First Edition

Management of Children with Deafblindness with Cerebral Palsy Part - I

Developing Gross Motor Skills

sense International (India)

Working with deafblind people throughout India

Resource and Information Unit

Acknowledgement

Over the years of working with deafblind children and adults, Sense International (India) has witnessed enrolment of many children with Sensory Impairments having associated condition of Cerebral Palsy in its partner projects. Management of children with associated Cerebral Palsy along with deafblindness is often perceived as a challenging task by many of the special educators and parents. This created the need to edify and update the skilled and valuable human resources about management of these children. This booklet gives step by step instructions on the management of problems and developing gross motor skills of children with Cerebral Palsy and deafblindness. The pictorial illustrations will help families and teachers to provide basic need based support to children who are deafblind having the associated condition of Cerebral Palsy.

We thank all children and their educators and parents for putting forth the need for this information material. We also thank the children, parents and organisations for sharing the pictures.

The contents in this booklet is informative and also looks attractive because of the illustrations. We thank Mrs. Viji Dayan and Mr. Shanker Bhoya for the same.

The credit of this booklet goes to the untiring efforts put in by Ms. Anna Daniel to work on and finalise the contents. We would also like to thank Ms. Sampada Shevde, Mr. Uttam Kumar, Ms. Brahada Shanker, Ms. Anuradha Mungi and Mr. Sachin Rizal for their constant support. They have reviewed the sections of chapters, by editing, adding, and compiling with never ending enthusiasm. We also appreciate the efforts of Mr. Shivkumar Sharma in designing the art lay out of the booklet. We also thank Mr. Biju Mathew for his continuous support and encouragement to team members.

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Preface

Children with deafblindness experience a range of associated conditions like Cerebral Palsy, Mental Retardation, Autism, Epilepsy, etc. Children who are deafblind with associated condition of Cerebral Palsy become the subject to orthopaedic and other functional complications, such as limitations of movement, scoliosis, joint instability, bowel and bladder dysfunction, dysarthria and dysphagia, and altered growth and nutrition. The physical and psychological consequences of compromised mobility and independence, difficulties with communication, altered appearance, and chronic illness may also require identification and specific intervention.

Cerebral Palsy along with deafblindness creates more difficulties in the life of individuals by limiting their ability to learn, explore and express themselves in their immediate environment. Thus, it is very important to identify these associated conditions, correct them and facilitate the maximum improvement in a child.

This booklet gives an introduction to Cerebral Palsy, its types, proper positioning and carrying techniques and also techniques to develop gross motor skills. Since each child is different, the reader will have to modify the activities given to facilitate movement, based on the individual child needs and skills, even though the techniques remain the same.

Though utmost efforts are being made to ensure that the information in this booklet is complete and accurate as possible. This text should be used only as a general guide and not as the ultimate source of writing and publishing information. The purpose of this book is to educate the reader and can in no way be taken to reflect the views of the European Union.

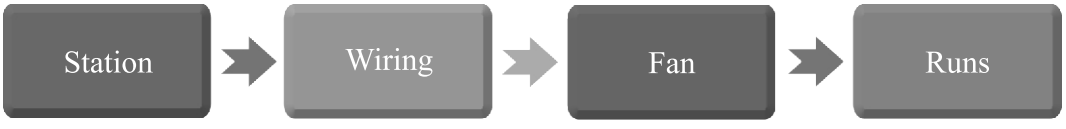
Contents

INTRODUCTION

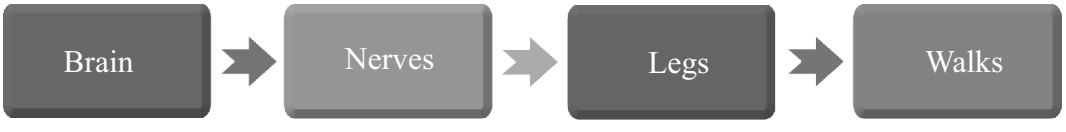
WHAT IS CEREBRAL PALSY (C.P.)?

Function of the human brain and Central Nervous System (CNS) can be compared to the functioning of an electrical equipment, say, a fan. For the fan to function properly, it should have an electric supply. Electricity produced in the station reaches the fan through the electric wires. If a fan does not work, there can be many reasons behind it, which could be

- Electricity is not produced at the station
- There is some problem with the wiring
- The fan is dysfunctional



This is exactly how a human system functions.
The human brain (station) sends in impulses (electricity) which reaches the limbs or other areas (fan) through the nerves (wires).



And if a child does not walk, the problems can be with the brain, nerves or the bony structure of the legs.

In Cerebral Palsy, the problem is with the brain, which sends inappropriate impulses to the limbs through the nerves.

Cerebral = Brain
Palsy = Disorder of movement or posture

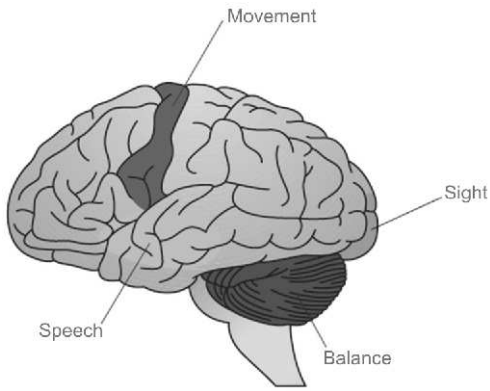
Thus, Cerebral Palsy refers to a disorder of movement or posture due to an insult to the developing brain. Cerebral Palsy or C.P. is a condition that is mainly characterized by an inability to fully control motor function. This may include muscle tightness or spasm, involuntary movement, and/or disturbance in gait and mobility.

It is **NOT** a disease, is **NOT** communicable, and is **NOT** progressive. The term non-progressive means that damage to the brain- while irreversible- does not deteriorate over time; but the effect on the body brought about by the brain damage can get worse, or, on the other hand, can improve. It is caused by damage to the brain, rather than muscles.

This damage can occur before, during or shortly after birth. Lack of oxygen, illness, poisoning, and head injury are some factors that can cause cerebral palsy.

C.P. can range from very mild to very severe. No two people are affected in exactly the same way. Some children with mild C.P. may not be diagnosed until after they are two years old.

Brain controls all that we do. Different parts of the brain have different functions.



Thus the degree of involvement, type of C.P. or severity of C.P. depends on the parts of the brain affected.

CLASSIFICATION OF C.P.

Each child with C.P. is unique. However, for general understanding, C.P. can be classified based on the type of movement disorders or based on the number of limbs involved.

Classification by movement disorder

a. Spastic C.P. (Muscle Stiffness)

This is the most common type of C.P. affecting more than 75% of the population. In spasticity the muscles will be stiff and tight, which limit movements. This causes part of the body to be rigid or stiff. Movements are slow and often the position of the head triggers abnormal positions of the whole body.

Fig.1: *A child who is deafblind and has Spastic C.P. The upper limbs and lower limbs are abnormally positioned beacuase of increased tone*

The stiffness increases when the child is upset or excited or when the body is in certain positions. The pattern of stiffness varies from child to child. They can also have deformities and oromotor problems like drooling of saliva, difficulties in biting, chewing, swallowing etc. These children can be passive and dependent. They are anxious and adapt poorly to change.

b. Athetoid C.P. (Uncontrolled movements)

Athetosis means without fixed posture. These children have uncoordinated and uncontrollable movements. These movements may be fast and jerky or slow and writhing.

They are worse when the child is excited or tries to do something. Children with athetosis have trouble in developing head control, maintain sitting posture or to walk. They also have trouble speaking because of their inability to control muscles of tongue and mouth, making it difficult for them to communicate their thoughts and needs. The constant changing muscle tension in some children with athetosis leads to poor balance and falling over easily.

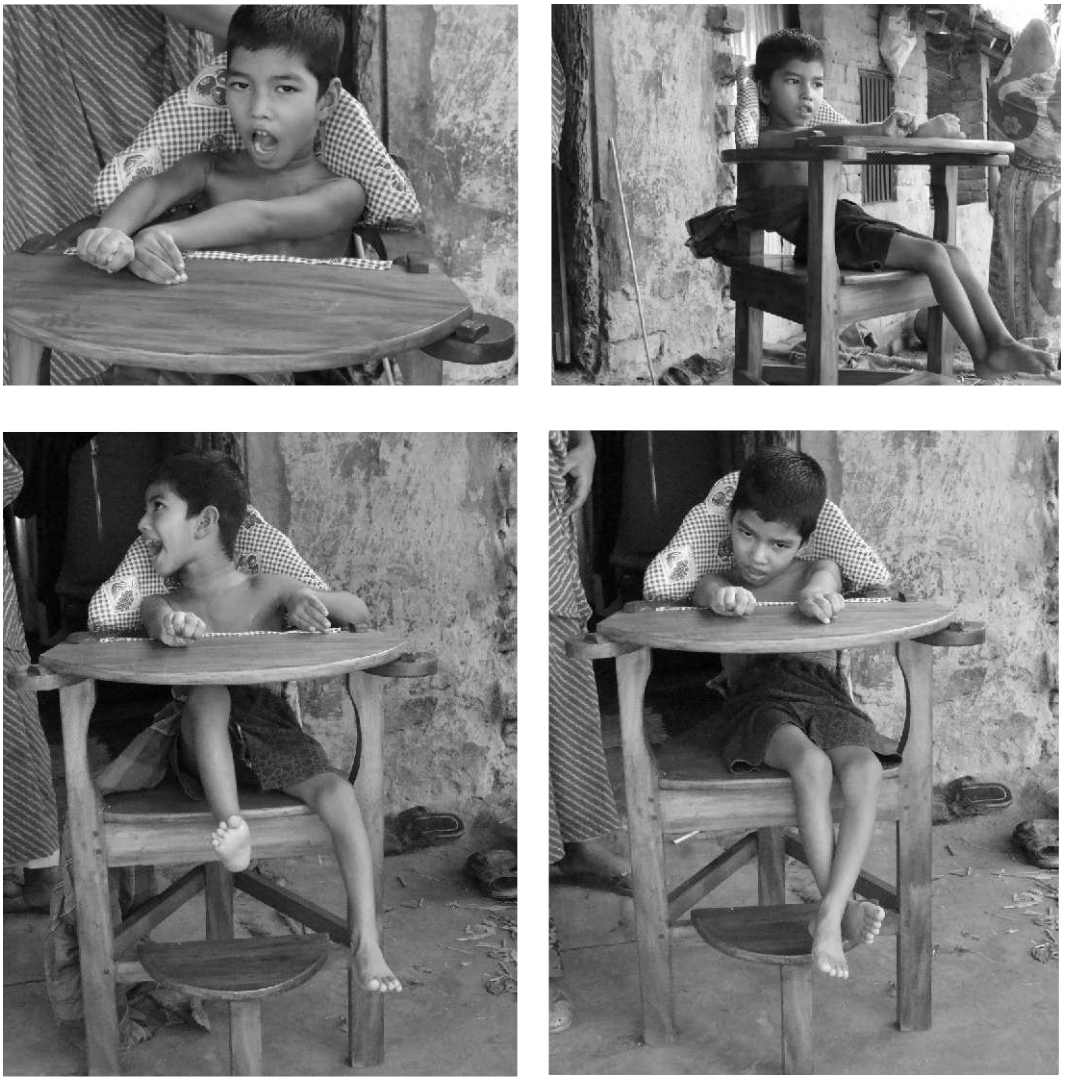


Fig. 3 : *A child who is deafblind and has athetoid C.P. Position of his head and limbs keep changing because of thier inability to control movements.*

c. Ataxic C.P. (Poor balance)

The child who has ataxia or poor balance has difficulty beginning to sit and stand. These children have problems in balance and coordination and in executing smooth movements. They can have tremors when attempting to do a task and these tremors disappear when the child is at rest.

There is lack of stability in shoulders and pelvic girdle resulting in unsteady movements and problems with balance. They walk with a wide base of support.

Fig.4: *A child who is deafblind with Ataxic C.P. walking with a wide base of support.*

d. Hypotonic C.P.

These children are floppy and are unable to assume or maintain a position. Children with hypotonic C.P. appear limp and can move only a little or can't move at all. Most children with hypotonia, by two years of age, develop into spastic or athetoid C.P.

Fig.5: *A child who is deafblind with hypotonic C.P. He is not able to maintain an erect sitting posture.*

Classification by number of limbs involved

Spastic C.P. can again be sub classified based on the part of the body affected.

a. Monoplegia: (Mono= one; Plegia= paralysis)

Monoplegia is a form of spastic C.P. were only one limb, usually one arm, is affected. Child will be able to walk, and do activities with the other hand and be independent.

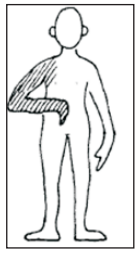


Fig.6: *Monoplegia*

b. Paraplegia: (Para= lower half)

In spastic paraplegia both the legs are affected. Upper limbs are not affected. These children can be independent in self care activities but will have problems in standing and walking balance.

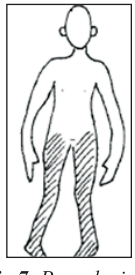


Fig.7: *Paraplegia*

c. Diplegia: (Di= two)

Spastic Diplegia is a form of C.P. primarily affecting the legs. The lower part of the body will be more affected as compared to the upper part, but there will be some abnormal muscle tone in upper part of the body, although to a lesser degree. Child may or may not have oromotor problems.

Fig.8: *Diplegia*

d. Triplegia: (Tri= three)

Three limbs, usually both legs and one arm are affected. Child can have oromotor problems.

Fig.9: *Triplegia*

e. Quadriplegia: (Quadri= Four)

All four limbs are equally affected. Child will not have head control and usually will be dependent in all activities. Problems with feeding are also noted.

Fig.10: *Quadriplegia*

f. Hemiplegia: (Hemi= half)

Limbs of one side of the body are affected. Child can be taught to do his tasks with one hand and will be able to walk.

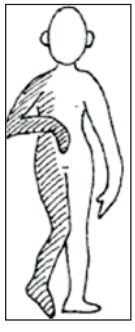


Fig.11: *Hemiplegia*

Children with all types of C.P. can also have the following features

- Absent or delayed gross motor skills like walking, running etc
- Absent or delayed fine motor control like, using hands, writing etc
- Tightness, contractures or deformities like, fisted or closed hands, crossing legs while standing, standing on toes etc.
- Poor bowel and/or bladder control
- Poor or inadequate balance
- Drooling or poor saliva control
- Difficulties in feeding

ASSOCIATED PROBLEMS

Along with the physical problems, children with C.P. may have additional problems.

- Intellectual disability
- Vision or hearing problem
- Deafblindness
- Epilepsy
- Sensory problems like tactile defensiveness, body rocking, head rocking, taste or smell defects etc.
- Orthopaedic problems
- Recurrent chest infections
- Constipation

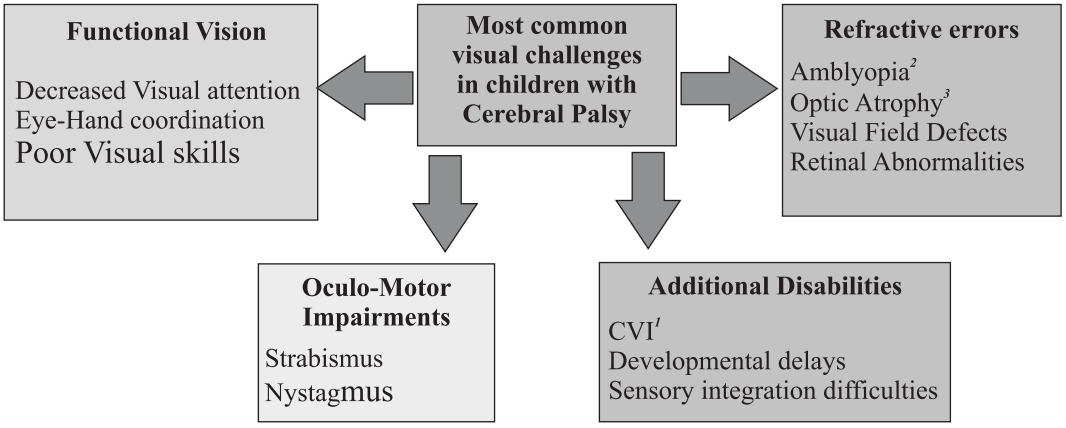
The success of treatment programme and the prognosis of the child with Cerebral Palsy depend on the degree and extent of associated handicaps. Early identification and management of these associated conditions causing handicaps are essential for optimum rehabilitation of the children with Cerebral Palsy.

SENSORY IMPAIRMENT AND C.P.

Visual or hearing impairment or a combination of both i.e. deafblindness is common in children with C.P.

There is a significantly higher incidence of visual impairments in this population. Due to problems with muscle tone, children with Cerebral Palsy are more likely than other children to have certain vision problems. For example, half of all children with Cerebral Palsy have eye muscle imbalance or strabismus (crossed eyes) and refractive errors (nearsightedness or farsightedness). In fact, strabismus occurring in the first few months of life is sometimes the clue that first alerts medical professionals to the presence of Cerebral Palsy. Children with Cerebral Palsy are also more likely to develop amblyopia, the condition known as "lazy eye" in which the brain suppresses vision in one eye because of problems caused by strabismus or cataracts. Amblyopia can be corrected if discovered early in life. Some premature children are likely to develop Retinitis of Prematurity.

Loss of coordination of the muscles controlling eye movements is very common with strabismus (the turning in and out of the eye due to weakness in eye muscles) being the most predominant. The child cannot fix his gaze on an object due to decreased visual attention resulting in poor visual skills. In half of the cases, binocular vision (vision in which both eyes are used together) does not develop.



[1] ***CVI:*** *Cortical Visual Impairment*
[2] ***Amblyopia****: a disorder of the visual system that is characterised by a vision deficiency in an eye that is otherwise physically normal*
[3] ***Optic atrophy:*** damage to the optic nerve

In addition to this, Cortical Visual Impairment (Cerebral Visual Impairment [CVI]) is sometimes a problem which accompanies C.P. It means that the child does not seem to see, or does not seem to see well (due to damage in the visual cortex of the brain), even though the eyes appear to function properly. CVI can cause the vision to fluctuate from day to day and minute to minute. It can also impact depth perception and cause a field loss. This is a condition which may persist into adulthood but, in many cases, may recover to some extent. Stimulation of the eyes by using lights and bright colours can be of enormous benefit in helping the recovery process. Always ensure that the room is always brightly lit when the child is doing any activity. The following ideas may help you to create some enjoyable visual stimulation for your child with CVI:

- Make a play mat out of shiny paper covered with sticky-backed clear plastic (the kind you can buy in rolls for covering textbooks etc.) You can further add to the effect by scattering glitter and other shiny objects under the plastic. You can add squeaky buttons to bring auditory stimulation and pleasure into the game.
- Set disco lights and bright coloured decorations on a frame for your child to play under.
- Coloured and illuminated targets as shown in Fig. 12 .

Fig.12: *Coloured and illuminated targets*

- Get hold of some disco lights and let the child enjoy frequent light shows.
- Make sure you have a bright light shining on the toys when you are playing with child.

Fig.13:*Toys with bright lights*

Children with C.P. are also likely to have problems with visual concentration and/or eye-hand coordination skills. Many of the children expend so much energy and concentration on keeping their body upright due to the muscle tightness and controlling an accurate reach, etc. they have little left over to use for visual tasks. For such children supporting and stabilizing his/her body will help him/her, to concentrate on looking and reaching for an object. If trunk and head control is the skill that we want to work on, it would be ideal to use a visual toy as a motivator. As a team we need to consider the types of demands you are placing on the child within any given activity.

Similarly both conductive and sensorineural hearing loss is seen in 10-15 % of children with Cerebral Palsy. Children born prematurely are at high risk for hearing loss. It is generally not diagnosed early because of other handicaps. An examination by a paediatric audiologist can help measure the extent of hearing loss in such children. Depending upon the hearing loss, hearing aids can be very effective, even in

infants, in helping the child as much as possible. Sometimes speech problems are also associated with C.P. children especially 'DYSARTHIA' (Speech problems with difficulty in producing sounds and articulating words). Spasticity or athetosis of the muscles of the tongue, mouth and larynx cause Dysarthria. This will lead to improper language development and difficulties with normal speech in the child. These children will need the auditory cues required for normal language development. A thorough understanding of the scope of impairment is mandatory in being able to give the child with C.P. the best education possible.

Visual (CVI) and auditory integration problems are frequently noticed in children with Cerebral Palsy. This is different from having a physical inability to see or hear things. When a child has a visual processing deficit, it means that they have a hard time finding the words for objects they are viewing. Sometimes if they are asked to go get an object, they might look right at it and then say they can't find it. This is because they are seeing it but their brains are not processing what they are viewing.

Auditory integration problems are the same, the child hears what you say but the brain does not process it in a way that is meaningful. It may take several minutes for what you have said to "click" with the child and make sense. One helpful way of interacting with a child who suffers auditory integration problems is to break down instructions, giving them one thing at a time to do. Let them finish with the first task before you give them direction for the next step. Music therapy can also be helpful with treating auditory processing deficits.

Thus, it is very important to identify these associated conditions and correct them, if possible, to get maximum improvement from a child. Regular visits and reviews with an ophthalmologist and/or ENT specialist are advisable.

ROLE OF VISION AND HEARING IN MOTOR DEVELOPMENT AND C.P.

Normal development occurs in a series of steps, with each motor act building on skills that have been previously acquired. Vision and hearing play an important role in motor development. It helps the child to orient and move towards people and environment. Children learn and develop motor and other cognitive skills by interacting with the environment for which vision and hearing plays a major role. Young children with deafblindness experience delays in motor development due to the decrease in vital sensory input needed to stimulate movement. Their ability to get around and explore the environment is very limited, as a result these children get very less opportunities to learn from and interact with the environment around them. These children also lack curiosity and motivation to seek out new situations in the world around them due to their dual sensory loss.

Impact of Deafblindness on a Child with Motor Developmental Delays and Cerebral Palsy.

When there is a combination of Cerebral Palsy and deafblindness, the result is not just a simple addition of the results of the handicaps, but rather a multiplication of disability. This combination of sensory losses with each other and with other problems present the most devastating results, and the interaction of the problems has to be considered. Cerebral Palsy may further limit children with deafblindness from actively moving and interacting with the environment, which will result in limited learning. Children with deafblindness may prefer certain positions like lying in supine (on their backs) all the time. They do not like lying on their stomachs (prone) or other antigravity positions like sitting and standing because of postural insecurity as well as due to the lack of visual input in these positions. These children do not like to be handled because of tactile defensiveness and fear and this will in turn prevent their parents from changing their positions. This lack of movement and improper positioning will increase their tone and lead to development of tightness, contractures and deformities, further limiting movement and development of higher motor skills.

Children with deafblindness and Cerebral Palsy may also have problems with visual concentration and/or eye-hand skills. Many of the children expend so much energy and concentration on keeping their body upright, controlling an accurate reach, etc. they have little left over to use for visual tasks. These children will benefit from

additional sensory input and encouragement to right their reach or their heads in different positions in order to develop head control and more mature righting and equilibrium responses.

For most of the deafblind children communication modes requires the use of motor movements like using sing language, pointing to objects or giving objects. But these children with concurrent Cerebral Palsy may face lots of difficulties to communicate through tactile sign language or the above techniques, because of poor hand functions, making communicating with them more difficult.

In this booklet we are trying to give techniques to manage children with cerebral palsy giving emphasis on deafblindness. Since each child is different, the reader will have to modify the activities given to facilitate movement based on individual child's needs and skills even though the techniques remain the same.

DIAGNOSIS

Diagnosis of C.P. is made by a Physiatrist (Doctor specialised in Physical Medicine Rehabilitation (PM&R)) or Paediatrician with inputs from Occupational Therapist, Physiotherapist, or other professionals. They look at the development of skills of the child and also look out for features like tonal abnormalities, tightness, reflexes etc.

The doctor may also order specialised tests like CT scan or MRI to assist them in the diagnosis.

PROGNOSIS

Is C.P. curable?

No. C.P. is not a sickness like fever which one can treat and cure. The damage to the brain is permanent and not reversible. However, with early and proper intervention we can train the child to become independent.

What medical treatment or surgery is available?

There are no medicines to cure C.P., however, medicines are given to reduce spasticity and other problems. Medical management includes oral medication like diazepam, injections and surgeries to reduce spasticity and involuntary movements and to correct deformities. These should be done under the guidance of a Physiatrist. However, the effects of these are not long term and it has to be combined with regular physical and Occupational Therapy to obtain maximum benefits for the child.

Will my child walk?

This is often one of the biggest concerns of all parents. Each child with C.P. is unique. The improvements seen in a child is directly proportional to the area damaged in the brain. More the damage lesser the improvements. Generally, it is said that if a child sits independently by 2 years he will be able to walk. However, this is based on observations and many other factors and cannot be generalised to all children with C.P. Not all children learn to walk. It is important to concentrate on other areas of development.

WHAT ARE MOTOR SKILLS?

A motor skill is an action that involves the movement of muscles in your body. It is done with the intent to perform a specific act. Thus, running, jumping, writing, stringing beads are all motor skills.

WHAT ARE GROSS MOTOR SKILLS?

Gross motor skills are large motor skills, one that involves the larger muscles such as those in the arms, torso and legs. Activities involving gross motor skills require balance and coordination. Such skills allow the child to move in a variety of ways. Gross motor skills are essential in body development. A child can comfortably move on to fine motor skills only after he has gained reasonable large motor skill. Gross motor skill begins to develop right from infancy itself. Gross motor skills are the first on the child's milestone charts. Gaining head control is probably one of the first motor skill that an infant develops - this happens when the neck muscles are sufficiently mature. This process moves lower down as the shoulder and hands gain some control. The trunk and the hips and then the legs attain better balance and coordination. It will be noticed that gross motor skills such as turning the head from side to side might occur around 2 weeks whereas holding the head upright tends to happen around four to five months. Around the same time, the infant tries to bring his hand up and grasp an object. While a child can sit up independently around eight or nine months, he/she can walk and run only few months later.

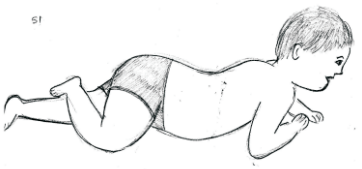
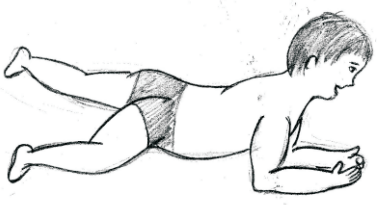
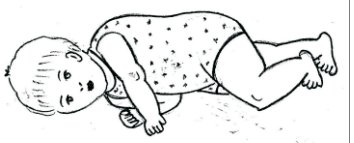
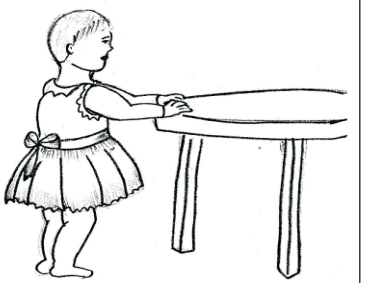
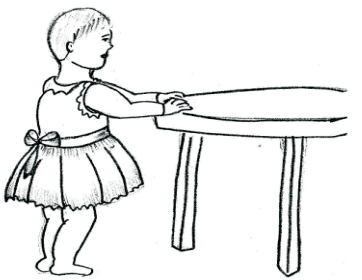
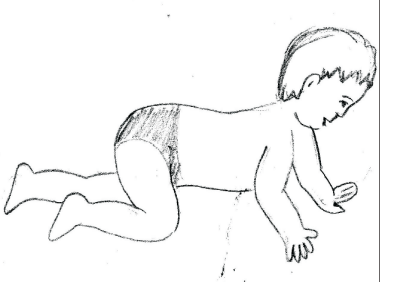
Jumping, hopping, climbing, skipping and catching - these are activities that kids master over time. Running involves considerable gross motor coordination. Hopping and climbing are also other activities that encourage gross motor development. Ball play games are ideal for kids as they grow beyond a year. This kind of activity also fosters good control over the body.

NORMAL CHILD DEVELOPMENT

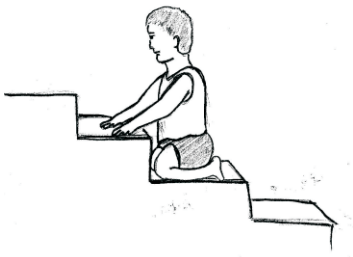
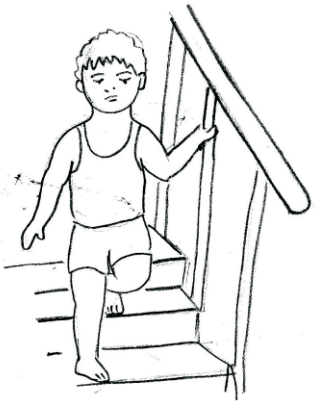
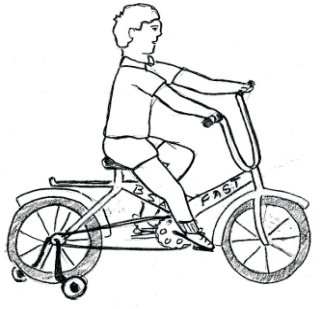
Principles of child development

- Development is a continuous process which starts from the time of conception and continues after growth.
- Development occurs in a proximal to distal direction. For example, before a child starts to grasp objects with his hands, he should have adequate control of arms and forearms to reach the object.
- Development occurs in a cephalo caudal direction, i.e. from head to toe. Head control develops first, followed by trunk control (sitting) and hip control (crawling). Standing and walking develops later.
- Development occurs in a sequential and hierarchical manner. Only after head control develops, the child will learn to sit. A child will not be able to stand or walk without good trunk control or hip control.

Normal gross motor development

Age	2 months	3 months	6 months	7 months
Gross Motor Skills	Attempts to lift head when lying on stomach	Head control	Roll over	Sits with hand support
				
	Fig.14: *Attempts to lift head*	***Fig.15:*** *Raises head and trunk off the floor while weight bearing on the forearms*	***Fig.16:*** *Rolls over*	***Fig.17:*** *Sits with hand support*
Age	**8 months**	**9 months**	**10 months**	**11 months**
Gross Motor Skills	Sits without support	SkipsStands holding on to furniture	Cruises: Walks sideways holding on to furniture	Crawls
				
	Fig.18: *Sits without support*	***Fig.19:*** *Stands holding on to furniture*	***Fig.20:*** *Walks holding on to furniture*	***Fig.21:*** *Crawls*

Normal gross motor development

Age	12 months	13 months	18 months	2years
Gross Motor Skills	Walks with one hand held	Walks independently		Runs stiffly; climbs stairs holding on to railings
	 ***Fig.22:*** *Walks with one hand held*	 ***Fig.23:*** *Walks independently*	 ***Fig.24:*** *Crawls up stairs*	 ***Fig.25:*** *Climbs stairs holding on to railings*
Age	**3 years**	**4 years**	**5 years**	
Gross Motor Skills	Runs well; rides a tricycle	Skips	Hops	
	 *Fig.26: Rides tricycle*	 ***Fig.27:*** *Skipping*	 ***Fig.28:*** *Hopping*	

MANAGMENT

There is no standard treatment that works for all children. However, a combination of certain therapies helps in improving the skills of the child. The treatment team consists of

- Family members
- Physiatrist (Doctor)
- Occupational therapist
- Physical therapist
- Speech therapist
- Special educator
- Social worker
- Psychologist

HOME TRAINING

Since children spent almost all or most of their time at home, parents play a very important role in child's development. The activities and exercises can easily be done at home without using expensive equipments.

Points to remember

- Start with limited exercises for limited period of time, say, one minute for each activity. Slowly increase the time period. DO NOT FORGET TO REWARD YOUR CHILD.
- A child develops in many areas at a time. So give activities in all the areas rather than limiting to just one.
- Provide activities based on the age of the child. For example 1 year old child should be made to do all developmental activities up to standing with support as needed. This will help the child to experience normal developmental patterns.

POSITIONING AND CARRYING TECHNIQUES

Positioning refers to the use of appropriate body positions. Due to abnormal pull of muscles, children with Cerebral Palsy often spend a lot of time in abnormal positions, which can result in contractures and deformities, which in turn causes delay in the development of skills. These abnormal positions of the limbs and body should be avoided as much as possible. Similarly, care should be given while carrying and moving or assisting a child in moving from one position to another.

The following positioning and carrying techniques can be used in the class rooms as well as while teaching the child.

Points to remember while carrying and positioning the child

- In any position the child should look balanced – no leaning or twisting
- Positions should help the child relax and should keep pressure off the bony areas of his /her body
- Positions should be changed frequently throughout the day.
- Try to position the child so he can see what is going on around him.
- Try not to move the child suddenly or jerkily. The muscles may need time to respond to changes in position.
- Some children's muscles tense (spasm). Let muscles tense and relax on their own time – don't force movements.
- Fear can make muscle spasms worse, so give the child as much support as he needs when you are handling him, being careful not to give more support than he needs
- As a general rule, while positioning in sitting, feet should be flat on the floor, knees bending at right angles, with hips firmly against the back of the seat.
- Correct positioning should increase purposeful movement in normal positions and postures. For e.g.: by freeing the child's head for turning and looking and letting the arms for reaching
- Get down to the child's level when talking or playing with the child (e.g.; squatting to be face to face with the child)
- Firmer surfaces may be needed for the child with low muscle tone.

Carrying and positioning techniques

- Lifting

While lifting a child with C.P. make sure that the head and trunk is well supported as shown in Figure 29(a). Head and neck should be slightly flexed. This will reduce the tone of the entire body and makes lifting easier.

DO

Fig.29(a): *Lifting a child with head and trunk well supported*

DON'T

Fig.29(b):*Improper method of lifting a child with C.P.*

- Carrying techniques

While carrying a child with spasticity always note to keep the legs apart as shown in the figure *30*. This will help prevent the development of tightness or deformities in the lower limbs.

Fig.30: *Carrying a child with spastic C.P. with legs kept apart*

If the child is hypotonic or athetoid, the following carrying technique as shown in ***Fig 31(a)*** will be better. Do not carry a child as shown in ***Fig 31(b)*** as this can lead to a developing tightness and contractures.

DO

Fig.31(a): *Carrying a child with hypotonic/ athetoid C.P.*

DON'T

Fig.31(b): *Improper way of carrying a child with C.P.*

- Positioning techniques

Positioning a child appropriately is very important for a child with deafblindness along with Cerebral Palsy especially while doing visual and auditory training. Proper positioning helps in proper alignment of the eyes and the head. It gives them a postural security and the child will be able to respond better when positioned appropriately.

Lying down: supine (on back)

DO

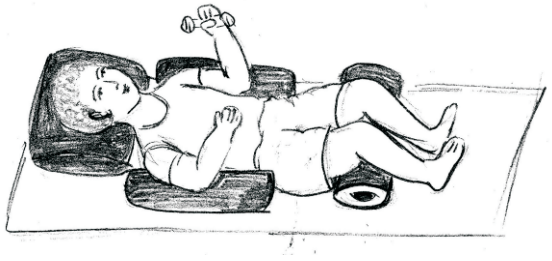


Fig.32 (a): *Child with C.P. well positioned in supine*

DON'T

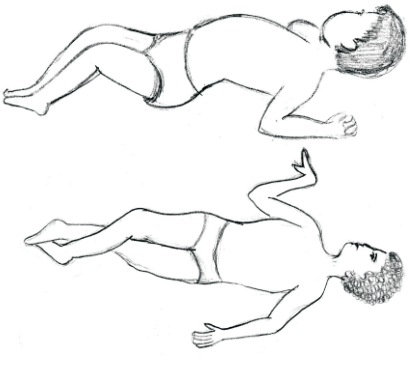


Fig.32 (b): *Position to be avoided in supine*

While positioning a child in supine, the head should be slightly elevated using a small pillow. Two small rolls should be placed on both sides and one roll under the knees as shown in *Fig.32(a)*.

Lying down: prone (on tummy)

On tummy, child can be positioned on elbows as shown in *Fig. 33(a)* and also on palms as shown *Fig. 33(b)*. While on elbows keep a small roll under the chest. Two rolls can be kept on both sides as well, as shown in *Fig.33(a)*.

Child should be kept on a wedge to position him/her on the palms. If a wedge is not available a bed can be folded and used as shown in *Fig.33(b)*. The elbows should be kept straight. If the child cannot maintain his/her elbows straight by self, gaiters can be used.

DO **DON'T**

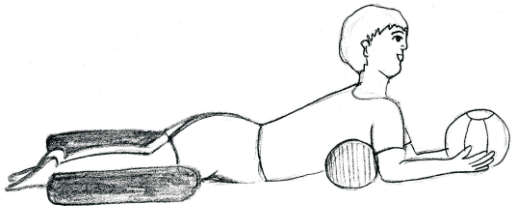


Fig.33 (a): *Child with C.P. well positioned in supine*

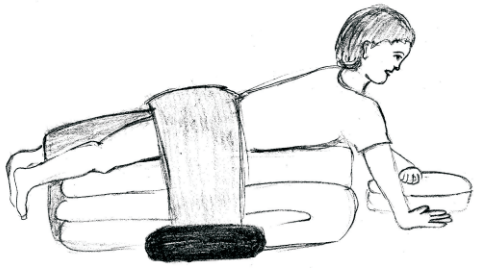


Fig.33 (b): *Positioning a child with C.P, in prone on palms*

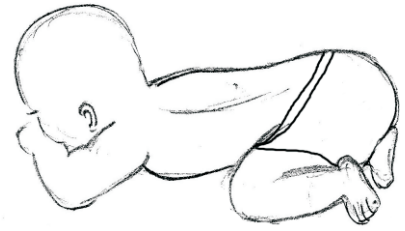


Fig.33 (c): *Position to be avoided in prone*

Side lying:

In side lying a child can be positioned as shown in *Fig. 34(a)*

- Small roll under the head
- Long roll in front extending from chest to legs
- One leg to be kept on top of the roll
- Position the child on both sides as this will help develop laterality as well as develop lateral neck flexors of both sides

DO

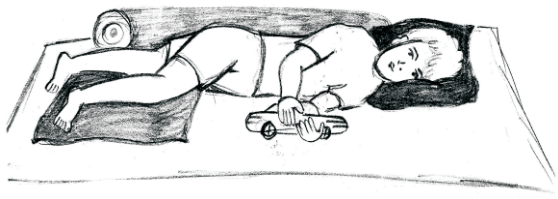


Fig.34 (a): *Child with C.P. appropriately positioned in side lying*

DON'T

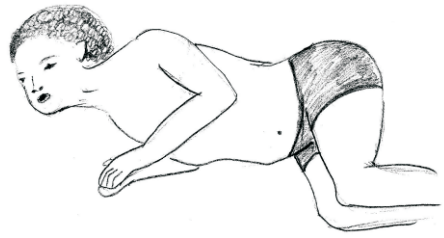


Fig.34(b): *Position to be avoided in side lying*

Sitting:

Children with deafblindness can have severe postural insecurity in an upright position. So, always encourage the child to be in an upright position (sitting and standing) as early as possible, for a few hours every day.

The common abnormal sitting postures seen in children with C.P. are as follows.

Fig.35(a): *Abnormal sitting with bent head and trunk*

Fig.35(b): *Sacral sitting*

Fig.35(c): *Sliding off a chair in sitting*

Fig.35(d): *W-sitting*

If a child with associated deafblindness is positioned like this he cannot keep his head upright making it difficult for him/her to use the residual vision and hearing. Moreover, his hands won't be free. W-sitting as shown in Fig. 35(d) will lead to development of deformities in the lower limbs and can affect the further development of the child like crawling and walking.

The appropriate positions to seat a child with C.P. is as follows. Some children need assistive devices to keep them seated.

Corner sitting: the child is made to sit on the corner of the room. A small wedge can be used between the legs and a lap board can be used to give activities to the child.

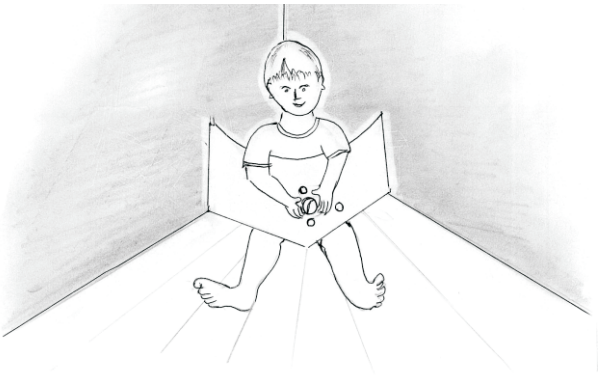


Fig.36: *Corner sitting*

Corner stool: can be used in class rooms along with lap board. The abductor block keeps the legs separate.

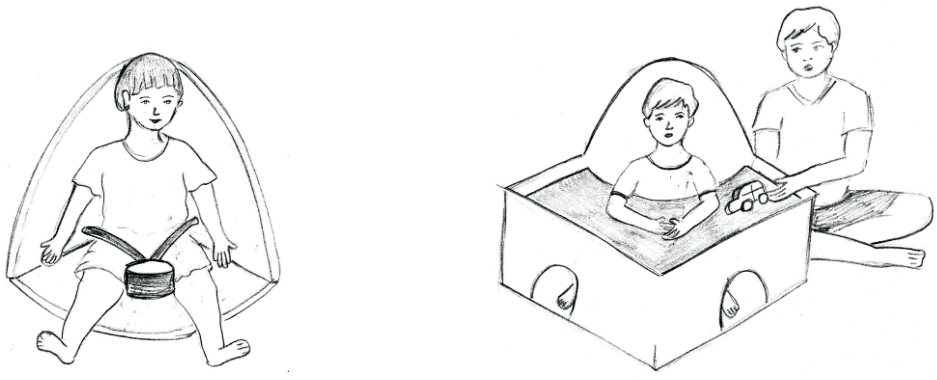


Fig.37: *Corner stool*

C.P. chair: While using a modified chair the following points should be noted

Fig.38: *C.P. chair*

- Always cushion the chair and the accessories so that the child will not get hurt
- Make sure that the hips, knees and ankle are at 90^{o}
- The feet should always rest on the floor. If not, provide a small foot rest.

- The legs should always be kept apart. This can be done by keeping a roll between the legs. Also we can modify the chair as shown in the Fig. 39.

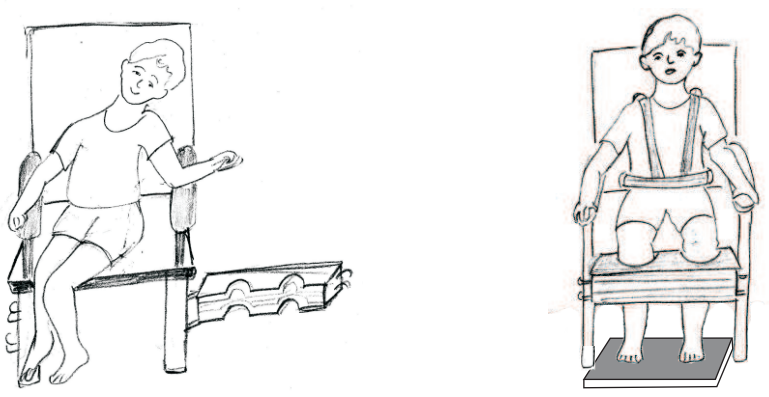


Fig. 39: *Modified chair to keep legs apart*

We could also strap the child's leg at the calf to the leg of the chair using velcro straps.

- If a child slips off from the chair (Fig. 40(a)), the seat modified as shown in Fig. 40(b), where the seat is tilted backwards

Fig. 40(a): *Child with C. P. slipping off a chair*

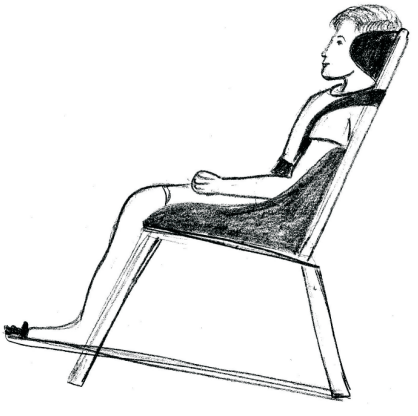


Fig. 40(b): *Modified chair with seat tilted backwards*

- If the child cannot keep her back straight (fig. 41(a)), modify the seat as shown in fig. 41(b), where the seat is tilted forwards

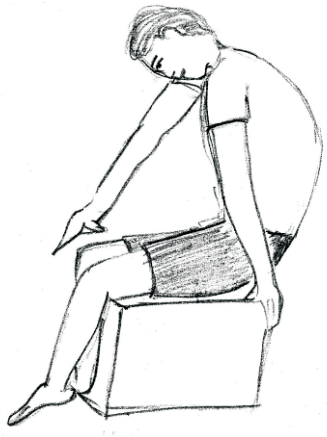


Fig. 41(a): *Child with C. P. sitting with a bent posture*

Fig. 41(b): *Modified chair with seat tilted forwards*

- Height of the back rest should depend on the child's trunk control. Better the trunk control, lower the height of the back rest
- A lap board should be provided, so that the child can do activities on it.
- If the child bends his trunk to one side while sitting (Fig. 42(a)), it will lead to deformities. Trunk blocks can be added to prevent this (Fig. 42(b)).

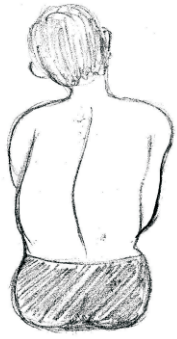


Fig. 42 (a)*: Child bending his trunk to oneside*

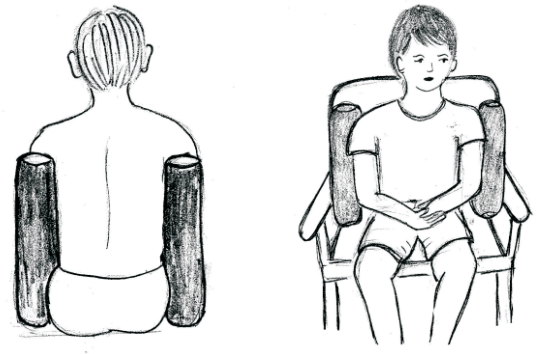


Fig. 42(b)*:Trunk blocks provided to prevent trunk curvature to sides*

- If the child is not mobile, wheels can be attached to the chair, so that it will be easier for the parents to move the child around the house

➢ ***Chair/ wheel chair measurements***

a. **Seat height**: bottom of the heel to the posterior thigh, then adding 2" to compensate for leg rest clearance
b. **Armrest height:** 1 inch higher than the distance from the bottom of the buttocks to the elbow kept at the side
c. **Back rest height:** measured by the distance from the bottom of the buttocks to the level of the spine of the scapula. (may vary)
d. **Seat width:** 1 inch wider than the width of the widest part of the buttocks
e. **Seat depth:** 2 to 3 inches less than the distance from the popliteal area to the back of the buttocks

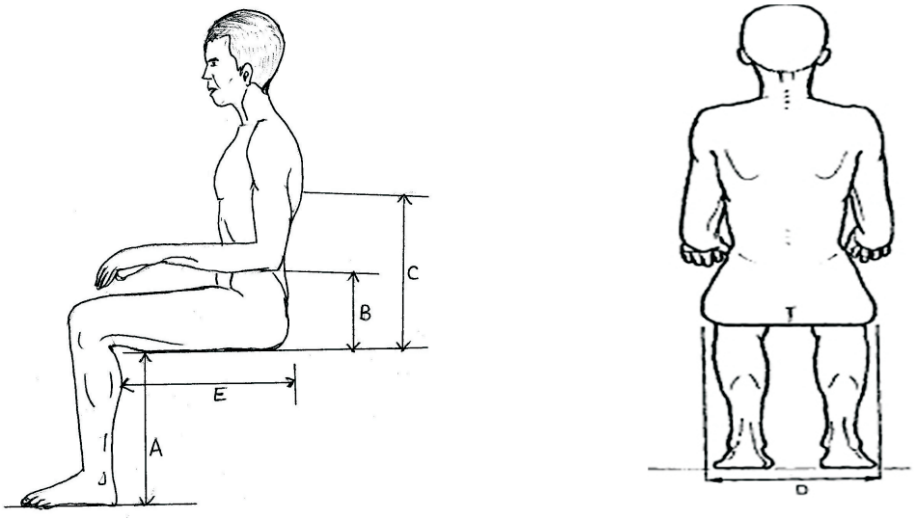


Fig. 43: *Chair/ wheel chair measurements*

Standing

Standing frame: a standing frame provides complete support to a child while he is standing. Making a child stand on a frame for 5-10 minutes can bring down and normalise the overall tone of the body. Activities can be provided to child while standing. KAFOs, AFOs, or gaiters should be used as needed to keep the lower limbs in the correct position. Hip and trunk belts will help to keep the trunk and hip erect. As the balance of the child increases these can be gradually removed.

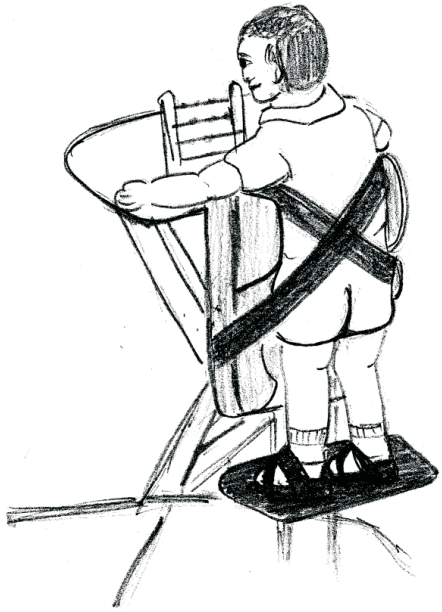


Fig. 44: *Standing frame*

MODIFIED SHOES

Ankle Foot Orthoses (AFOs):

When the child has good control of the knees but stands on toes, AFOs can be used. It supports the ankle and foot of the child.

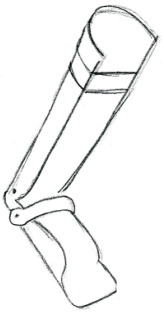


Fig. 45: *Ankle Foot Orthosis (AFO)*

Knee Ankle Foot Orthoses (KAFOs):

When the child does not have control of both knees and ankle and stands with bent knees and on toes, KAFOs should be used.

Fig. 46: *Knee Ankle Foot Orthosis (KAFO)*

Medial arch support:

Medial arch support is used for flat foot (Fig. 47(a). It can be inserted or an ordinary foot wear can be modified with a medial arch.

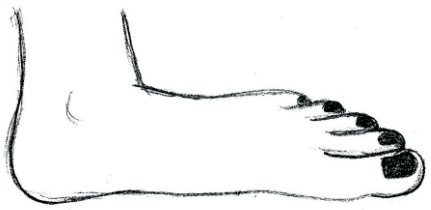


Fig. 47 (a): *Flat foot*

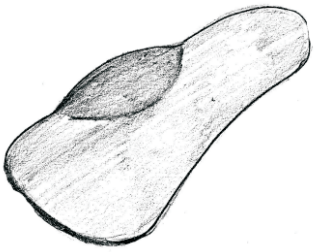


Fig. 47(b): *Medial arch support*

ACTIVITIES TO IMPROVE GROSS MOTOR SKILLS

General relaxation and activities to reduce tightness

Doing certain activities helps the child to relax. It should be done under the guidance of a Physiotherapist or an Occupational Therapist.

Shoulder flexion

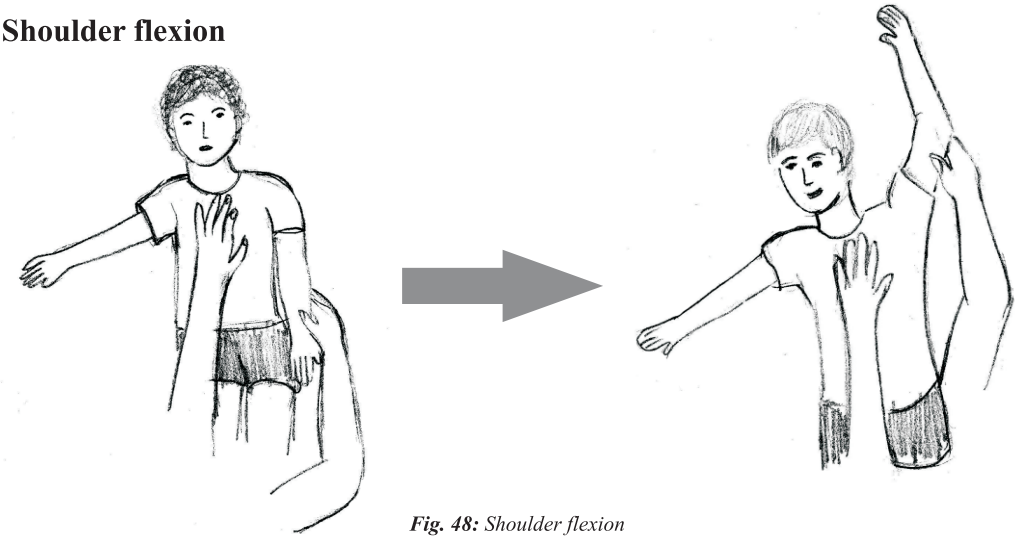


Fig. 48: *Shoulder flexion*

Shoulder abduction - adduction

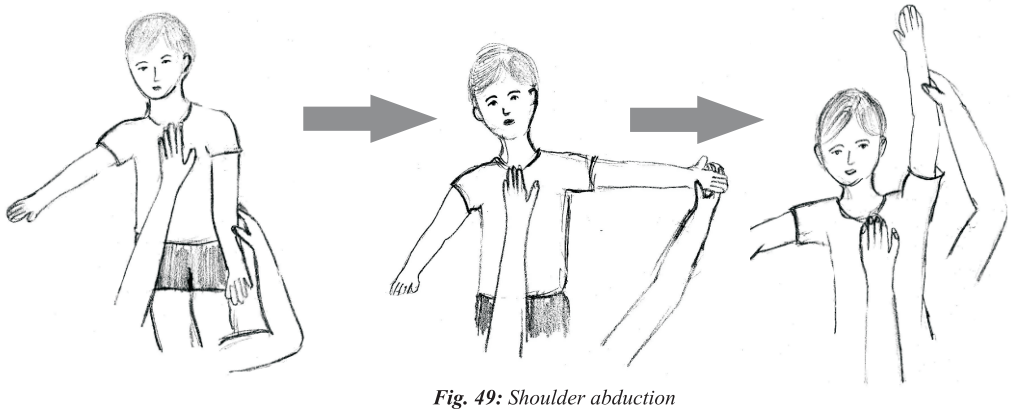


Fig. 49: *Shoulder abduction*

Shoulder: Internal rotation - External rotation

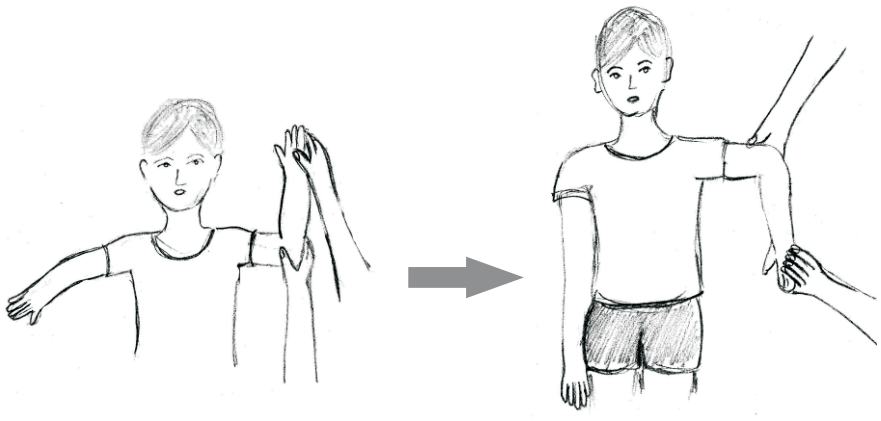


Fig. 50: *Shoulder internal rotation- external rotation*

Elbow flexion – extension

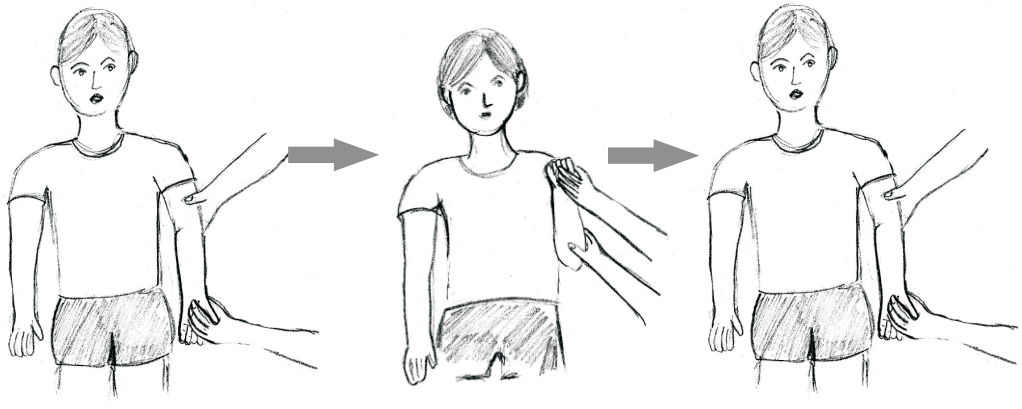


Fig. 51: *Elbow flexion- extension*

Forearm pronation – supination: Hold the child's hands as though you are going to shake his/her hand (*Fig. 52(a)*). With your other hand, hold above child's elbow. Slowly turn the forearm to both the directions (*Fig. 52 (b)*). It should be done with elbows bent and elbows straight.

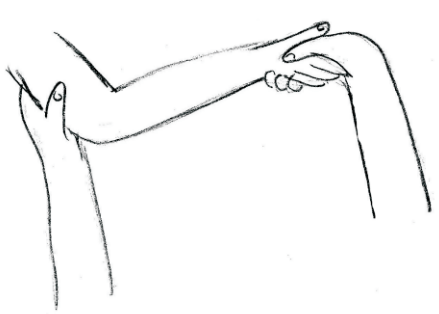


Fig. 52 (a): *Forearm pronation-supination - start position*

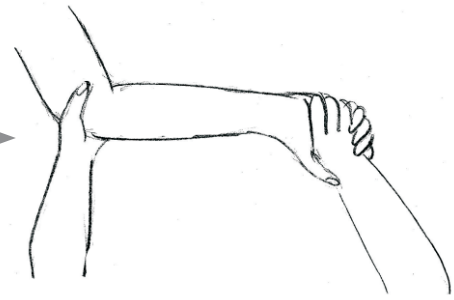


Fig. 52(b): *Forearm pronation-supination - end position*

Wrist and finger flexion and extension

If the child's wrist and fingers are bent as shown in *Fig. 53*, do as follows.

i. Slowly bring the thumb out. (*Fig. 54(a)*)
ii. Open the hands by straightening the fingers (*Fig. 54(b)*)
iii. Straighten the wrist and bent it backwards while keeping the finger and thumb straight (*Fig. 54(c)*)

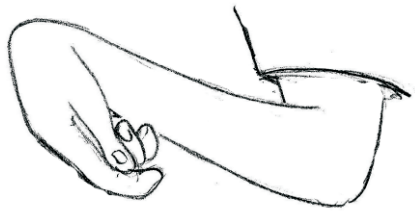


Fig. 53: *Wrist and finger deformity seen in children with C.P.*

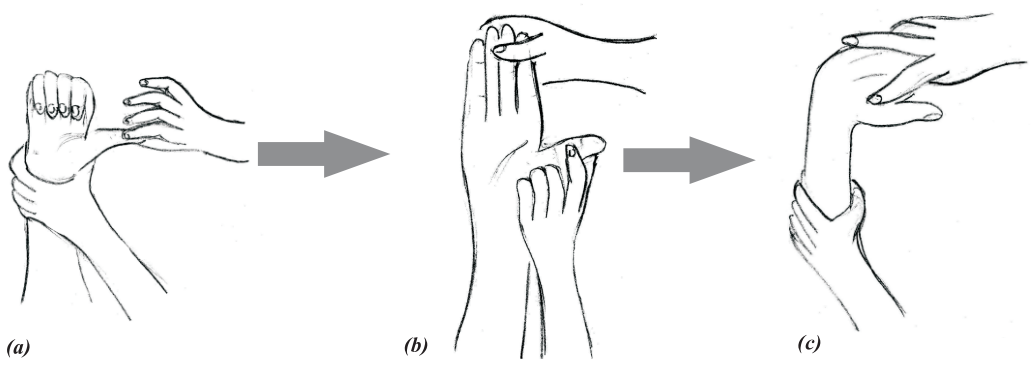


Fig. 54: *Wrist and finger extension*

Hip flexion: Straighten both legs. Slowly bend one leg at the hips and knees while keeping the other leg straight.

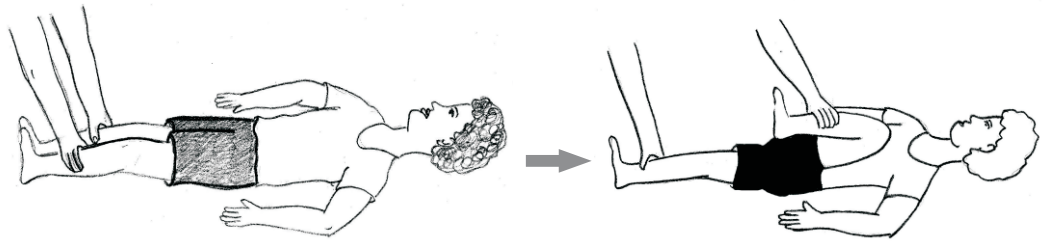


Fig. 55: *Hip flexion*

Hamstring stretch: Hip flexed to 90°, slowly extend knees. Keep till 10 counts

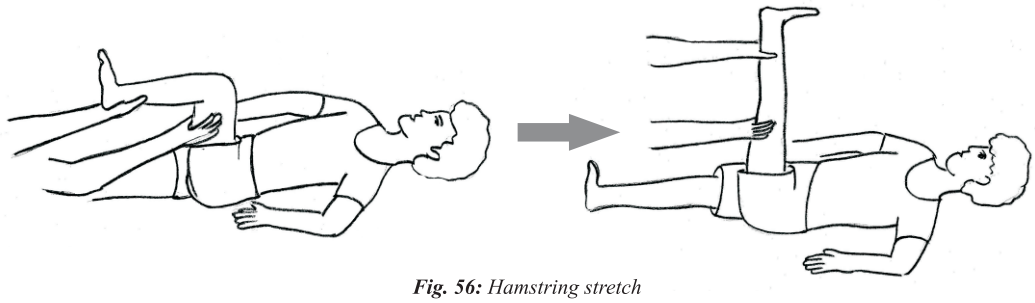


Fig. 56: *Hamstring stretch*

Hamstring stretch can also be done in long legged sitting and standing and stooping.

Long Legged Sitting and Stretch: make the child sit with both the legs straight at the knees. Gaiters can be used to keep it straight. Keep something in the front and ask the child to take it without bending his/her knees.

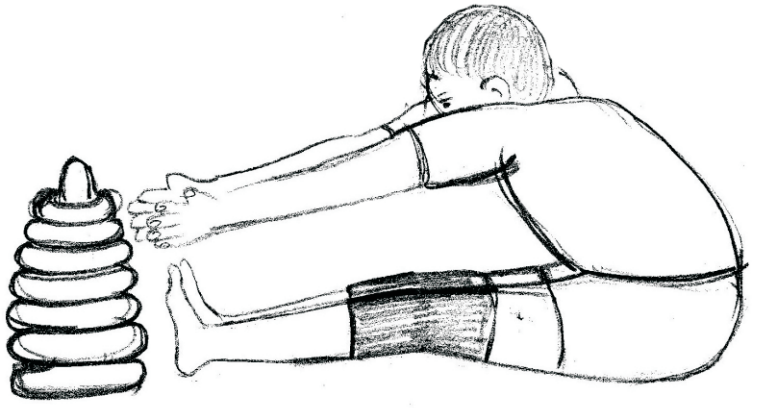


Fig. 57: *Hamstring stretch in long legged sitting*

Stand and stoop: make the child stand with AFOs and gaiters for the knees. Ask him to bend down and take something from the floor and then to straighten up and put it in a basket overhead

Fig. 58 *Hamstring stretch in standing and stooping*

Ankle stretch: Child lying down on the floor. Bend the hips and knees to 90°. Slowly bring the ankle up towards the shin of the leg. Straighten the knees while keeping the ankle in the same position and hold for 10 counts.

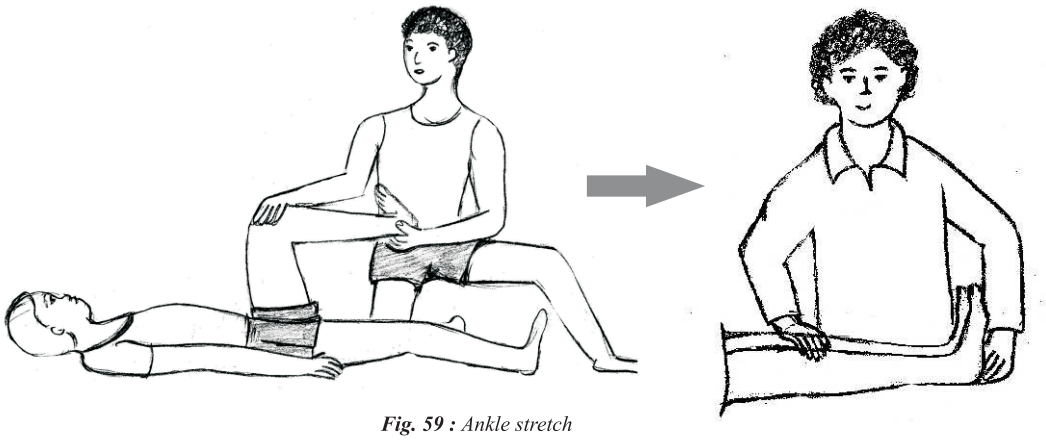


Fig. 59 : *Ankle stretch*

Head control

One of the first skills a child develops is head control, i.e. the ability to hold the head upright. Always provide activities to the child while positioning the child to develop various skills. Make use of the residual vision and hearing of the child by using bright light and sounds. If the child is completely deafblind, use tactile stimuli to facilitate various skills.

Activities in prone (on his tummy, face down)

Put the child in prone. Attract the child's attention by showing a bright coloured toy or a toy which produces sound like a rattle or squeeze toy.

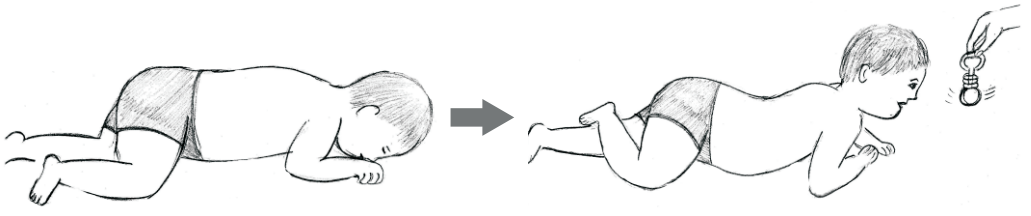


Fig.60 : *Positioning to develop head control in prone*

Place a rolled blanket under the child's chest. Keep the child prone on elbows. Provide activities above the head. Always remember to place the child's elbow in front of the body as shown in ***Fig 61(a).***

DO (elbow placed in front)

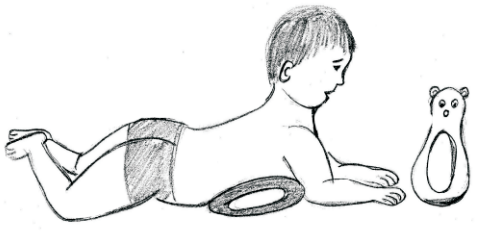


Fig.61 (a): *Positioning with elbows in front of the body in prone*

DON'T (where the elbow is under the chest)

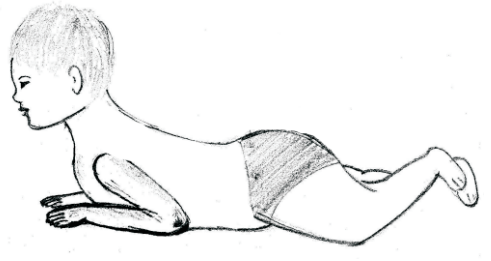


Fig. 61 (b): *Do not position the child with elbows under the chest.*

Keep the child prone on a wedge. Keep the elbows straight and hands open. Give activities overhead. Gaiters can be used to keep the elbows straight. Gradually reduce the support as the child gains more control of his/her elbows.

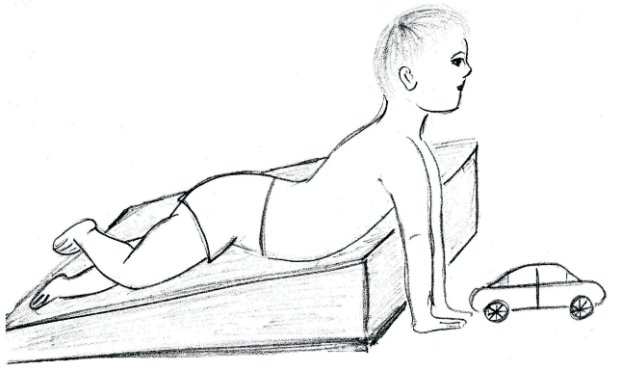


Fig. 62: *Prone on palms*

For a child, with visual impairment and C.P., bright lights or a toy producing sounds.

If a child has both visual and hearing impairment along with C.P., the skin behind the neck can be stimulated by stroking it gently and fast. Try blowing lightly on the child's face.

Activities in supine (on back, face up)

Pull the child up gently by holding his arms ***Fig. 63(a)***. Encourage him to look at you while coming forward and to raise his head.

DO
(pull the child up by holding the upper arm)

Fig. 63 (a): *Pulling up to sit holding the upper arm*

DON'T
(pull the child up by holding his hands)

Fig. 63 (b): *Do not pull up the child holding his/her hands*

If the child stiffens and bends back, try pulling the shoulder blades (***Fig. 64(a)***) forward as you pull him up. Also you can hold the child as shown in ***Fig. 64(b)*** to prevent stiffening back and to promote a flexed posture.

Fig. 64(a): *Pulling shoulder blades forward to prevent stiffening back*

Fig. 64(b): *Holding the child in a flexed posture to prevent stiffening back*

Activities while sitting

As the child develops head control, keep him on your lap, support his trunk, leaving head and arms free. Play with him by showing toys.

Fig. 65: *Positioning the child on the lap to promote head control*

Roll over

The next step in development after head control is rolling over.

Prone to supine.

- Position the child as shown in the *Fig 66 (a).*
- Show a toy, bring it sideways and encourage him to reach for it (*Fig 66(b)).*
- Slowly bring the toy up, so that the child has to turn his body (*Fig 66(c)).*

Fig. 66: *Encouraging roll over from prone to supine*

Supine to prone

- Position the arm as shown in the *Fig. 67(a)*, i.e. the arm to the side in which the child is turning should be flexed.
- Slowly bend the opposite leg at the hip and knee. Apply gentle pressure over the hip towards the side the child is turning (*Fig 67(b)*).
- Turn the child completely (*Fig 67(c)*).

Remember to handle the child only at the shoulders and hips. This will facilitate rolling over by self.

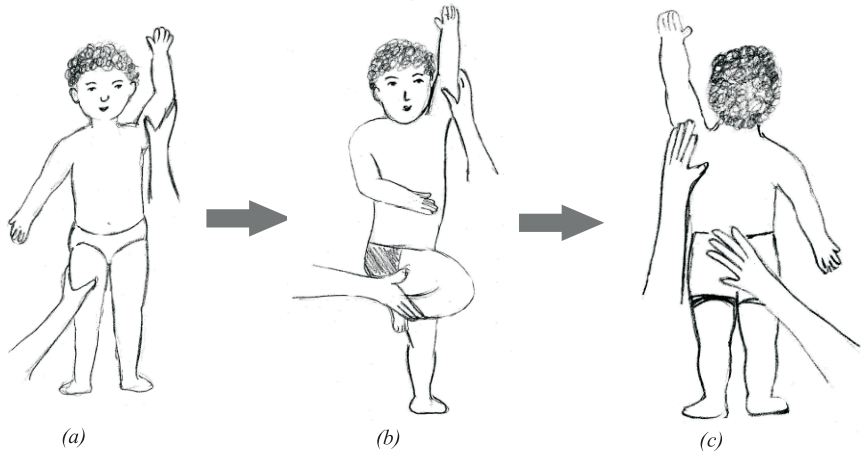


Fig. 67: *Encouraging roll over from supine to prone*

Sitting

Place the child in sitting while supporting his trunk from behind. Children with deafblindness can show resistance to an upright posture. Start with providing maximal support and gradually reduce the amount of support provided.

Fig. 68: *Supporting the child's trunk from behind*

Keep the child in circle sitting. Keep his arms in front of him so that he can support himself. If the child cannot keep his arms straight, give support at the elbows or use a gaiter. Hold his trunk.

Fig. 69: *Sitting with self support*

As the balance develops, bring your arms down and slowly leave him.

Once, the child is able to sit with self support, encourage him to reach for a toy with one hand

Fig. 70: *Sitting with one hand support*

Slowly encourage him to play with both hands while sitting.

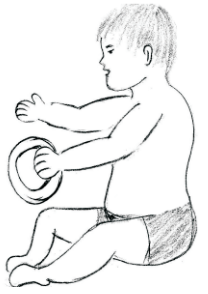


Fig. 71: *Playing with hands off the floor in sitting*

Improve balance

Place the child on a log and tilt it to one side. Encourage the child to maintain balance.

Fig. 72: *Activity to improve sitting balance*

Slowly tip the child sideways, forwards and backwards while sitting in a balance board. Encourage him to break the fall by straightening his arms towards the side of fall.

Fig. 73: *Balance board activity*

Give tilt board activities, like throwing a ball while sitting on it.

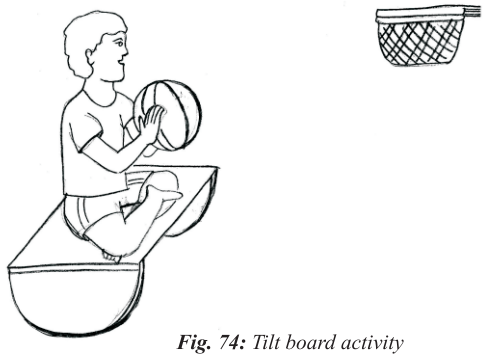


Fig. 74: *Tilt board activity*

Coming up to sit

From lying on tummy (Prone)

- Encourage the child to come on to side lying from prone (*Fig. 75(a)).*
- Ask her to pull herself up by putting weight on the elbows as shown in *Fig. 75(b).*

Fig.75 (a): *Coming to side lying*

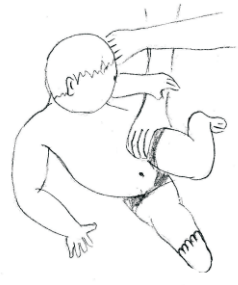


Fig. 75 (b): *Pulling up by putting weight on the elbows*

- Slowly, straighten the elbow *Fig 76*

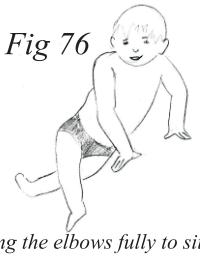


Fig. 76: *Straightening the elbows fully to sit*

- Provide support by slowly pushing the hips down

From lying on back

- Encourage the child to put weight on one arm.
- Slowly pull the child up by holding the arm
- Press the hips down
- Gradually reduce support

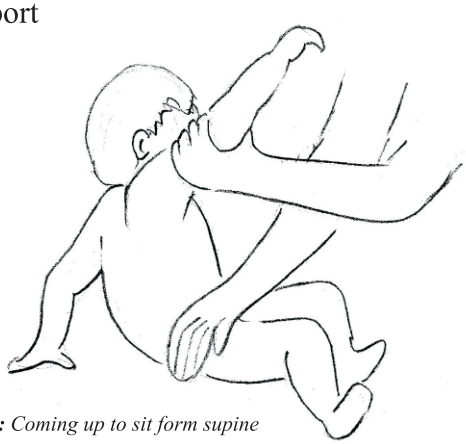


Fig. 77: *Coming up to sit form supine*

From on all fours (crawl position)

- Ask the child to come to crawl position

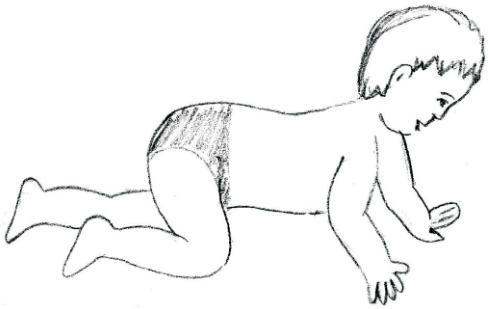


Fig. 78: *Crawl position*

- Encourage him to shift his weight to one side
- Slowly come to side sitting position

Fig. 79: *Side sitting form crawl*

Creeping and crawling

Once a child has good head control and is able to roll, we can work on mobility by creeping or crawling. Creeping is moving on your tummy and crawling is moving on all fours.

Creeping : creeping is moving on the tummy

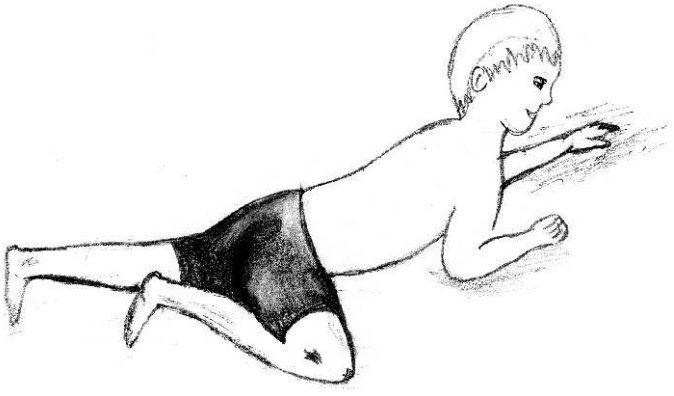


Fig. 80: *Creeping*

- Child should be placed on his elbows. Show a toy in front of the child.
- Keep one arm forward as shown in *Fig. 80*
- Bend the opposite leg. Let the child to weight bear on the big toe of the bent leg
- Apply gentle and steady pressure to the foot of the other leg

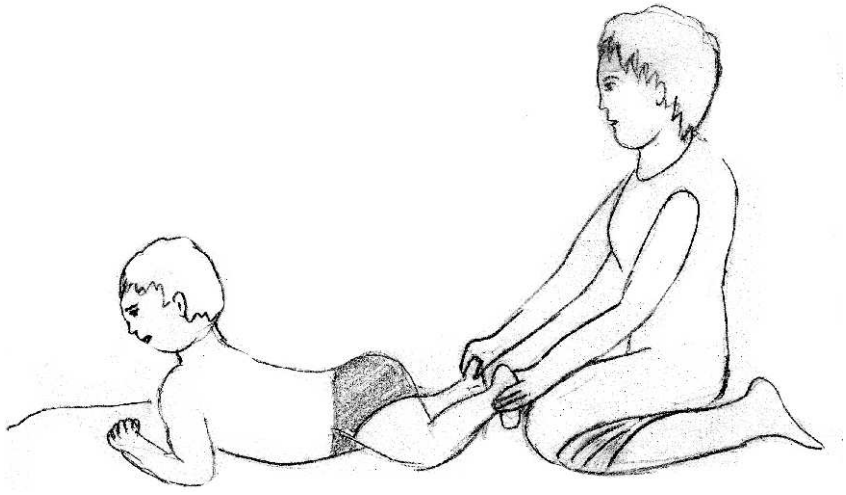


Fig. 81: *Applying gentle pressure on the foot to promote creeping*

-
- Then, keep the other arm forward and repeat the process

Crawling: moving on all fours

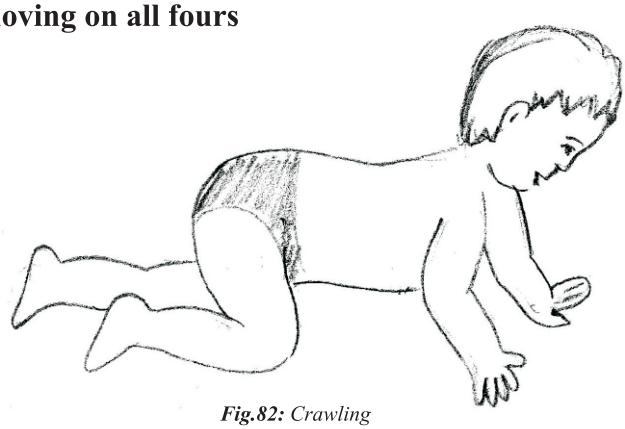


Fig.82: *Crawling*

- Keep the child on all fours first. This can be done by keeping the child over your knees, or keeping him over a log. Crawl maintenance will help in normalising the tone in the upper limbs. It also helps in improving head control.

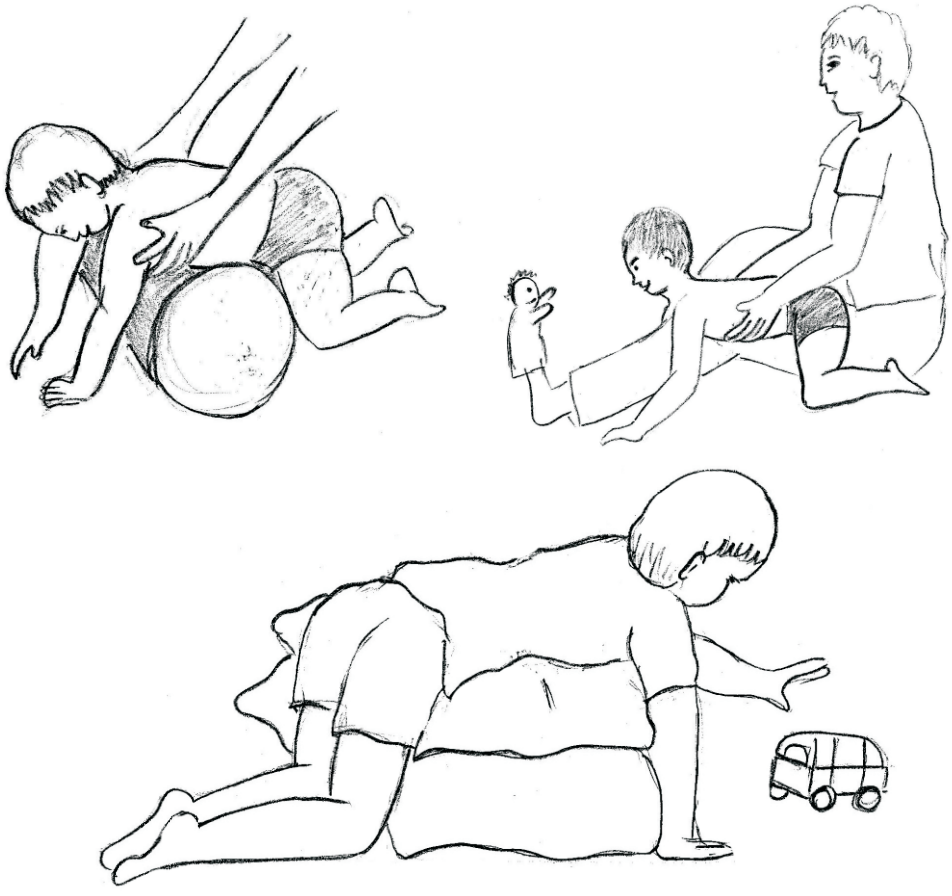


Fig.83: *Encouraging crawl maintenance in various positions*

- Give support to the elbows and to the hip
- Once, he is able to maintain the position, encourage him to reach for a toy with one hand. This will help in shifting weight to one hand.

- If the child is not able to do that, use a towel to hold him up and gently sway side to side

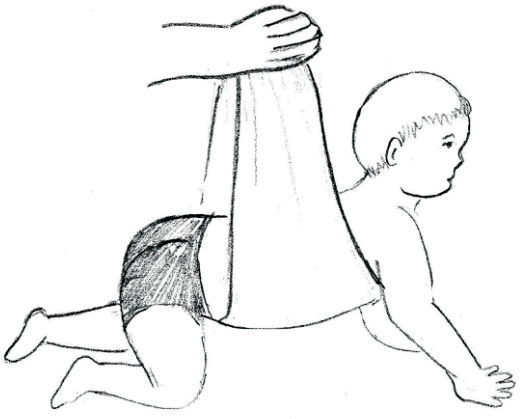


Fig. 84: *Promoting weight shifting in crawl position*

- Encourage the child to reach and then later crawl to something he wants.

Activities to improve hip stability

Before a child starts to walk, he should have good hip control. The following activities can be done to increase hip stability

Crawl maintenance and crawling

- On all fours
- Reaching out for objects with one hand
- Rocking back and forth
- On an balance board

Fig. 85: *Balance board activities to improve hip stability*

- Raise one leg

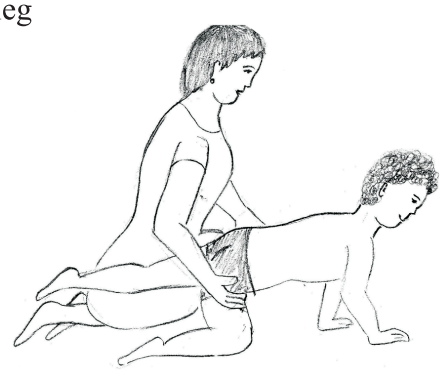


Fig. 86: *Raising one leg in crawl position to improve hip stability*

- Raising one hand and opposite leg.

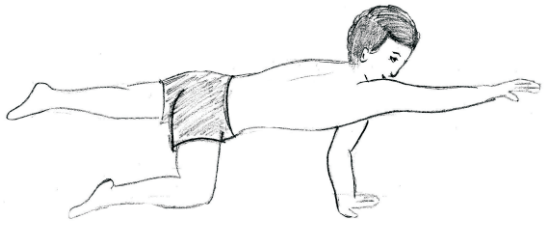


Fig. 87: *Raising one leg and opposite hand in crawl position to promote hip stability*

Kneeling

- If the child does not have any control of the hips, we can make him kneel against a stool, while providing support over the trunk and hips. Gradually reduce the support to hips alone and then no support.
- Holding on to a railing, or chair.

Fig. 88: *Kneeling holding on to a chair*

- Engaging in activities with one hand, while supporting self with the other hand.
- Kneeling without support. E.g. ball throwing in kneeling

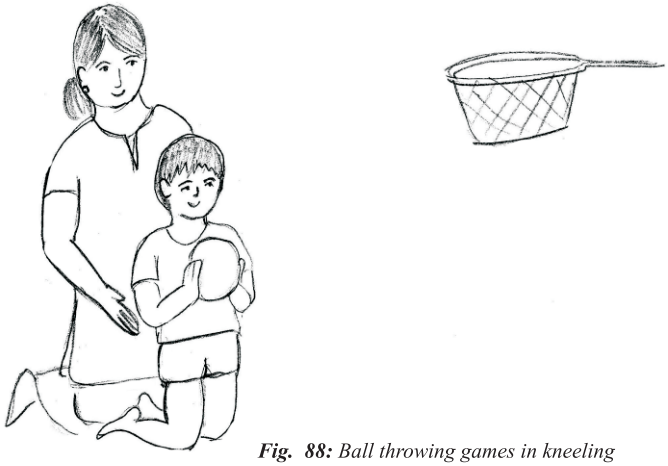


Fig. 88: *Ball throwing games in kneeling*

l fkneeling

- Half kneeling is done as shown in ***Fig. 90***

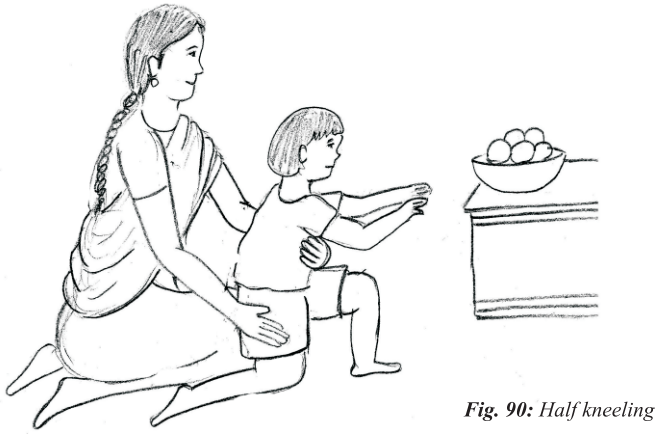


Fig. 90: *Half kneeling*

- Continue the same steps as given in kneeling

Kneel walking

- Sideways, holding on to a railing
- Forwards, holding on to a push cart
- One hand held
- Without external support

Bridging

Bridging is lifting the pelvis off the floor when lying on back with knees bent. It helps in strengthening the abdominal muscles.

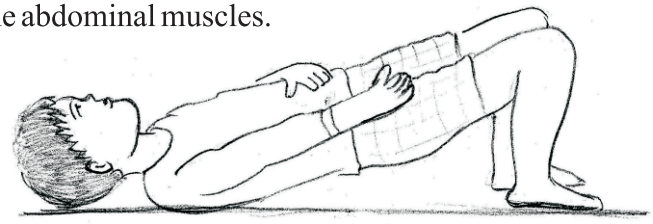


Fig. 91: *Bridging*

Standing

- Do not make a child to stand without support, if he does not have adequate sitting balance and cannot maintain a crawl position.

- Make sure that the child's foot is flat on the ground and that the knees are not bent. If the child stands on toes, with knees bent as shown in *Fig. 92*, consult a doctor/ PT/ OT and get suggestions for modified shoes.

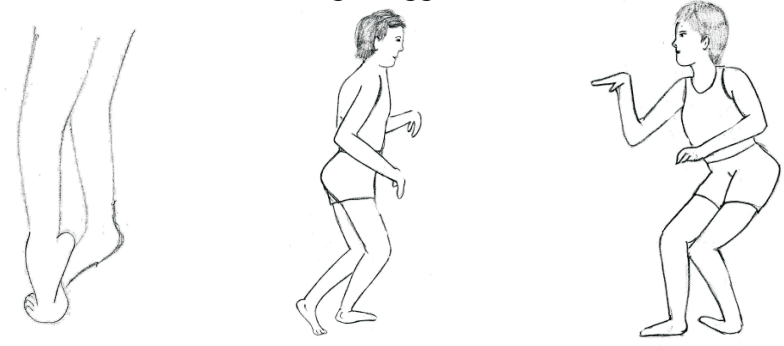


Fig. 92: *Common deformities in lower limbs seen in children with C.P.*

- Make the child stand on a standing frame with full support. If the legs cross over, keep a roll between the knees. Gradually remove the support from trunk and later from the hips. This position can be used to reduce tone and is helpful in the development of the hip joint. Children with deafblindness are afraid of position changes especially upright positions. So they should be encouraged to stand for a few hours every day.

Fig. 93: *Standing frame*

- Encourage the child to stand holding on to furniture, like table. Stand behind the child and provide support by holding his hips

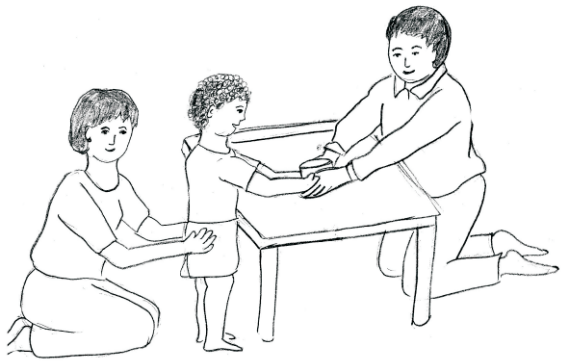


Fig. 94: *Standing holding on to furniture*

- Give activities to do with one hand, while stabilises self with one hand

Fig. 95: *Standing with one hand support while playing with the other hand*

- Activities with both the hands. Give support over the hips and gradually reduce it
- Balance board activities

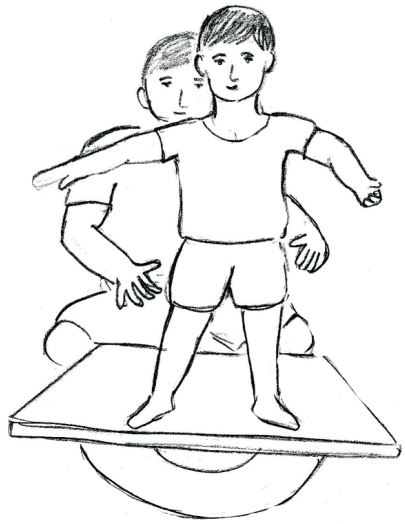


Fig. 96: *Balance board activities in standing*

Coming up to stand

Both the feet should be on the ground. Ask the child to lean forward putting weight on the foot. Holding on to a walker, railing or any other support encourage him to stand up. Support can be given on the knees by the therapist sitting behind the child by pulling it backwards and straightening it.

Walking

- Walk within a parallel bar

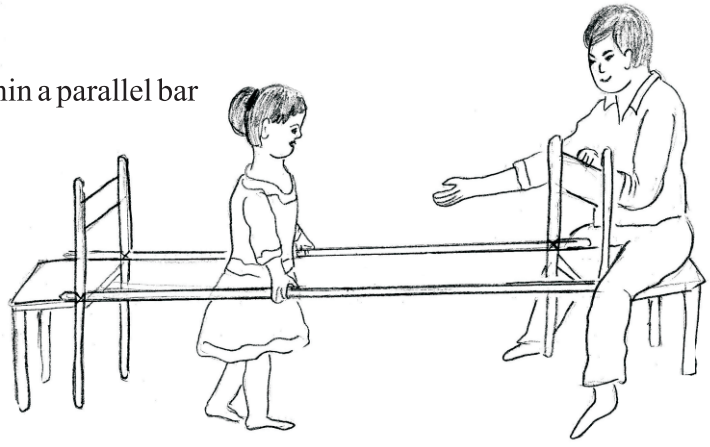


Fig. 97: *Walking within a parallel bar*

- Walk holding on to a push cart

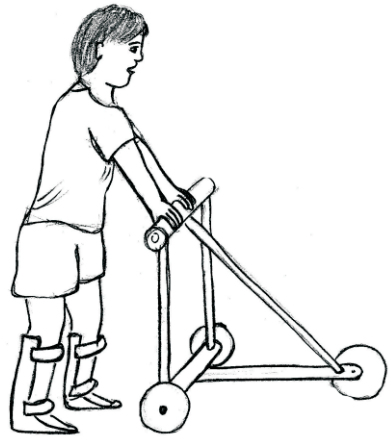


Fig. 98: *Walking holding on to push cart*

- Walk with two hands held.

Fig. 99: *Walking with two hands held*

- Do not do it like this

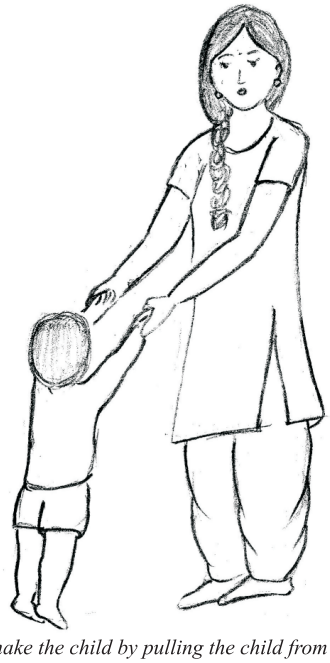


Fig. 100: *Do not make the child by pulling the child from the hands*

- Walk with one hand held

Fig. 101: *Walking with one hand held*

- Keep a towel around the child's chest. Leave it loose. Do not let the child put his weight on it. It is to hold the child if he falls.

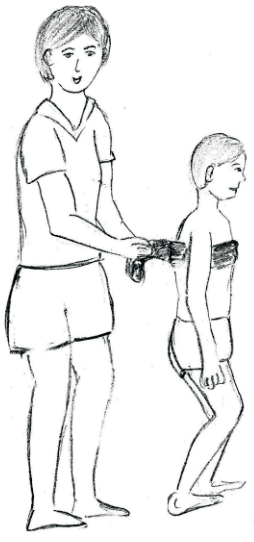


Fig. 102: *Promoting walking using a towel around the chest*

- Children with tightness or deformities will need modified shoes. Consult a physiatrist for the same. They will also need walking aids. The use can progress as follows. This should be done under the guidance of a PT or an OT

- Parallel Bar

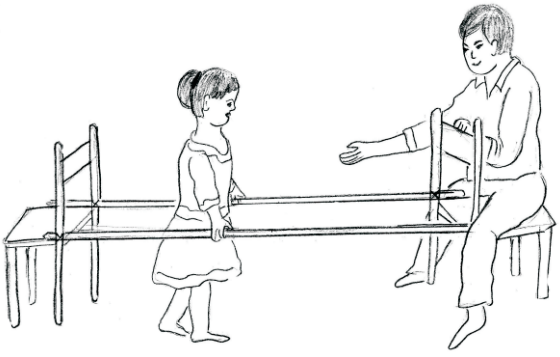


Fig. 103: *Parallel bar*

- Walker

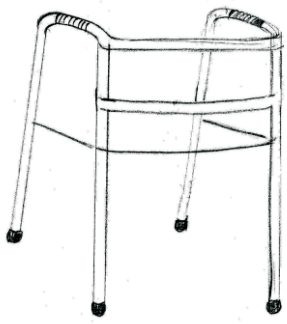


Fig. 105: *Walker*

- Bilateral elbow crutches

Fig. 105: *Bilateral below elbow crutches*

- Cane

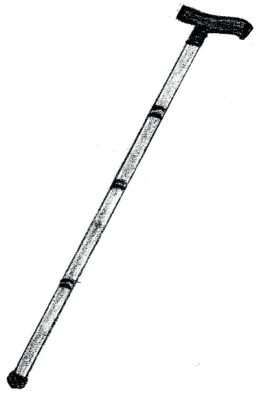


Fig. 106: *Cane*

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