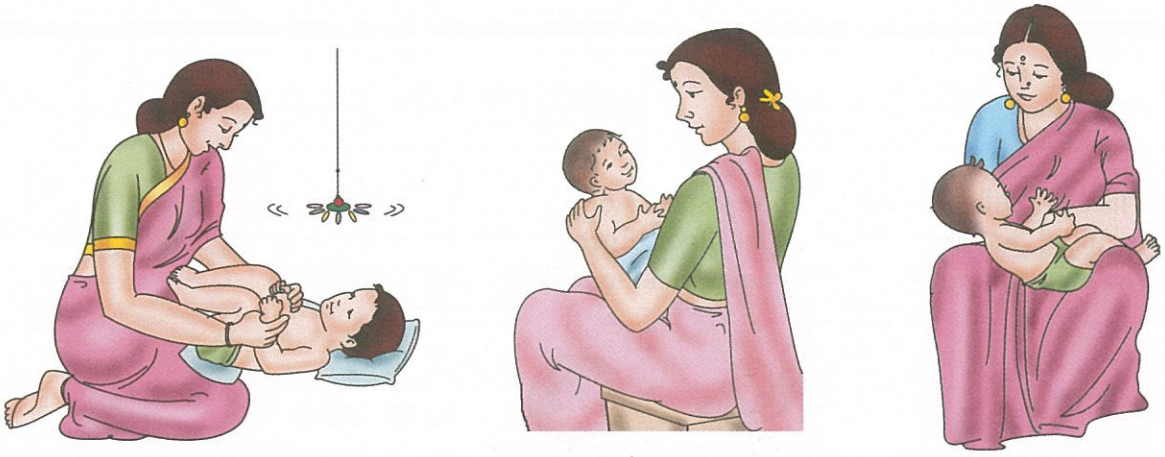
- Persistence of abnormally strong ATNR (turning the head to one side will cause extension of limbs on face side, & flexion of limbs on the occiput side). This will not allow the child to move voluntarily in and out of this postures. It also prevents midline orientation, rolling, body alignment and ability to use hand in midline.



Intervention:

- As far as possible, keep the child's head in midline. This can be achieved by placing the child in a air filled rubber tube.Keep the lower limb flexed at hip and knee. Hold the head in central postion and flexed.

- Activities on the mother's lap are also useful. Present all the objects and toys for play in midline. Protract childs shoulders, passively manipulating the neck this will help the child in regaining the midline orientation. Side lying is better than supine as the child can maintain hands in midline with the assistance of gravity, various other positions in which child can be handled are shown in the pictures as follows.



These positions promote midline orientation, trains neck flexors and ideal for interaction with caregiver. Holding at the shoulder girdle and turning the shoulder inside will promote flexion pattren.

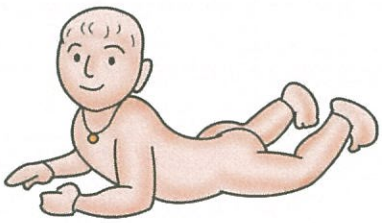
ITEM 4

Lifts head and chest off the surface, bearing weight on elbows, on stomach

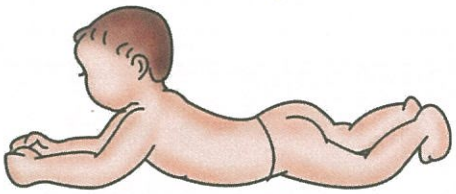
Age: 3-5 months

NORMAL

As the extensor strength improves the child tries to take weight on elbows and forearms and raises the head to see interesting things in environment. Unilateral reaching with hand in this position is also seen. Children show the capacity to raise on elbows around 3-4 months.



IMPORTANCE



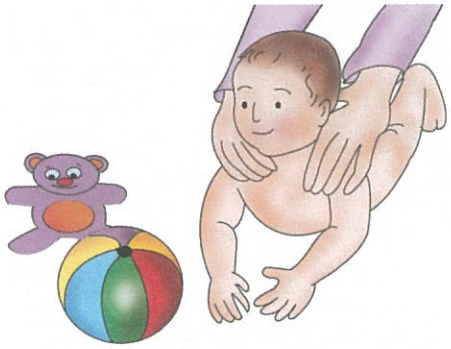
This is an activity, which forms a part of head and upper trunk control that develops due to strengthening of spinal musculature. Resting on elbows, child can play with hands and will be motivated to move forward if reinforcement is given.

Problems Involved

Unable to bear weight on elbow and forearm as the head is raised while on stomach.

Intervention:

- Place the child in prone position (on the stomach) over a large enough bolster so that the chest is raised but forearms touch the floor. Encourage the child to lift head and upper chest by showing some attractive and noise making toys.



- Position the child in prone lying with forearm weight bearing. Encourage the child to hold the head up by showing toys so that the child hold head in this position. Stabilize the shoulder to assist the child to hold the head in this position.

- Carry the child in a up-right position by holding the child supported only around hips and midchest region. Your other arm should guard, but not touch the child's head and shoulder. This acitivity will help in gaining trunk control which is needed for this objective.

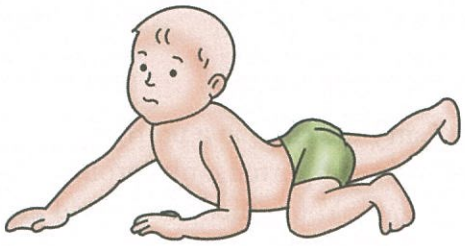
- Place the child on stomach with weight bearing on elbows. slowly rock the child from side to side. Encourage the child to raise the head by showing some attractive toys. Slowly move the toy upward and laterally so that the child will try to track the toy.

- Lie down on the back, with a pillow under the head. Place the child on the chest facing the caregiver. Stabilize the child's shoulder with caregiver's hand, encourage the child to raise the head up. Keep interacting with the child in this position.

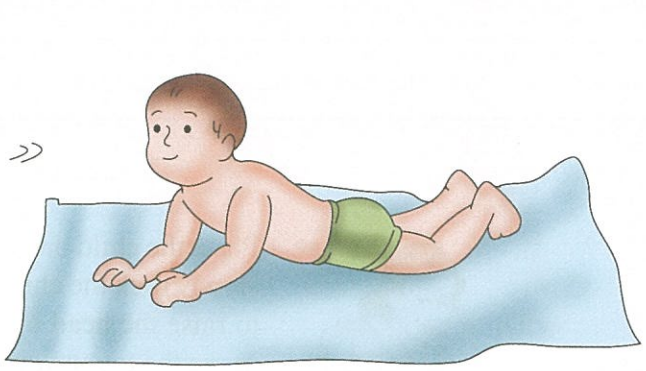
ITEM 5 Bears weight on hand while on stomach
Age: 4-6 months

NORMAL

As the upper back muscles are strengthened, child lifts up the upper body and chest over the hands. The whole weight of the body is on the hands. The strengthening of shoulder girdle muscles, spinal muscles and elongation of abdominal muscles, shortening of the spinal muscles, allows the child to develop this skill.



IMPORTANCE



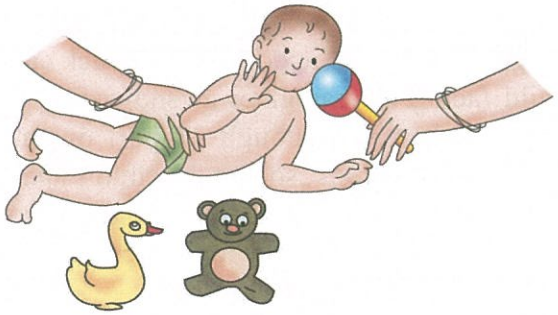
This is an important activity that precedes the creeping and crawling patterns. This activity is a learning position for the children to achieve an appropriate shoulder girdle and upper extremity strength. This skill achievement also requires a good spinal muscle strength. Bearing weight on hands, balancing the upper body against gravity, and use of hands are the skills the child learns in this position. Many children who learn to come to sitting from side lying also use this position, as a useful fulcrum.

Problems Involved

Unable to bear weight on hand while on stomach

- Make the child lie with face down over your lap.Offer the child a toy which will encourage to lift the head and trunk to look at or listen to it. Support the child just under the hips and lower chest so child arches most of his back as head is raised up.

- Place the child face down on floor. Offer a toy or bottle at a height that will encourage them to do a push up in order to see it. Child should be able to hold head and chest raised with his elbows straight for increasingly longer periods of time.



- Make the child lie in prone lying with weight bearing on both elbows. Offer the child toys at shoulder height. This will encourage the child to shift his weight to one side as the child reaches with the opposite hand.

- Place the child over a bolster /pillow, with hands flat on floor and encourage the child to look at you by interacting with the child .

- Ask caregiver to lie on the back, on a pillow under the head. Place the child on the chest facing towards caregiver. Stabilize the child's shoulder and upper body with caregiver's hand, encourage the child to lift and hold the head up and keep interacting with the child in this position

Strengthening the back extensors

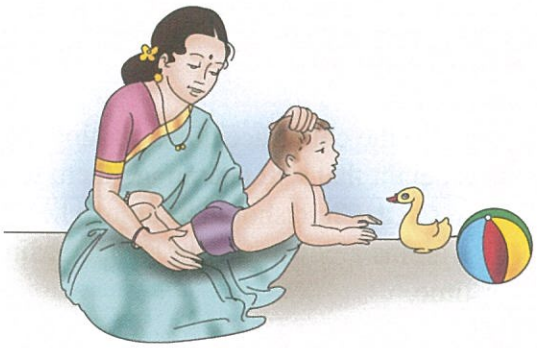
For the child to have enough strength to bear weight on the elbows and the hand he requires the primary skills namely head control that is ability to hold the head against gravity, and to move the head to the sides and to push up on the arms the weight of the upper body against gravity.

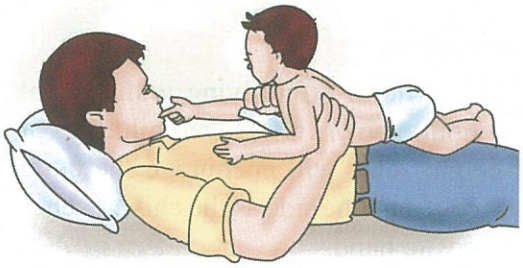
Teach the back strengthening by different Activities.

(A)

(B)

***On the mothers lap*:** - Put the child on mother's lap in prone lying and with the mother sitting on a floor in cross sitting as in the picture. Give some visual or auditory stimuli for to the child to see in the direction of the stimuli. While doing the same stabilize the pelvis/hip with one hand. When the child starts to cooperate keep a hand on the head so as to guide his movements and to improve the confidence of the child.





On the care giver's body - Lie down on the back and hold the child facing the caregiver as shown in the picture and give the child enough support on the shoulders and the upper trunk, so that the child's head is maintained in midline. Talk to the child and sing to them so that they hold this position for longer time by themselves.

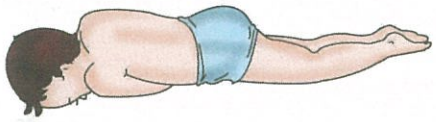
Using julas:- Make the child lie in prone with the head and the hand out side the jula. Make sure that the childs hand should reach the floor now slowly move the swing or jula and allow the child to bear weight on hand. Keep interacting with the child during these activities. Call his name and talk to the child and keep a guiding hand on the child's head if needed.

In all these positions make the child do reaching activities with one hand and later with both hands. Both unilateral and bilateral reaching should be taught. Initially let the child practice these activities with the forearm on the ground or putting weight on the elbows and later on the hands.

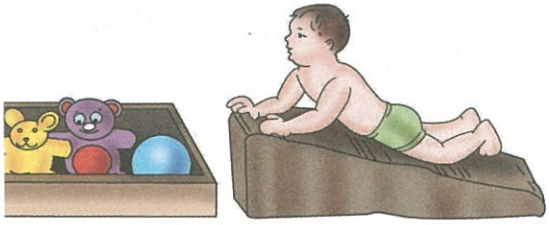
When the child practices the hand weight bearing give initial assistance to keep the elbows straight, by giving manual pressure from the shoulder downwards to the hands or giving a compression on the elbows downwards.

Abnormal positions in prone lying severe spastic child

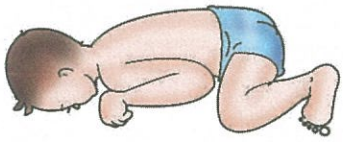
Child with severe spasticity who lies on his tummy, and take his weight on flexed arms with shoulders protracted to lift his head.



Intervention:



Place the child on a prone wedge do not try to lift his head first, as this increase pulling down of the head and flexion of arms and hip. Try to bring the child's arms forward, hold it in weight bearing position. Then slowly encourage the child to lift the head.

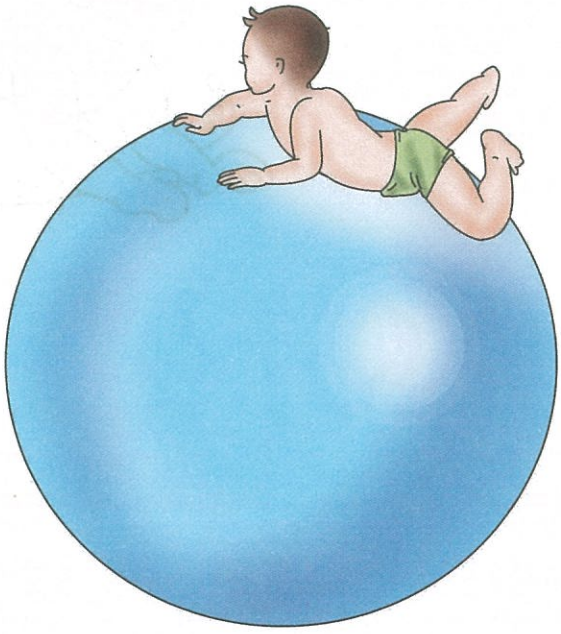


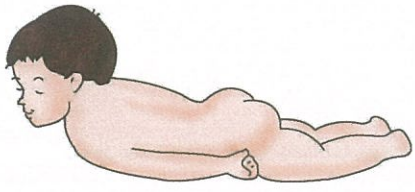
Severe flexor spasticity of upper and lower limb

When the child is in prone lying and tries to lift the head up, it increases flexion of arms and hip and also elevation of shoulder to support the head.

Intervention:

Place the child across the ball, elevate his arms and gently stretch them stiff arm should be grasped at shoulder and turned outwards and extend forwards, and keep the legs apart when the head is raised.





Child with severe extensor spasticity

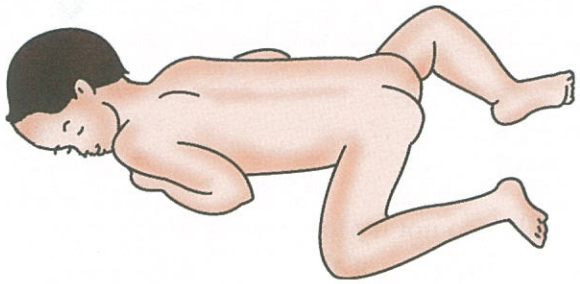
When the child attempts to lift his head, there may be over arching of spine, and also hyperextension of hips

Intervention:

Place the child in to prone lying with fore arm weight bearing, providing trunk support, and assist the child for head lifting

Child with hypotonia

Child lies with flexion, abduction of upper and lower limbs and head turn to one side.



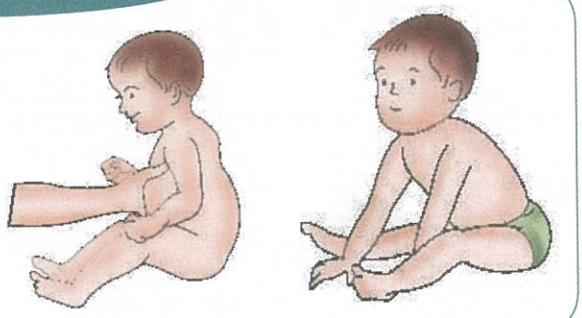
Intervention:

Weight bearing on forearm will also help to increase head control, providing adequate support to the child's chest to prevent him hunching at shoulders keep the legs together.

ITEM 6 Sits with support Age: 3-4 months

NORMAL

Child is usually placed in sitting position by parent, once the child develops optimal head control without head drooping. Usually sitting with support is developed by 3-4 months



IMPORTANCE

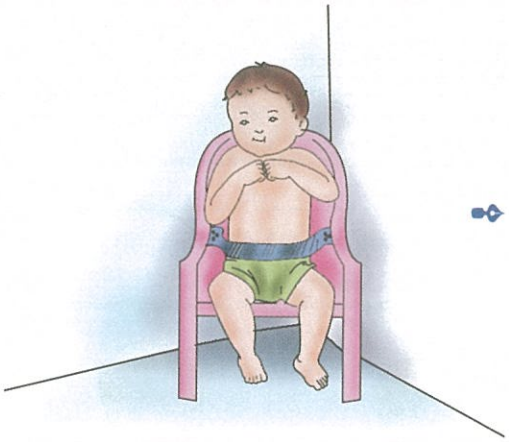
Sitting with support gives the concept of looking at the world around in an erect way. The child gains the confidence in this posture. This also adds to strengthening of antigravity muscles. In infants, it leads to independent sitting later in the development.

Problems Involved

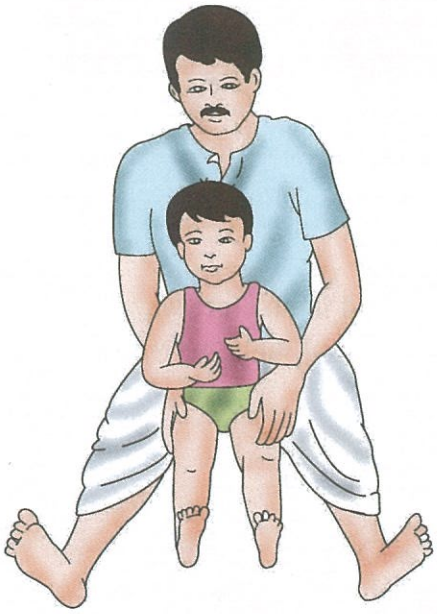
Unable to maintain erect posture when the child is made to sit with support.

Intervention:

- make the child sit against a wall, with large pillows around the child.



- make the child sit in a high chair with straps loosely tied for support, make sure that the back is straight.



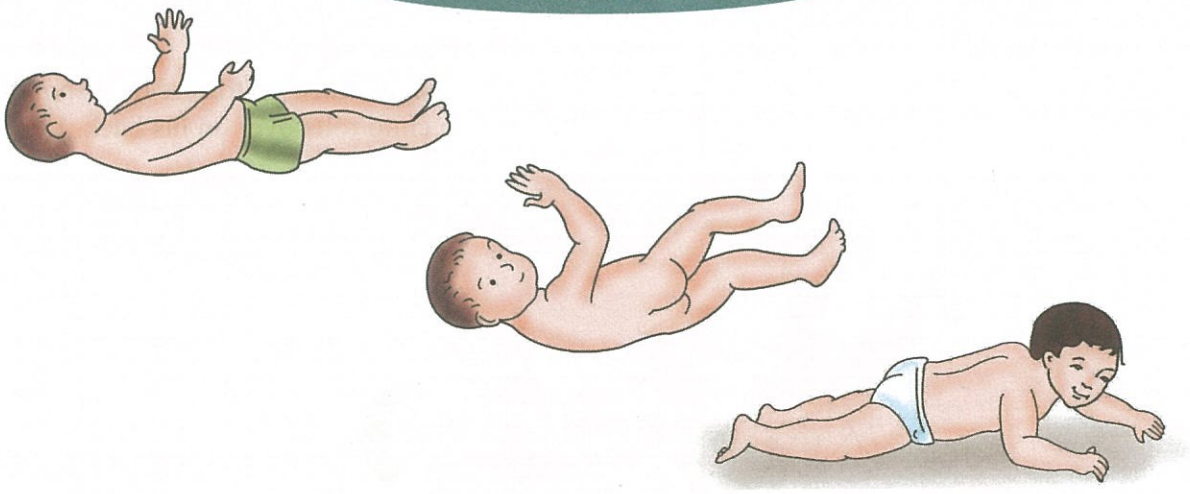
- make the child sit between the legs of the caregiver with legs extended and straight.The child's head and back should be straight and supported by the caregivers body. Encourage him to sit in this position during playing, bathing and feeding times etc. Hands of the child should be kept free to play and manipulate.

- Carry the child with his legs spreading around mothers waist. Support the child only around the hips and lower chest with your hand. Interact with him in this position.

ITEM 7

Rolls from stomach to back
Age: 5-6 months

NORMAL

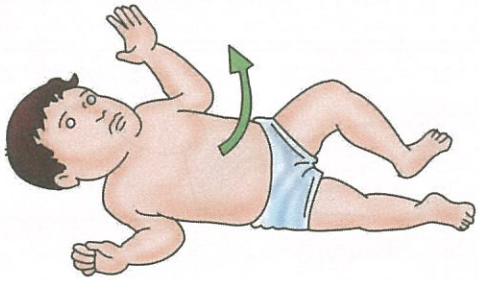


An infant rolls by turning the head, twisting the trunk and using a leg to push the body over. The baby catches sight of a moving object and turns the head to follow it. The turned head triggers the righting reflex, which causes the body to flip over.

Rolling from supine to prone, prone to supine are at first occur accidentally.

The ability to roll smoothly from back to stomach or from stomach to back requires some degree of head control, and a rotation movement that occurs along the trunk of the body, between the hips and the shoulders. Rolling is the first movement that allows a baby to change his position, and usually develops between 4 and 5 months of age

IMPORTANCE

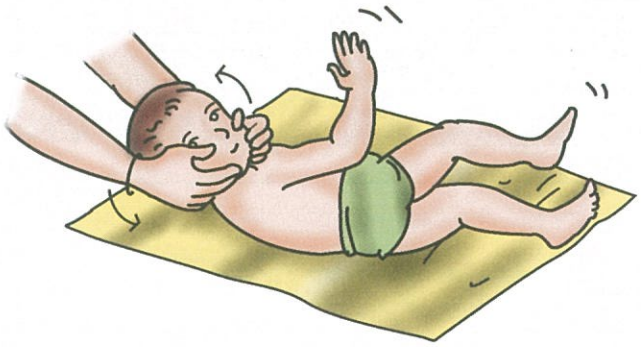


Rolling from prone to supine (Stomach to back), is the first form of mobility (active), that a child learns. Rolling helps the child to improve control over flexion and extension of the trunk muscles. This skill makes the child more independent

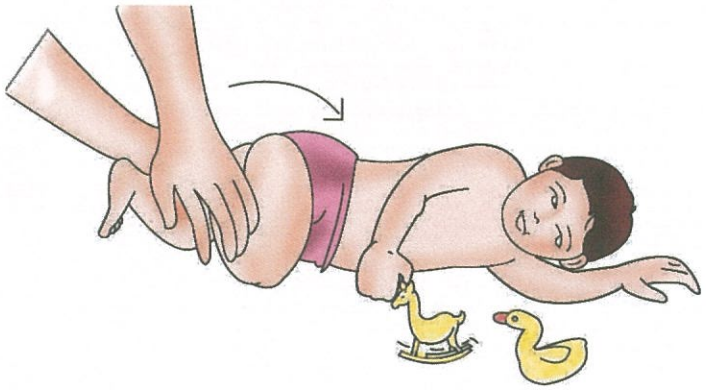
Problems Involved

Unable to roll over from stomach to back even after 5-6 months.

Intervention:



Position the child on side lying on a soft matress, turn his head and face up towards his shoulder that is off the floor.Continue to move child's head, so that the child rolls over on his back. Repeat for other side of the body



Entice the child to roll from stomach to back by placing a favourite toy to child's side, out of arm's reach. Assist, if necessary by bringing one leg up and over the chest, then waiting for the child to complete the roll. Try from side lying position first then try from prone lying ..

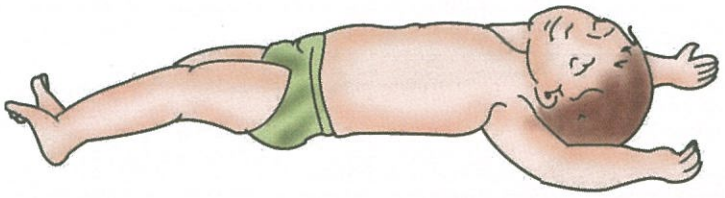
An infant wth auditory impairment can be encouraged to roll by providing him with brightly colored object, musical toys and your voice. If the baby is physically unable to roll, all by self, help the child to roll so that the child can experience this pattern of movement.

An infant with visual impairment can be encourage to roll by providing bright making toys and slowly encourage him to follow the light.

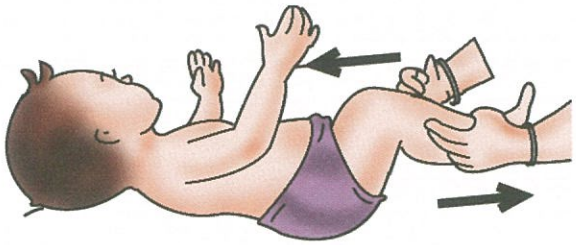
Abnormal rolling patterns:

Problems Involved

Rolls with hyperextension / thrust developed in extensors of neck/ cervical region (increased extensor tone)

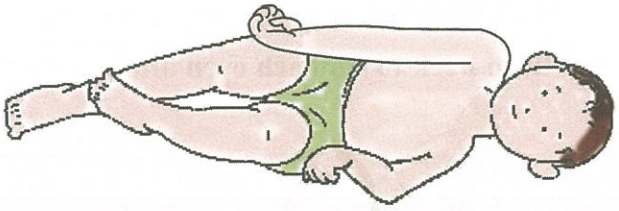


Place the child in Supine lying, flex both hip & knee, move both the legs to either side.



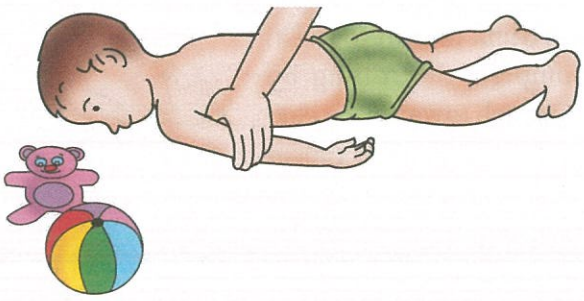
Problems Involved

Rolls only to one side (hemiplegia) Arm trapped awkwardly when child rolls to side.



Intervention:

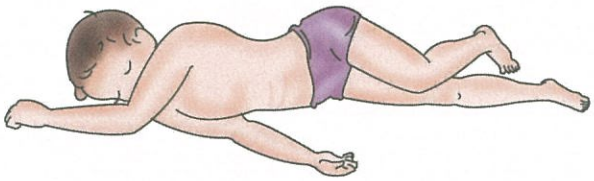
Encourage rolling towards both the sides. Assist the child to lift the affected arm overhead just before child initiate rolling. Encourage child to clear the arm by providing reaching activities. If the child is unable to do so, lift the arm passively over the child's head.



ITEM 8

Rolls from back to stomach
Age: 6-7 months

NORMAL



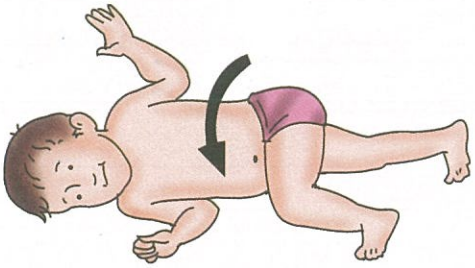
Rolling from supine to prone, (back to abdomen) is at first achieved accidentally as a part of normal process. The ability to roll smoothly from back to stomach requires some degree of head control, a rotation twisting movement between shoulder and hips. the movement starts with head turning to side followed by shoulder, trunk, hips and legs.

IMPORTANCE

Rolling from supine to prone and prone to supine, is the first form of mobility(active), that a child learns. Even though pivoting in prone/supine does exist or is learnt before, still , they do not help as much in development of active mobility as rolling does. Rolling help the child to improve control over flexion and extension of the trunk muscles. This skill makes the child more independent. It also provides opportunities to explore the things around the child.

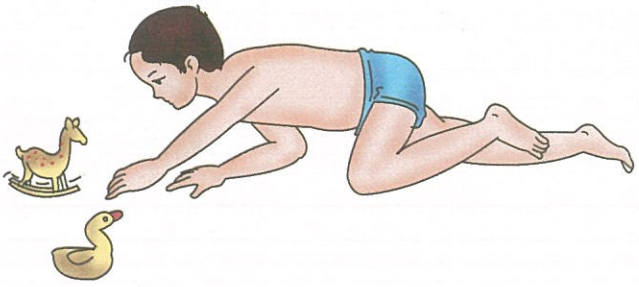
Problems Involved

Unable to roll over from back to stomach even after 6-7 months of age.



Intervention:

With the child lying on his back, bend the child's hip and knee(one side), and bring it up and across his body. Wait for the child's trunk to start to twist. Encourage the child to complete the rolling by providing an attractive toy to reach towards the side you want him to roll. As shown in picture repeat the activity till the child masters it. Gradually reduce the degree of your initial assistance.

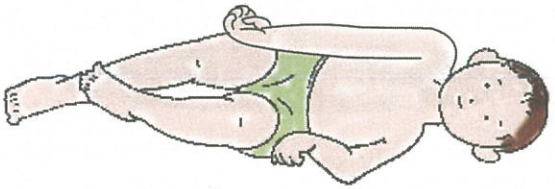


Problems Involved

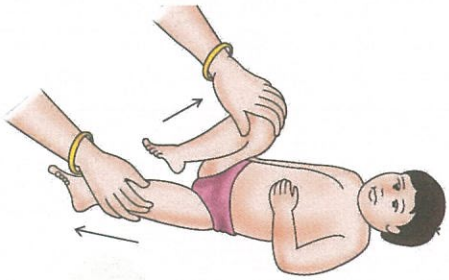
Rolls like a log (Stiff rolling).

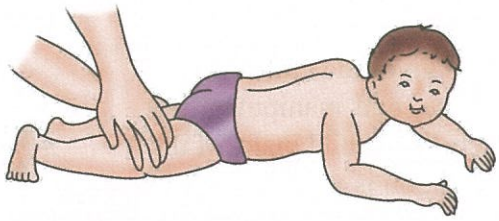
when child rolls there is no rotation at shoulder and trunk.

The hips are slightly flexed and the knees may be touching each other.



Rolling can be done on either of the sides.To roll the child on left side caregiver has to hold both the lower limb, bending the right leg and stretch the left leg. Hold both leg and half turn the child to left side. Now the child is brought to side lying. turn further from side lying to come on to the abdomen.Follow the same step in the opposite direction to roll onto the right side.





Problems Involved

When the knees are touching each other or when scissoring is observed.

Intervention:

The child is made to lie on one side with back supported. Keep the legs widely spread by placing a bolster in between the legs.

ITEM 9

Sits unsupported steadily
Age: 6-8 months

NORMAL

Usually skills are achieved in an orderly sequence. Sitting with support is achieved around 3-4 months , now child makes attempts to sustain sitting/maintaining posture for few seconds then for few minutes etc, later he starts to attempt coming to sit once he has achieved basic mobility pattern of rolling and has learnt to bear weight on hands.

Components of sitting involves coming to sit by self and able to move out of sitting by self into different position and ability to balance one self in sitting.

IMPORTANCE

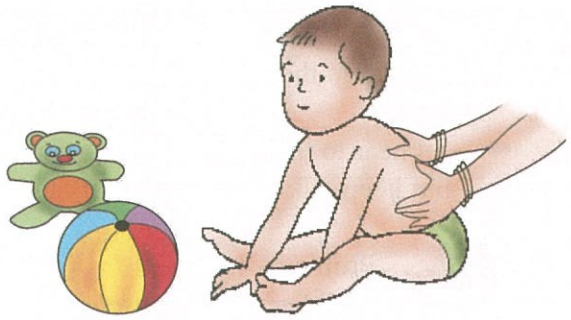
Sitting is an important milestone, even for the development of communication, play, and social skills. Sitting is the most stable antigravity position that the child adopts early in life. This position gives the child enough room to move the hands in space, and manipulate the environment. This position teaches the child many of the activities of daily living. This position is where the child is able to balance his upper body on the pelvis.

Problems Involved

Unable to sit independently even after 8 months of age.

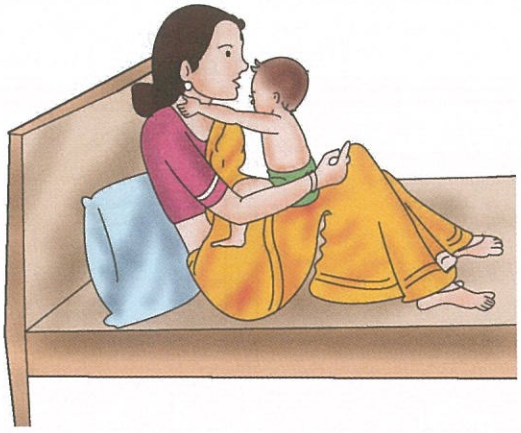
Place the baby on the floor in a sitting position, and seat yourself behind him to provide support as needed. Place the toy or familiar object on floor in front of the infant to encourage child to prop forward on both hands. If baby cannot put both hands on the floor, you, can help by placing child's both hands on floor, and gently placing your hands over child's hand to give the sensation of taking some weight through child's hands and arms. While your hands are still over the child to rock forward over hands several times to help facilitate this propping position.

- Place the child in sitting position on the floor with his hands infront of him. so that they prop themselves upright. Initially offer some support at the shoulder or hip then gradually withdraw the support.



- Put the child on a small stool in such a way that his feet rests on floor. Stabilize the child holding around the hips until balance. Remove your hand slowly, but be ready to catch the child when they loose his balance. Repeat this activity many times to improve his confidence.

- Sit on the floor with your knees bent and your feet flat on floor. Hold the child facing you with legs straddling your hip. Child's back will be resting on your thighs. Encourage the child to sit straight up by using abdominal muscles. You can direct this action of abdominals by holding around the child's hip with your hand placing thumb under the umbilicus, and give a slight down ward pressure to initiate abdominals to work. Gradually move your knees closer to the floor so that the child comes further to sit upright. Interact with the child in this position.



- Give the child toys to play with, once they are able to sit with his own support. They become involved in manipulating the object rather than in using hands for support. Later offer the toy in all directions (either side, to the front, and over head) this will give the child practice shifting their body weight and balancing their body in sitting.

For Visually Impaired. Hang a bright colored light producing toy with music to a string placed infront of child, this encourages the child to focus and fix on object. Move the toys from side to side and encourage the child to trace the object. Give verbal cues whenever necessary.

- Sit near to the child on floor until the child feels secure. Gradually move away from the child but keep talking to them. Put familiar toys within easy reach.

Problems Involved

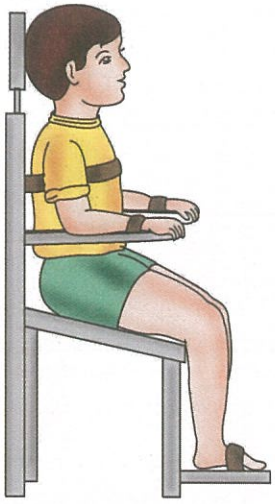
Child with low muscle tone

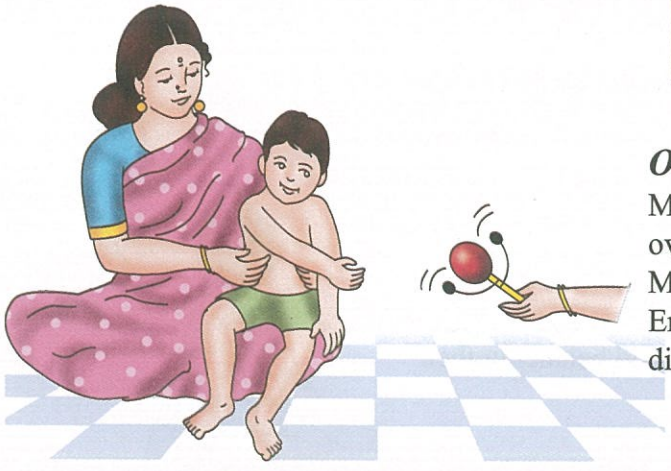
The child sit with the legs bent and wide apart on the floor. Body leaning forward, hands placed on the floor taking support. Back is rounded.

Intervention:

On a chair

Make the child to sit on a chair (as shown in picture) back of the seat is raised than front. Keep the head and trunk straight and supported. If required tie a strap at chest level. See that the feet will rest flat on the surface.





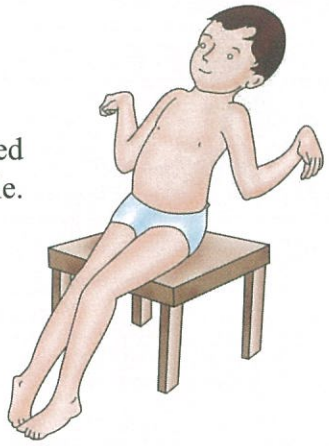
On Lap

Make the child sit on mothers thigh, provide support over lower chest and maintain the back straight. Make sure that child's feet are flat on the floor. Encourage the child to reach for toys in overhead direction and both the sides.

Problems Involved and their Intervention

Spastic child (stiff child) extensor spasticity

The child's head and shoulder are thrown back, back is arched presses the buttocks down. straightning at hip, knee and ankle. Toes pointing down.



Intervention:

- Make the chid sit on a chair which has base that is raised in the front than back (as shown in picture) Make sure the hip and knee bent and supported, with feet rested flat on the surface. Keep the head and trunk straight and supported. If required tie a strap at chest level.

- The child should be lifted to the mother waist with the trunk supported with the mothers arm. Child's legs held widely separated. Carry the child with legs apart around the mother's trunk as shown in the picture.

Problems Involved

'W' sitting

The child sit with leg folded under his thigh and heals touching his buttock.

Intervention:

Make the child sit between the legs of the caregivers with legs extended and straight.

The child's head and back should be straight and supported by the caregivers. Engage child to play and manipulate toys with hand in this position.

Let the child sit on raised surface only. Floor sitting position has more probability of getting into 'w' sitting position. So, always make the child sit on a small chair or stool, as often as possible.

Hemiplegic child:-

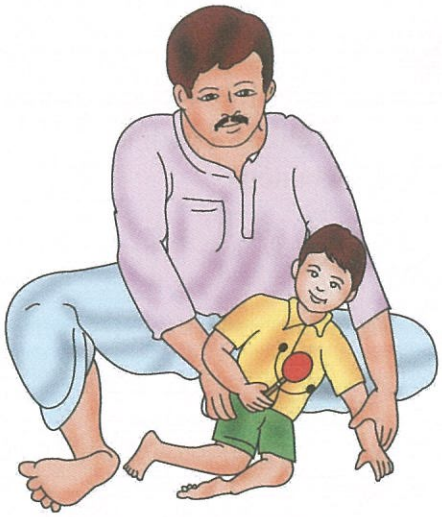
In hemiplegics, stiffness is in one half of the body. the child uses only normal half of the body, the other half is stiff. The child sits with one leg bent on the affected side and the other leg placed normally.

The effected hand is bent and held close to the chest.

Intervention:

Allow the child to take support on the affected side by resting the palm on the floor.

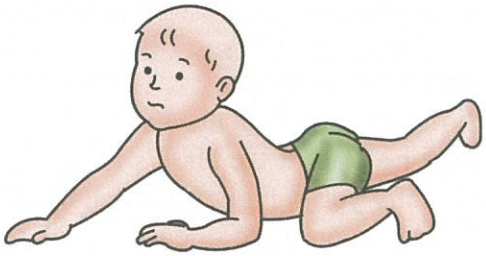
The knees should be bent in such a way that the child is in the side sitting position on the affected side. Maintain side sitting and encourage the child to reach for toys with the other hand.



By giving a strong pressure (deep) proprioceptive stimuli to the hips, child can be made to lift up his trunk and head. Add visual/auditory stimuli in front in order to compliment the child's efforts.

ITEM 10 Creeps on abdomen
Age: 6-8 months

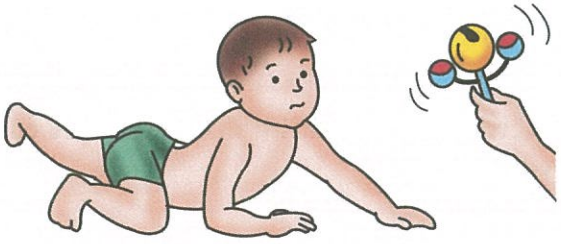
NORMAL



Creeping is the skill that the child develops at the age of 6-8 months. During creeping children hold their head up and back straight, and moves forward by using opposite arm and leg, first backward and then forward. However some children with normal development do skip this item, and directly go for crawling.

IMPORTANCE

The natural skill of creeping help the child in self initiated mobility. This is a precursor for crawling on all fours. The alternative movements of limbs in creeping is taken to the later life as alternative movements of arms and legs during walking, running etc.

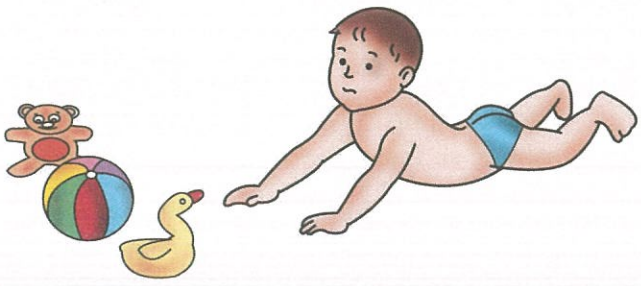


Problems Involved

Not able to move forward with alternate movements of legs and hand while on stomach

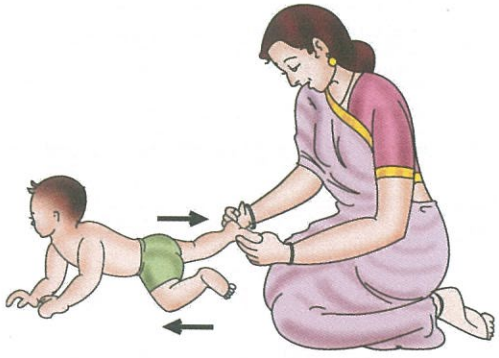
Intervention:

- Place the child on stomach. Offer a toy or a rattle at a height, that will encourage the child to do a push up in order to see it. Make sure that the child is able to hold the head and chest raised with his/her elbow straight as shown in the picture.



- Place the child on stomach. Offer a toy at shoulder level towards one side. This will encourage him to shift his weight to one side as he reaches for the toy with the opposite hand.

- Place the child on stomach help him to bend his one hip and knee to bring the knee under the stomach. Place a favorite toy just out of the child's reach, and encourage the child to move forward to obtain the toy. Intially you can give physical assistance by offering support to his bent feet with one hand and lift the opposite side trunk with the other hand.



- Once the child starts to initiate creeping increase the distance with stimulating toys in the environment.

Problems Involved

The problems faced in children with disabilities are commando creeping.

Commando creeping.

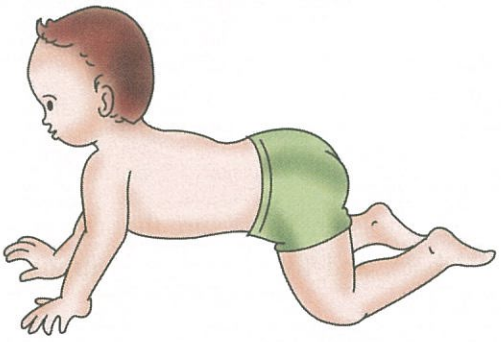
Occurs when the child has increased neck flexor tightness and limited movements of the lower body. Usually seen in children with all the four limbs affected and the lower limbs more affected than the upper. (Diplegic C.P)

Alternate limb movement pattern has to be taught to children when they start moving in an abnormal fashion, so that these abnormal pattern can be prevented.

As crawling and creeping are the basic mobility patterns for walking if the child is not taught the right way at this stage he may continue to have problems in the later stages also.

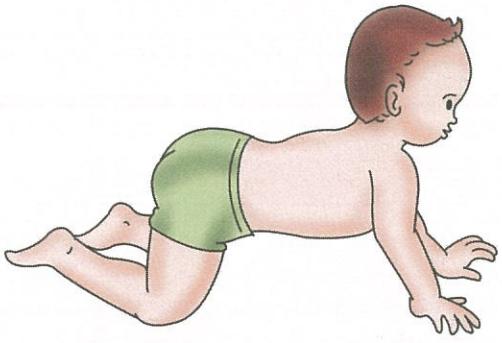
ITEM 11 Crawls on hands and knees
Age: 9-11 months

NORMAL



Crawling is moving on hands and knees. When the infants attempt to crawl, they slowly and deliberately move one limb an inch, or two at a time. With practice, the movement becomes smoother, efficient and faster. Most babies exhibit a pattern in which the arm movement is followed by movement of the opposite leg. However, about 20% of all infants follow the arm movement by moving the knee on the same side, of the body . After some time they adopt bear walking that is on hands and feet.

IMPORTANCE



This developmental milestone is also important to children, because they learn to use hands and legs alternatively Crawling helps the child to learn weight shifting laterally, back wards and forwards.This position helps the child to hold a furniture and kneel down and then stand. Some children do not go through the stages of creeping and crawling which might be quite normal. They directly graduate from sitting to pull to stand.

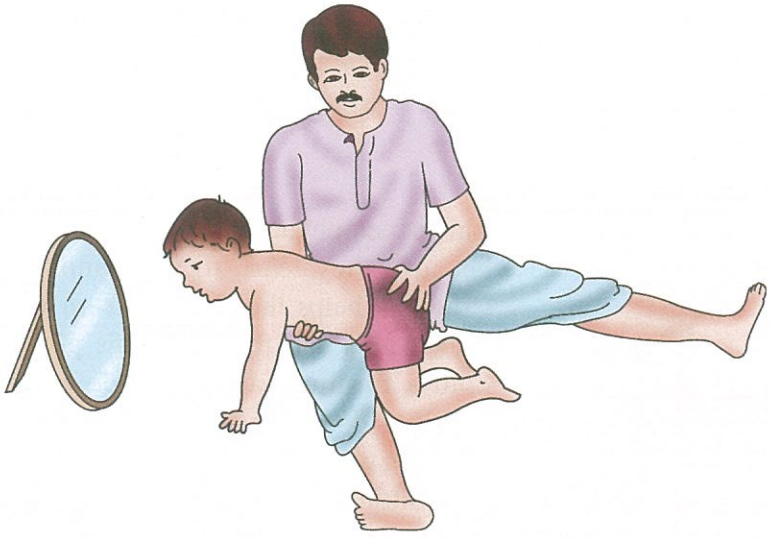
Problems Involved

Unable to move forward on hands and knees.

Intervention:

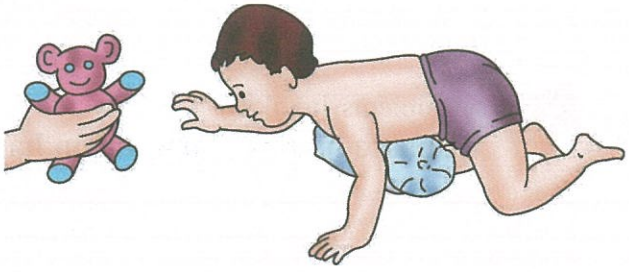
- Place the child on stomach on a bolster. Make sure that child's both knees and hands touching the ground. Rock the child back and forth in this position. Provide support over elbow if needed.

- Place the child in crawling position (on hands and knees). Support the child's trunk against the caregivers thigh. Make sure that child take weight on the hands and the knees. Provide support over the hip and shift the body weight forward, backward and side to side. Keep a mirror or interesting toys at shoulder level, so that the child will encourage to lift the head in this position.



- Offer the child toys at the shoulder height when he/she is in crawling position.

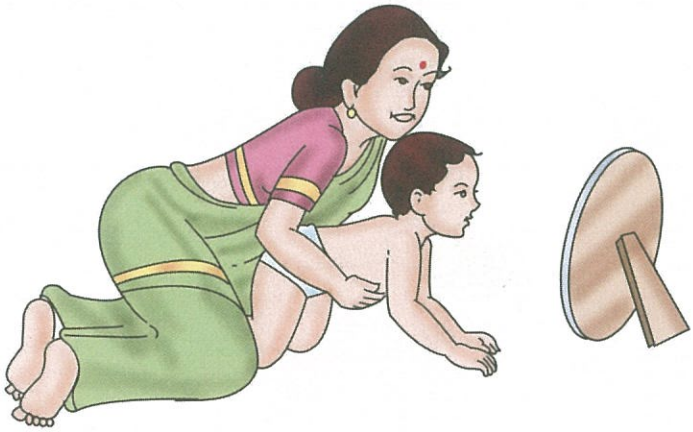
  This will encourage the child to shift body weight to one side, as he/she reaches for toys with opposite hand.



- Place the child on stomach, bend the child's both hips and knees to bring them under the stomach.

  Assist the child to lift the trunk and straightened the elbow to take body weight on his hand.

  Use stimulating toys infront to encourage the child to lift the head and upper chest.



- Put a towel under child and hold up both ends of towel so that you help to lift the child's stomach from the floor. As he starts supporting himself, reduce the support.

- While on hands and knees, help the child to move right hand front and then move left leg forward. Then left hand / right leg. Repeat until the child starts to move on their own .As the child gains this skill, start to move right arm and left leg or left arm and right leg, instead of using two distinct motions.

NOTE :

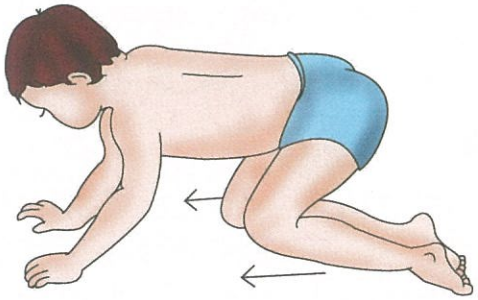
It is important to train the balance in quadruped position (crawling) by using a bolster under the stomach or support the stomach by using care givers thigh/lap. Teach the child weight shifting by slow rocking forwards backward and sidewise .It helps in improving shoulder and pelvic stability.

Problems Involved
Abnormal Patterns

- Bunny hopping.

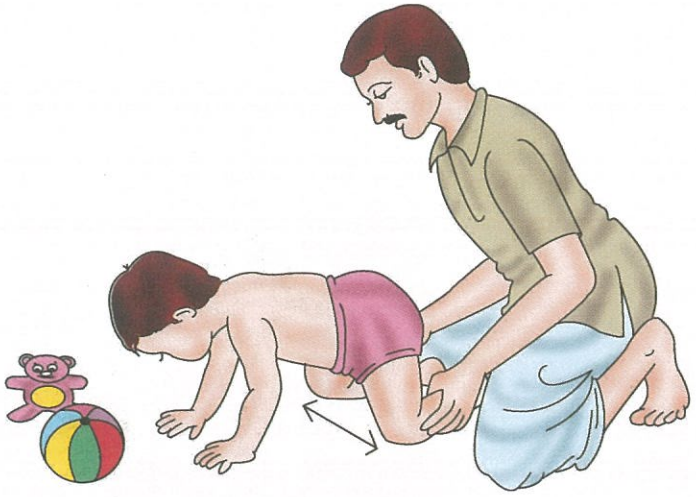
  Children do bunny hopping with adductor tightness of hip and with flexor tightness of hip and knee. Usually this pattern seen in children with all the four limbs affected and the legs more affected than the hands (Diplegic C.P) This leads to lack of alternate movements at trunk and pelvis.

  The child crawls forward with both the legs moving together at the same time.



Intervention:

- Put the child in crawling position (on hands and knees). Hold the leg slightly below the knee. Place an attractive toy infront of child and out off his reach. Encourage alternate movement by pushing the child's leg one at a time, whenever the child is moving forward.



Problems Involved

Bottom shuffling.

Child sit on floor with extended leg and weight bearing on buttocks. The child moves forward by flexing & extending both hips & knees, The child may use hands also, to bear the body weight.

Intervention:

Place the child in crawling position, hold a towel wrapped around child's waist, to support the trunk. Shift the weight of the child forward, backward and side to side by slowly moving the towel. Once they start supporting themselves reduce the support and gently pull the towel in forward direction, so that the child progress forward. Encourage alternate movement of legs by assisting them to do so.

NOTE : Do not encourage the child to sit on floor.

ITEM 12 Pulls self to standing holding on to furniture Age: 9-11 months

NORMAL

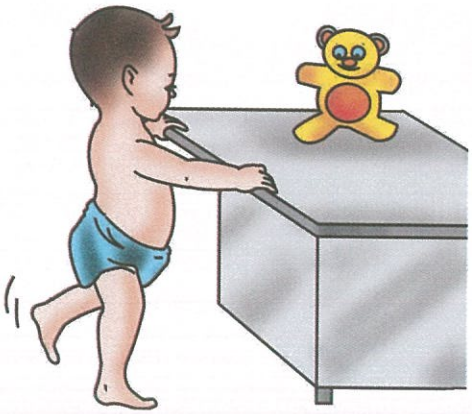
Infants typically begin to stand by pulling themselves up and holding onto furniture. The child will be able to pull self to standing at the age of around 10 months. A child who has to come to standing or pull self to standing has to attain the primitive skills to sitting and moving in and out of sitting position.

IMPORTANCE

The child learns many activities with this as the basic skill. The child will be able to work against the gravity in this position A strong abdominal activity is necessary for the children to achieve this skill.

When the child masters the art of pulling himself to stand, he expresses enthusiasm in standing and walking by self.

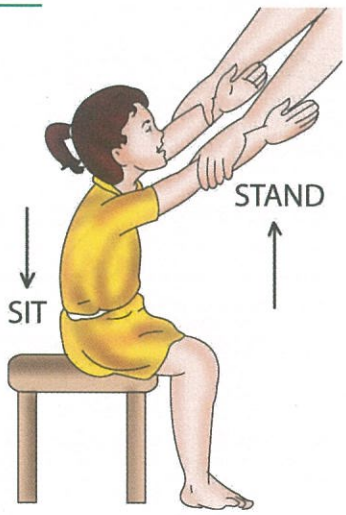
This is the second major postural variation that the child exhibits in the infant hood, next to sitting. A strong development to antigravity muscles is important for this skill to be mastered. One of the infants motivation for standing is to extend the range of grasping and reaching for attractive objects above the eye level. The infant will be having strong reactions to supported standing right from the 3 months of age, when placing and walking reflexes are manifested.



Problems Involved

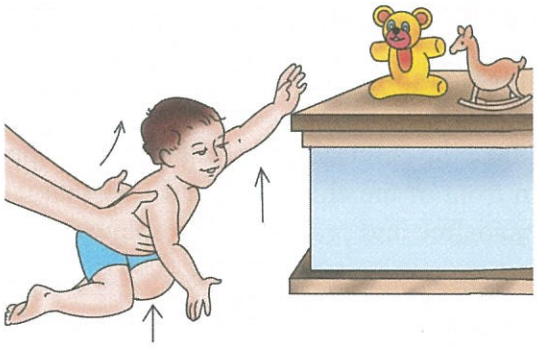
Unable to pull self to standing by holding on to furniture.

Intervention:



- Make the child sit on a small chair with feet flat on the floor. Offer your hands to child and ask him to stand up. Assist the child by pulling towards you, so that the child learns to shift his weight forward over his feet. Play sit to stand game.

- When the child is seated on floor, place few attractive toys on a low table or a couch infront of the child and gain child's attention towards it. Encourage the child to stand to obtain toys. Grasp the child firmly around his/her chest and to pull the child to standing once he/she initiates the action.



- Caregiver seated on the floor with buttocks touching the heel. Place the child on caregivers thigh spreading childs one leg in between the caregivers thigh and one leg laterally. Make sure that child's feets are flat on the floor. Place a low table infront of child with few attractive toys. Hold child's hip with both the hand and encourage the child to stand and obtain the toy. Appreciate the child when ever they succeed by praising them. Repeat this activity many times.

Keep the child's toys at little heightened position on a table or chair, which got lots of supporting bars to hold. Encourage the child to hold the bar of the table and pull to stand to obtain the toys. Initially give manual assistance by holding child's pelvis.

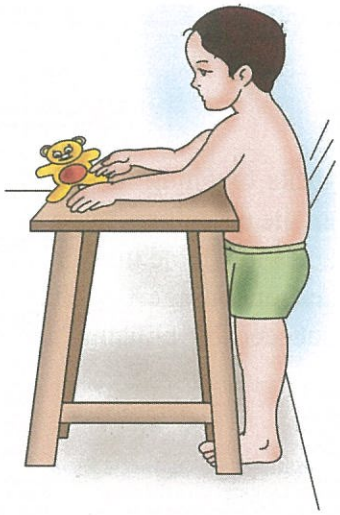
Problems Involved

Child with flexor spasticity:

- Child with flexor spasticity stands with head bent forward with stiff hand and back. Child's hip and knees are also in flexion.

Intervention:

Make the child stand against the wall supporting the back and holding it straight. Place a short table in front of the child in such a way that it gives some support to his trunkal area. Keep the child's handsfree and provide toys to play and manipulate.



Problems Involved

Child with extensors spasticity:

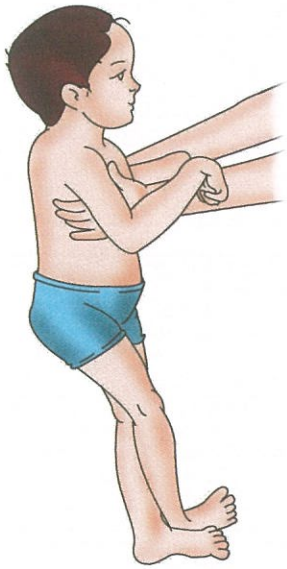
- Child with extensor spasticity stands with the extension of head and neck. Child's lower limbs are stiff with toes pointing downwards.

Intervention:

Child should be made to stand with his knees and abdomen supported with the hands of the caregiver. Support the back and head of the child which prevent the head from bending backward and arching the back.Make sure that childs feet touch the ground completely.

Problems Involved

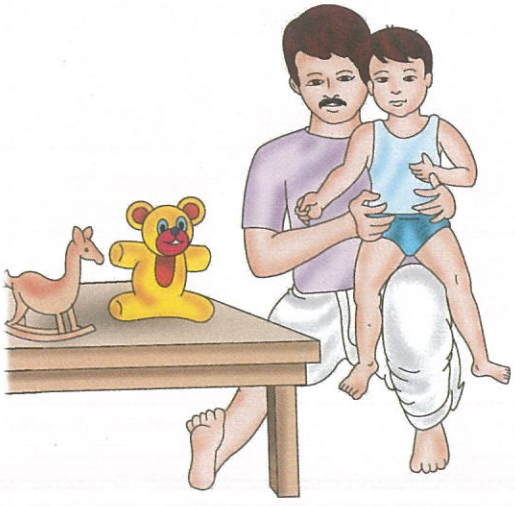
Spastic child with scissoring of lower limb:



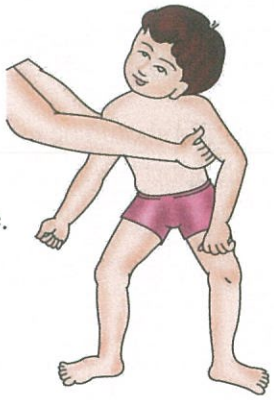
The child stands with support and with legs crossing
The hand bent at the elbow and wrist, and held close to the body.

Intervention:

Caregiver seated on the floor with one leg extended and the other slightly flexed. Place the child on caregivers thigh spreading childs one leg inbetween the caregivers thigh and one leg laterally. Make sure that child's feets are flat on the floor. Place a low table infront of child with few attractive toys. Hold child's hip with both the hand and encourage the child to stand and obtain the toy. Appreciate the child when ever they succeed by praising them.



Problems Involved



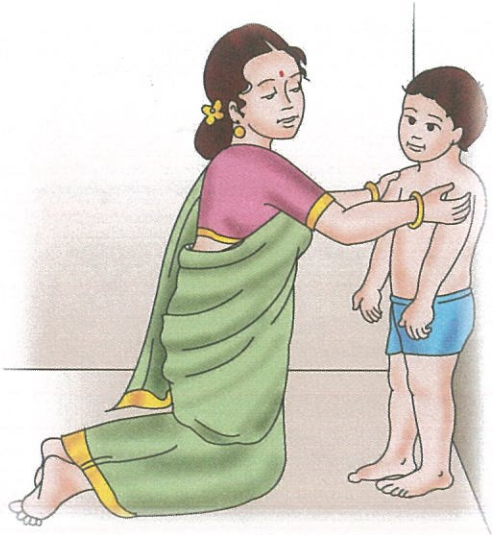
Floppy child:

Child with lower tone stands with support, keeps the legs apart and is unstable. The child's hands fall loose on the side.

Intervention:

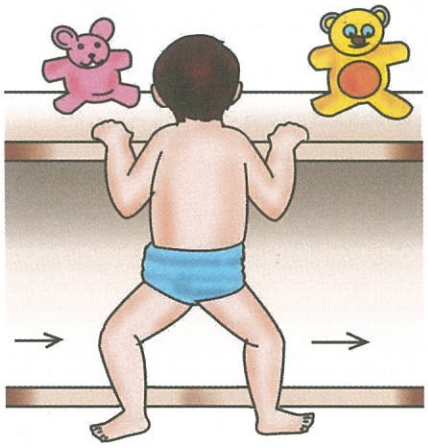
- Make the child stand between the parents legs with knees and trunk support. encourage the child to keep head straight and looking forward by keeping attractive toys at eye level. Tap the child in this position which help the child to be alert and maintain the tone, at near normal level.

- Make the child stand against the wall with the feet placed firmly on the ground. Legs to be held straight, hold the child around the shoulder and keep the hand close to the child's body.



ITEM 13 Walks holding on to furniture, sideways Age: 10-12 months

NORMAL



The activity of cruising consists of moving around, usually sideways, holding onto furniture or other objects. As infants gradually gain stability in pulling up and cruising, they develop enough confidence to let go of their support for a few seconds.

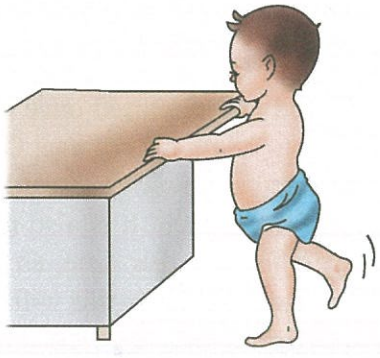
Walking is mature coordination of body functioning in perfect harmony. Children always attain a milestone, which can be executed with support and then progress to independent development.

Usually children start to cruise sideward with support soon after being able to come to standing. They try to reach to things kept at a distance

IMPORTANCE

Once an infant develops strength, coordination and balance to move about freely on the floor, he will begin to pull up to stand and discover ways to explore things that were previously out of his reach. As a baby pulls to his feet and stands, he gains further strength and control in his trunk and leg muscles. Soon he develops enough strength and balance to cruise along furniture as he side steps to reach a new destination. This side stepping teaches the weight shiftting which will help the child to take steps forward in walking in later development.

This is a pre walking skill. It helps the child to orient to the upright world. Cruising also helps the child to move around with the non-human support. The child starts to anticipate the difference in the supporting surface, when he walks on different textures and learn about surrounding environment

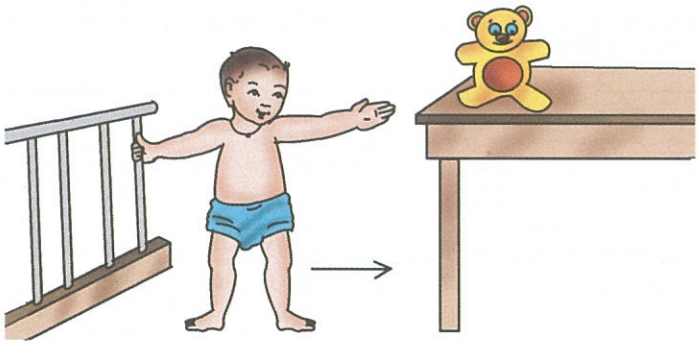


Problems Involved

Unable to stand and walk with support by holding on to furniture sideways.

Intervention:

- Make the child stand with support by holding a bar, place few attractive toys out of child's reach that the child should take sideways step to get them. Do this on both sides. Gradually increase the distance at which the toys are placed.



- Make the child stand by holding a stick horizontally. Caregiver should also hold the stick from the opposite side. Both the child and caregivers are in face to face and holding the same stick. Now caregiver should move slowly sideways, this facilitates the child to step sideways.

A visually impaired infant will often be delayed in walking, as he may feels insecure in the upright position. Very little of his body is supported once he is up on his feet, and he may prefer being on the floor until closer to 18 months of age. Once he does show some interest in walking, he will need to be encouraged to move towards musical or noisy objects, or a familiar voice that is slightly out of their reach. It is also normal for the visually impaired infant to pull their feet further apart for a longer time, as they are under- standably more unsure of Themselves without the visual input, and this will allow him to feel more balanced and secure during the first few months of walking.

ITEM 14 Stands independently
Age: 11-13 months

NORMAL

Standing on two legs is a very crucial and specific skill that only human beings possess. Accidentally while child is still walking with support, he attempts to use both hands to manipulate, and while doing this, discovers that he is able to support himself on his feet without taking an external support with hand. Initially child can hold in independent standing for few seconds, later masters the skill by combining different combinations of leg pattern.

Initially they stand with wide base of support with guarding hands. The initial standing posture is bow-legged with legs apart to preserve balance. Hips and knees are slightly bent, the stomach sags and the lower back consequently is curved.

IMPORTANCE

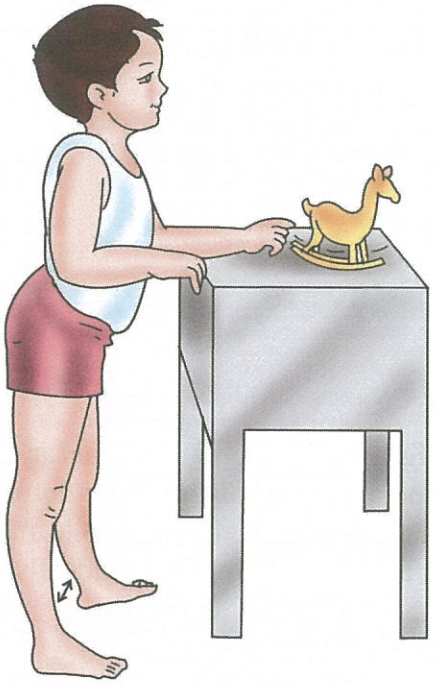
Development of antigravity strength in spine and legs improves confidence of child .Independent standing gives lot of opportunity to manipulate the environment with hand child also learns weight shifting to both the legs which helps in walking independently later

Intervention:

- Make the child stand with support of your hand. Offer a toy that must be grasped with both the hand or offer two toys one in each hand or play two handed game with the child. Offer mild support over the shoulder or at hip if necessary. Then, gradually withdraw it. It is usually best to speak quitely and not call attention to the fact that the child is standing without support.

- Help the child get into a squat position. Play jack-in-the box game, so that the child uses own muscle power to stand up, give mild support for balancing while coming to stand.

- Make the child to stand with wide base of support. Offer toys infront within child's reach at chest level, so that the child will flex the shoulder and extend the elbow to obtain the toy. which will help the child to balance by self.



- Make the child stand caregiver should kneel back side of the child and give support to the lower trunk and knee as shown in figure. Keep child's hand free for manipulating the toys and other household materials. Slowly withdraw the support

Problems Involved

Child with extensor spasticity:

The child with extensor spasticity, stands with extension of neck, trunk, hands and stiff legs.

Intervention:

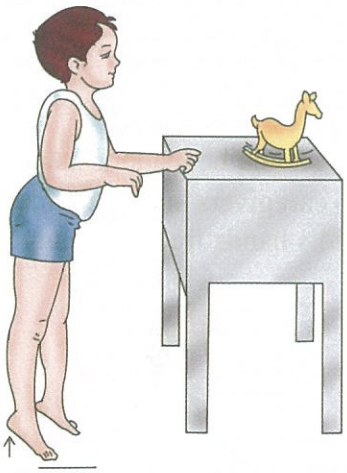
- Caregiver sitting on a stool, child should be made to stand in between the leg of the caregiver, holding the hips of the child with caregivers knee. Provide mild support over middle trunk and hold the trunk straight.Keep child's hands free for manipulation.

- Make the child stand with proper support at knee and abdomen by caregiver who sit behind the child on floor.Provide support at back and head by keeping the child closely on caregivers body. This will prevent the arching of the back.

Problems Involved

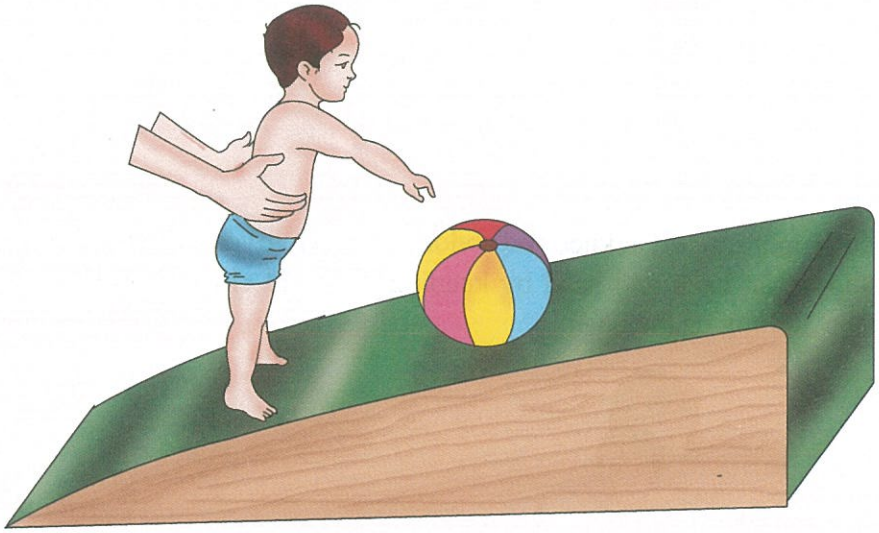
Toe standing :

Children with severe extensor spasticity stands on toes because of increased of tone in posterior group of muscles. This toe standing is also accompanied by pronated/everted foot as a compensation of spastic plantar flexors. It is also seen with flexion of hip slightly flexed or straight knees.



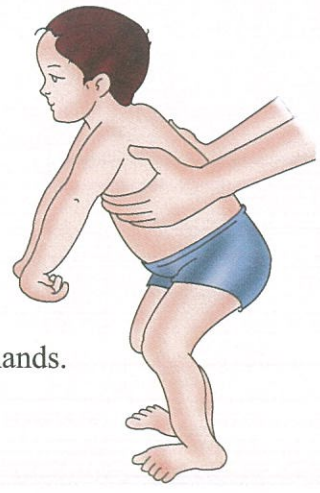
Intervention:

- Encourage child to stand on inclined surface towards uphill side which help to bring dorsiflexion and alsoextension of hips and knees and ask the child to take an object from the floor with knee in extension throw it forward. This activity will help to correct this problem.



Problems Involved

The floppy child:



- The child with low tone stand with wide base of support and hanging hands. The head of the child may fall forward or backward.

Intervention:

The child made to stand in between the parents leg with knees and trunk supported, encourage the child to keep the head straight with the help of interesting toys and activities at shoulder level. Tap the child's back to maintain his tone. taping also help to make the child alert.

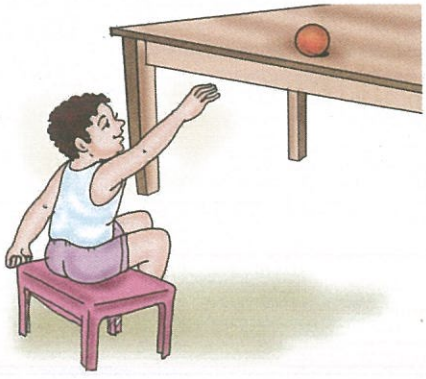
Problems Involved

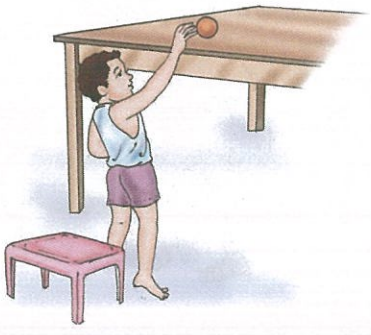
Stand with hyperextension of knee.

Hypotonic child usually prefer hyperextension of knee while standing. because of weak musculature around the knee. Hence it is easy for them to mechanically lock the joint than with muscular effort.

Intervention:

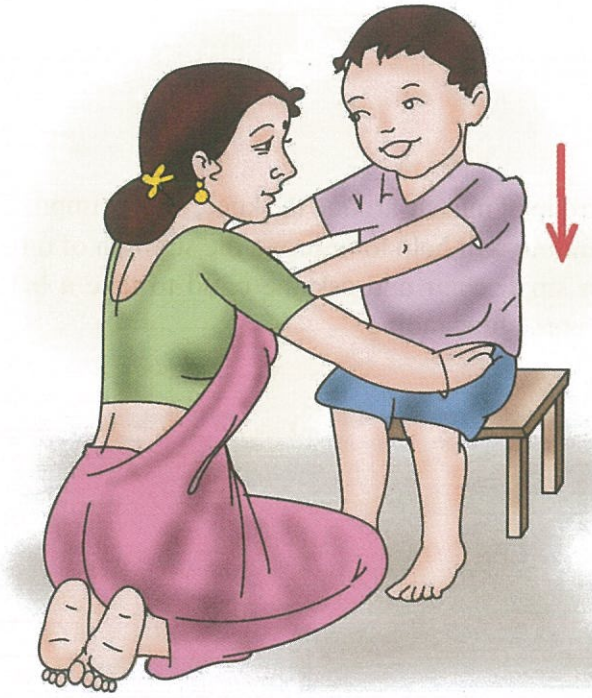
- Strengthening of both the group of muscle around the knee, help to improve the stance. Activities like partial squatting to standing will help to improve the strength of muscles around the knee. make the child to sit on a small chair and ask the child to take a ball from a stool placed forward and encourage to come to standing.





- Ask the child to move a stool forward with one leg placed forward maintianing knee in flexion. Caregivers can hold child's knee to prevent hyperextension.

- Make the child in half squat position or sitting on a low stool, keep child's hand on caregivers shoulder for support, encourage sit to stand activity in this position. Maintain knees in slight flexion by holding the knees when ever child comes to standing position.



ITEM 15

Walks independently
Age: 13-15 months

NORMAL

Children start cruising as soon as they pull to stand. But walking independently is achieved when he is able to judge distances accurately, confident to balance his body when the legs are moving First walking pattern shows high guard position with no or minimal hand swing and wide base of support.

In the initial stages of walking, the legs are spread apart for a wide base of support. The toes are pointed outward with the knees slightly bent. The arms are held out for balance as the legs move in rigid, high stepping, and halting movements. The baby has difficulty in maintaining balance and falls easily. Some infants may walk sideways as a carry over from early cruising movements.

At first child leans slightly forward and to prevent falling, moves instinctively one leg forward. He goes fast that it almost becomes a kind of run that cannot stop, ending with the child running into the furniture or a wall, or falling down. Thus the child seems to run before he can walk, because slower motion requires better balance.

IMPORTANCE

Independent walking will improve the confidence of the children, this developmental milestone provides greater exposure to exploration of environment. Independent walking is a prerequisite to running, jumping and hopping.

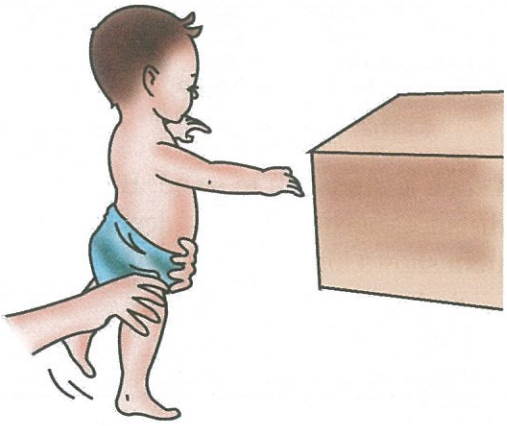
Problems Involved

Unable to walk independently

Intervention:

Make the child stand, care giver kneel at back of the child and give support to the child by holding around the hip. Gently push away from you untill they take a step.

- Make the child stand, caregiver stand behind the child and give support by holding around child's hip. Prompt the child to walk forward by giving a gentle push forward. If the child is not taking alternate forward step, use your feet to push one leg forward as you help the child to shift weight to the opposite leg.



- Once the child stand by holding a furniture then slowly make the child to walk with support of a tricycle with head and trunk erect or give the child a stick to hold horizontally while in standing. Caregiver should hold the outer side of stick by facing towards the child and slowly pull the child to take step forward.

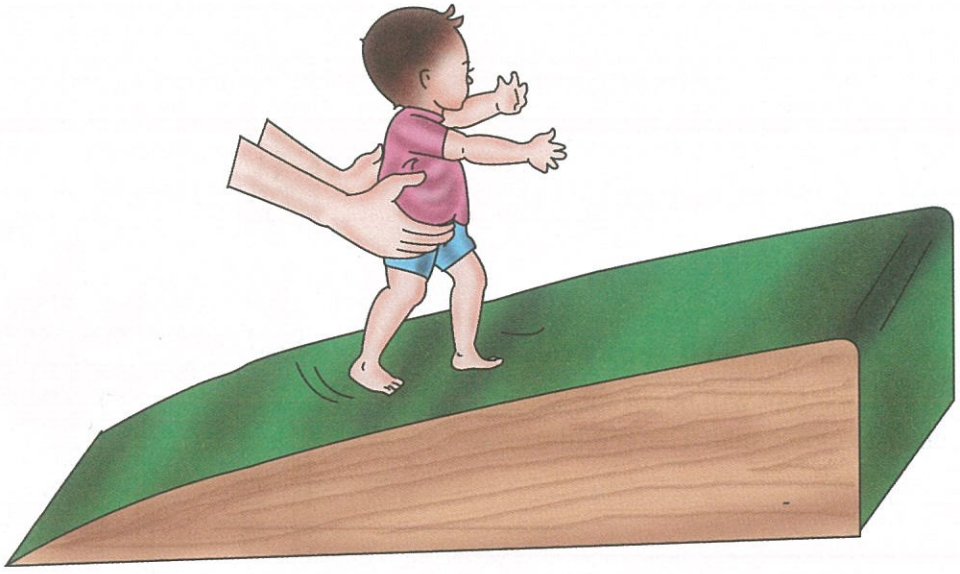
Problems Involved

Toe walking -

Walking on toes is seen in children with increased tone in lower extremeties. It is mainly because of increased tone in posterior group of muscles.

Intervention:

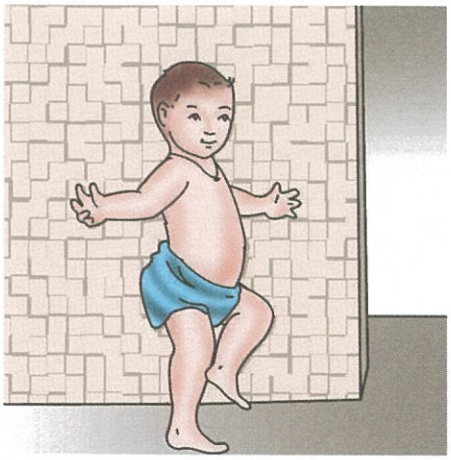
Encourage standing on a inclined surface towards the uphill side, which help to bring dorsi flexion and also extension of hip and knees. Encourage the child to walk on the same surface and also ask the child to take an object from the floor and throw it forward.



ITEM 16 Stands on one foot
Age: 14-16 months

NORMAL

Balancing ones body on the feet is by itself a difficult task. As the child's body proportion is, the upper body is bulkier than the lower body, he takes time to balance, on both feet. Balancing on one feet is a learnt process, this is practicsed when the child is trying to hop or jump, or climb stairs, etc.



IMPORTANCE

This skill is basic one for the attainment of later skills of balancing. The prerequisite for this skill is ability to balance self in sitting, standing, and other primitive areas of development. Balancing is done in different ways. When the child is moving, when the ground or the base of support is moving, or when the child attempts to reach for or grasp at an object or when the child is in one position

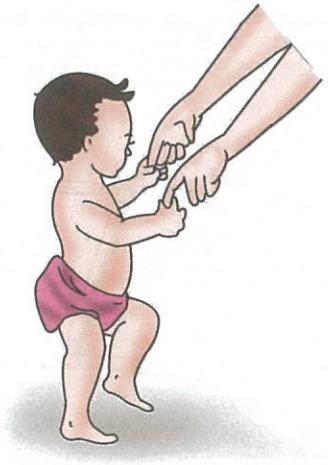
Problems Involved

Not able to stand on one foot.

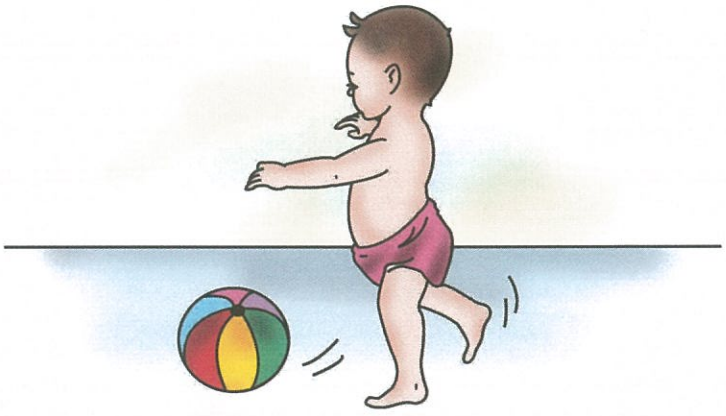
Intervention:

- Place a toy on top, so that when the child tries to reach for it, one foot will be off the Surface. Tilt the chair to either side. Then child tries to balance in one leg.

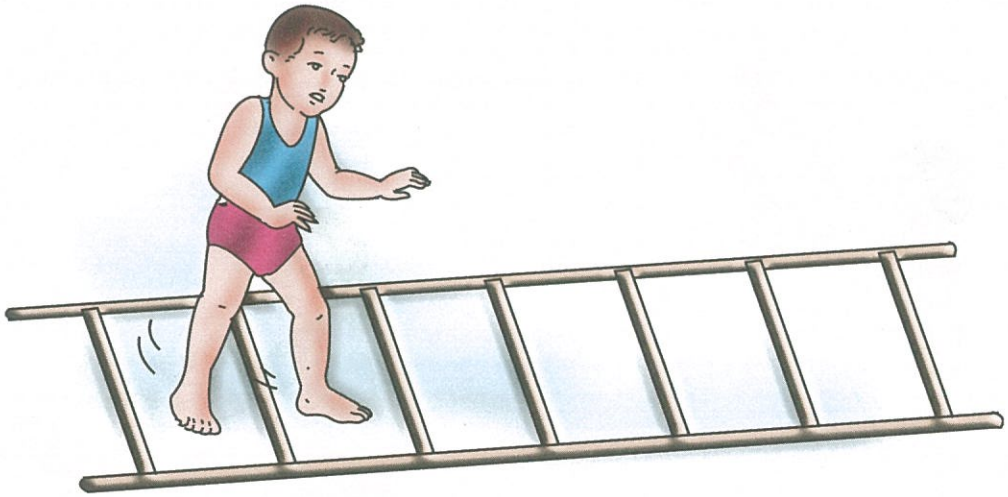
Use one small chair or hold one of the child s hands and make him to stand on one foot. When the child can stand on one foot with support gradually reduce the support given. Go from holding on to a chair, to holding the end of a pencil (with adult on other end)



Stepping over a suspended rope and kicking a ball will provide the child with momentary practice of standing on one foot.



Walking between rungs of ladder which is placed on the ground,



Count aloud the number of seconds he stands and reward improvement. Start with the goal set at one or two seconds and gradually increase the time criteria.

ITEM 17 Climbs up-stairs holding on to the railing or to support Age: 16-18 months

NORMAL

An infant may attempt to go upstairs steps on all fours before developing the ability to stand alone or walk. These initial climbing efforts are an extension of creeping and generally coincide with early attempts to stand. After they begin to walk, infants will attempt to climb stairs in an upright position with the assistance of an adult. First children learn to go up stairs by putting one leg on the step and then take other leg onto the same step. Later they learn to place one foot on one step and the other on next step.

IMPORTANCE

To develop the leg muscle strength, to distinguish between up and down
To improve balance while moving on to height, to develop depth perception

Problems Involved

Not able to climb upstairs even with support.

Intervention:

- Stand behind the child holding at hips and gently push one leg to lift and place on the step. Then guide him to push up himself to take other leg onto the step. Reduce the support gradually as the child masters to do so.

Hold child's finger of one hand and the other hand to take the support of railing.

Withdraw the support as the child gains confidence.

If the child is fearful, start with just the bottom stair, then gradually increase the number of steps.

ITEM 18 Walks down stairs holding on railings Age: 18-20 months

NORMAL

An infant learns to climb down the stairs later to climbing up the stairs. A child who learns creeping backwards also attempts the same on the steps. Child creeps down on all fours and later on legs when child learns to walk in upright position. The child walks down the stairs first with one foot on one step and later shifts other leg onto the same step. Later child learns to place one foot on one step and the other on next step, which is a matured way of climbing down the stairs.

IMPORTANCE

To develop weight shifting of the body from one leg to other.
To develop depth perception
To improve balance while getting down the height.

Problems Involved

Not able to walk down the stairs even with support.

Intervention:

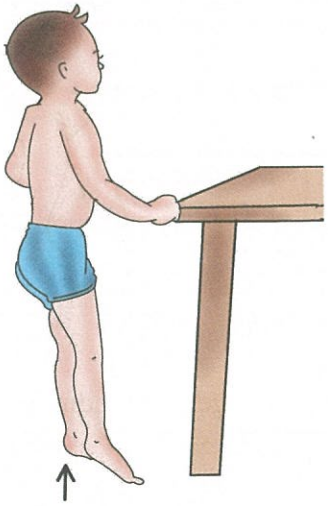
Stand in front of the child holding at pelvis and direct the child to step down by giving a slight pull to the child. As the child becomes ease in coming down encourage to come down by holding fingers of the child.

Remove the support as the child gains confidence.

If the child is fearful start with lower steps and then gradually increase number of steps

ITEM 19 Stands on toes momentarily
Age: 22-24 months

NORMAL



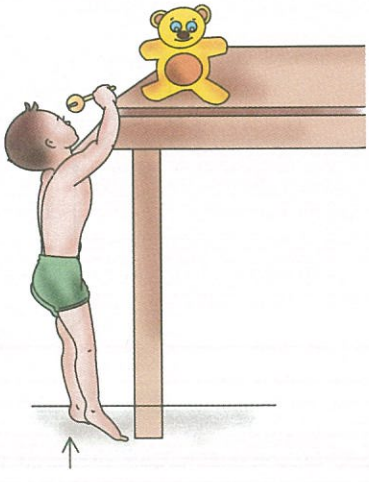
The child learns the act of balancing in different phases. Initially the child begins to seek for security, as they are excessively fearful of the gravity. Once they are out of this, when they start to walk, and stand erect, they now concentrate on the development of their skills. They start experimenting in different positions. They try to stand on their toes when they reach out for something beyond their height. This gives them the confidence to stand on toes. They start making this a part of their play activity and keep rehearsing, until they attain perfection

IMPORTANCE

They learn to balance their bodies on their toes, very useful later when they involve in play routines.

Other Problems Involved

Not able to stand on toes.

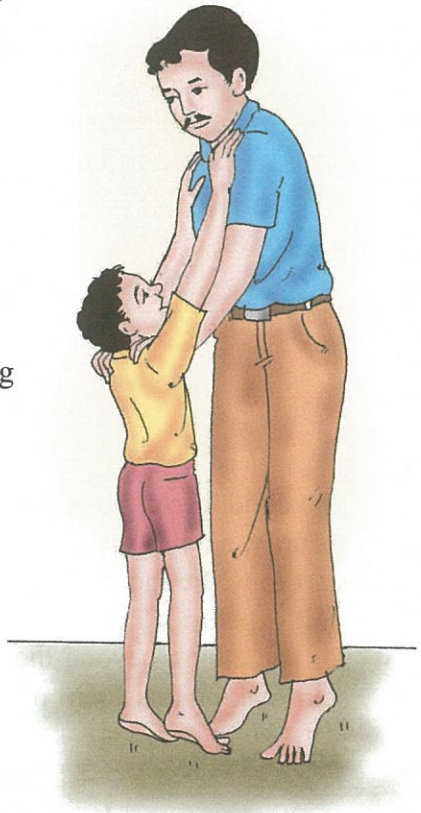


Intervention:

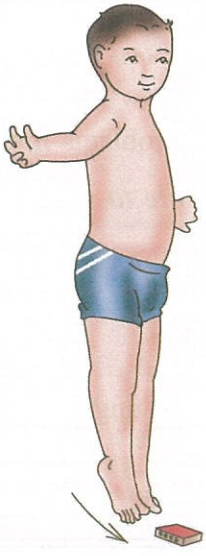
- Hold an interesting object over head so that child tries to reach it.

Gradually increase the height of the object so that child shifts the weight onto the toes.
Initially encourage reaching over head object with one hand and take support with other hand.

As the child masters in this, then encourage toe standing by imitating an adult. Ask the child to touch caregiver shoulder



Place a small object at dorsum of foot and encourage the child to roll it down by lifting heels.



ITEM 20 Jumps in a place with both feet off the ground Age: 26-30 months

NORMAL

Child jumps in a place normally when he is happy or playful.

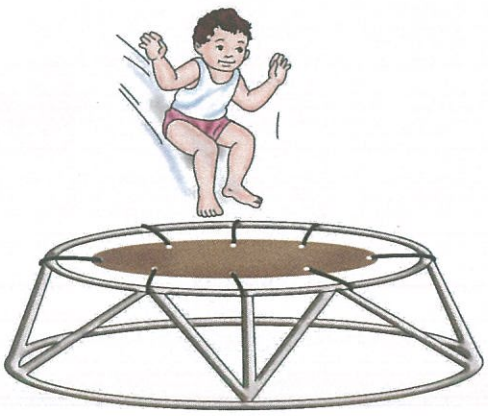
IMPORTANCE

Games are learnt through these early skills of jumping, hopping etc. Jumping also helps the child in developing and strengthening the vestibular system.

- To develop leg muscles and coordination
- To remember and follow two and three part directions
- To distinguish between such directions like back, forward, backward and around.

Problems Involved

Not able to jumping with both feet off the ground.



Intervention:

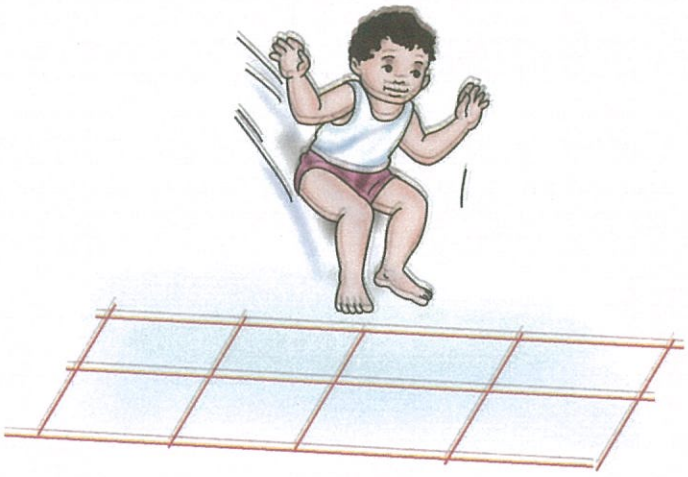
- For children with developmental delays : can start with activities on the trampoline

- Can try a springy jump.
  Start with a 4inch platform the height as child gains skills. Demonstrate stepping down from a step without holding on. Have the child imitate this until she is confident of not falling.

- Demonstrate jumping. Offer to catch the child when she practices. Introduce the verbal command, jump! Child should step off with one foot remain suspended a few seconds and land on both the feet When the child is proficient in the second activity, call attention to take feet off by demonstrating and then reminding them to jump with both feet.

- Do not attempt this activity until the child can descend stairs by herself. Stand in front of the child holding both his hands . have him bend his knees as you do. Lift his hand's up as you, jump up, keeping feet together. Reinforce him and verbalize jump! Use minitrampoline/ minicanvas/or inner tubing, stretched over it as base instead of floor. Use bed as a base for jumping until child has idea of motion

- Have child jump up,as if making a basketball jumpshot, raising his arms above his head may help him to gain upward momentum.



- Make chalk lines on side walk , encourage child to jump between lines.

- Jump from one colored circle to another placed on the floor.
  Jump from a 3 inch book increase height gradually by adding more news papers.

ITEM 21 Climb upstairs without support of railing placing both feet on same stair Age: 26-30 months

NORMAL

- Make chalk lines on side walk , encourage child to jump between lines.
  The child first does climbing up and down stairs with both feet on to same stair, then with alternate feet.

- Make chalk lines on side walk , encourage child to jump between lines.
  They take the support of the railing during the first few attempts, later they try to climb without support.

IMPORTANCE

- Improves bilateral motor coordination.
- Enhances depth perception
- Improves differentiation between lower limbs
- Strengthening of antigravity muscles.

Problems Involved

Inability to climb upstairs without support of railing.

Intervention:

- Sway the child backward and forward: Child shifts his weight forward and backward against your hand placed on the hip. This forward weight shift initiates stepping.

- Child stands by holding on with both hands, then slowly ask the child to place one leg on the ladder to take/touch on object placed an the top.

- In standing child should lift one leg and place it on stool placed in front, to reach for an object forward, by shifting weight from one leg to another. Initially give the support to place on the stool. As the support.

First start with just one step and gradually progress to more steps.first start with one stool, later try with stool of differnt height placed in series.

ITEM 22 Jumps off stair with both feet
Age: 30-36 months

NORMAL

Jumping is a important developmental milestone Normlly it is expressed by the childwhen he is happy and playful.

IMPORTANCE

Activates vestibular system, which gives the information about our body alignment in space.

Help to plan motor activities in play.

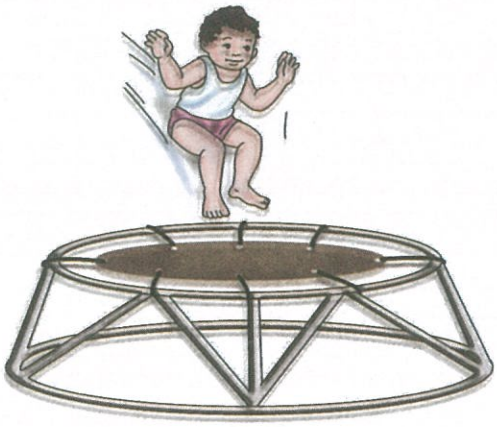
Gives a chance for emotional expression

Problems Involved

Inability to to jump off the stair with both feet.

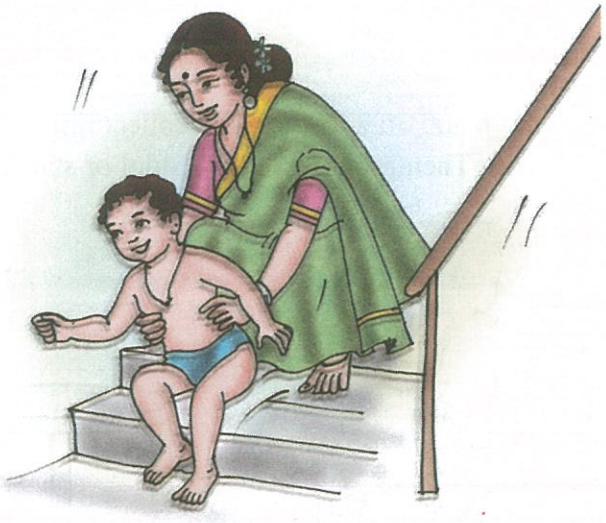
Intervention:

Start the activity on trampoline to jump at a place.
Try springy jump to gain momentum.



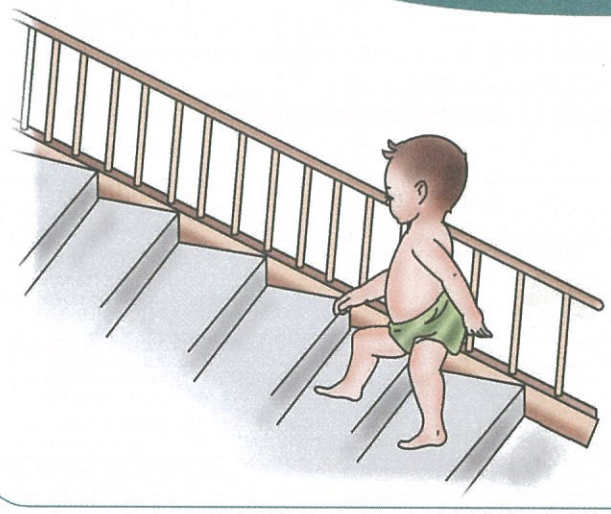
If the child has fear of falling start the activity on soft and firm surface like bed or a pillow.

Later practice the child to jump off the step with pelvic support and gradually reduce the support until the child can do independently.



ITEM 23 Climbs up and downstairs without support of railing Age: 30-36 months

NORMAL



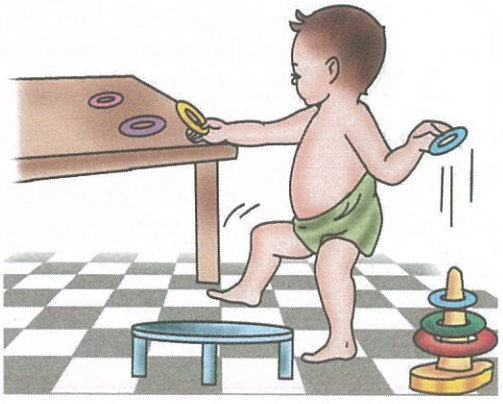
Child learn to explore environment even if there are obstacle in their way. The child will be able to do this activity once he has gained confidence over his body and balances himself even on one leg.

IMPORTANCE

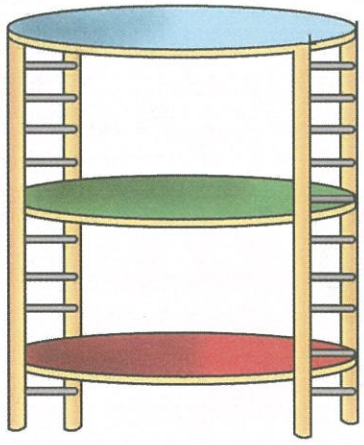
- Development of postural control
- Improves high grade locomotion.
- Climbing up the stairs, improves antigravity control and down the stairs improves more of graded control.

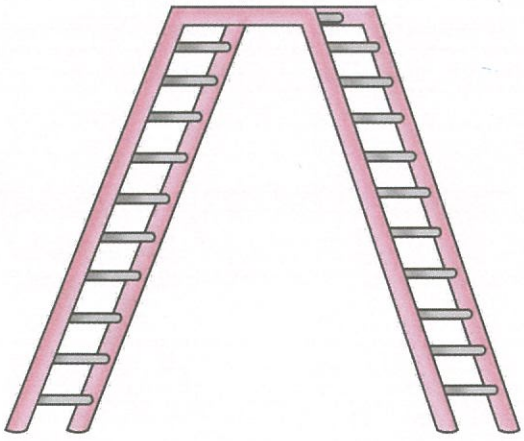
Intervention:

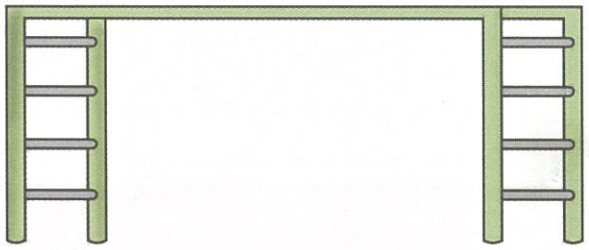
- Train the child to climb on and off a low stool to collect rings from the table & place it on the ringstand. with assistance. Then progress to high stool or stair case.

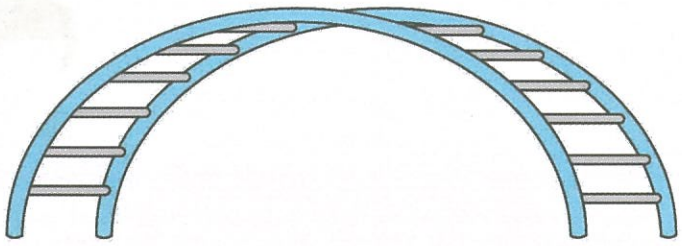


- Encourage child to participate in play models in amusement park.



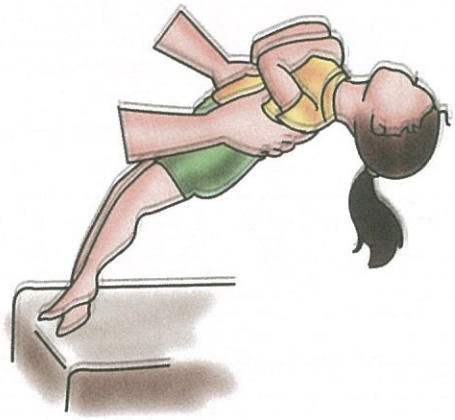






LIFTING

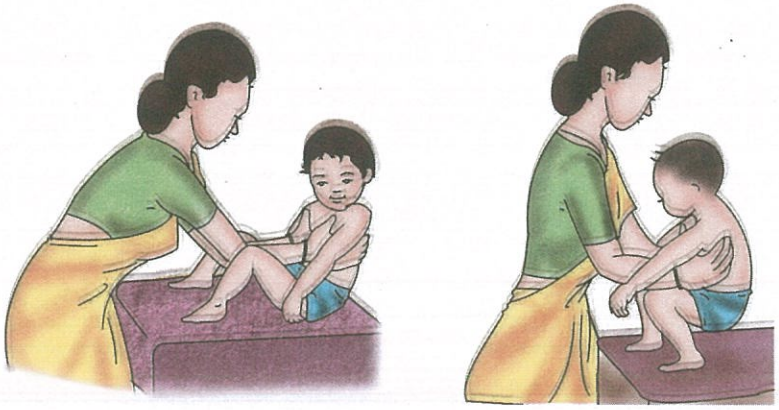
Incorrect way of lifting spastic child.



Intervention:

If a severe spastic child is rolled to one side it makes lifting easier as the child's shoulder, head and hips are brought forward.

One way to lift spastic child (predominantly extended) bring to sitting,controlling at shoulder, holdunder arm-lift and turn girdle out.this brings his head and arms forward and facilitate the bending of his hips and knees, your forearms helping to keep his knees apart.



CARRYING

Child with severe spasticity Wrong way of carrying .

Abnormal position of spastic child when carried by completely supporting the child,will not be able to look around.

CARRYING

Intervention:

Correct ways of carrying child with spasticity.

Initially provide more support (informal)

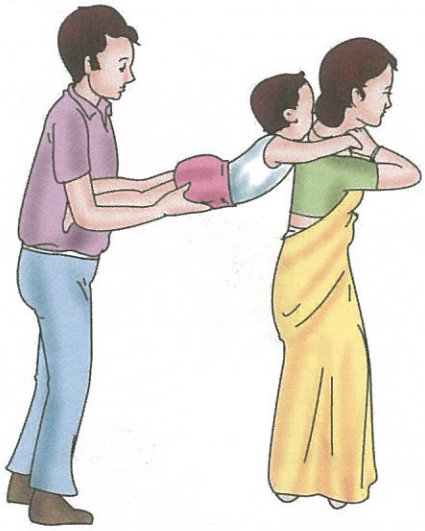
Carrying spastic child who is heavy.

Gradually as the child starts balancing his head and trunk reduce the support

TO FACILITATE HEAD RAISING

Position to keep hips and knees bent and relax to give better head control in a spastic CP child.

Carrying baby so as to free hand and head to look and move around.



Carrying a heavy spastic child,predominantly flexor pattern.

Both parents carrying the child to play with and also facilitate interaction with parent and environment.

Mother carrying child inside the house.careful monitoring of child's level and mother's expertise in carrying the child should be done under supervision of a trained physiotherapist.

Intervention:

Correct ways of carrying a floppy child:

A floppy child tries to take as much support as possible from the parent while he is being carried. To improve his balance and train him to use his body against gravity,it is better to give only optimal support and improve the active involvement of the child while being carried.

Incorrect ways of carrying

Kiddie carrier for carrying a young floppy child

Incorrect ways of carrying :

Correct ways of carrying :

Correct ways of carrying a floppy child

SOME PLAYFUL ACTIVITIES FOR CHILDREN WITH CEREBRAL PALSY

SWINGING

One therapeutic way to soothen children with tonal abnormality is by vestibular stimulation. Swinging a child in different position and pace prier to therapy or durning therapy will help normalize the tone

Swinging a spastic child

Rhythemic slow swinging will help to normalize tone

Swinging an athetoid child

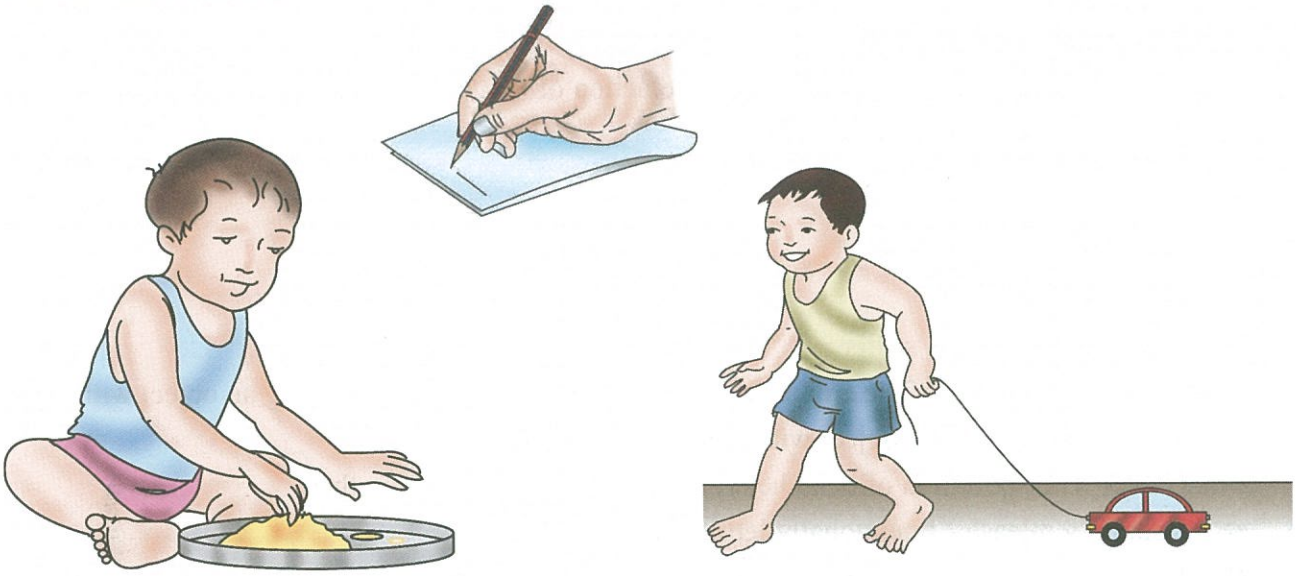
This position also can use to swing a floppy child as well

FINE MOTOR

FINE MOTOR

Introduction

The development of the ability to visualize, reach, grasp and manipulate are critical, for interaction with the environment.



Hands are the "tools" most often used to accomplish work, play and perform self maintenance tasks. Emergence of hand skills depends on complex interaction of hand skills, postural mechanism, cognition and visual perception.

Fine motor skills is the use of small muscle movements that occur in the fingers, in coordination with the eyes. Fine motor development allows the child hold and uses small objects like pencils, crayons, and scissors.

The development of reaching and grasping skills provide an excellent example of how motor skills start as gross, defuse actively and move towards mastery of fine motor skills. Delay in the development of gross motor skills surely impede the development of fine motor skills. But, once fine motor skills evolve the environmental stimulation play a major role in child's learning and practicing of these skills.

The initial movements are involuntary and reflexive like the grasping/palmar grasp which have their origin in the lower brain stem and spinal cord. With maturation they eventually come under the control of higher centers.

The prerequisites for hand function:

Motor function is an outcome of sensory stimulation in the early years of development. Hence it is reffered to as sensory- motor stage. As the motor ability develops all the other sensory and perceptual abilities also develop. (Sight, body awareness, touch, kinesthetic sense)

Importance's of grasping things, turning them over, and seeing what happens when they are released, infants learn a great deal about the sights, sounds and feel of objects.

Pre reaching is poorly coordinated swipes/swings that an infant performs on directing hands to dangling objects. Once the infant starts to reach, they modify the nature of grasp making it more refined.

As their reaching and grasping is better coordinated and precise, their explorations of objects become refined. In addition, they become increasingly able to perform more complicated action sequence, such as drinking from cup, eating with a spoon, etc.

Components of hand skills

Effective use of hand required a complex interaction of

- Hand skills.
- postural mechanism.
- cognition.
- visual perception.

Basic pattern of hand skills

- Reach - Movement of the arm and the hand for the purpose of contacting an object with hand.
- Grasp - Attainment of object with the hand.
- Carry - Transportation of hand held object from one place to another.
- Voluntary release - Intentionally letting go of an object.
- Bilateral hand use - Use of two hands together to accomplish an activity.
- In hand manipulation - Manipulating an object with in the palm.

NORMAL DEVELOPMENT OF FINE MOTOR SKILLS

Age in months	Developmental skills.
0 - 3	Grasps objects placed in hand.
3 - 6	Drops objects held in the hand, Takes toys and objects to the mouth, Transfers objects from one hand to another.
6 - 8	Hold objects using the thumbs. Points using index finger.
8 - 10	Hold object like marbles between thumbs, first two fingers
10 - 11	Holds crayons/chalks and attempts to scribble Turns 2-3 pages of a book at a time
12 - 14	Places one object on another Scribbles spontaneously
14 - 17	Builds towers of three cubes
18 - 22	Differentiates scribble and stroke
22 - 25	Turns door knobs Turns pages one at a time.
23 - 26	Builds towers of 6 blocks
26 - 30	Imitates vertical and horizontal lines
31 - 34	Unscrews lids of container
32 - 36	Copies a circle

SEQUENCE OF FINE MOTOR DEVELOPMENT

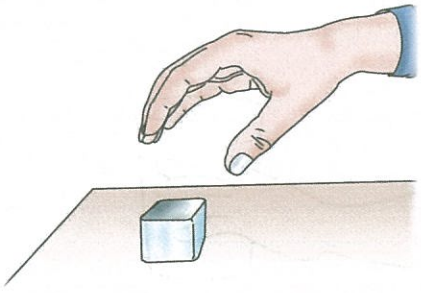
Proximal to distal : Head and trunk first, later hands and feet

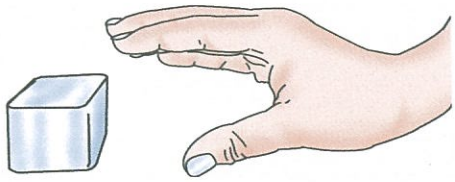
Mass to specific : Use of all the fingers in early grasp, later only specific.
Human development starts with the head and progress towards the trunk and then continues outwardly. The torso and shoulders develop long before the elbows, and the hips long before the knees, and so on. In other works, skilled use of one's hands and fingers is the last in a long process of motor development.

Development of fine motor skills

Reach

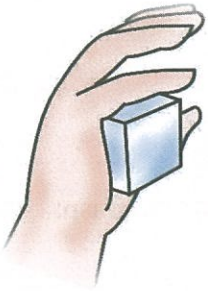
The arm movements of the new born are asymmetric, in the next few months the general arm activation becomes active swiping and batting at objects which are rarely grasped, if grasped they are released randomly in association with arm movements. Initially hands are held close to the body with an increase in visual regard and greater proximal stability he/she can hold hand at a distance to view them. Ask the infant shows dissociation of the two sides during movement unilateral reaching begins. The hand opens in preparation for grasping the object and is usually more open than necessary for the size of the object. Mature reach is seen with sustained trunk extension and slight rotation towards the object and increasing accuracy of arm placement and gradually extending the fingers to attain an object.



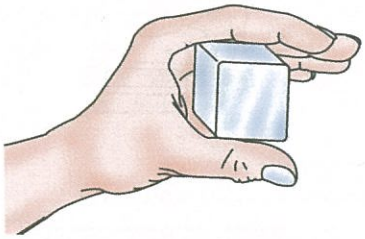


Grasp

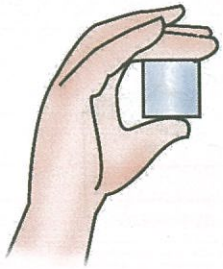
It is the attainment of the object within the palm. It is the sequence as ulnar grasp



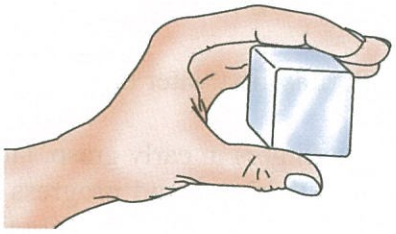
palmar grasp



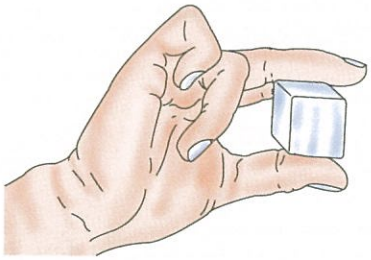
radial grasp



palmar contact finger surface contact



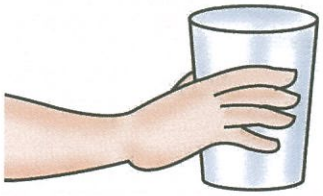
finger pad contact.



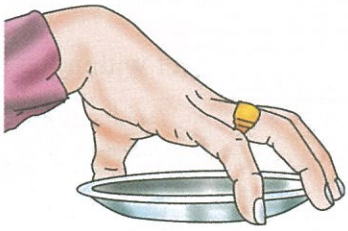
Common types of gross prehension:

Spherical grasp: Ex: Throwing a ball

Cylindrical grasp: Ex: Holding a glass

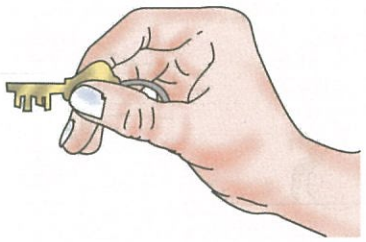


Span grasp: Ex: Holding a saucer



Hook grasp: Ex: Holding a hand bag

Common types of fine prehension:



- Lateral pintch Ex: Manipulating a key

- Tip pintch Ex: Picking a beed

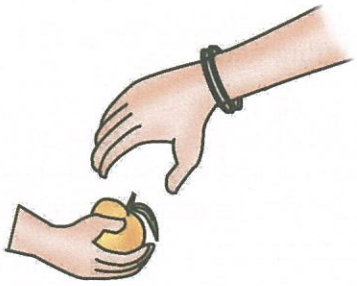
- Tripod pintch Ex: Tripod grasp holding a pencil

Several developmental trends affects particular type of grasp patterns that an infant is able to use at a time. Mature and voluntary grasp depends upon neutralization of internal stability throughout the upper limb, thumb activity and control necessary to allow for patterns other than palmar grasp. Ability to grasp variety of objects increases significantly between 6 - 9 months of age with crude raking (touch the object).

By 9 - 12 months refinement occurs in the ability to use thumb and finger pad control for tiny and small objects.

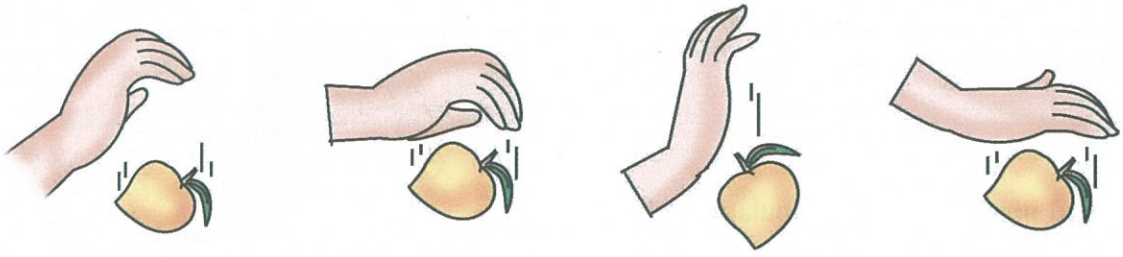
By 12 - 15 months of age infant has the ability to hold biscuits, flat objects etc.

Carry



It involves stabilizing an object in the hand coupled with small ranges of movement used and adjusted in accordance to demands of the task. The child must be able to use rotation movement simultaneously with flexion and abduction so that appropriate object orientation is maintained.

Voluntary release:



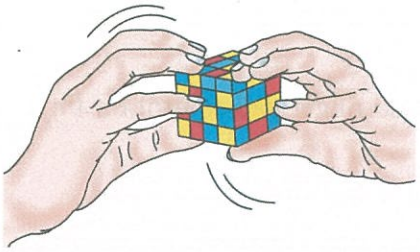
1 2 3 4

It depends on contact of arm and finger movemnts. Intially objects either drop involuntary from the hand or must be forcibly removed from the infants hand.

1) Voluntary release - 7 to 9 months
2) Release with wrist inflextion (bent) - 8 months
3) Release in ***wrist in neutral (straight)*** - 9 to 10 months
4) Release with wrist extended (up) - 12 to 15 months

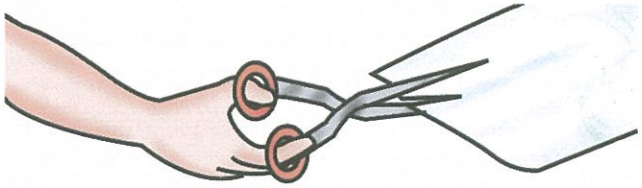
Bilateral hand use:

Bilateral reach, grasp and mouthing of hands and objects are primary activities, control of these movements originate proximally at the shoulder allowing the hand to engage in midline. By 10 months one hand grasp the object and the other one manipulates the parts of the objects.



By 18 - 24 months simultaneous manipulation develops.

Ability to perform highly differentiated activity like cutting with scissor begins at 2 ½ years.



For development of these skills effective stabilization of shoulder, elbow and wrist is required and also should be able to dissociate the two sides of the body.

Inhand manipulation:

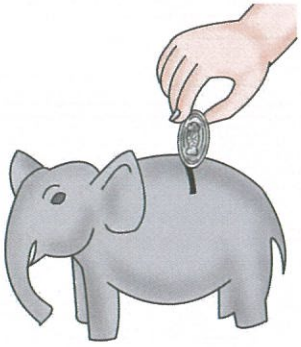
It is the ability to manipulate one or more objects within the palm. Motor skills necessary for in hand manipulation are

- Wrist ability
- Isolated thumb and radial finger movement
- Control on the palmar arches
- Dissociation of the radial and ulnar sides of the hand.

They are sub components in in hand manipulation

- Finger to palm translation - This usually begins by 12 - 15 months of age. Ex: Picking up coins in the palm.

- Palm to finger translation - This usually begins by 2 - 2 ½ years of age. Ex: Putting coins in the kitty bank.



- Shifting - This usually occurs between 3 - 3 ½ years of age. Ex: Organizing pen between the fingers before writing.

- Rotation - This usually begins between 2 - 2 ½ years of age. Ex: Unscrewing a lid.

Inhand manipulation is important, as this skills acts as a subcomponent in all activities of daily living.

S.No	Item	Chronological age
1.	Reaching	3 – 6 months
2.	Grasp a) Palmar grasp b) Radial grasp c) Pincer grasp d) Tripod grasp	4 – 5 months 6 – 8 months 9 – 12 months 18 – 24 months
3.	Release a) Voluntary release	9 – 12 months
4.	Bilateral hand use	12 – 24 months
5.	Differential hand use	30 – 32 months
6.	Inhand manipulation a) Translation 1) Finger to palm 2) Palm to finger b) Shift c) Rotation	 12 – 15 months 24 – 30 months 36 – 42 months 24 – 32 months

In order to understand developmental sequence of hand skills, the following development table would be helpful.

SIGNS OF FINE MOTOR DELAY

1 Delayed pincer grip (after 10 months)

2 Inability to open hands from a closed posture.

3 Lack of visual regard to objects

4 Lack of / poor hand regard.

5 Inability to maintain hands in midline

6 Inability to transfer objects from hand to hand.

BEHAVIOURAL INDICATIONS

A delay in development of fine motor skills **in older children may be manifested by not being able to perform functions such as:**

1 Use a spoon,

2 Hold a toy,

3 Pick up small objects

4 Hold a pencil correctly at the age appropriate time.

5 stack the blocks

6 Avoiding constructional toys

7 Avoiding pencil tasks (after 2 years)

IMPACT OF FINE MOTOR DELAY ON OTHER AREAS OF DEVELOPMENT

Communication: Children with motor impairments are at risk for learned helplessness because they are unable to effectively control their environment either directly or indirectly through communication with others. Communication is one way of providing the child with a powerful means of influencing others and the environment.

Social development: Child may have limited socialization with his peer groups due to restricted fine motor skills in play activities.

Cognition: Intellectual development may be affected due to limitations in exploratory skills, which are in turn linked with restricted fine motor development.

ACTIVITIES TO IMPROVE FINE MOTOR SKILLS

Here are some suggestions for developing fine motor skills, and some activities to use to practice them:

- Modeling with play dough, clay
- Beading and lacing
- Trace and then color shapes, increasing the size and complexity gradually.
- Rolling out dough or other simple cooking activities
- Dot-to-dot drawings of pictures, objects, shapes, numbers, letters, etc.
- Folding activities

ADAPTATIONS:

Positioning is extremely important. Poor positioning results in unwanted reflexes, pain, fatigue, lack of adequate visibility, poorer motor control, and potentially permanent physical damage. Take the time to position the child so that the child can use his or her hands, eyes etc., to the maximum ability Always have the child's wrist positioned appropriately to develop good thumb movements; which activities fine motor muscles.

To warm up hands before an activity follow the tips given below:

- Alternate clenching the fists and opening the hands
- Spread and close fingers
- Wiggle fingers or drum them individually on a table top
- Bend and straighten fingers one at a time
- Play finger games.

"INTERVENTION PACKAGE"

(This Package is in accordance with the checklist appended in ***Appendix B***

The interventions are addressed for each of the items, which can be followed if the child has not developed it normally.)

Problems Involved

Intervention:

Intervention

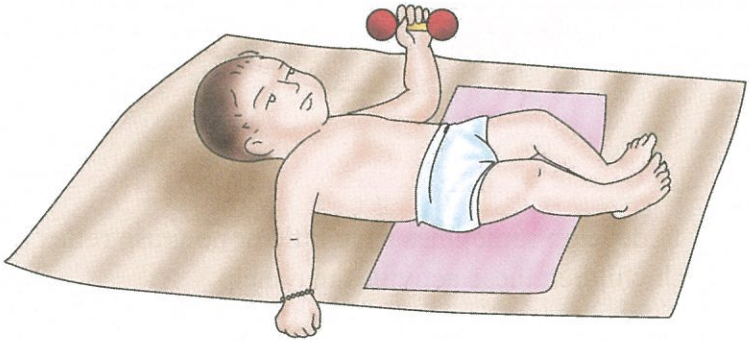
Visually Impaired

Hearing Impaired

FINE MOTOR

ITEM 1 Grasps objects placed in the hand
Age: 0-3 months

NORMAL



Newborn child generally holds his hands clenched, if finger is inserted in child's hand, his grasp will be so strong that we can lift him. Stimulation of the palm elicits reflexive closure of the object, this is the part of the total flexion noted in the first 3 months of life. This reflex activity should disappear with the development of increased extensor tone

When the child grasps with one hand the other will be clenched at the same time, ie, there is a corresponding movement of the other hand.
Grasp reflex is inhibited gradually; so that by 5 months child can consciously, though still with difficulty, let go off an object.

IMPORTANCE

Grasp is initial stage of fine motor development to be followed later by development of manipulation.

Problems Involved

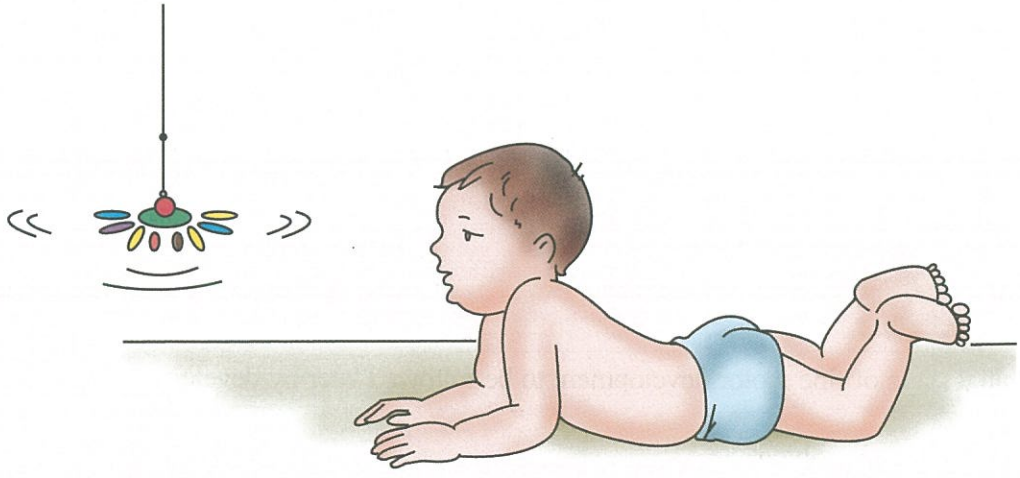
Retention of reflex prevents voluntary release of objects and development of mature grasping patterns (pincer grasp).

Problems:

- Closed fist due to spasticity.
- Thumb in palm attitude (ape thumb deformity.)
- Poorly developed muscles of the hand.
- Increased flexor/extensor tone.

Intervention:

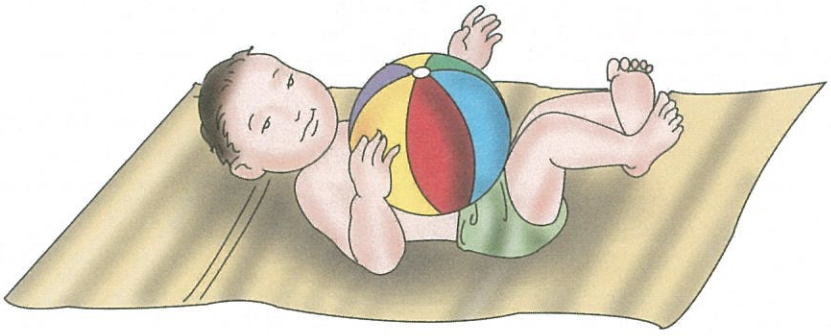
- Babies who are slow to develop sometimes have little or no grasp reflex and are slow to learn to hold things, for such children these activities may help.
  a. If she keeps her hand closed, stroke the outer edge of the hand from little finger to wrist (persisting fisting). This causes the baby to lift and open her hand, and to grip your finger.
- Moving arm in elevation, abduction and external rotation will facilitate hand opening.



- Weight bearing on elbows with hands open will facilitate hand opening, then hold shoulder forward/backward, keeping the head upright.
- Facilitate eye contact (same level to child's as) with objects with shining or sound producing objects.
- Encourage child to look and reach towards the direction of sound.

ITEM 2 Reaches for objects placed in midline with both hands Age: 2-4 months

NORMAL



Reaching is the ability of the child to hold on to something like a toy by raising his/her hands. This skill depends on development and integration in the childs early years so that he/she could visually locate a toy and reach for it. Reaching is not goal oriented for the child initially, gradually with increased interested by trail and error he/she is able to hold the toy when he/she hits it repeatedly. This increases his/her interest in exploring the toy and thus he wants to reach the toy accurately in order to manipulate it. Reaching is initially with use of both hands hitting the toy later it matures into reaching with both hands in midline, but grasps with one hand better than the other.

IMPORTANCE

When the child starts to reach for toys his sensory and the motor capacities are sharpened. He/She starts to use hand together for the first time for a purposeful activity, in form of play.

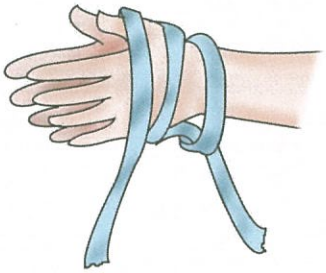
The child is able to evolve from a total flexion pattern to an extension pattern in supine. He is more aware of his hands and their utility.

Problems:

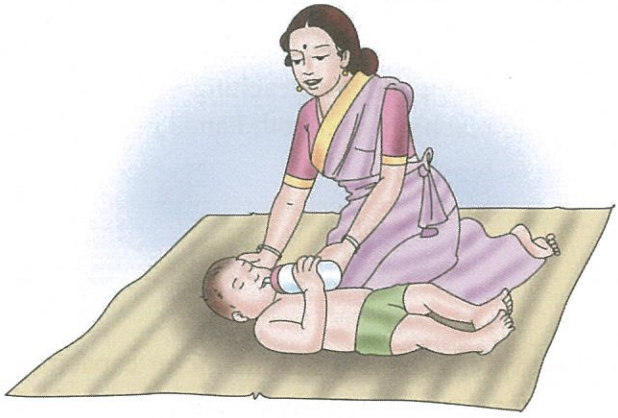
- Delay in hand regard and visual exploration.
- Delay in bringing hands togerther to mouth.
- Inability to explore once own body parts
- Inability to grasp objects placed in hands.
- Touching with semiflexed/closed hand.
- Abnormal patterns of reach and grasp - in presence of abnormal tone reach and grasp for visual object may be present, but child may perform the activity in an awkward manner. For Ex: - Child might undershoot or overshoot to reach an object, in that case simultaneous intervention for normalizing tone and facilitating reach and grasp need to be practiced.

Intervention:

- Loosely wrap a colored piece of yarn or ribbon around the child's hands and fingers so that they are brought into contact with each other.



- Play pat-a-cake with the child. Move her arms through the actions, pausing to help him/her feel other hand at the midline. Use finger tips to feel his/her palm and other fingers.

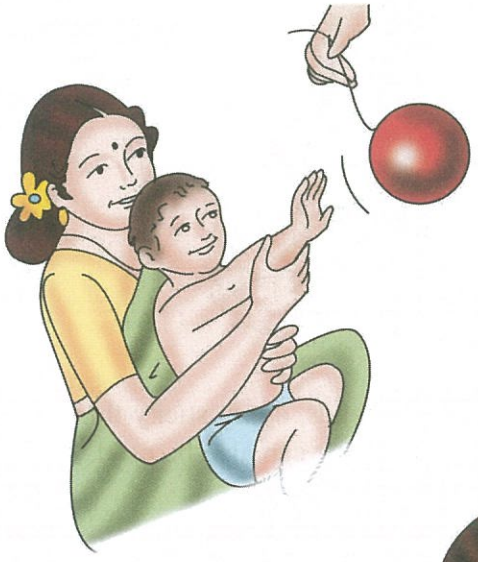


- Help the child hold her bottle with both hands until he/she is able to do it without help.

- Help the child bring hands to mouth to suck on his/her fingers. Substitute other safe objects to suck on, such as rattle.

- Make the child sit on your knees. Hold enticing objects in front, so he/she must reach for it. If the child does not reach, hold objects close to him/her and gradually pull away as he/she learns to reach for it.

- Tie a scarf, necktie, or place wooden beads around your neck. Lean the baby so that he can see your face and touch the scarf*beads, shake the scarf/beads so that can see and reach for it. When he the scarf /beads or even touches it, praise him smile to show him you are pleased. Initially move scarf/beads towards baby's hands so he does not need to reach as much for it.

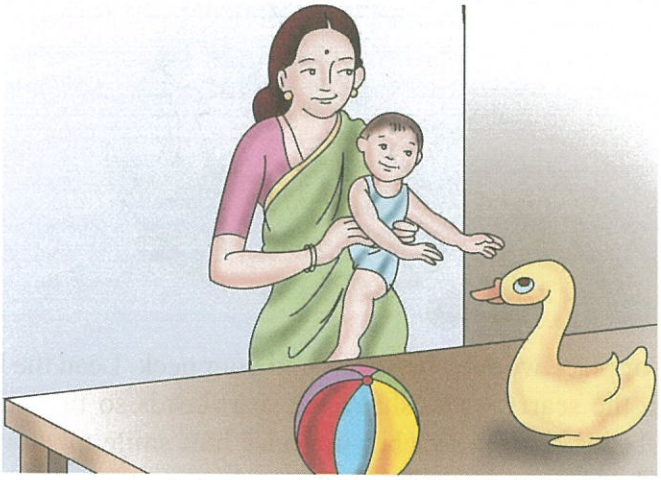


- Use ball hanging from a string tied around it. Swing ball slowly in front of or over child's face. Help him to hit the ball by moving his hand.

- Blow bubbles in front of him. Encourage him to touch and break bubbles by talking to him or clapping and smiling.

Intervention for hand regard and bringing hands to midline:

- Place in sidelying / half lying with shoulder forward or supported sitting with shoulder forward
- Sidelying board can be used if abnormal positions of arms persist



- Child sitting on lap/chair with hands forward

- When arms are forward, make aware of it by shining torch on hands, apply sticky things on hands, help to play with fingers, colored ribbon or bracelets on wrist can also be used.

- Rub palms together, touch face and body, clasp and unclasp hands
- Clutch materials and toys softly

ITEM 3

Drops objects held in hand

Age: 3-6 months

NORMAL

During the initial months the flexor pattern of the arms dominates. The child has a strong grasp reflex and is unable to release. As the grasp reflex is integrating he is able to voluntarily open and close hands.

It is difficult for the child to let go than to grasp. The grasp reflex is present at birth, the finger-stretching is learned subsequently as the CNS develops, the child amuses him/her self by throwing everything within reach on to the ground, this is a necessary stage in development.

IMPORTANCE

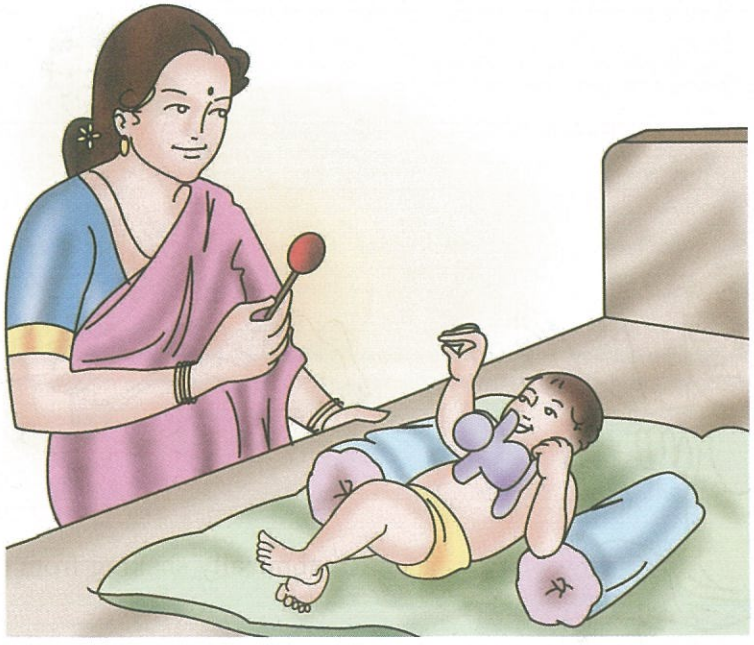
The integrating of the grasp reflex is an indicator that the child is able to use his/her sensory system most effectively (tactile and visual), and his/her hands are effective to changes in the environment.

Hands skills develop promptly and readily. This brings an ability for the child to act on surroundings at his/her will.

The child is practicing holding, letting go, observing the speed of fall, getting an idea of the distance to the floor and hearing the noise when object hits the floor. Thus the child gains experience.

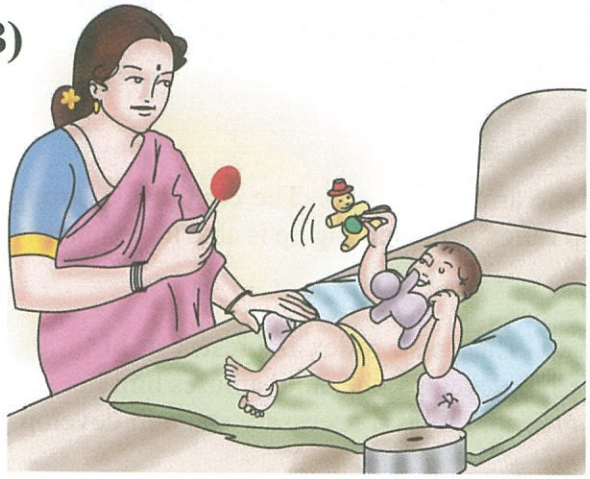
Intervention:

A)

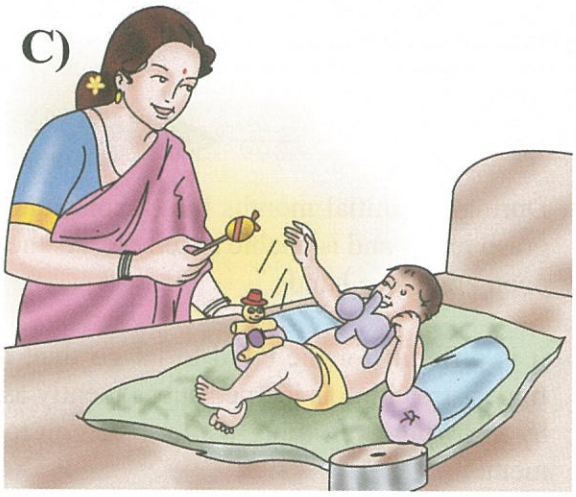


a) Give the child a toy, allow the child a moment to explore and play with that toy, then offer a second toy and encourage him/her to take the second toy as well. If the child does not take the second toy, place it in his hand. It may be helpful to reserve a favorite toy to offer as the second choice.

B)



C)



b) Give the child a toy in each hand, then offer a preferred toy or favorite finger food like finger chips or lollypop. Help him release object in one hand and grasp new object if he does not do so by himself use verbal encouragement.

c) Immobilize one arm by holding, putting inside shirt, putting under high chair tray etc, let him hold the object in free hand. Then offer a preferred object so that he must release the first object.

d) Whenever you see child put down one object to pick up another, reinforce him with smiles and praise.

Note: In the normal developmental sequence, when a child first learns to reach for a second object, he usually drops the first. It is more mature response for the child to retain both toys simultaneously.

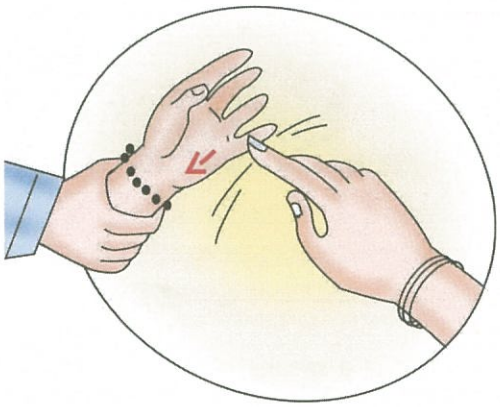
Intervention for opening hands

1) If the child is still facing difficulty in opening his hands one of the following activities can be helpful

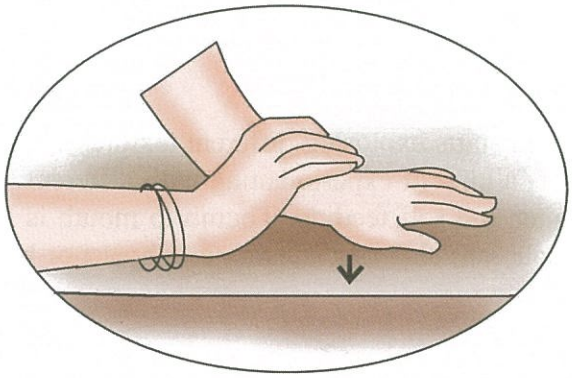
- Rub palm on rough surface like sand

- Rhythmically shaking from the shoulders

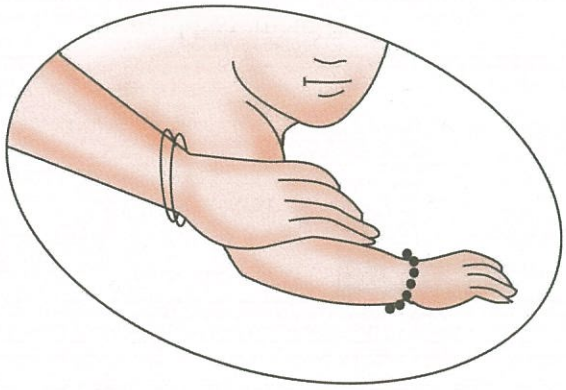
- Stroke ulnar side of hand and fingers.



2) To train the child to release a toy/ opening hand and weight bearing on hand are important, hence the following activities.



- Keeping elbow straight, press palm of the hand on hard surface
- Turn shoulder, elbow outward and upward so that palm faces up and child sees picture on the hand
- Keep arms away from body (do not give squeaky toy or very large toys)



- Leaning on open hands, prone, sitting and standing

Note: Coordination within the bending and stretching pattern is difficult. At about 8 months the child can let go off an object when it is resting on a table or on the other hand, for Eg: by one year can the object be released in the air, the grasp release function is now under control.

ITEM 4 Takes objects and toys to mouth
Age: 3-6 months

NORMAL

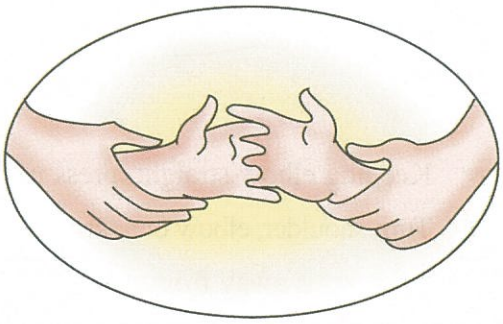
Mouthing is a means of exploring for a child. In the first one-year of life the child shows curiosity to lick, suck, and feel objects by his/her mouth. Tongue, lips and the oromotor mechanism is in peak exploring abilities at this phase. Mouthing thumb, mothers breast, and own feet or toes is very common. The child also shows immense interest in mouthing inanimate objects like toys, cradle, dust on the floor, to anything given or shown to him. The child primarily learns about his environment and the components through this mouthing.

IMPORTANCE

Hand to mouth coordination develops mouthing. Child starts exploring different textures with the mouth, he/she can feel them and also taste them. It is a kind of experimenting with different toys and objects. This skill later helps in feeding by finger and self feeding. Thumb to mouth is also done as part of psychological satisfaction (self consolation) also as a substitute to breast or bottle milk for self consolation.

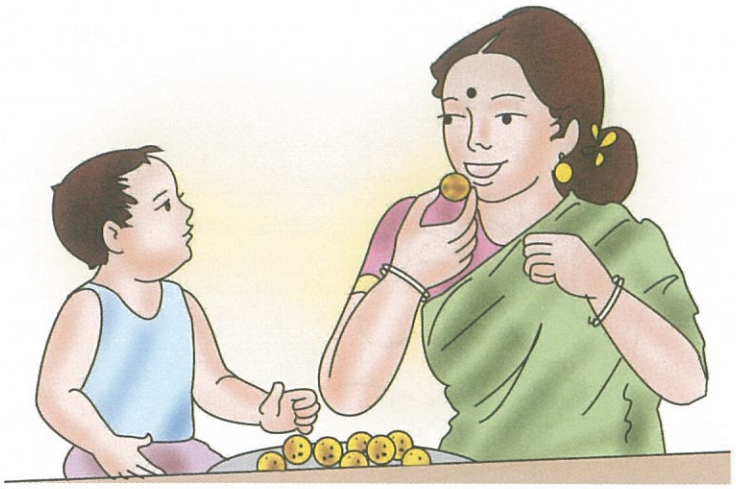
Problems:

- In ability to bring hands to mouth because of clenched fist, thumb in palm attitude and hands held close towards the body.

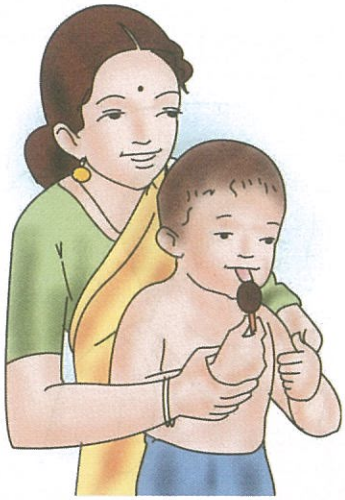


- Move the child's hands about by clasping them, clapping them and guiding them to his face

- Place an object in the child's hand and help him move it to his mouth. Take the object to his hand if necessary. (Spoon with honey etc.).



- Give the child a piece of food on tray and you pick up a piece and put it to your mouth. Place food in his hand and encourage him to imitate you. If the child does not imitate you, place the food in his hand then guide his hand to his mouth. Reduce help given by lessening the pressure on his hand.



- Use a lollypop/long candy and guided to his mouth for initial taste..
- Hold an object for child to see. Place it in his hand if he does not reach for it himself. Guide it to his mouth.

- Use teething rings, hard and soft rubber toys/wooden toys silver toys etc.

- Put honey, sugar or jaggery or other preferred food substance on the object to initially motivate the child to put object into his mouth.

- Try letting him hold hard teething biscuit, a carrot stick or long waffer into his mouth. Watch that he doesn't bite or break off large piece.

ITEM 5 Transfers objects from one hand to another Age: 4-6 months

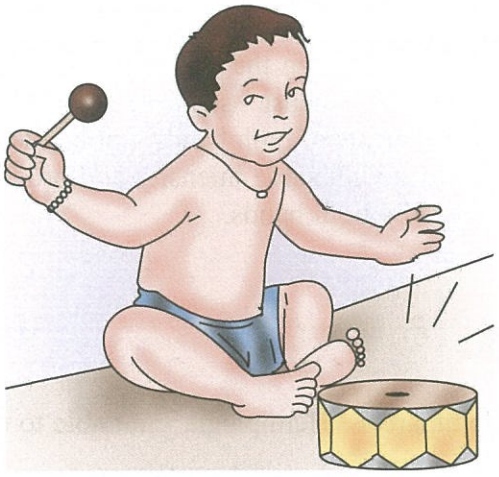
NORMAL

In the initial stages of development the child is not able to dissociate the movements of both the arms. The earlier movements of the hands are mass movements which are similar (either opening both hands or closing both hands). Child performs mass patterns of movements that indicate almost the equal use of both hands in manipulating objects. The child randomly uses bilateral hands, but with maturity and the development of laterality, he starts to master some tasks with one hand. Transferring objects from one hand to the other is learnt by the child, when he/she wants to grasp the toy shown to him/her, and already there is a toy in the hand, initially he is not able to open one hand when the other hand is holding a toy, later he learns to do two dissimilar functions with both hands.

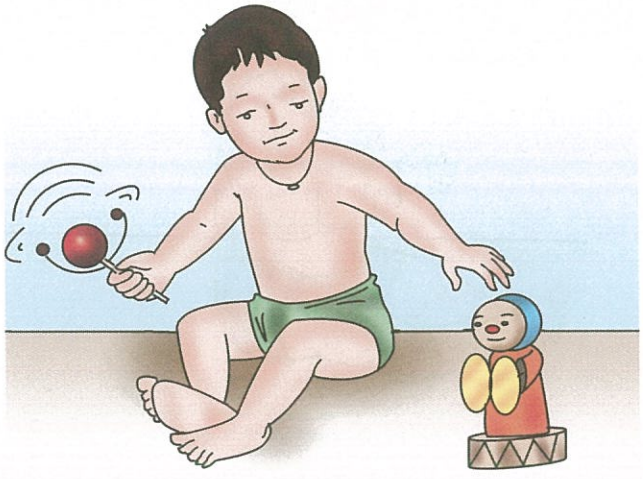
Bilateral coordination proceeds this way:

- The ability to use the hands simultaneously to perform a similar action.

  Eg: Beating a drum.



- The ability to use hands simultaneously to perform two dissimilar tasks. Eg: Child reaching out for a second toy when manipulating a toy in another hand.



- The ability to use one hand to assist and the other in performing an action. Eg: crushing glitter paper with two hands.

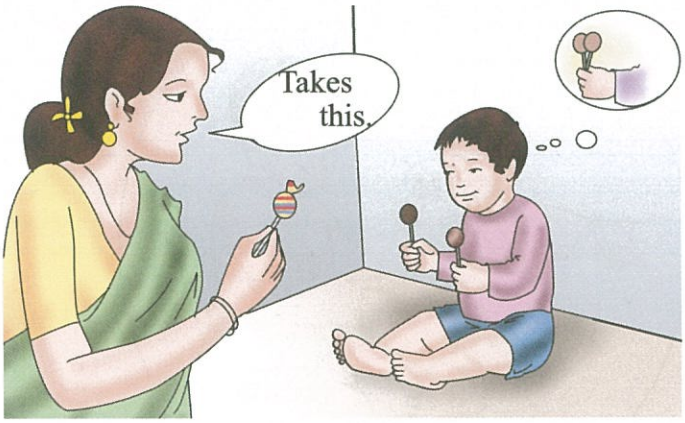
IMPORTANCE

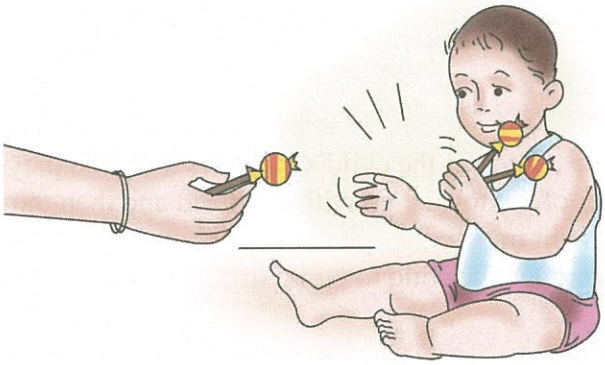
Transferring toys and objects from one hand to other manifest the ability of the child to relate to external environment. This midline orientation should be well developed for the task to be achieved. Coordination between the two hands is a prerequisite for the child to understand an object as a whole in all its dimensions. These skills also manifest the ability of the child to perfectly control finger movements of both hands, unlike the initial stages when reflexive performance of activities on both sides with same intensity and precision, now he can do individualized and differentiated movements by both hands.

Problems:

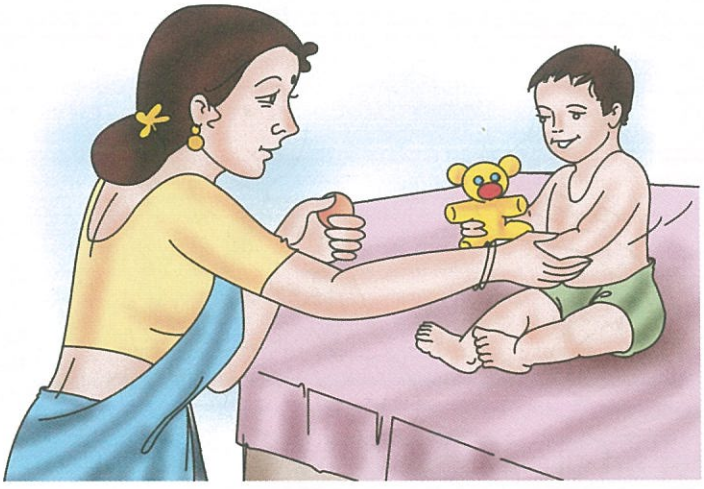
- Hemiparesis/ Hemiplegia - not able to use one hand.
- Does not like to touch certain textures.

Intervention:





a) Give the child one object and hand him another to be taken by the same hand. Show him how to transfer the first object to other hand in order to grasp the second object. If he/she holds two in one hand, or puts them to his/her chest with one hand then give the third object to him/her.

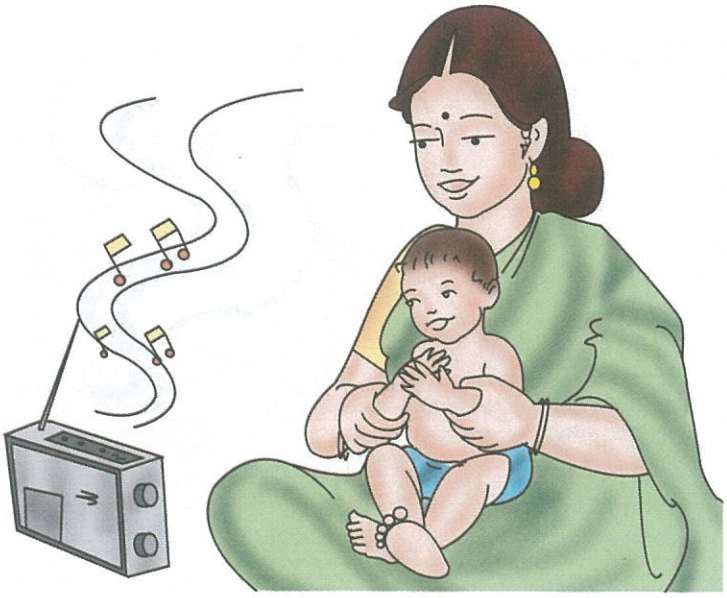


b) If the child tends to use one hand more than the other, palce a snack in the child's less preferred hand.

c) Place the toy in the child's hand. As the child plays with it, see if he/she will take hold of both sides of the toy, let go with one hand and then transfer it back to the original hand. If the child does not transfer, try placing a sticking bow or circle of tape with sticky side out on one hand. Encourage the child to pull it off with his/her other hand. Provide physical prompts as needed.

The following are some suggestions to help child use his both hands in coordinated fashion:

- Clapping the hands-This is a good motivator for the child to practice bilateral coordination. It can be done while singing songs, listening to music, and clapping games.



NOTE: Select the activity appropriate for the childs age and developmental level.

- To improve tactile exploration start with one of the below games:

a) Water play

b) sand play

c) dough or clay play

d) using vegetable paints

e) soap solution etc

- Holding container and putting pebbles inside it

- Holding container and take out pebbles from it

- Hold stick and put the rings into it

- Hold stick and take out rings from it

- Threading beads or nuts with holes into a thread

- Pouring water from one container to another

ITEM 6 Holds objects using thumb side
Age: 6-8 months

NORMAL

Initially no voluntary hand use, hands alternately open and close in response to various sensory stimuli. By 6 months child uses palmar grasp. By 7-9 months crude raking of a tiny object and grasp patterns with active thumb use emerges. By 8th month child holds object with thumb and radial two fingers.

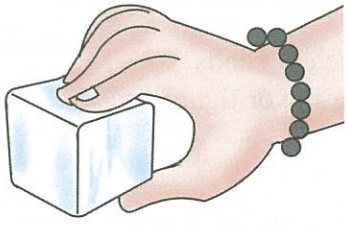
IMPORTANCE

This grasp facilitates use of long flexors, stretches thumb abductors and allows for opposition, thus forming a base for future refined skills.

Problems:

- Unable to open or extend thumb
- Unable to oppose using thumb

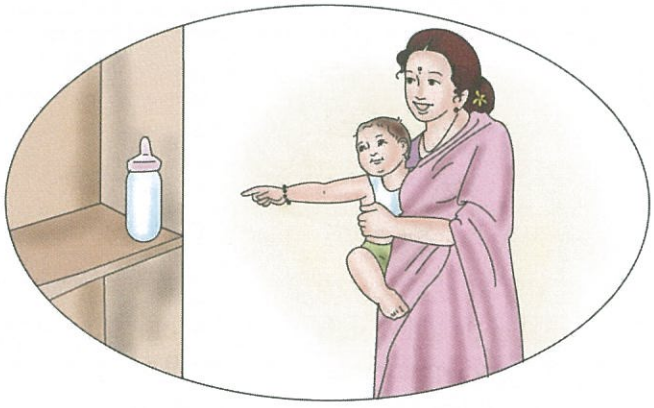
Intervention:



- Let the child grasp a teething biscuit or other finger food, encourage him/her to use thumb and index finger by presenting the item on the thumb side of hand.
- Let the child grasp a soft rubber or sponge cube, encourage him/her to use thumb and index finger.
- Give child blocks to hold, encourage him/her to use thumb and index finger.
- Give gradually smaller toys and objects to the child to play with until she/he can hold one inch cube with his/her thumb and index finger.

ITEM 7 Points with index finger
Age: 6-8 months

NORMAL



Pointing the index finger is a complex task for the child to master. This is a ability in which flexion and extension components of the hand and wrist coordinate. Isolating the movements of one finger could be labeled a learnt behaviour.

IMPORTANCE

Pointing is a skill for the early development of gestural or nonverbal language that means a lot in development. The child starts conversing and establishing relationship with others; ask for toys or food or water etc, by pointing the index finger.

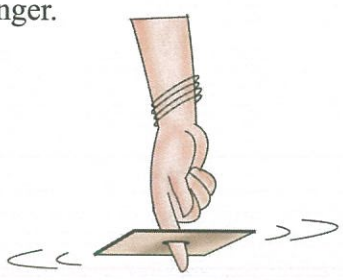
Ability to isolate index finger develops with improved dexterity skills.

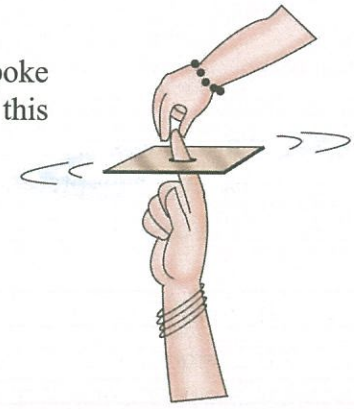
Problems:

- Clenched hands
- Long flexor tightness.

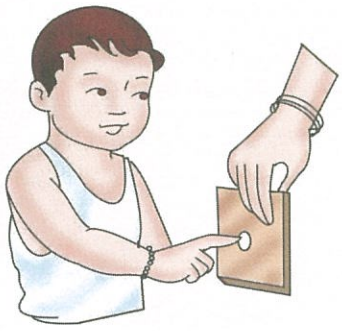
Intervention:

- Present an empty pegboard to the child and demonstrate how to poke your finger into the holes and pull it out, guide the child to try this activity with his/her own index finger.





- Cut a hole in a piece of wood or cardboard that is big enough for you to stick your finger through., stick your finger through it and wave it at the child, making a game of it.



The child will probably reach for your finger, if so withdraw it gradually enticing the child to come after it with his/her finger.

If the child gets his or her finger through the hole, turn the board slightly so that child can see his/her finger wriggle.

Note: the point of this item is to get good separation of the index finger from the rest of the fingers. Watch for other activities where the child spontaneously does it.

Activities to isolate the movements of the index finger

- Using telephone / dialing

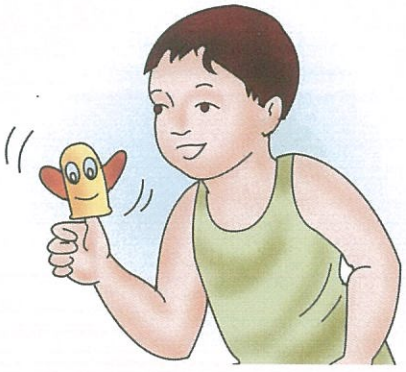
- Scribble on sand

- Finger tip painting

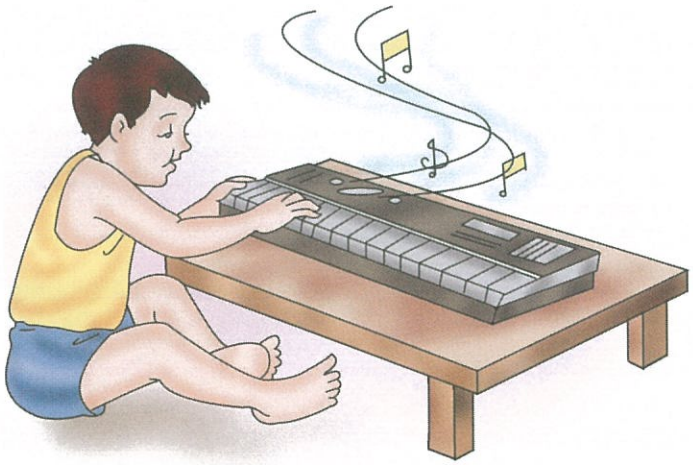
- Pressing small buttons on the clothes

- Switches of the toys

- Finger puppets



- Using piano, type writer-toys



8) *Isolating movement of index finger from other fingers by* Placing an edible (candy, nut, and raisin) in a small vial and encourage the child to get it.

ITEM 8

Holds objects like marbles between thumb and first two fingers

Age:8-10 months

NORMAL

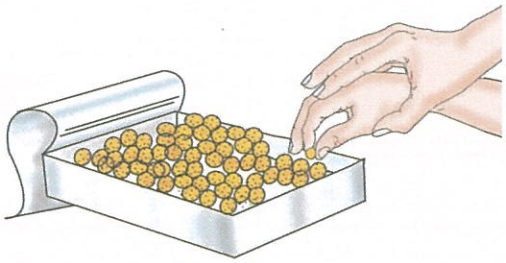
By 8-10 months infants holds an object between thumb and two radial fingers and readily varies the grasping patterns according to the shape of the object. Refinement occurs in the ability to use thumb and finger pad control for tiny and small objects.

IMPORTANCE

Holding objects like marbles between thumb and first two fingers also called pincer grasp which facilitates holding a writing pencil/pen in a tripod grasp.

Problems:

- Inability to hold small objects between thumb and two radial fingers
- Lack of oppsition of the thumb.
- Lack of isolation in the finger movements
- Flexor tightness in radial two fingers.



Intervention:

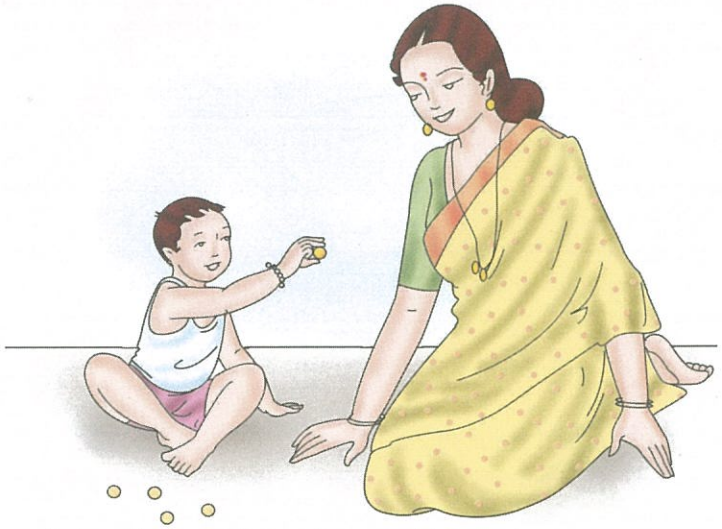
- Place small item of food such as puffed rice/boondi on tray in front of child. Show him how to grasp it with thumb and forefinger by modeling. Position this thumb and forefinger and guide with your hand if necessary.

- Use sticky raisins (kishmish), puffed rice in jaggery that are moistened to make them sticky. Let child eat them as reward as he/she picks them up.

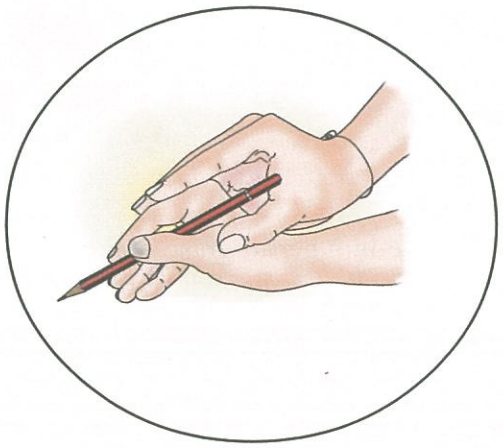
Caution:

Eatables should not be large in size, they should be small and soft, so that they soften further with saliva when put into the mouth. Hard snacks and mouthfull of foods may cause chocking.

- Use small beads and ask the child to pick them up and give them to you.

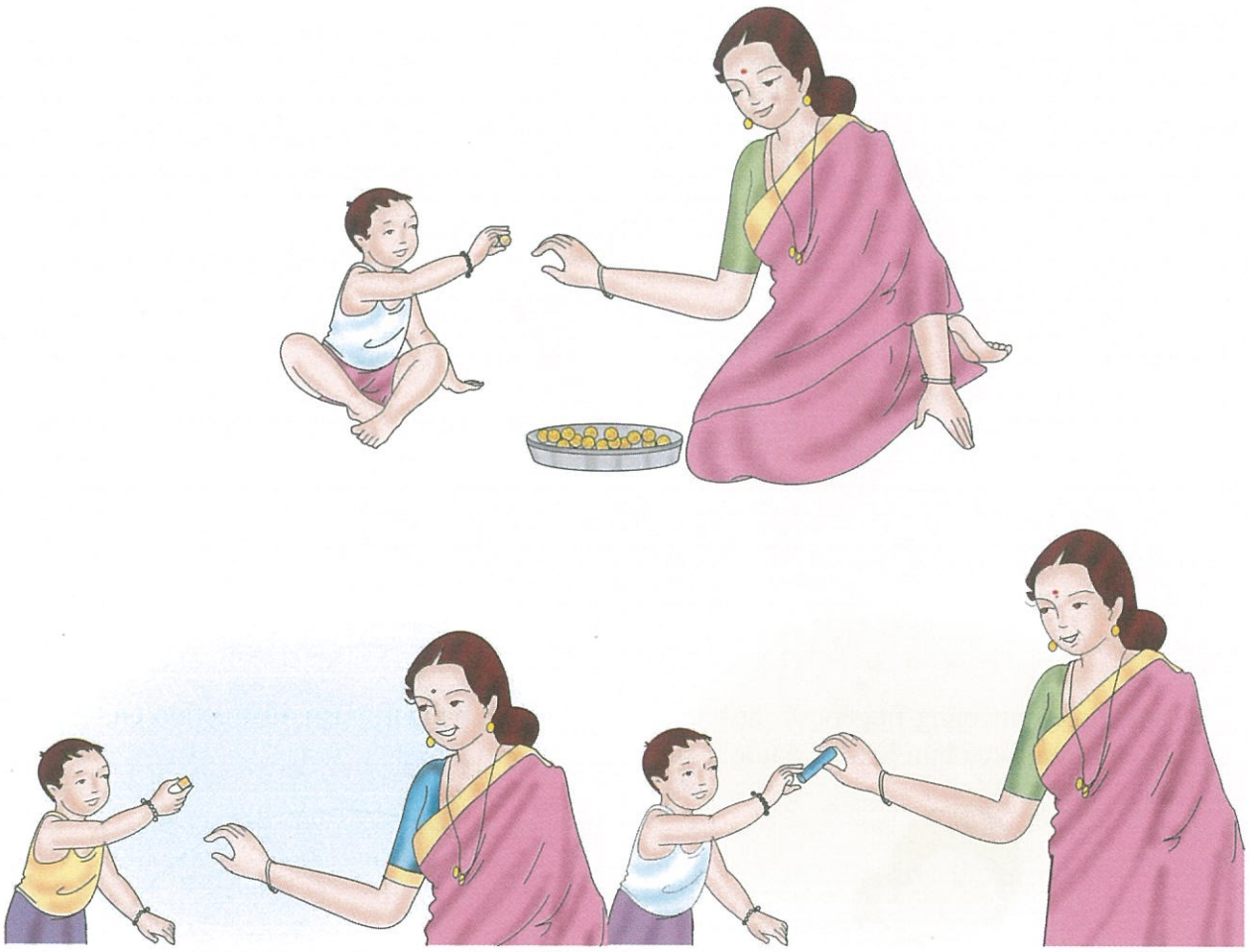


- Tape three remaining fingers, if he/she persist in using palmar grasp, instruction on "pick it up" and reinforce him/her for doing it successfully.



- Hold pencil in correct position in child's hand (tripod grasp), guide his hand as you mark on paper. Praise child for making mark while holding pencil correctly.

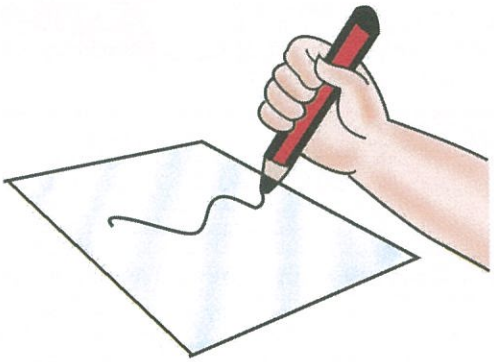
- Show the child how to poke and pinch edible play dough with her/his first 2 fingers and thumb. Hand the child toys and objects which gradually decrease in size(large blocks to one inch cubes, large woodenbeads to small ones).



- Encourage him/her to grasp and hold them with his/her thumb and first 2 fingers, give the child gradually smaller edible objects (decreasing sizes of cubes peices, cereal and raisins).

ITEM 9 Holds crayons or chalk and attempts scribbling Age: 10-11 months

NORMAL



The child's first grasp on a writing tool is a cross palmar grasp. The whole hand clutches the chalk or pencil, and usually the arm is turned inwards. The arm is not supported on the table, so the child draws with gross motor movements. The hand is only a tool for holding and does not take part in the movements. A little later, almost the same grasp is used, but the child notices that he can guide the pencil better, if he extends his finger now the elbow and the shoulder are stabilized to guide the hand movements in symmetric fashion.

IMPORTANCE

- This pinch pattern is used to obtain small objects.
- Child's ability to dissociate the two sides of the hand and use the tips of the index finger and thumb.
- This ability of scribbling acts as a pre-writing skill.

Problems:

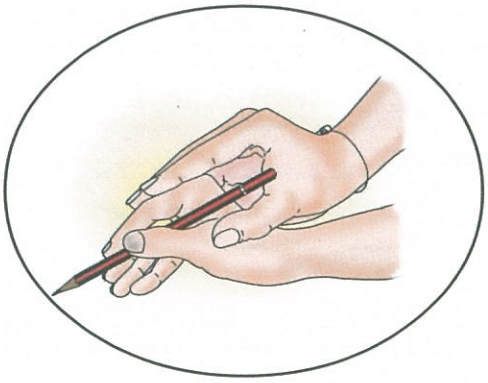
- Lack of thumb opposition
- Inability to bend index and thumb interphalangeal joints
- Inability to dissociate ulnar and radilal side of the hand.

Intervention:

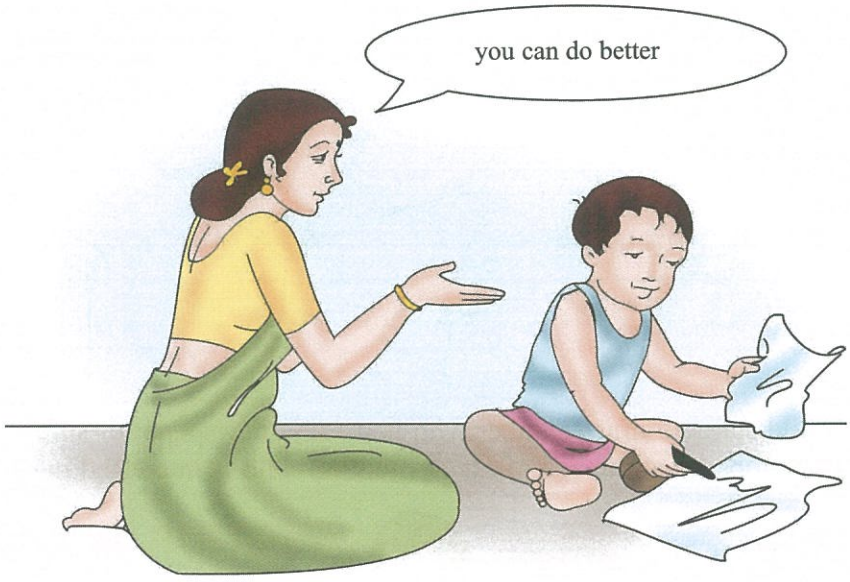
Give the child many opportunities to play with crayons (or other writing implements) and a piece of paper. Show the child how to scribble on the paper. Physically assist the child if necessary. After the child begins to readily scribble what you have demonstrated, begin a play session by giving the child a crayon and paper and observe what he or she does. If the child does not spontaneously scribble, ask him/her to draw or write. Demonstrate if needed.

- Using edible finger paints or yogurt, put some paint on child's finger and help him/her paint on a mirror, tabletop, or a paper. Gradually decrease your assistance until child marks spontaneously after you help him/her obtain paint this helps the child ability to mark, draw, make figures with fingers. He/she can repeat the same with crayons and chock later on.

- Give the child a loaded paint and brush, and help her to hold the brush dab, stroke or make any type of marks on a piece of paper.



- Demonstrate scribbling on a piece of paper with a large crayon or marking pen, give the crayon to the child clasp your hand over her helping in holding her hand and move her hand through the scribbling movement.



- Decrease the amount of assistance offered until she does it without assistance and demonstration. Praise and reward the child for holding pen/pencil, stick/brush and scribbling or stroke marks she makes.

It is easier to use paint like finger paint, stick with threads/cloth attach etc. Allow the child to continue to use them if she cannot use crayon Marking on sugar, salt, sand etc or in a brightly colored background is more beneficial.

ITEM 10 Turns 2/3 pages of books at a time
Age: 10-11 months

NORMAL

- When the child starts imitating the actions of parents and caregivers one interesting thing in immediate environment is paper-more so the books and newspapers.

- When the child starts to imitate father who is reading newspaper or siblings in nursery and start turning pages at the age of 10-11 months, child is interested in colorful books and paper.

- He/She shows interest in turning pages he likes the feel of the paper, sometimes tears it. Crudely he turns 2 or 3 pages at a time. It takes little longer for him to segregate and turn one page after other.

- Helps in sharpening the cognitive abilities of attention and memory
- Helps in developing bilateral hand use-stabilize one hand and use other hand
- Develops visual memory and regard to 2 dimensional objects and relating objects to abstract forms
- Helps also in developing language skills, identifies pictures, make appropriate sounds and later use words and labels.

Problems:

- Shifting becomes difficult due to lack of thumb opposition and adduction.
- Inability to initiate minimal movement at Meta Carpo Phalangeal joints & Inter Phalangeal joints of the fingers

Intervention:

- Read simple stories to the child and show him how to turn the pages as you read the story. Help him turn the pages as you read the story. Help him turn the pages by guiding his hand. Gradually let him help you turn the pages

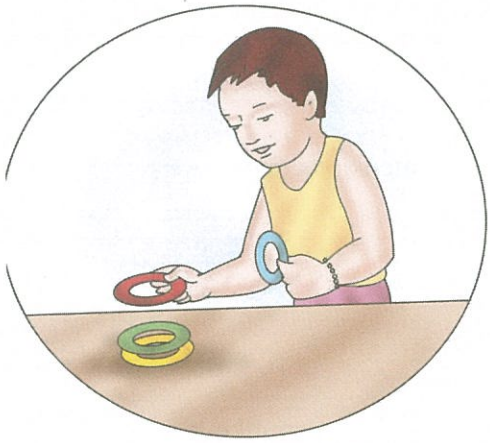
- Give the child old catalogues or magazines to play with plastic coated pages, make a book with throw away material. Make pages with thick package material and stick colorful pictures.

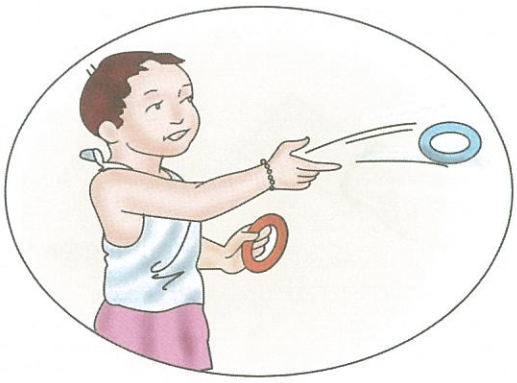
- Tape pieces of cereals or candy on the pages of the book and show child as you do this. Then give him the book and let him find the treats.

- Use a favourite book, ask the child to find the dog, or object that he recognizes in the book. Praise him for turning the pages.

ITEM 11 Places one object on another
Age: 12-14 months

NORMAL





- Stacking is the ability to fine balance one object on another. It is just by trial and error when the child places one object on the other while playing. He is trying to experiment with toys in different ways -throwing, catching, hitting, arranging etc.

- This skill starts with larger items on base and smaller items on top of that later keeping similar shape and sized items one on top of another is learnt.

Problems:

- Lack of wrist extension coupled with finger extension.
- Inability of the arm to move into position accurately and then stabilize fingers on the object.

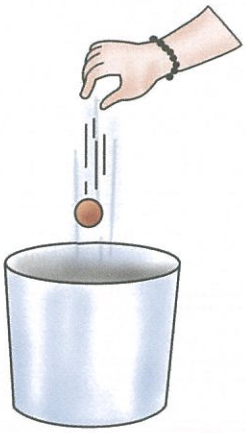
IMPORTANCE

- Develops ability to fine motor balance in activities.
- Planning organizing, sequencing toys
- Better understanding of 3 dimensional objects in space.
- This skill facilitates integration of perceptual, cognitive, sensory and motor skills.

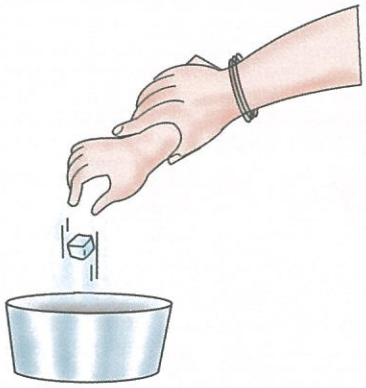
Intervention:

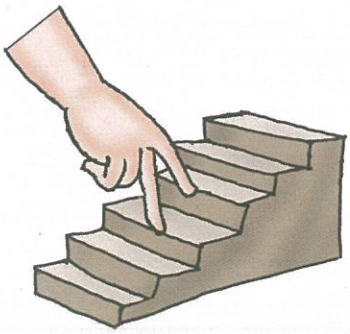
- Training voluntary grasp of objects with different dimensions and shapes
  Ex: Plastic/wooden cubes, rings, and bowls etc.

- Training on voluntary release of objects like boxes, cubes and bowls etc.



- Therapist/caregiver may stabilize the arm or hand for releasing an object.

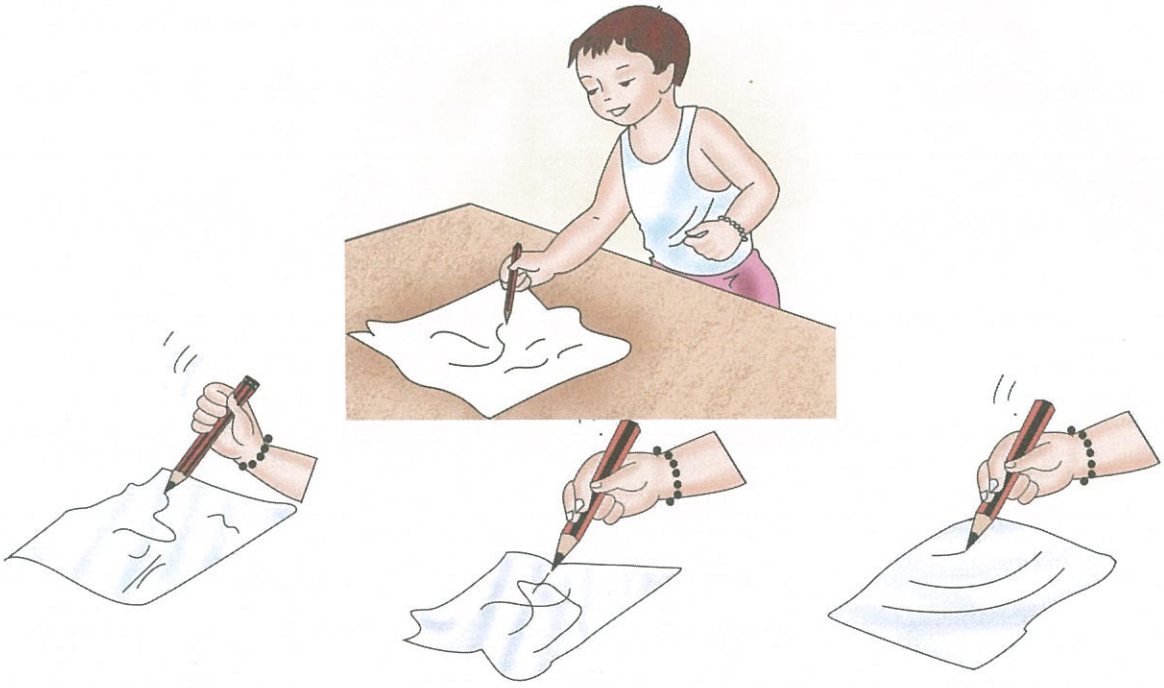




- Let the child drop objects into small containers.
- Grade extensions strength of fingers by using theraband.
- Play games like finger ladder climbing, carroms etc.

ITEM 12 Scribbles spontaneously
Age: 12-14 months

NORMAL



Holding the writing tool, is initially by crossed palmar grasp, later the child extends index finger, thereby strengthening the grip in writing. Scribbling leads to fine mature strokes. All this contribute to skilled tripod grasp.

IMPORTANCE

When a child start holding things in hand with fingers and thumb, he/she most often exhibits an interest in scribbling. We often notice that children pull out pens and pencils from dad's pocket or siblings boxes. They show interest in creative scribbling, but more often do a messy work with crayons, pens, pencils, and paint. They starts scribbling spontaneously but the initial grasp is very crude, later the grasp is more refined. Initially he can hold large crayons and pencils better than the slender ones. Slate and chalk piece are the most favorite and easily available items for scribbling.

Problems:

- Lack of thumb opposition
- Inability to flex index and thumb IP joints
- Inability to get finger pads close to hold tiny objects

Intervention:

- Use large pencils or crayon and paper. Tape paper to table, so child need not have to hold it. Make a mark on the paper, encourage the child to make a line. A mark can be (1) or (-). His mark need not be exactly like yours. Praise any attempt.

- Use large strokes covering the entire page and make them quickly, to encourage imitation. After you have drawn a stroke, give the child a crayon and take his hand and help him make the stroke. Do this several times, praising each attempt and reduce help as the child gains in skill. Practice on paper just using your finger to make the stroke instead of crayon.

- If an average sheet of paper is not large enough for the child, start with a newspaper. Gradually reduce the size of paper. Chalk and chalkboard, paints, magic slates etc may by also stimulate the child to draw lines.

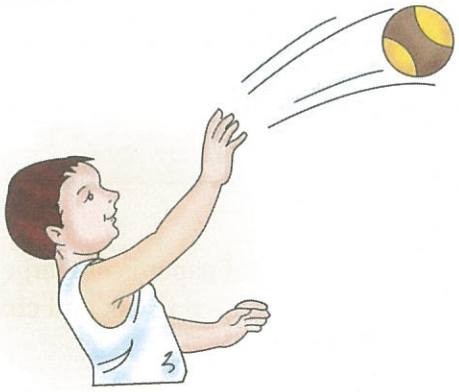
- Place paper on wall or almirah/cuboard front so that the child can stand to mark. Melt crayons and mould into blocks of colour that can be easily grasped by the child (palmar grasp).

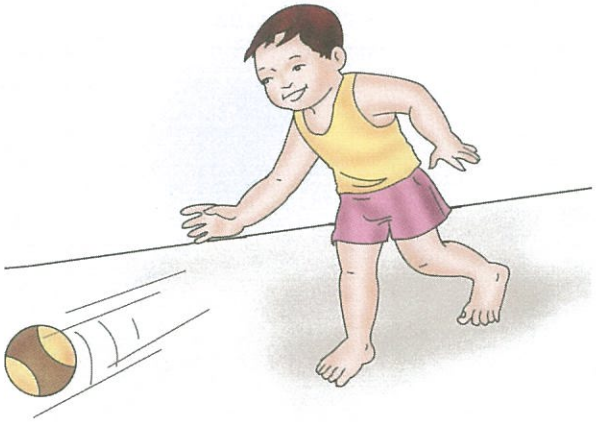
- Use finger paint, kumkum paste or shaving cream for the child to practice making lines with fingers.

ITEM 13 Throws ball in a direction /overhead
Age: 12-14 months

NORMAL

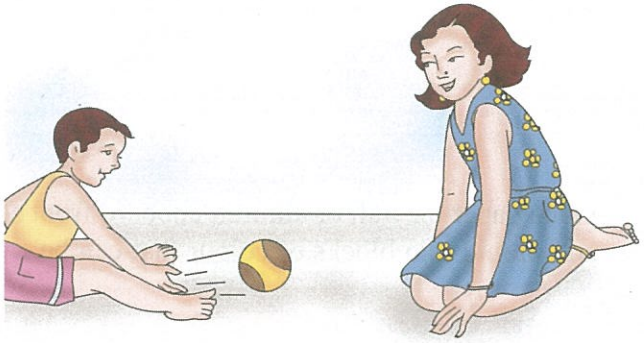
Sequence of ball games:



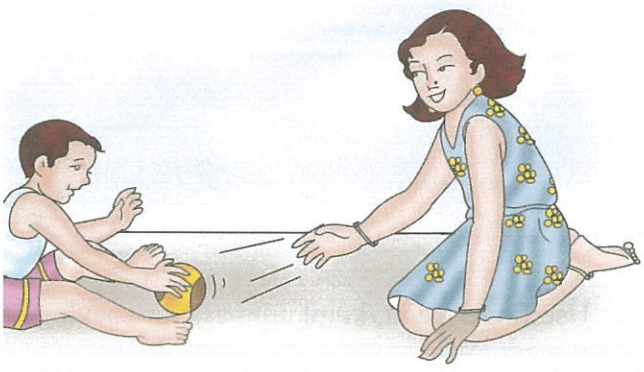


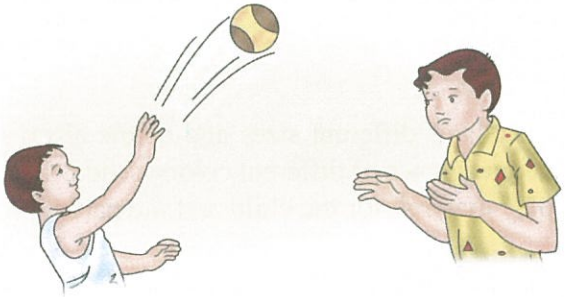
- Chasing, grasping, and playing with self

- Able to roll a ball back to the partner.

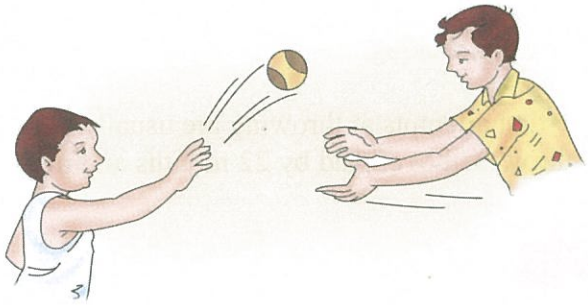


- Able to receive it when rolled back.

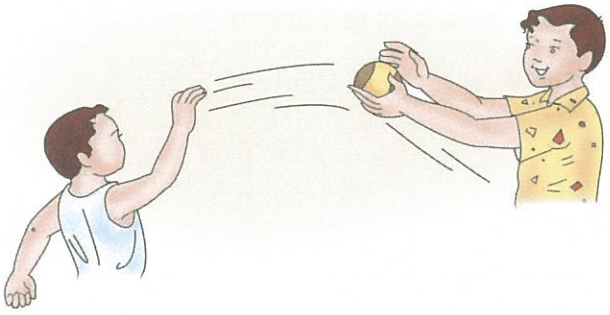




- Able to crudely throw ball up in air.



- Fine throw directed towards the partner



- Able to throw at the level of chest or legs.

- Level of head or overhead.(30 months)

(Kicking ball develops before throwing i.e. gross motor before fine motor development.) Child tries to roll and receive ball, before he learns to throw and catch. During initial stages the child mainly uses elbow action-elbow is in front of body and action resembles push. Child moves backward to maintain balance, there is no rotation of the trunk. Places both feet on same plane and trunk perpendicular to ball, feet is also stationary.

IMPORTANCE

Ball games make interesting play activities for children. Balls of different sizes and colors always form a central theme of child's play in all age ranges. The convenience of different colors, shade, size, textures, weight that are available make it a conductive play material for the child and the parent.

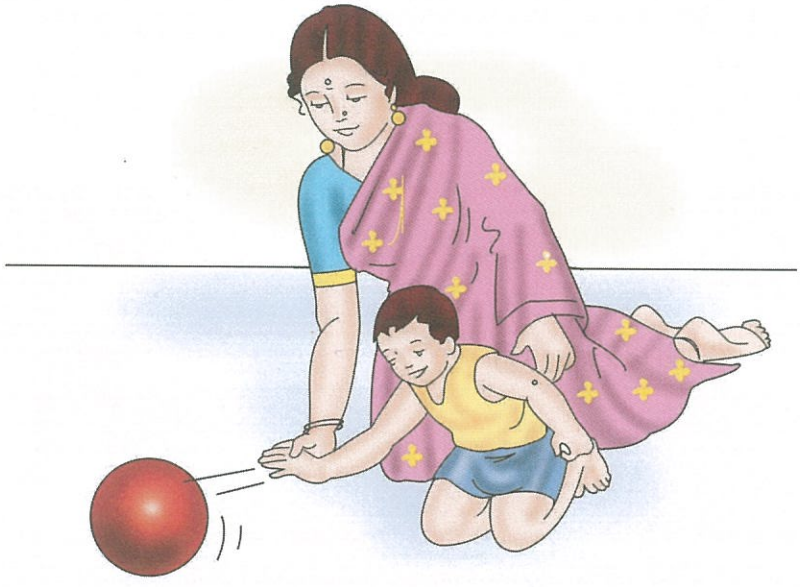
Infants do not develop much proficiency in throwing. However, the ability to throw objects begins to emerge as early as 6 months, when babies accidentally release and hurl objects that they are waving or shaking.

The first attempts at throwing are usually a stiff underhand motion, 75% of infants develop ability to throw ball overhead by 22 months and more.

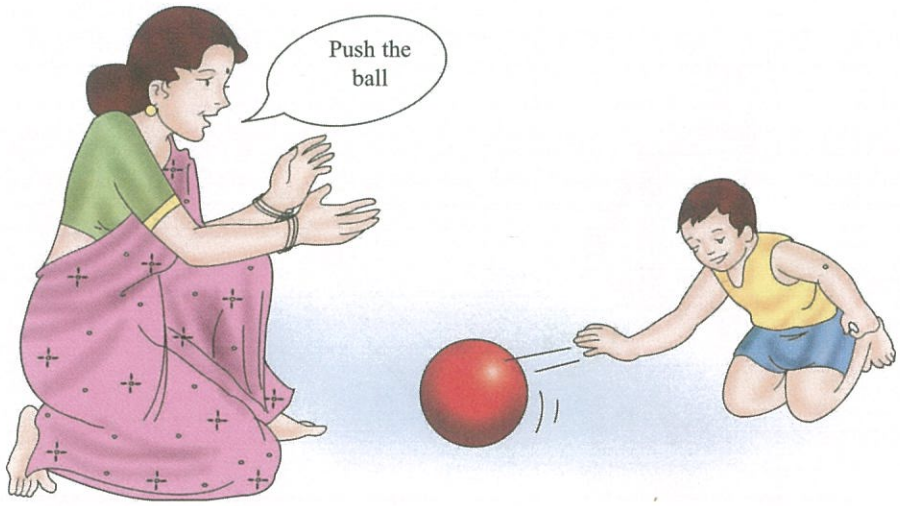
Problems:

- Lack of shoulder stability coupled with elbow extension
- Stability at the elbow joint with simultaneous extension of fingers and thumb
- Lack of dissociation between trunk and arm movements
- Inability to gauge distance, speed and accuracy.

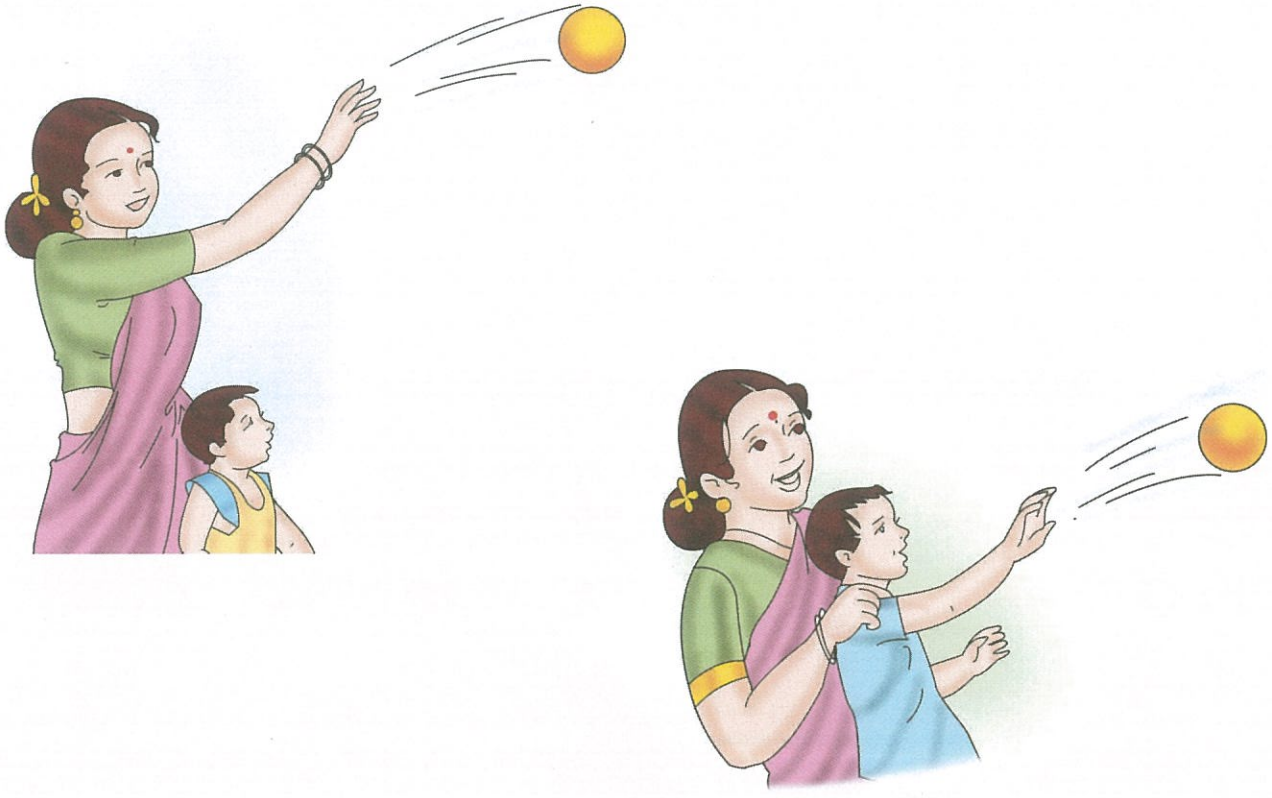
Intervention:



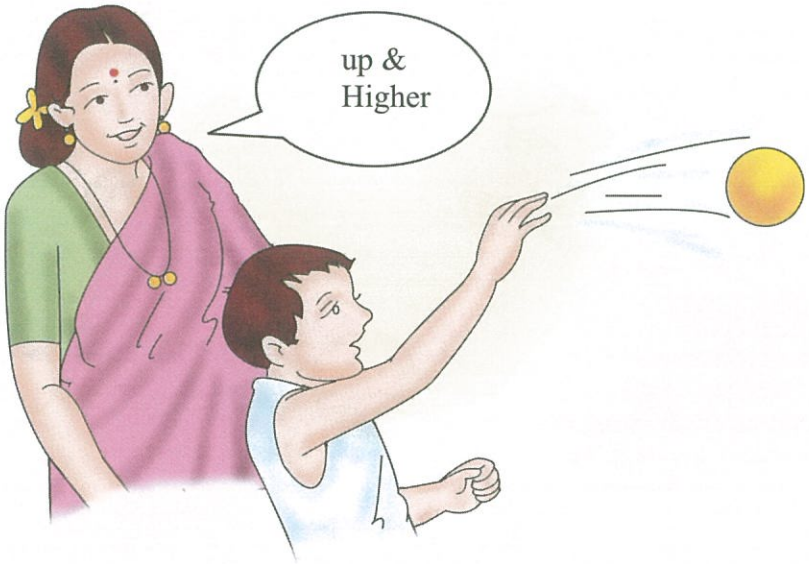
- Use lighter balls and easy to catch ones like beach ball, balloons then proceed to balls like football, at last to smaller and firm balls like rubber balls, later to other catching activities like tennicoit (ring throw).
- Sit on the floor behind the child and help her to push a ball or truck away from herself so that she gets used to the idea of using some force to move objects away from her.



- Then face her so she pushes the object to you with some direction. Reward her appropriately on accomplishment. Watch the child when she is discarding an unwanted object.

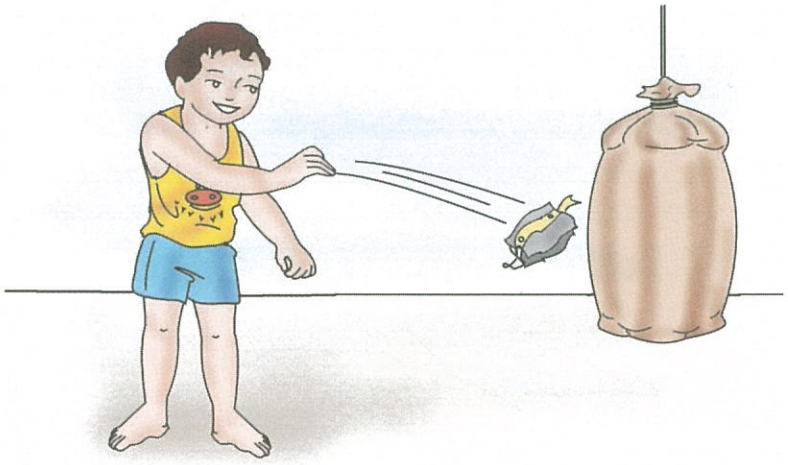


- Label action of releasing an appropriate object as throwing and have him/her repeat it. Demonstrate throwing an object either over or underhand. Hand the child an object and tell her to throw it using her whole arm.



- Move away from child and have her throw an object towards you to know speed, distance and accuracy. Make the child throw ball in a tub. Initially by demonstrating and later practice each attempt.

- Overhand fashion: Use a ball (size of tennis ball) that the child can easily grasp in one hand. Demonstrate throwing the ball. Encourage child to throw the ball. Position yourself further away to increase the distance the child should throw ball and to begin to develop aim.

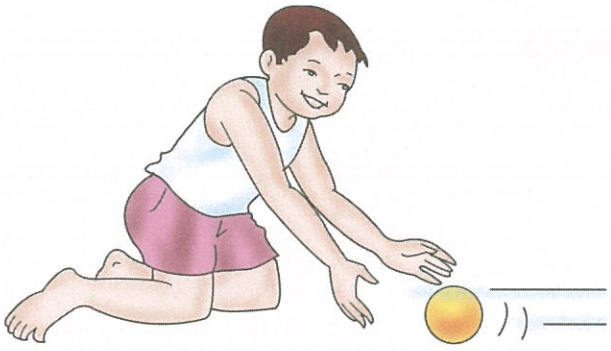


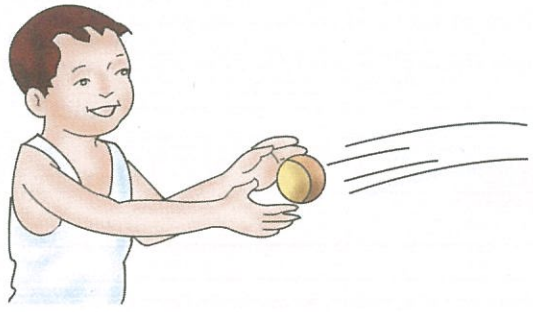
- Use beanbag as a target, then encourage child to throw bags at the target. Thereby encouraging the child to experiment throwing in an underhand manner.

Note:

Catching:

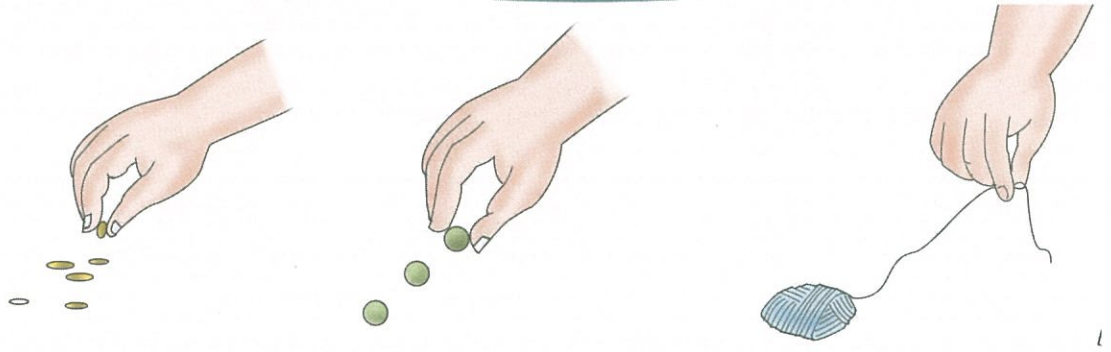
- The ability to catch an object requires much more eye hand coordination and perceptual ability than does throwing. Consequently, infants make little progress in this area. The baby's first efforts at catching are typically trying to stop a rolling ball. The first successful attempts to catch an object thrown into the air usually occur around 3 years of age.





ITEM 14 Picks up small objects like rice grain, thread Age: 12-14 months

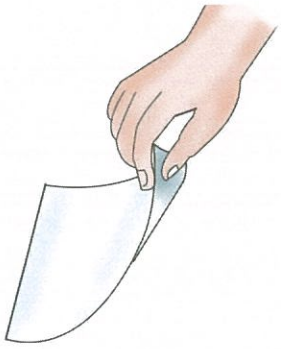
NORMAL



Child opposes thumb tip and index finger tip, to attain tip pinch which is required to obtain small objects. Initially child holds small objects with fingers in extension and thumb adducted. Gradually to get better control on tiny objects he learns to oppose thumb and flex index finger.

IMPORTANCE

- When children are growing inquisitiveness increases, as their senses become sharper and refined. Their focus is concentrated on the finer details and the complex designs of environment rather than the gross things.



- They are interested in things like piece of paper, small piece of thread. They acquire the ability to coordinate hand movement and approximate thumb to the fingers they start picking up objects with finger grasp. This is the useful step towards fine motor maturity, which helps children later in life for better functioning.

Problems:

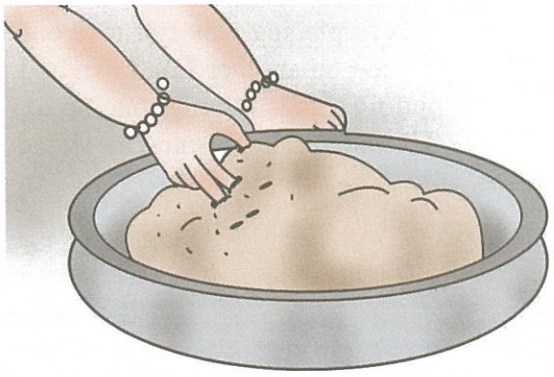
- Long flexor tightness
- Inability to flex Inter Phalingeal joints of thumb and index finger
- Lack of thumb opposition

Intervention:

- Child is encouraged to pickup small edible items like puffed rice/ boondi etc.

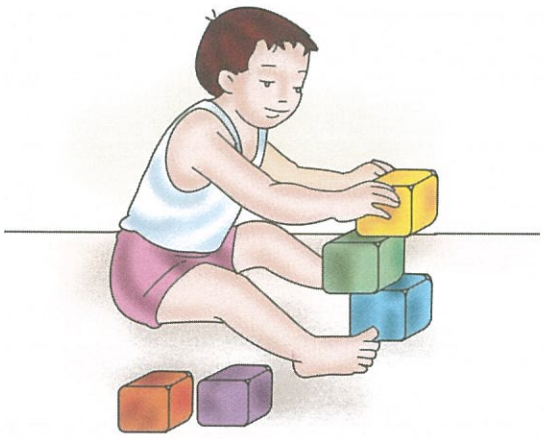
- Pinching and sealing a zip lock pouch.
- Pushing paste from a small tube using thumb and index finger.

- Use of clay, play dough to train fine pinch.



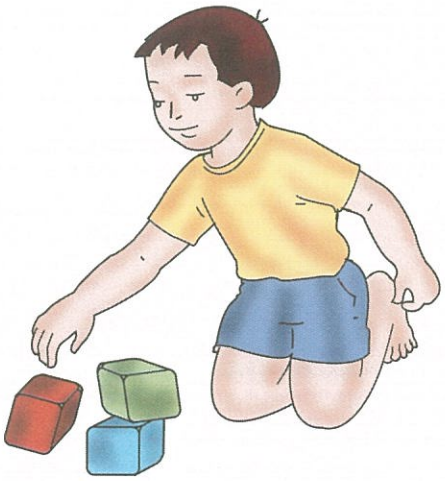
ITEM 15 Builds tower of 3 cubes
Age: 14-17 months

NORMAL



It is the ability to place objects one over the other initially by trial and error with irregular placement of cubes that can easily topple. As the voluntary grasp and release matures building tower becomes more symmetric

Stacking begins as placing cubes or toys one over the other. Initially only to see what happens, if the object's placed on another fall down and make noise they enjoy it. Later children take lot of pleasure in putting things in order one on top of the other, stacking is a skill that develops slowly but steadily. This interest in pursuing the skill depends on the parental encouragement and opportunity provided.

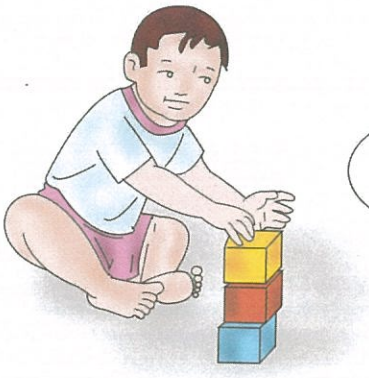


Problems:

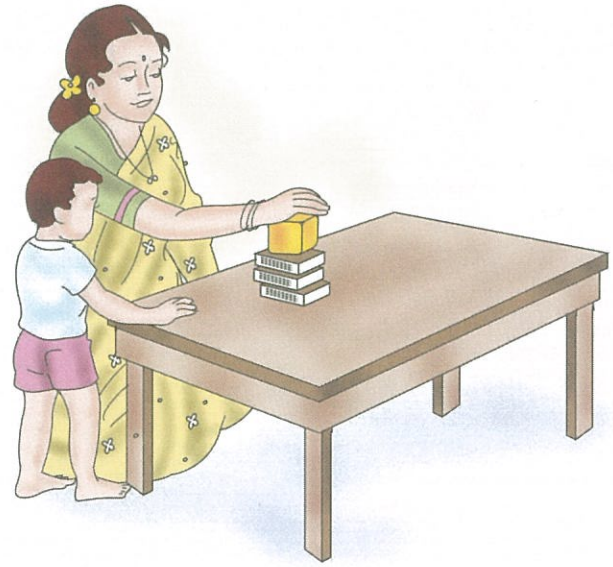
- Lack of voluntary grasp and release
- Inability to extend wrist during grasping and releasing
- Inability to accurately place one over the other due to abnormal movements/tonal fluctuations.

Intervention:

a) Let the child play with the blocks for several minutes. Tell the child that you are going to build a tower, build a 3-4 block tower, knock it down, start to build another and ask the child to build a tower like yours.



b) Begin with 2-3 blocks. If the child does not respond , you may need to physically assist him/her in putting one block on top of another. Express a lot of praise for the child's attempt.



c) Practice the same activity with shoe boxes, plastic cans, match boxes (empty), books etc.

ITEM 16 Differentiates scribble /stroke
Age: 18-22 months

NORMAL

Child begin to scribble on paper shortly after they are able to grasp a tool, eventually write on any available surface. As children mature there scribbling evolves into handwriting. Scribbling comparatively primitive, as the lines have no direction, they are straight, curve, crooked and continuous. Whereas, strokes are more directed they are either straight, slanted, horizontal and discreet.

Children who starts scribbling spontaneously soon learn the difference between scribbling and a stroke. They need hand coordination and attention to do this activity. They enjoy their first achievement on drawing a stroke.

Problems:

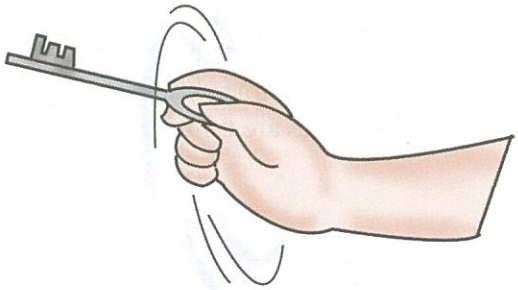
- Lack of isolated finger movement
- Unable to hold the required writing tool for scribbling and stroking
- Spasticity, flexor tightness decrease range of motion for the required grip etc.

Intervention:

In order to scribble or stroke manipulation of the hand held tool is the first step. To train this

- Use thumbs opposition with index finger to pick up kishmish, tiny tit bits with small pliers.

- Feeding of raisons (kishmish), small tiny sweets to a toy with open mouth toy.

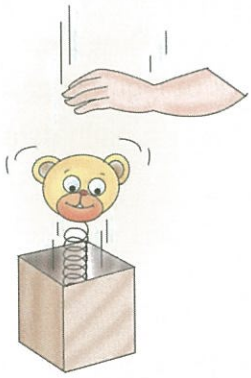


- Moving a key from palm to finger tips of one hand.
- Connecting dots with the chalk on the board
- Squeezing tubes using thumb, index and middle finger.

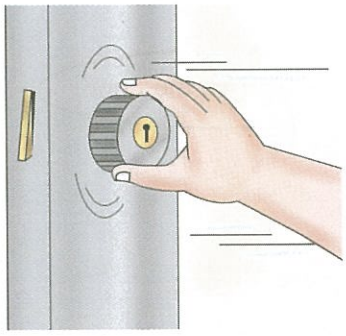
ITEM 17 Turns door knobs Age: 22-25 months

NORMAL

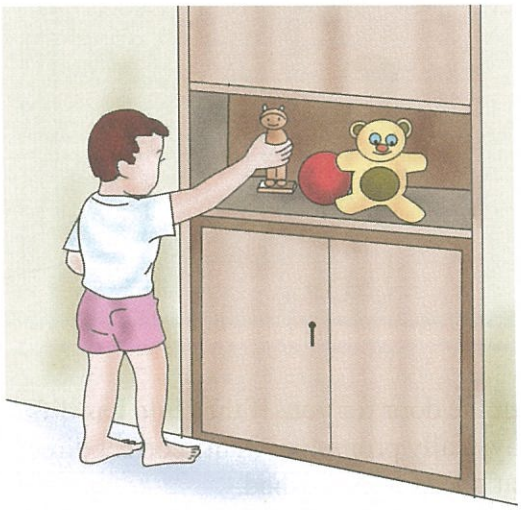
Manipulation is the accuracy and efficiency with which the child can use his hands. The child keeps learning things like manipulating with toys, sand, water, food etc. By pushing, pulling, transferring one hand to another or banging just to watch the effect of the action on the toy.



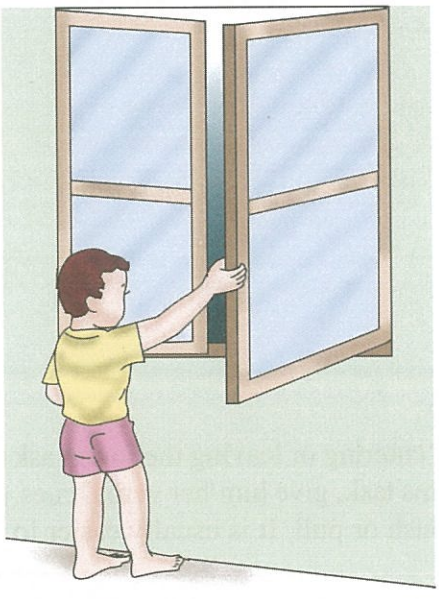
One major skill is turning bottle cap,



door knocks



drawing out things from shelf,



opening window door,

IMPORTANCE

Alternatively moving hands in supination and pronation is essential for active object exploration, use of wide variety of grasps in various playing of movements.

Problems:

- Lack of elbow flexion, supination and pronation at the elbow joint.
- Lack of required grasp (for various door nobs)
- Decreased mobility/strength at the elbow joint

Intervention:

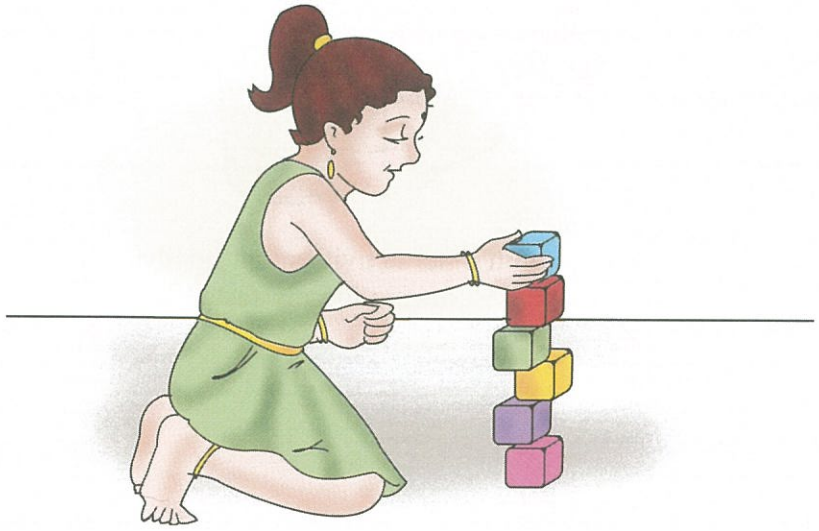
When entering or leaving the room, ask the child to open the door for you. If the child has difficulty with this task, give him/her verbal cues, such as turn (physically prompting in the correct direction), then push or pull. It is usually easier to open a door that needs to be pushed.

If the child is unsuccessful, practice with other activities that involve turning (**eg:** nested barrels, kitty in the keg, Plastic nuts and bolts) unscrewing loosely fastened lids from various jars.

Incorporating supination pattern (with palm up) into the activities may also be helpful. (**eg:** using one hand to drop small objects into the other hand (palm down) to see how many objects the child can hold before dropping any).

ITEM 18 Turns pages one at a time
Age: 22-25 months

NORMAL



Academic activities that lay foundation in the initial years are turning pages, scribbling, drawing etc that involve fine motor coordination.

IMPORTANCE

- Concept of shifting i.e. ability to manipulate using fingers is learnt.
- Relating to two dimensional objects is learnt.

Problems:

- Lack of thumb Opposition and adduction
- Inability to initiate minimal movement at meta corpo phalangeal joint & inter phalangeal joints of fingers
- Inability to isolate radial fingers with that of ulnar side of the hand.

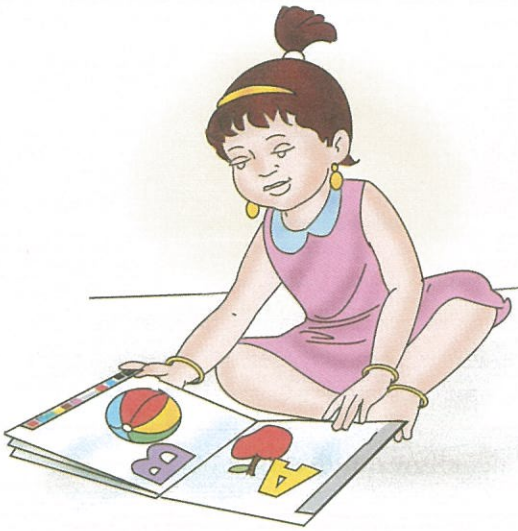
Intervention:

- Assist the child with the book, turning the pages and pointing out pictures on each page. Then ask the child to turn the page for you. If needed, turn one page partialy and then verbalize to the child to complete the task (page turning). If he/she does not respond give physical assistance to turn the pages.

- Provide the child with books to look through and manipulate, allow him/her turn the pages for you while you read the story. Praise and thank him for assisting you.

- Use a picture book with cardboard pages. Reinforce him for turning the pages, encourage him further by showing picture of himself in the book.

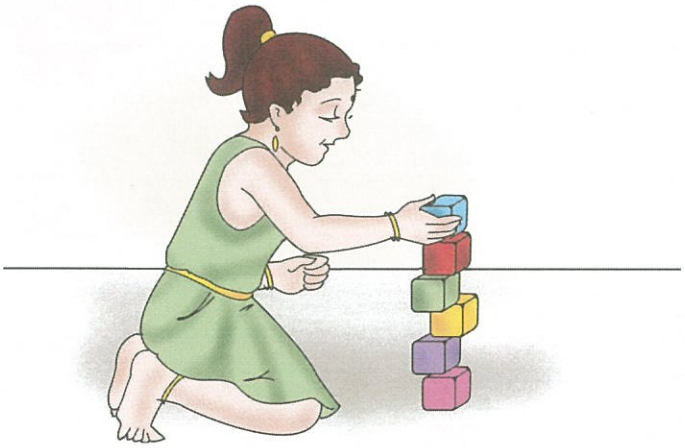
- Place the picture under the next page to be turned to encourage child to turn the page to find picture (favourite cartoon/animal)



- Make a scrapbook of pictures consisting of favourite objects, place index tabs on the corners of the pages for ease in turning.

ITEM 19 Builds tower of 6 blocks
Age: 23-26 months

NORMAL



Child places and releases objects with shoulder, elbow and wrist stability but the Meta Carpo Phalangeal joints remain unstable during this pattern. So there is excessive finger extension, gradually with release of objects into small containers, release pattern is refined with graded extension of fingers and stacking/tower construction is achieved.

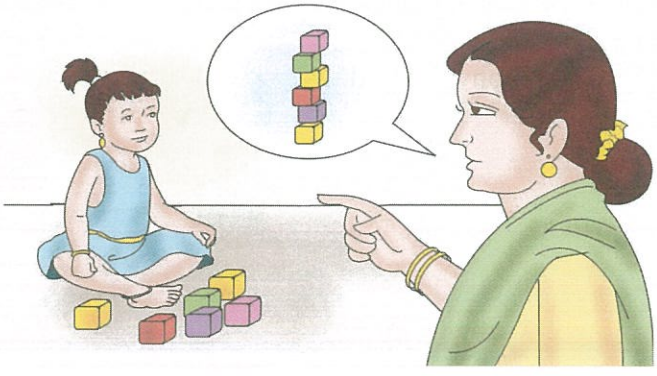
IMPORTANCE

- Voluntary grasp and release of the objects, indicates control of muscles of the hand.
- These skills indicate integration of perceptual sensory, cognitive and motor skills.

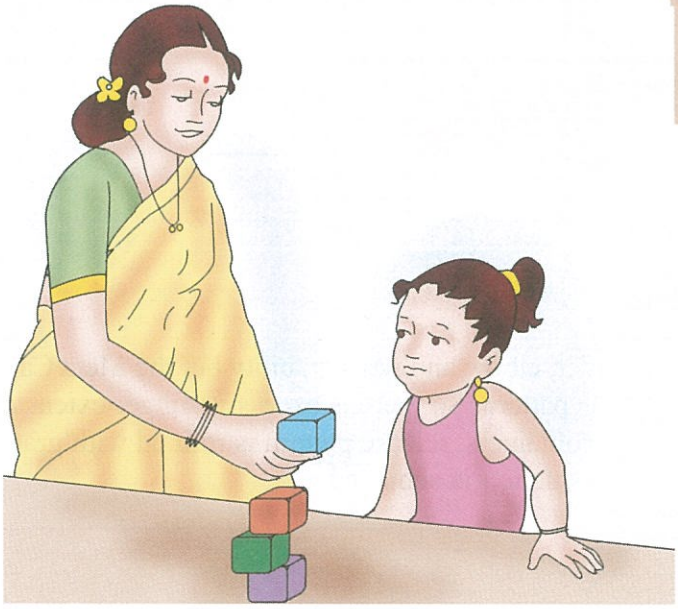
Problems:

- Lack of voluntary grasp and release
- Lack of wrist extension coupled with grasp or release
- Inability to gauge speech accuracy and dimension of the object.

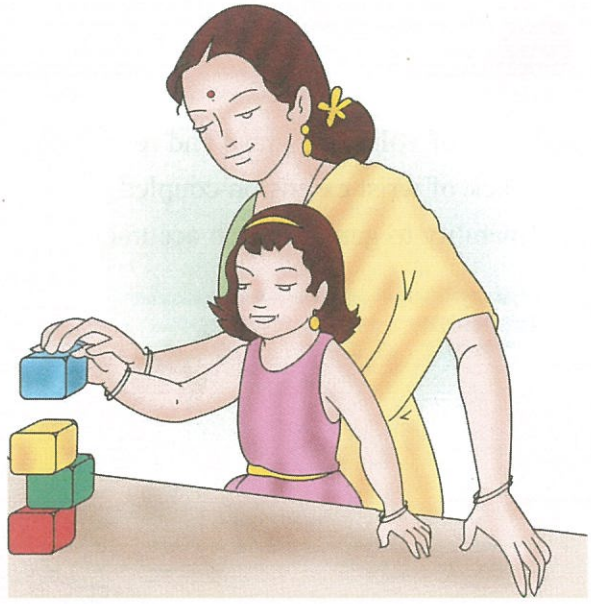
Intervention:



- Praise him for each block he places on the tower

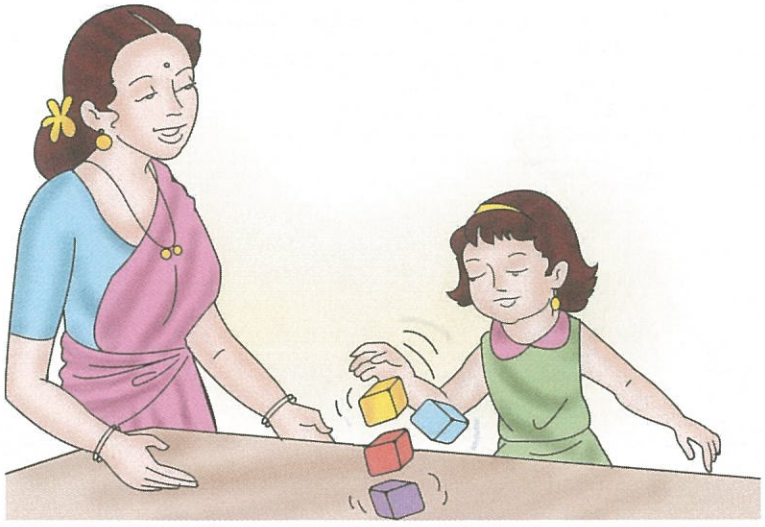


- If he stops at third block, hold out another block to him and ask him to place it on the tower. Guide his hand if necessary. Praise success.

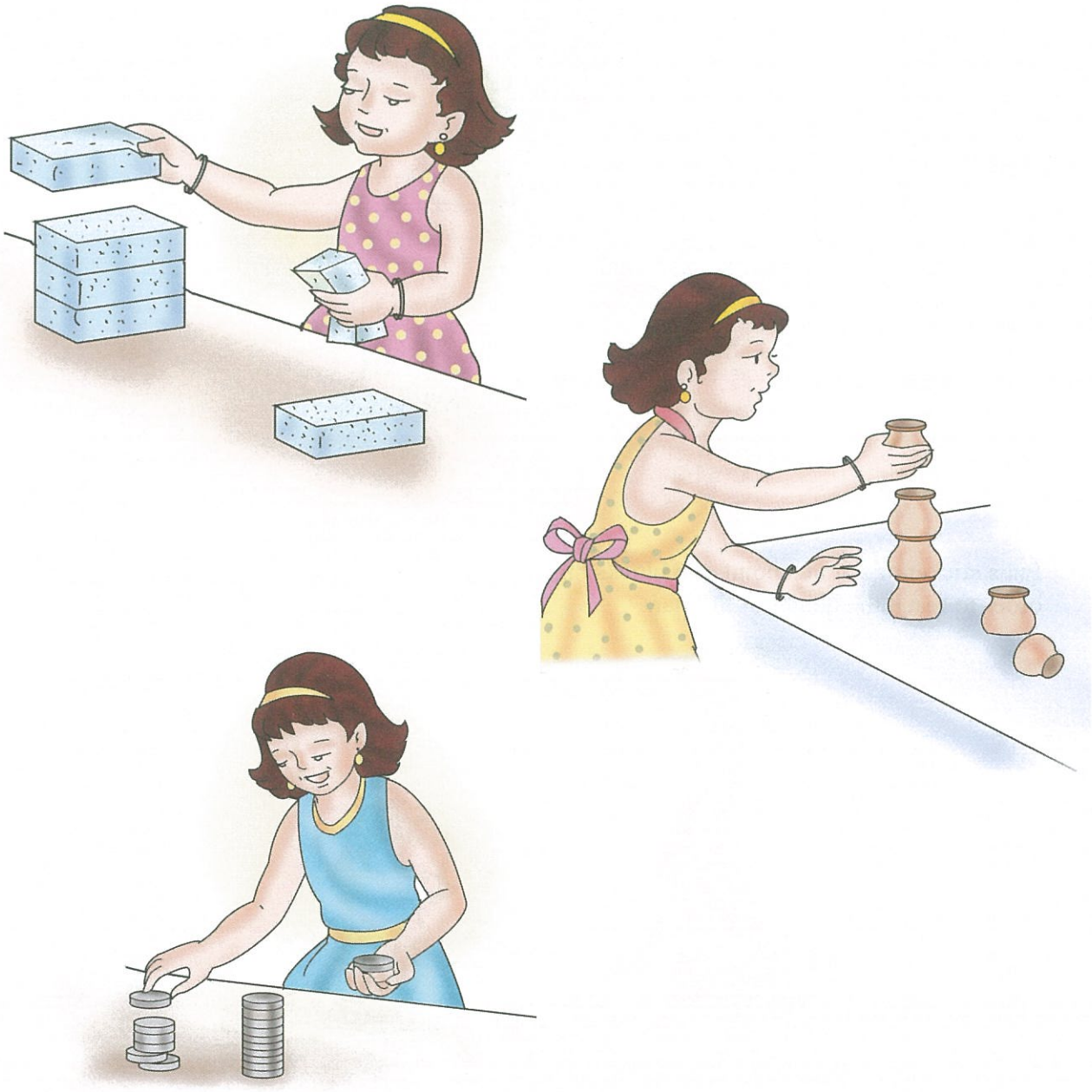


- Gradually remove verbal and physical aid.

- Put a sticker or star at a point of 6 blocks high on a wall. Encourage the child to build tower in order to reach the height of the star.



- Let the child knock down the tower. Let him/her enjoy it as a reward.



a) Have the child's practice stacking using other materials such as books/sponges, cans, plastic coins.

ITEM 20 Imitates vertical and horizontal lines
Age: 26-30 months

NORMAL

Children usually reveal following sequential stages of pre-writing

- Control scribbles
- Discreet lines, dots or symbols

IMPORTANCE

Later they learn the art of drawing vertical and then horizontal lines.

Problems:

- Decreased ability to hold the tool required for drawing lines.
- Decreased depth and line perception
- Tightness, spasticity and poor grips etc.

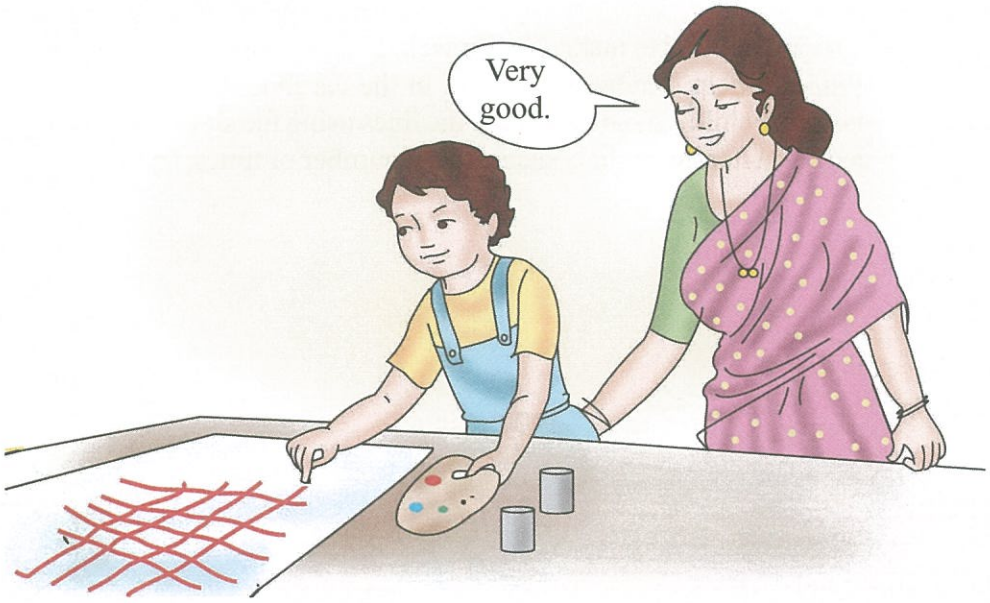
Intervention:

- Place a piece of paper in front of the child and demonstrate how to make vertical strokes. While doing so, instruct the child to follow you, as you draw lines that go up and down. Try adding a sound as you make each line (**eg:** z.....).

- In order to draw lines, encourage initially with physical assistance and gradually decreasing the same to enhance competency.

- Instruct the child to make 1 by himself. If the child is having a lot of difficulty, make a cardboard guide to help him/her (cut a slot in the cardboard). Place the cardboard over the paper and guide the child's hand in making the lines using the slot. Then see, if the child can independently do this. After the child is successful a number of times, try the activity again without the guide.

- Use corrugated cardboard pieces one with ribs placed horizontally across the sheet and the other with ribs vertical. Start child drawing in a groove. Decrease assistance as she gains skill. Put finger paints on the child's hands. Move her hands up and down and across on a mirror or paper.



- Verbally identify up, down and across. Demonstrate vertical and horizontal strokes. Manipulate child's arm through the motion. Encourage child to imitate independently.
- Drawing lines to complete a picture story in a book or black board.
- Complete simple dot to dot pictures and mazes

ITEM 21 Unscrews lids of containers
Age: 31-34 months

NORMAL

Using the hands for activities of daily living is called manipulation. Ability to manipulate the environment, according to the needs and to satisfy our necessities is a very useful skill. Child learns to be independent, by practicing these skills. When the child is able to smoothly synchronize supination and pronation, flexion and extension of wrist, fingers, and elbows. They become proficient in manipulation.

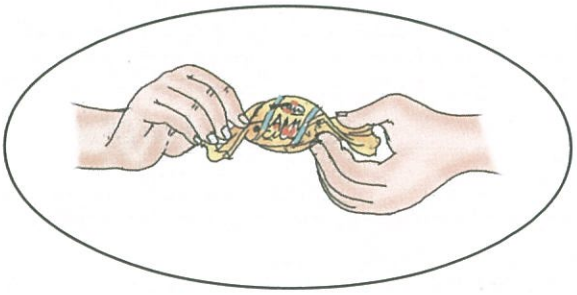
IMPORTANCE

Synchronizing supination and pronation is important as it positions the hand so that thumb and fingers are free for active object exploration and allows the child to view his/her fingers and thumbs during grasp.

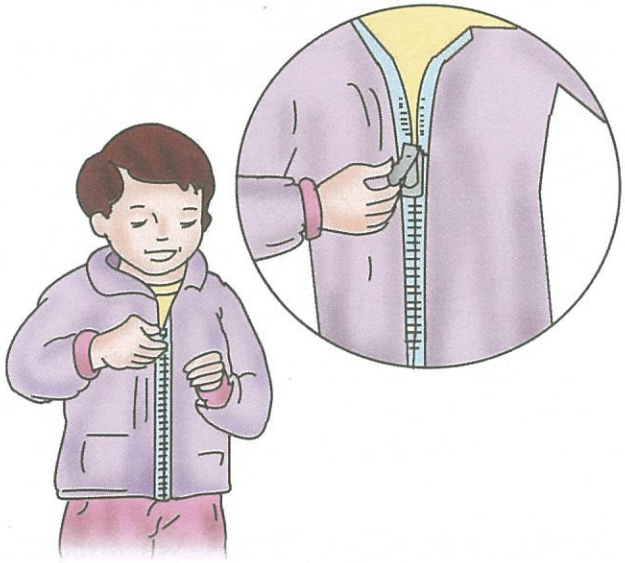
Problems:

- Lack of supination and pronation at the elbow joint
- Decreased palmar contact, finger surface and finger pad contact
- Inability to use muscles of the hand

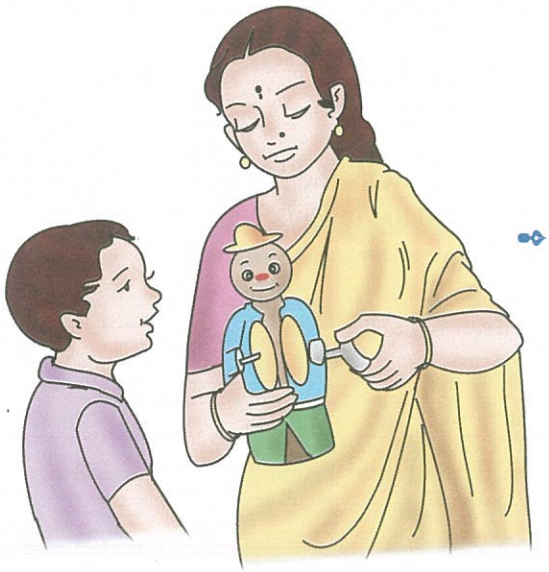
Intervention:



- To train such other similar skills give the child edibles which require unwrapping (piece of toffee in a paper).



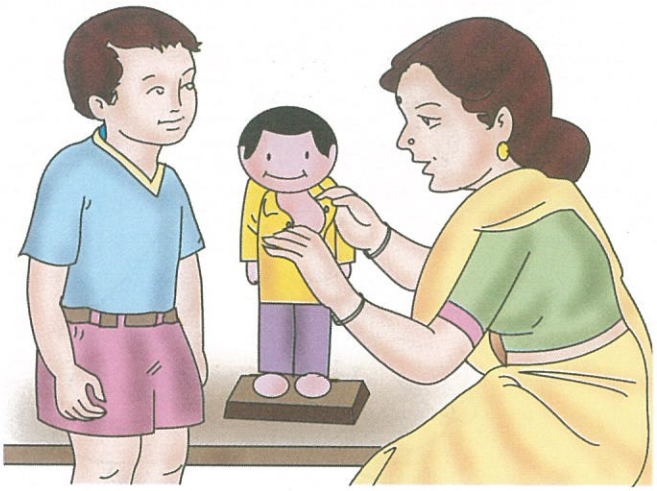
- Encourage the child grasp zipper tab and pull zipper up and down.

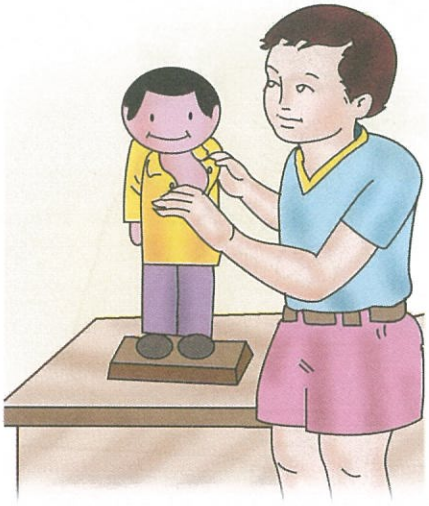


- Demonstrate winding a wind-up (keyed) toy, the child turn the handle of the key till he/she can do it on her own

- Encourage child to remove plastic lids of containers and boxes.

- To improve increasingly complex skill in manipulation. Show the child how to unbuckle an adult leather belt. Allow him to practice with the belt.





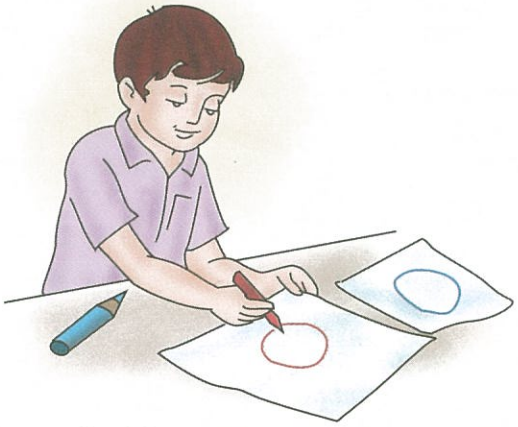
- Demonstrate unbuttoning on a dressing board/ doll/ child's own clothing.Let child practice independently with large buttons and gradually decrease size as the child gains skill in unbuttoning.

- Let child practice. Start with large buttons and decrease size as the child gains skill in unbuttoning.

- Encourage the child to play with play dough. Show him/her how to roll it into snakes, squeeze it, roll it flat with rolling pin, or pat it flat with his hands. Encourage child to imitate and to experiment with new ways of handling the dough.

ITEM 22 Copies a circle Age: 32-36 months

NORMAL



Child begins to use writing tool while scribbling, making strokes, drawing lines. Once this activity is mastered he/she begins to explore, complex geometric figures like drawing a circle by turning the writing tool in the required direction to copy a circle.

IMPORTANCE

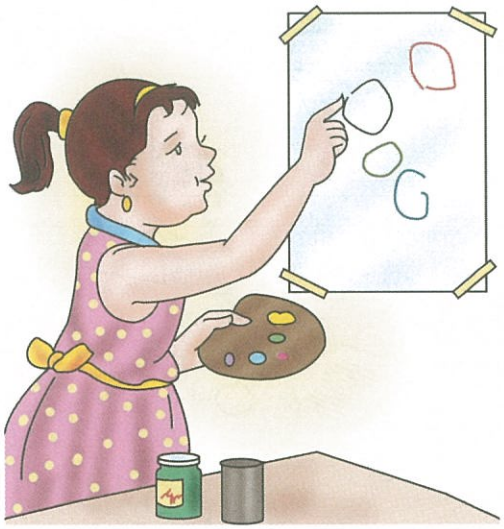
It is indicated that children who are able to copy circle, significantly copy more letters than others who are not able to do so. Hence, copying a circle is an important pre-writing skill which later refines writing.

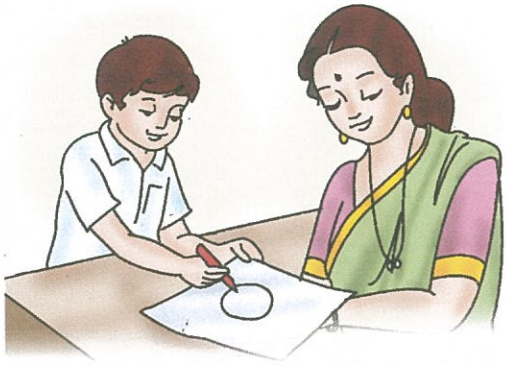
Problems:

- Inability to attain and sustain grasp of the writing tool
- Poor right and left discrimination
- Decreased directionality

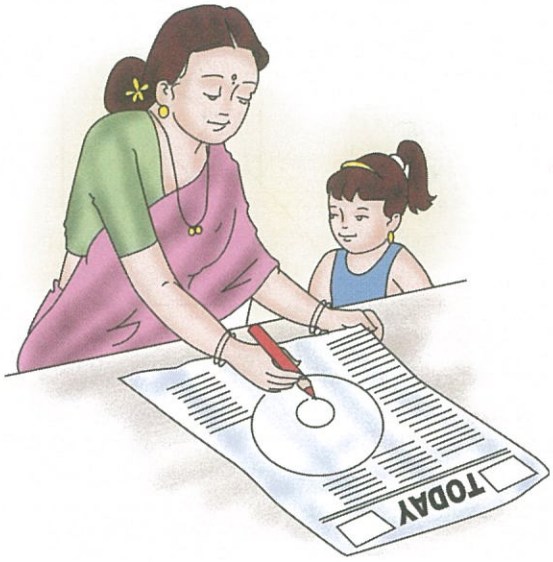
Intervention:

- Take the child's hands to the paper, make circular motion with crayon. Praise the child as he attempts.

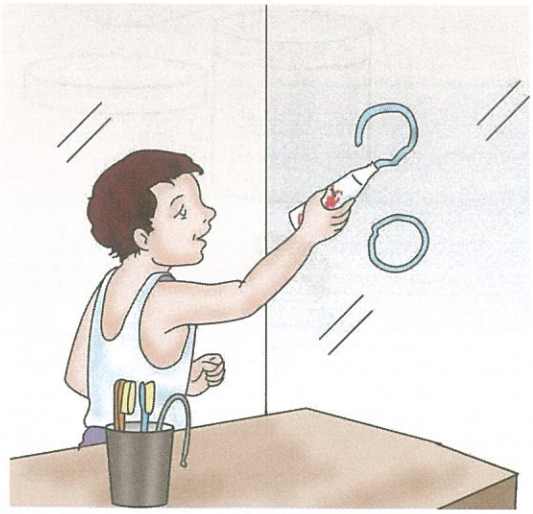




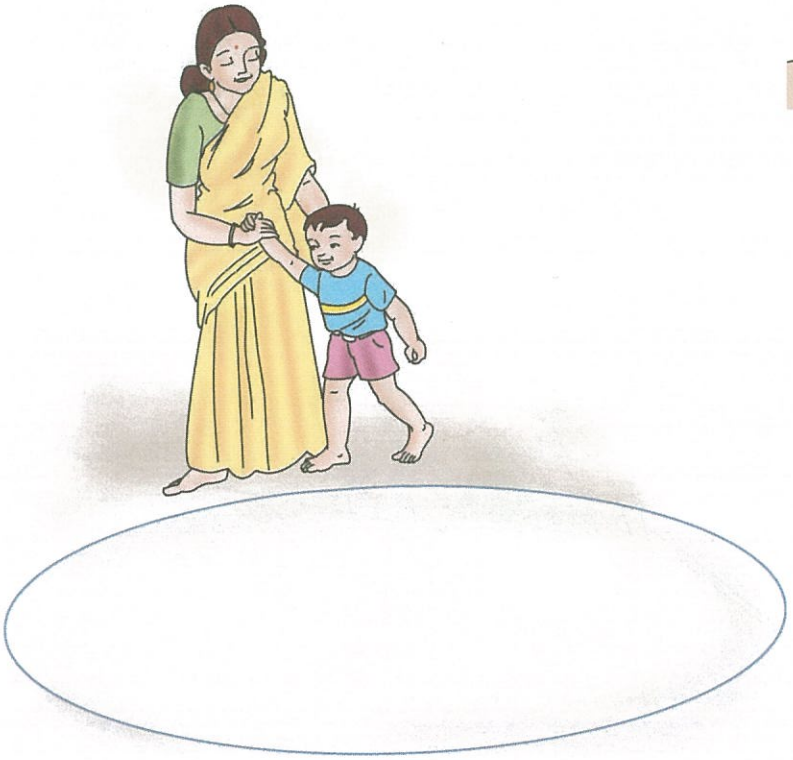
- Encourage the child to use the hand to make the circular movements on the paper, floor, finger paint, or in sand and give him additional practice before using a crayon. Have the child trace around the circle you draw, encourage him to make one on his own. Saying "good circles" and drawing happy faces inside them.



- Use large newspaper to encourage gross movement of the arm, then reduce the size of the paper to encourage fine movement of the fingers.

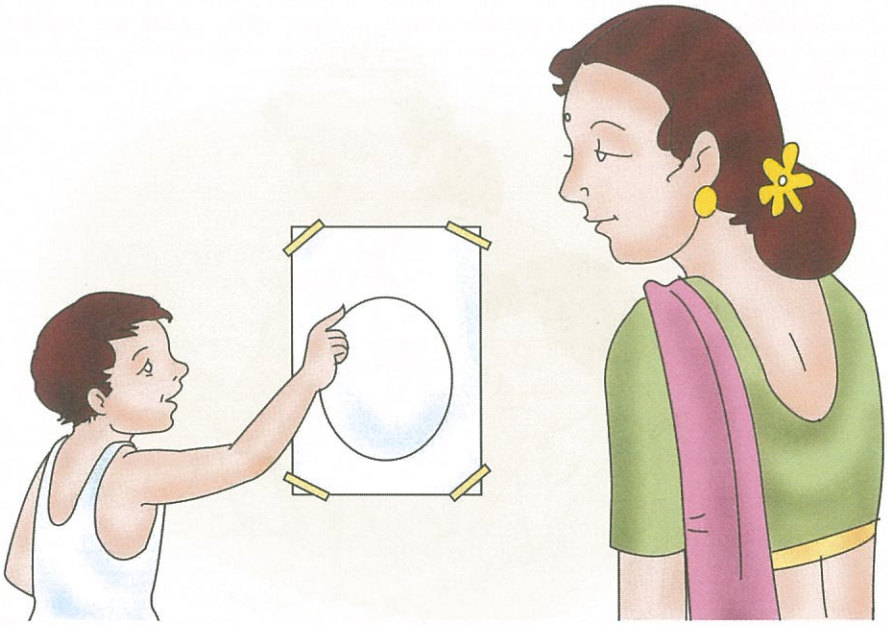


- Have the child practice on the bathroom wall, or plastic table top using paste or cream.



- Draw a circle on the floor and encourage the child to walk around it, Using a grease pencil draw circles on the child's palm and ask him to finger trace the shapes.

- Draw a circle on a piece of paper with a thick crayon. Encourage the child to trace over it with his finger and then with a crayon.



- Using stencil, guide him to trace it himself. Present the child with a picture of a circle and encourage him to copy it. Reward by making a face out of the circle.

APPENDIX

APPENDIX : A

GROSS MOTOR

APPENDIX : B

FINE MOTOR

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