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GUIDELINES FOR THE PREVENTION OF DEFORMITIES IN POLIO

Expanded Programme on Immunization
Rehabilitation
World Health Organization

CONTENTS

INTRODUCTION

Polio is a disease that disables children.

It can cause disabilities in two ways:

Polio can cause paralysis by destroying nerve cells which make muscles work. If all of the nerves to a muscle are destroyed, the muscle will be completely paralysed. If some of the nerves are destroyed, the muscle will be partially paralysed. Paralysed muscles cannot cause movement. The child may be unable to move a limb (arm or leg), or part of a limb; or his back or other muscles may be weak.

Polio paralysis can result in deformities. Limbs which cannot move may become fixed in one position. These fixed positions are deformities of the limbs which will cause difficulty with dressing, bathing or going to the toilet. Deformities in the legs make it impossible for a child to wear braces, so the child cannot walk.

Paralysis of muscles and deformities of the limbs can cause many difficulties for a child and his or her family. There are two ways to prevent these difficulties:

- *Prevention of the disease*, by full immunization so that the child cannot become paralysed by polio.
- *Prevention of deformities*, by special care to paralysed limbs to prevent them from becoming fixed in one position.

Thus, children who have not been immunized, and who get paralytic polio, can still be helped so that they do not get deformities.

These guidelines provide health workers with the information they need to educate families of children with polio on how to prevent deformities in their children's limbs. It provides information which will help the families to understand the disease, to learn how to position and move the child's limbs to prevent deformities, and to know how to help the child grow and develop in the most normal way possible. It also suggests ways in which the health worker can teach the family how to carry out these activities.

Whenever possible, health care personnel skilled in assessing children with polio should supervise the work at community level. A physician or therapist should periodically assess the child to insure that proper care is given to prevent deformities.

These guidelines should be translated into the language used by health workers and by the families. Translations should include any changes that make the booklet more appropriate within the communities where it is used. For example, if splints are available that are not like the splints in this booklet, put drawings of the available splints in the translated version.

1.
HOW TO RECOGNIZE POLIO

Polio (or poliomyelitis) is a disease caused by a virus. The virus spreads by the fecal-oral route, in the same way as diarrhoea.

The spread of the virus can be reduced with good hygiene, including hand washing before eating and after using the latrine. However, the only reliable way to protect a child is with a full course of immunization.

When new cases of polio are detected in a community, immediately give all young children living in the area a dose of oral polio vaccine. Complete these immunizations with all vaccines as soon as possible.

Report all new cases of polio to the health authorities. Try to find children who may have polio but who have not been brought to the health centre. Ask people in the community and people who come to the health centre if they know about any child who has weakness of an arm or leg.

1.1
Types of Polio

There are two types of polio, non paralytic and paralytic.

1.1.1 Non paralytic polio.

Most children infected with the virus remain completely well. Their families do not realize that they have been infected. Many others have a minor illness with some fever, muscle pains, headache and backache. These symptoms are the same as for many other mild virus infections. It is not possible to diagnose polio infection without help from a laboratory. Fortunately, most children, perhaps as many as 99 out of every 100 infected, recover completely without any paralysis. Their illness is called *non paralytic polio*.

1.1.2 Paralytic polio.

A small percentage of children infected with the polio virus develop paralysis. Their illness is called *paralytic polio*. The polio virus damages some of the nerve cells which make muscles work. The clinical types of paralytic polio depend on which nerve cells are damaged:

- *Spinal polio*, in which nerve cells in the spinal cord are damaged, so that muscles of the legs, back, abdomen, and arms may be paralysed.
- *Bulbar polio*, in which nerve cells in the brainstem are damaged, and the muscles for swallowing and breathing are paralysed.
- *Bulbo/spinal polio*, in which nerve cells in both the spinal cord and the brainstem are damaged.

These guidelines present information only for the care of children with spinal polio. It does not discuss the care of children who are affected by bulbar or bulbo/spinal polio, who need intensive hospital-based care if they are to have a good chance of survival.

1.2 Stages of Spinal Paralytic Polio

There are three stages through which a patient with paralytic polio passes:

i) acute illness

ii) recovery

iii) residual paralysis

1.2.1 Acute illness

There are two phases, a) the minor illness and b) the major illness.

a) The *minor illness* lasts for 1-2 days and then the child improves for 1-2 days. The symptoms are nonspecific and similar to those of any other virus infection, e.g. fever, malaise, headaches, generalized aches and pains, nausea and vomiting.

b) The *major illness* follows the minor illness. It has a pre-paralytic and a paralytic phase.

The *pre-paralytic phase* lasts for one or two days. The symptoms of the minor illness return and become more severe. Neck stiffness may develop and muscles become painful and tender. Muscle spasms may be a problem.

The *paralytic* phase then starts. It progresses rapidly to reach its full extent, usually within 48 hours. The extent of the paralysis depends on the area of the spinal cord damaged by the polio virus and the number of nerve cells affected. The number of muscles paralyzed varies from child to child. In very severe cases, all four limbs and the trunk may be affected. In milder cases, only a small group of muscles may be paralysed.

The severity of paralysis also varies from child to child. Each muscle in a limb or the trunk is supplied by many nerve cells. If all the nerve cells are damaged, paralysis is complete. If only some nerve cells are damaged, paralysis is partial. If paralysis is complete, the affected muscle cannot contract at all. If paralysis is partial, some weak movement remains.

The paralysis caused by polio is *flaccid*, i.e., the affected muscle has poor tone and feels loose.

1.2.2 Recovery

Usually, during the second week of the illness, the fever, pain, spasms and muscle tenderness decrease. During the third week, the general symptoms disappear and the affected muscles start to recover.

From the third week onwards, the muscles become progressively stronger. At some time between three and six weeks, those muscles which will recover begin to function a little. At first, they are weak and not able to contract strongly. Later, they become stronger. Most recovery takes place during the first six months after the acute illness, but some recovery can be expected up to one year.

1.2.3 Residual paralysis

This is the stage when no further strengthening of paralysed muscles can be expected. It begins about one year after the acute illness.

The extent and severity of residual paralysis varies from child to child. One child may have only one limb affected, while another has some paralysed muscles in two or three limbs and the trunk. The muscles which are affected may vary from weak to completely paralysed.

In most children, it is the lower limbs that are affected, and usually only one leg.

Upper limbs suffer from residual paralysis much less frequently (10-20% of children), and usually other parts of the body are affected also.

Frequently, one group of muscles, such as those which straighten a limb, are weaker than another group, such as the muscles that bend the limb. This imbalance in muscle strength can cause the limb to remain in one position, e.g. flexed or bent. In this case, a deformity may develop in which the limb cannot be straightened.

2.
HOW TO CARE FOR THE CHILD DURING THE DIFFERENT STAGES OF PARALYTIC POLIO

2.1
Acute Illness

During the minor illness, the family is likely to treat the child's fever, aches and pains, headache and backache as they normally treat such nonspecific symptoms. There may be some improvement immediately followed by the pre-paralytic phase of the major illness. For a day or two, the child has severe pain and spasms in the affected muscles, together with headache and backache. The child may need analgesic drugs, such as paracetamol, to relieve these pains. During this phase you may suspect that the child has polio, but this can be confirmed only by laboratory tests. The following care can be given to the child even if a diagnosis has not been confirmed.

2.1.1 Pre-paralytic phase

Apply warm moist cloths to the painful muscles. Position the child's body and limbs to prevent later deformities. (See pages 15 to 18 for information about proper positioning.)

How to apply warm moist cloths:

- Cut a piece of blanket or a thick, soft cloth to fit around the muscles which are painful.
- Moisten the cloth by holding it in steam, such as over a pot of boiling water.
- Wring out any excess moisture and quickly wrap the warm cloth around the child's limb.
- Wrap a piece of plastic around this cloth to keep it warm. Then wrap a piece of dry blanket or cloth around the plastic. This wrap should remain warm for 10-15 minutes.
- When the wrap is cool, remove it from the limb.
- Repeat this treatment every two to four hours, until the pain and spasm decrease.

2.1.2 Paralytic phase

When the paralysis of the muscles takes place, the pain decreases. During this period of two to three days the family can care for the child in the following way:

- Continue to position the child's body and limbs correctly.
- Continue to apply warm cloths as long as there is pain and spasm in the muscles.
- As soon as the acute pain and tenderness have decreased, move the limbs gently. (See pages 28-40 for guidelines for the movement of the limbs).

In babies, movement of the limbs is usually possible two to three days after the paralytic phase begins. *If the child is two years of age or older*, the acute pain may last longer.

2.2 Recovery

During this period, which begins three weeks after the acute illness and can last for one year, the family can do the following:

- Continue to position the child properly.
- Continue to do gentle movements of the limbs which are weak.
- Encourage the child to do as much active movement as possible.
- Encourage the child to do the activities which are normal for his or her age.

2.3 Residual Paralysis

After the first year, paralyzed muscles will not become stronger. However, the child can learn to use muscles which are not paralysed to do many activities. To prevent deformities and to promote the child's development, the family can continue the special care:

- Position the body and limbs properly.
- Move the limbs regularly.
- Encourage the child to do activities which are normal for his or her age, including:
  - self-care
  - play
  - helping in the home
  - going to school

When the child is old enough to walk, find out if he or she needs a brace for one or both legs. (Information about braces is on pages 46-47.)

3.
EFFECTS OF POLIO

3.1
Physical: Paralysis and Deformities Frequently Caused by Polio

3.1.1 Paralysis

There are certain muscles which are affected by paralytic polio more frequently than others:

- In the lower limb:
  - The muscles of the foot and ankle, particularly the muscles which pull the foot up;
  - The muscles which straighten the knee;
  - The muscles which straighten the hip.
- In the upper limb:
  - The muscles of the fingers and hand;
  - The muscles which straighten the elbow.
  - The muscles which lift the shoulder.

Muscles of the trunk may be paralyzed, causing curvature of the spine. The severity of the curvature depends on the extent and severity of the paralysis.

Any other muscles can be affected, though less frequently. Each child who gets polio must be observed by the family and the health workers to know which movements the child cannot do and which movements are weak. Then the family and health workers will know which deformities are likely to occur.

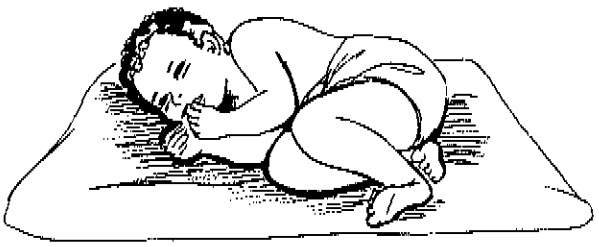
3.1.2 Deformities

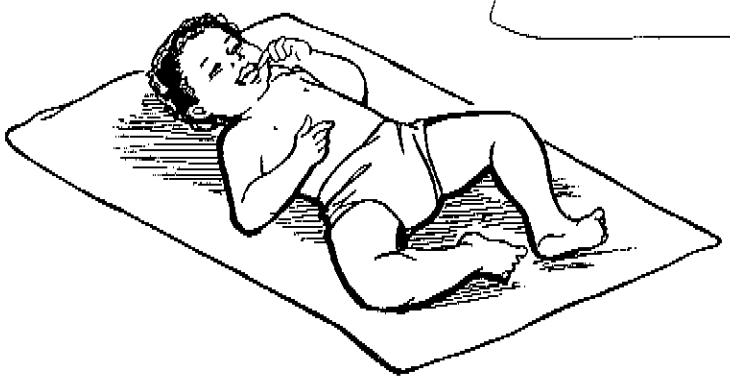
The usual deformities associated with polio are those caused by limitations in joint movement. These limitations can begin during the acute illness, when the muscles are very painful. The child cries when the limbs are moved, so family members allow the child to rest in a position which seems to be most comfortable. The child may rest on his or her back or side with the hips and knees bent. These positions are not good for the child because the muscles which bend the hips and knees shorten, and the hip and knee joints become difficult to straighten.

During the acute illness it may be necessary to allow the child to rest in these positions because of the pain. But as soon as the acute illness passes, the child should spend some time each day in positions with the hips and knees straight.

Positions to Avoid

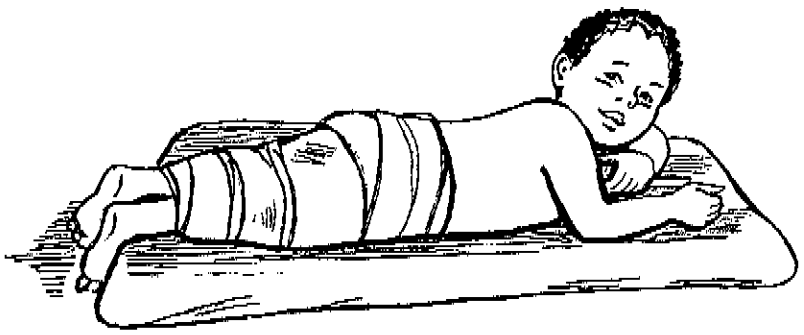
If muscles at the hips and knees are paralyzed, the child should not rest for long periods of time with the hips and knees bent, as they are in the pictures below.



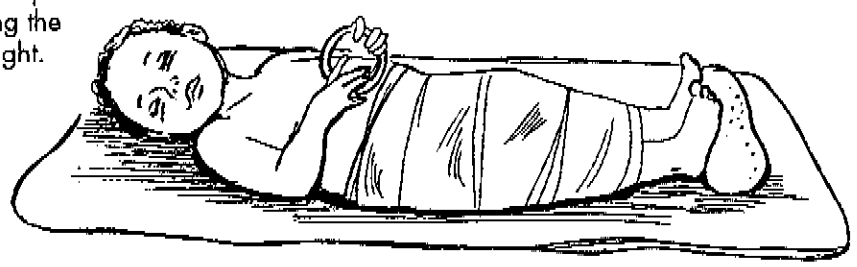


Helpful Positions

The hips and knees need to be kept straight. It may be necessary to wrap the legs together, or to put both legs into one leg of a trouser. Do not wrap the child's trunk because he or she may have difficulty breathing. When the child is lying on the back, use sandbags or something firm to keep the feet pointing upward.



Put the child in these positions for brief periods during the day and during the night.



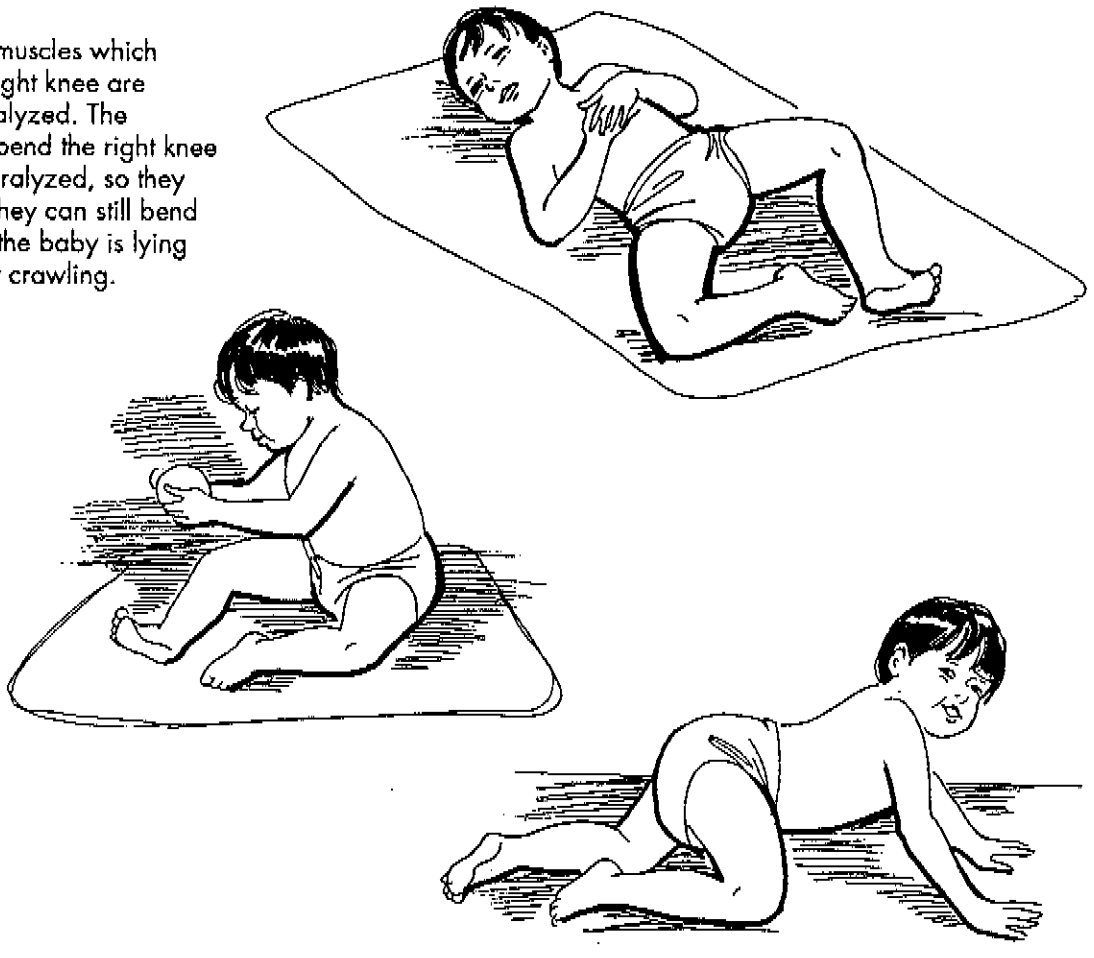
During the recovery stage, and during the permanent paralysis stage, limitations in joint movement can occur from:

- an imbalance in muscle strength
- resting in one position for long periods of time.

The following example shows how this can occur.

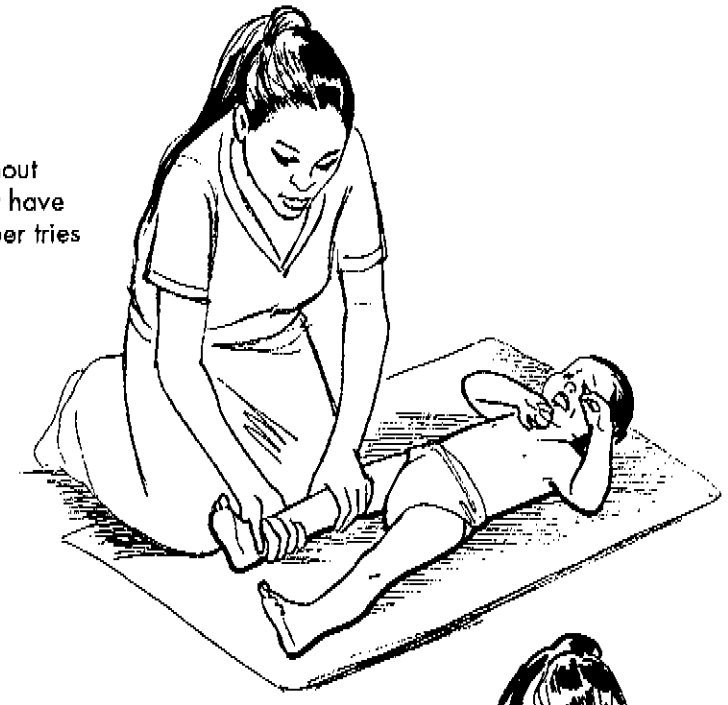
Example of deformity at the knee

This child's muscles which straighten the right knee are completely paralyzed. The muscles which bend the right knee are partially paralyzed, so they are weak, but they can still bend the knee when the baby is lying down, sitting or crawling.



Whenever the child tries to move the right leg, he or she bends the knee. Because the muscle which straightens the knee is completely paralyzed, the child does not straighten the knee. The child has the knee bent during the day when sitting and crawling, and during the night when sleeping. He does not straighten the knee, so he does not stretch the muscles which bend the knee. The muscles which bend the knee begin to shorten. Gradually the child begins to lose the ability to have the knee straight.

After a few weeks without proper care the child may have pain when a family member tries to straighten the knee.



After a few months the knee will not straighten completely.

Gradually the joint movement will become more and more limited. Two or three years later the child's knee may not be able to straighten very much beyond the position used for sitting.

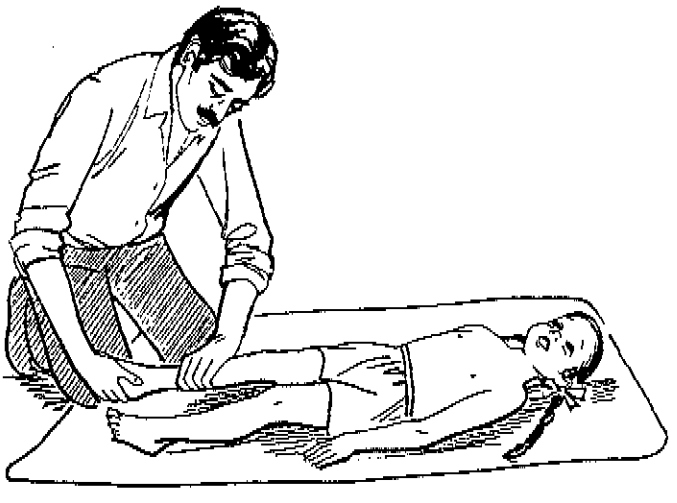
In this example the child loses joint movement in the knee because of muscle imbalance and poor positioning of the limb. The deformed limb cannot straighten, so a brace cannot be put on to help the child to walk. The deformity makes the child more disabled. Without the deformity, the child could use a brace and could walk.

In most cases, proper positioning of a limb which has muscle imbalance can prevent the joint limitation from occurring.

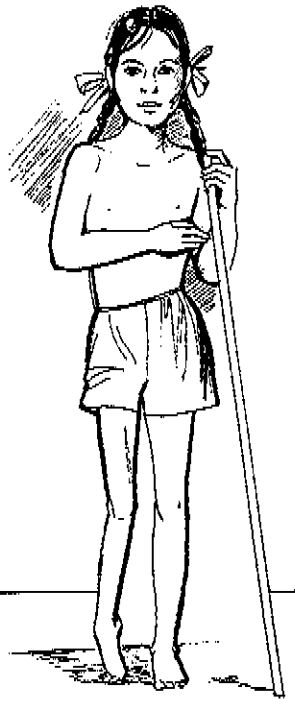
The deformity of the bent knee is one of the most common deformities found in children with polio. Other common deformities occur at the foot and the hip, as shown in the following examples.

Example of deformity in the foot

The child may lose the ability to lift the foot up toward the leg. This deformity can occur from a) an imbalance in muscle strength when the muscles which pull the foot down and in toward the other leg are stronger than the muscles which pull the foot up and out, b) leaving the foot in the downward position during the day and night, and c) a combination of these two conditions. This deformity may be the only deformity a child has if there is muscle weakness only around the foot. However, this deformity can also occur with the other deformities in the knee and the hip.



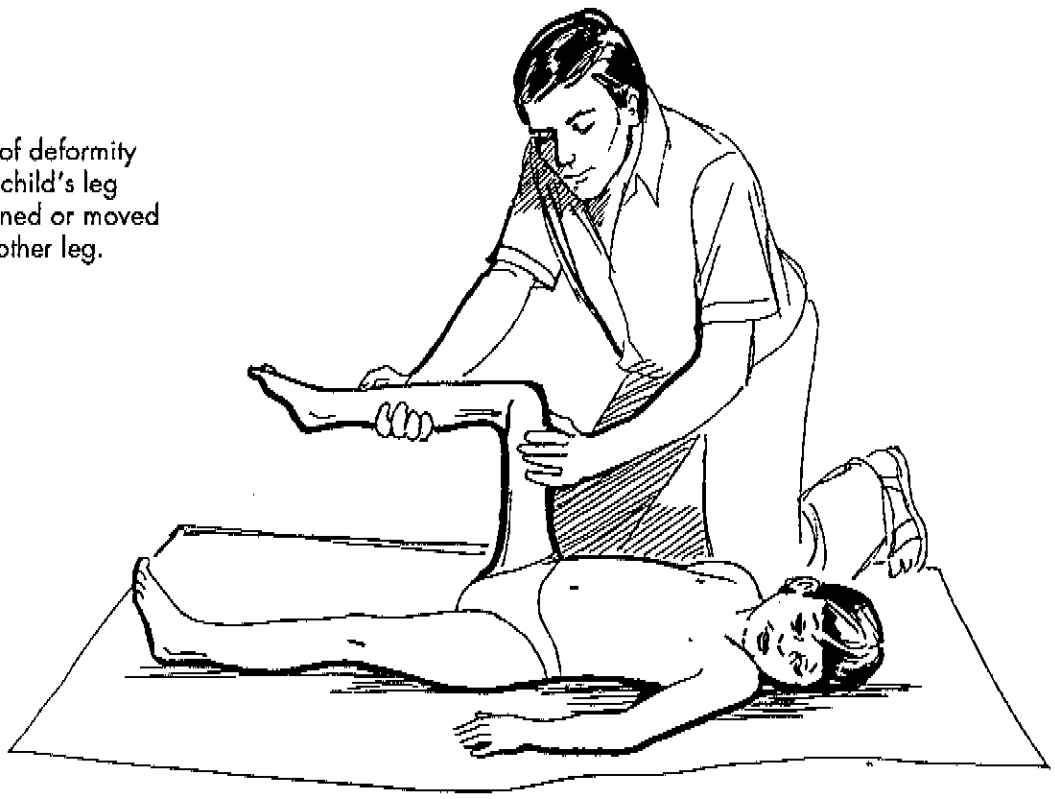
Without proper care, the foot can become fixed in a position pointing down and in, and cannot be moved up and out.



If the child can walk, but the foot is fixed in the downward position, the child will walk on the toes of that foot.

Example of deformity at the hip

The hip may lose its ability to straighten, so it is always in a bent position. When this happens, the leg is pulled up and outward, away from the other leg. This deformity can occur from a) an imbalance in muscle strength when the muscles which bend the hip and pull it out are stronger than the muscles which straighten the hip and pull it in toward the other leg, b) leaving the hip in the bent position during the day and night, and c) a combination of these two conditions. This deformity often occurs at the same time as the deformity of the bent knee.



When this type of deformity becomes severe, a child's leg cannot be straightened or moved inward next to the other leg.

Sitting, crawling, and lying down with the legs bent are positions which can lead to the three most common deformities in children with polio. However, changing the position of the legs while sitting and lying, and doing exercises each day, can prevent deformities in most children.

3.2
Social: Limitations in the Child's Activities Caused by the Family and the Community

Sometimes attitudes and beliefs of families or communities prevent children with polio from doing activities which they could do. The health worker can help children with polio to do more activities by helping the families and the community to understand more about polio and what children with polio can do.

Normal Intelligence

A child who gets polio is just like all other children except for the loss of movement in some muscles. The child's intelligence is not affected by polio, so the child can do everything that other children do, except some movements of the limbs. If a child has many muscles affected by polio, he or she may be unable to do many physical activities, but the child is still able to do things which require thinking. The child may have difficulty getting to school because he or she cannot walk, but the child can learn just like the other children in school.

Need for Education

The child who cannot do many physical activities may need education even more than the children who can do physical work when they become adults. A child who has polio may have to do work which can be done sitting down. If the child learns how to read, write and do mathematics, he or she will have more opportunities for work.

Fear of Teasing

A family with a child who has polio knows that the child is able to think just like other children. But the family may fear that if the child goes to school, the other children will tease the child because he or she cannot walk, or walks in a strange way. Therefore, the family may want to keep the child at home to protect him or her.

- The health worker can talk with the family about this and encourage the family to send the child to school.
- If children in the community or at school tease a child who has polio, someone should meet with the children and talk to them about polio and about the children who get polio. A health worker could talk to the children, or a teacher, or a family member of the child who has polio. Perhaps if the children understand more about the disease, and about the effects of polio, they will be more understanding about the problems in movement that a child with polio has.

Difficulty with Transport

Some families who have a child with polio may want to send the child to school, but they cannot because the child cannot walk the long distance to the school.

- Perhaps the child could walk to school if he or she had a brace for the leg. The health worker can find out where braces are made, and how the family can obtain a brace for the child.
- Some children need braces for both legs, which will help them to walk for short distances, but they cannot walk long distances.

These children will not be able to walk to school if it is a long distance from their home and they do not have any means of transport.

- The health worker can encourage community members to help the family to arrange transport for the child.
- Perhaps the child can go to school in a cart. A group of older children can take turns pulling the cart to and from school.
- Perhaps someone in the community has a bicycle that the family could use to take the child to and from school. They could attach a seat for the child to the bicycle.

If the family and community work together, they can find a way to solve the problem.

Explaining to Teachers

Most school teachers who have had children with polio in their classes know that these children are able to learn just like all other children. However, a teacher who has never taught a child with polio, may not want to have a disabled child in the classroom. The teacher may think that the child will need extra attention in order to learn, or will need help to move around, to eat, or to go to the latrine.

- Family members can meet with the teacher and explain what the child with polio is able to do.
- An older child can take responsibility for helping a child so that it does not take the teacher's time.

Health workers can teach the family and the community about the abilities of the child, and can encourage them to give the child an education and help the child to participate in normal activities. This helps to remove the limitations placed on the child with polio, and provides him or her with more opportunities.

4.
HOW TO PREVENT DEFORMITIES

It is possible to prevent deformities in most children with polio. At least one family member must take responsibility for prevention until the child is old enough to take care of himself or herself. The family member needs to do these things:

- Maintain proper positioning of the child's trunk and limbs.

  This includes, if necessary,

  - using proper positioning when sitting and lying,
  - changing positions during the day,
  - using splints to position the child's limbs.

- Make certain that the child's limbs are moved every day.
  - Move the parts of the child's limbs which the child cannot move fully without help.
  - Encourage the child to move the parts of the limbs which are weak.

- Teach the child to do the normal activities that a child his or her age does, such as rolling, crawling, standing, playing, and feeding himself or herself.

If the child needs braces on the leg (or legs) to walk, find out what service is available to provide braces, and refer the child and the family to that service.

4.1
Position the Child's Trunk and Limbs Properly

Observe each child with polio closely to see which movements the child can do normally, which movements are weak, and which movements the child cannot do at all. Keep a record of the child's movements so that you will know what improvements occur. Give special care to the limbs which have weak or no movements.

4.1.1 Positions which are good for the prevention of deformities

The child should spend as much time as possible with the trunk, hips and knees straight, and the feet in a position to form a right angle with the legs.

It is not possible to have these positions all of the time because the child must be allowed to sit and to move into different positions like a child who has normal movements. However, during the night, and for short periods during the day, position the child so that the trunk and the limbs are straight.

If necessary, use splints to keep the child in a good position. (Different types of splints are described on pages 20 to 25.)

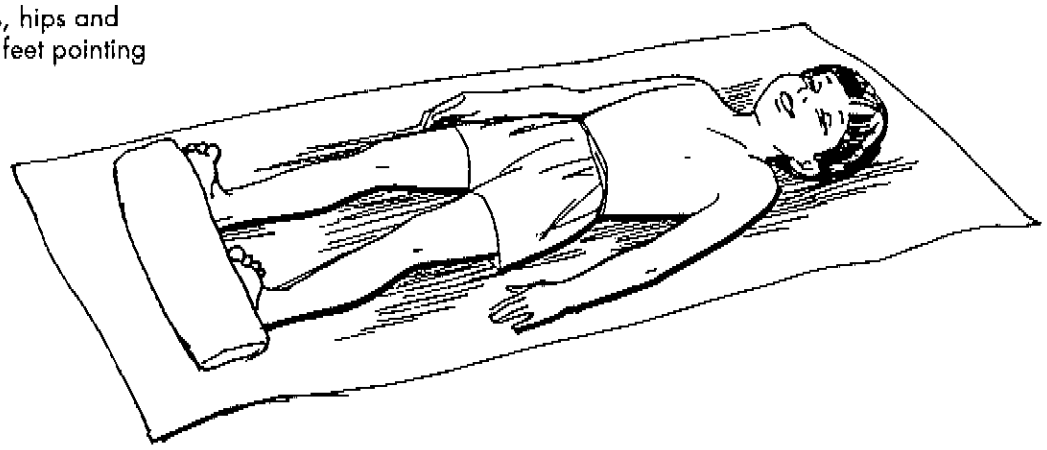
During the night the child can sleep on the back or on the stomach. The bed should be flat and firm so that the child's trunk does not curve.

Lying on the Back

The back should be flat and the limbs should be straight. However, it is unlikely that a child will remain in this position throughout the night.

- To keep a baby's legs straight, the mother can put the legs into one trouser leg, or wrap them together in a straight position. She can put a sandbag next to the child's feet to keep them pointing upward.
- For an older child, splints can be used to keep the feet pointing upward and the knees straight. If the knees are straight, the legs usually remain straight at the hips as well. This also helps to keep the trunk in a straight position.
- If the child has weakness in the arms, splints may be needed to keep the elbow straight.

Proper position on the back with the trunk, knees, hips and elbows straight and feet pointing upward.

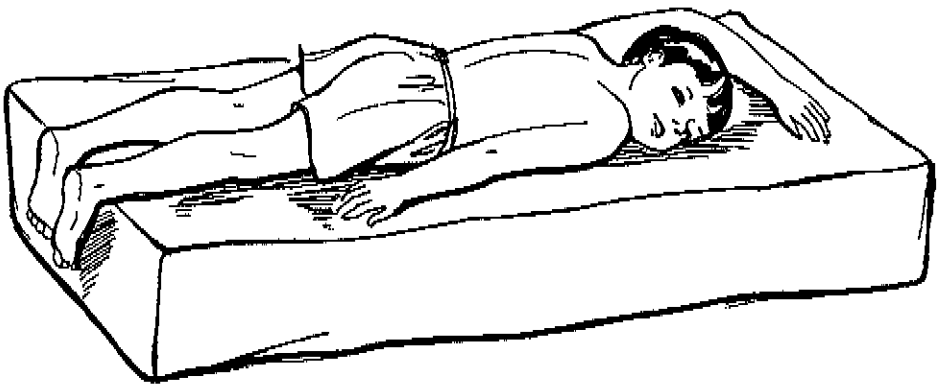


Lying on the Stomach

When a child lies on the stomach, it is difficult to have the feet in the proper position.

An older child may be able to lie on the stomach at the end of the mat, or the bed, and let the feet rest over the edge. This allows the feet to rest in a good position.

Proper position on the stomach with the hips and knees straight and the feet hanging over the edge of the mat:

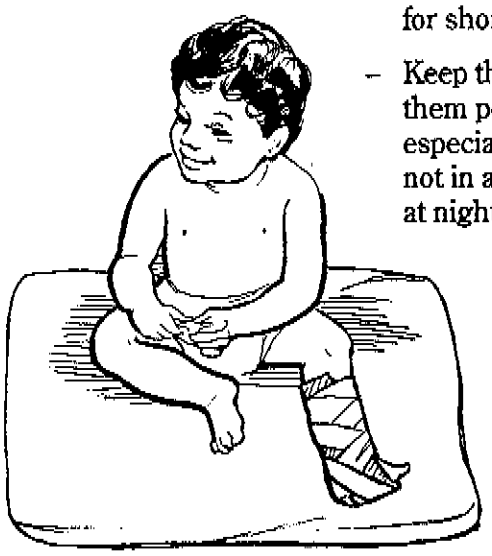


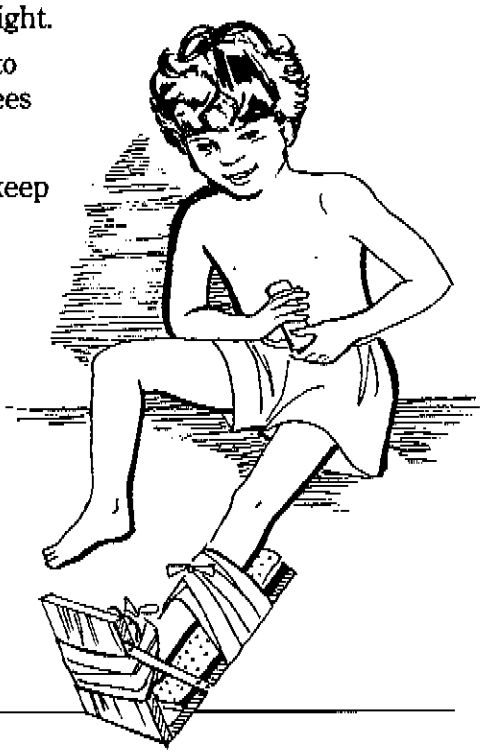
If the feet are not in a good position all night, it is necessary to keep splints on the legs during part of the day to maintain the proper position of the feet.

Sitting

During the day, the child will spend some time sitting. The knees can be bent or straight.

- The child should lie down to straighten the hips and knees for short periods.
- Keep the feet in splints to keep them pointing upward, especially if they are not in a good position at night.





Carrying the Child

Think about the position of the child's legs.

If the mother carries the child with the hips and knees bent for long periods of time:

- When she puts the child down, she should make certain that the child is in a position with the legs and trunk straight.

- Sometimes she may be able to carry the child with the legs straight.

4.1.2 Splints to keep the limbs in good positions

When to Use Splints

If a child cannot move part of a limb, use a splint to position that part of the limb during the night.

- Each day a family member should move the child's limb to see if there is a decrease in passive movement of that part of the limb. (See page 28 for information about passive movement.)
- If passive movement decreases, the splint for that part of the limb must be used for several periods during the day as well as at night.

Materials for Splints

You can use different types of splints, depending on the child's age and size, and on the degree of paralysis.

Metal or plastic

Metal or plastic splints are the easiest to use because they do not lose their shape and they are easy to clean. However, they may not be available, particularly in rural areas. If they are used, they must be changed as the child grows so that they fit properly. Plastic or metal splints may be expensive and difficult to replace. For this reason, a family may choose to use other materials for splints to position the child, and metal or plastic braces when the child needs more support for standing and walking.

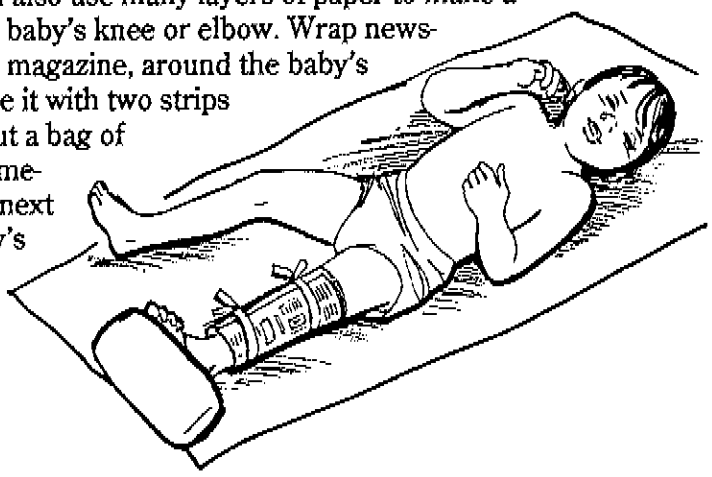
Metal and plastic splints are usually made in workshops that make braces and artificial limbs. Find out if there is a workshop near your community and ask about the cost of splints. Give this information to families so they can decide what type of splint they want to use.

Cardboard

A baby or a small child with complete paralysis in a limb, can use splints made from cardboard. Although the cardboard is not strong, it will hold a small limb, or a completely paralyzed limb, in a straight position. If necessary, you can use two or three layers to strengthen a cardboard splint.

Paper

You can also use many layers of paper to make a splint for a baby's knee or elbow. Wrap newspaper, or a magazine, around the baby's limb and tie it with two strips of cloth. Put a bag of sand or something firm next to the baby's foot to hold it up.



Wood or Bamboo

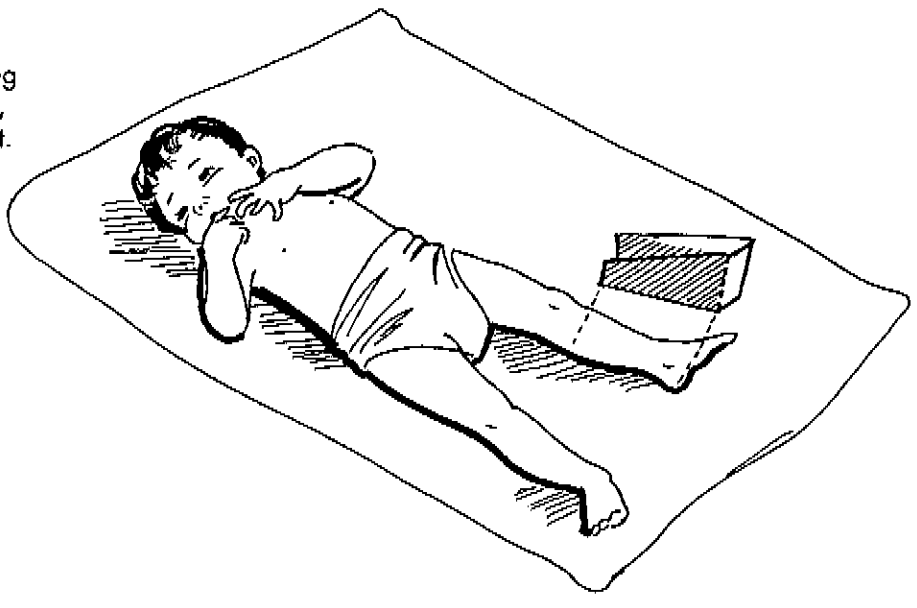
An older child, or a baby who has some strong muscles and some weak muscles in a limb, tends to move the limb, and to lose the good position in the splint. For these children, use a splint made of stronger material, such as wood or bamboo, whichever is most easily available.

Foot Splint for Babies

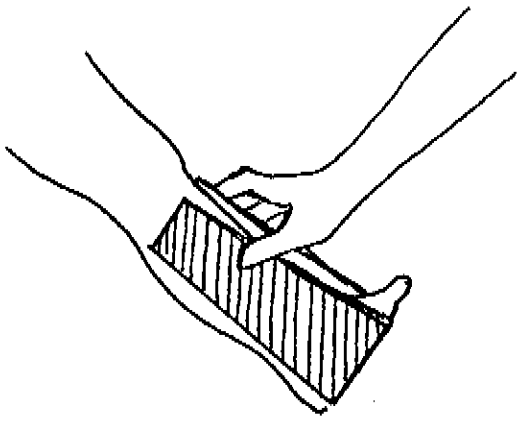
For babies, and for small children, you can make a foot splint from cardboard.

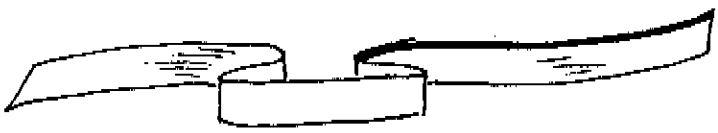
Cut a piece of cardboard twice the length of the baby's leg from below the knee to the heel, plus the width of the baby's foot.

Bend the cardboard at right angles to fit under the baby's foot and along the sides of the baby's leg.



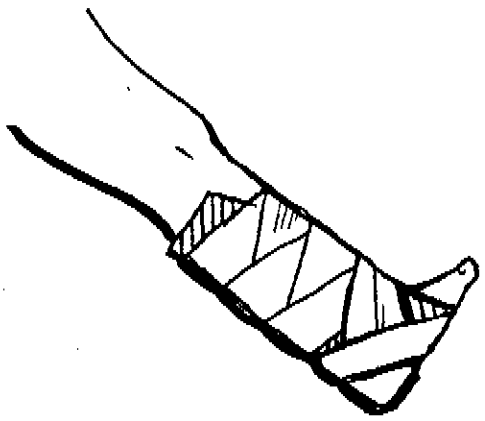
Position the baby's foot so that it is pointing upward. Put the splint on the baby's foot and leg so that it is under the foot just behind the toes, and goes up the sides of the leg to just below the knee.





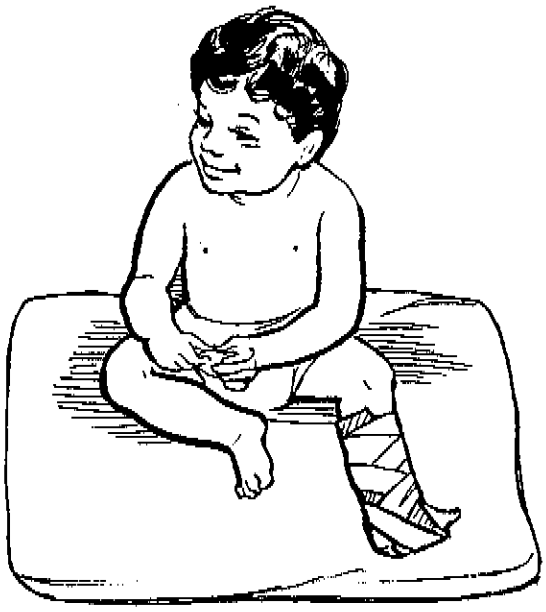
Use a long strip of soft cloth to wrap around the splint and the baby's leg. Wrap the cloth under the foot to add support to the splint to hold the foot upward. If the splint does not hold the foot properly, use two or three layers of cardboard.

If this still does not keep the foot in a good position, you may need to make a wooden splint as on pages 23–24.



Make certain that the cardboard does not scratch or press into the baby's skin. If the cardboard makes marks on the skin, put a soft cloth between the leg and the splint.

The baby can wear the splint when lying down and when sitting.

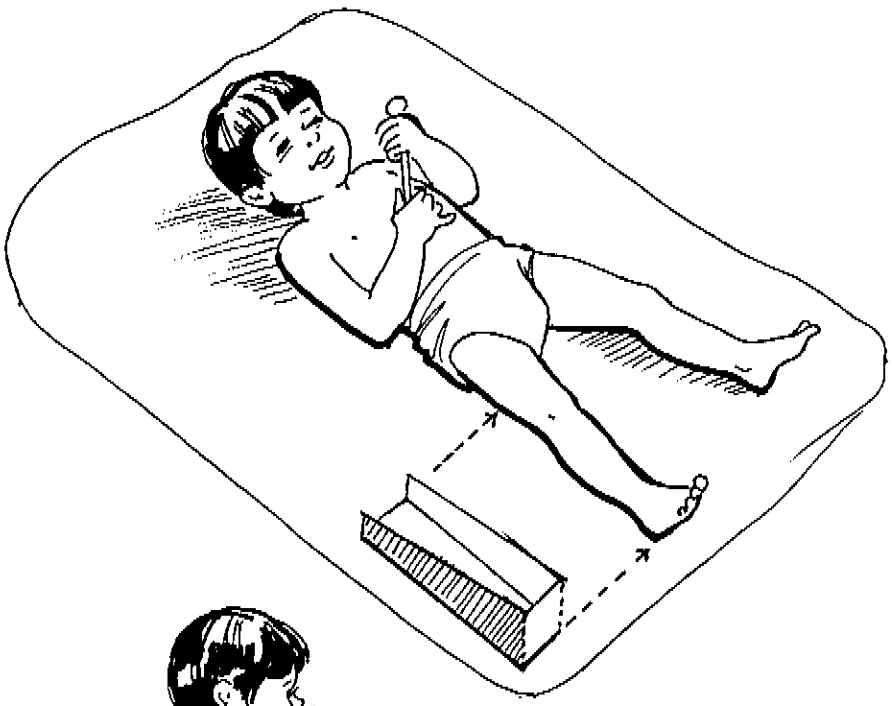


Foot and Knee Splint for Babies

For babies, and for small children, you can make a foot and knee splint using cardboard.

This splint is like the one described for the baby's foot, but the sides of this splint go above the child's knee.

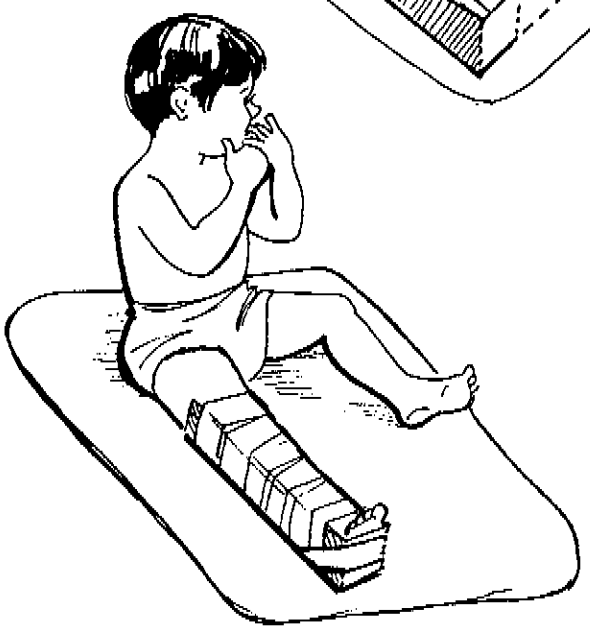
Cut a piece of cardboard twice the length of the child's leg from the middle of the thigh to the heel, plus the width of the child's foot.



Put the splint on the child's leg in the way described for the foot splint shown on the previous page.

Wrap a strip of soft cloth around the splint and the child's foot and leg up to the top of the splint.

Make certain that the splint does not scratch or press into the child's skin. If the cardboard makes marks on the skin, put a soft cloth between the leg and the splint.

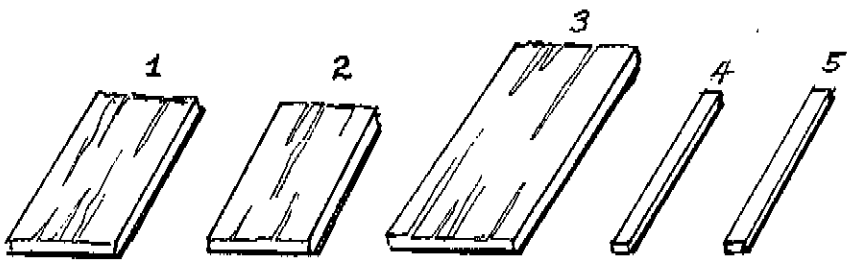


If the splint does not hold the position of the foot and knee properly, use two or three layers of cardboard.

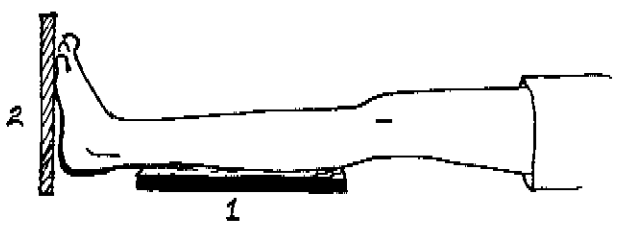
If the splint still does not hold the foot and the knee properly, you may need to make a wooden splint as on page 25.

Foot Splint for an Older Child or for a Younger Child if a Cardboard Splint does not Work

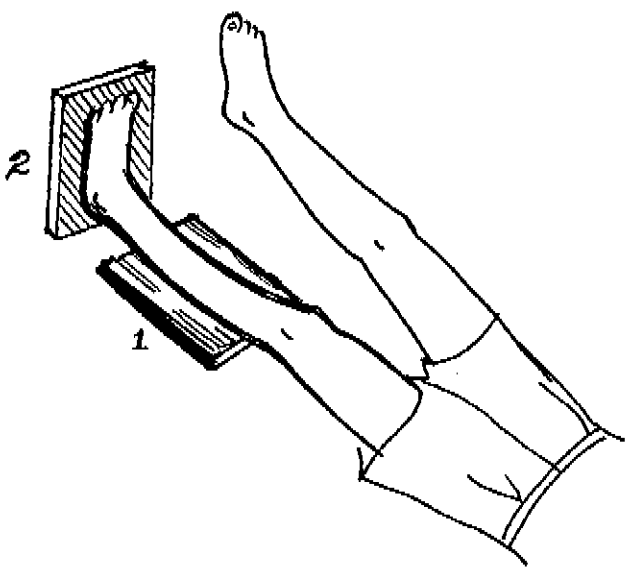
You will need five pieces of wood to make this splint. If possible, use plywood with a resin coating to avoid splinters.



Use two pieces of wood (1, 2) which are as thick as your finger. One piece should be the length of the child's leg from just above the ankle to just below the knee. The other piece should be a little longer than the child's foot.

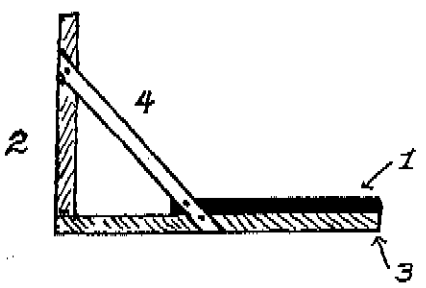


Both of these pieces should be the same width. They should be wide enough for the leg and foot to rest comfortably on them.

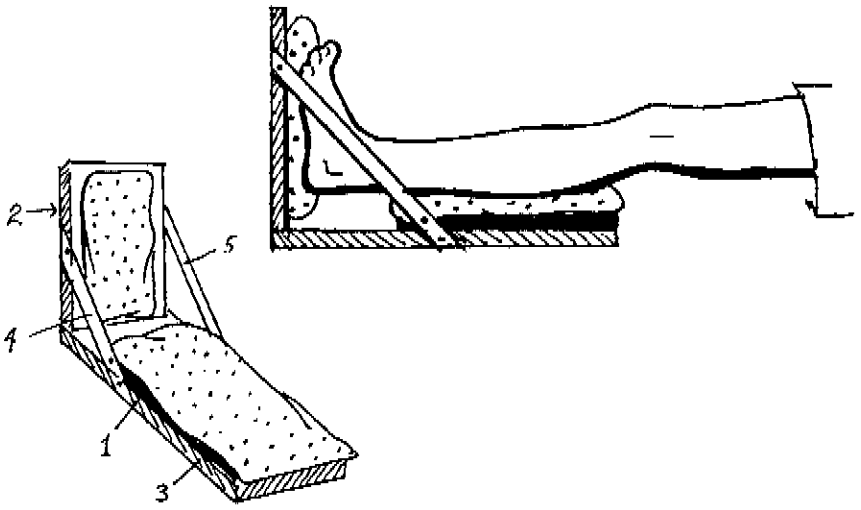


The largest piece of wood (3) fits under the two pieces for the leg and foot. This makes a base for the splint. Nail these pieces together.

Use the small pieces of wood (4, 5) to fix the leg piece and the foot piece onto the base. Nail the small pieces of wood to each of the other pieces.

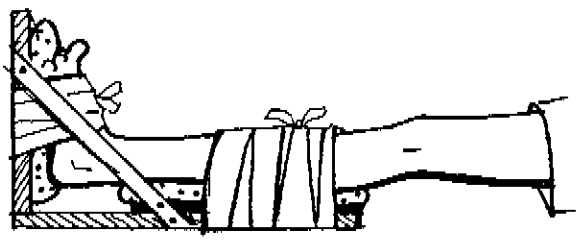


Put soft padding on the foot piece and the leg piece to protect the child's skin.

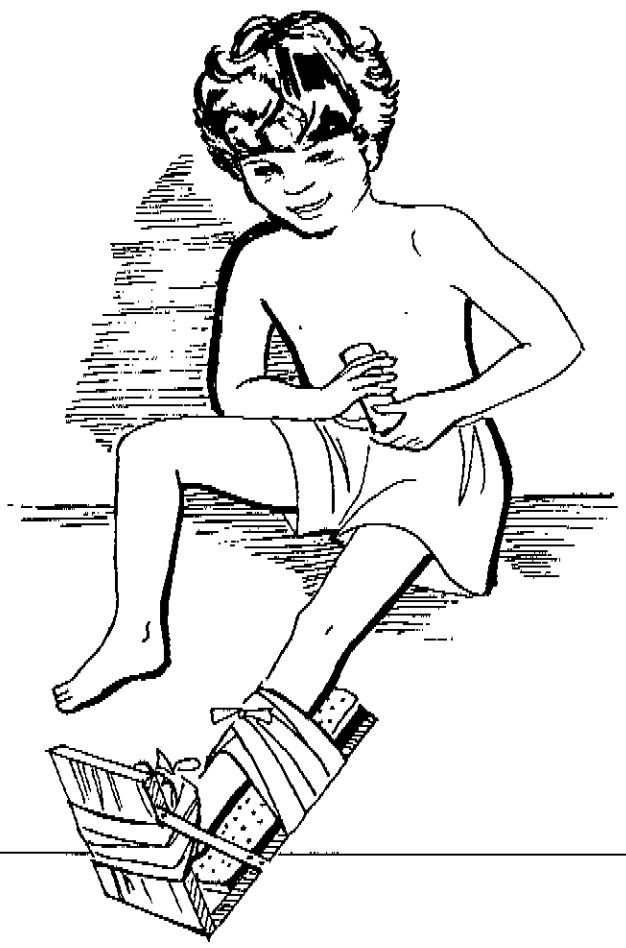


Use two strips of soft cloth to wrap the splint to the child's foot and leg.

The back of the child's heel should not touch the board which forms the base.

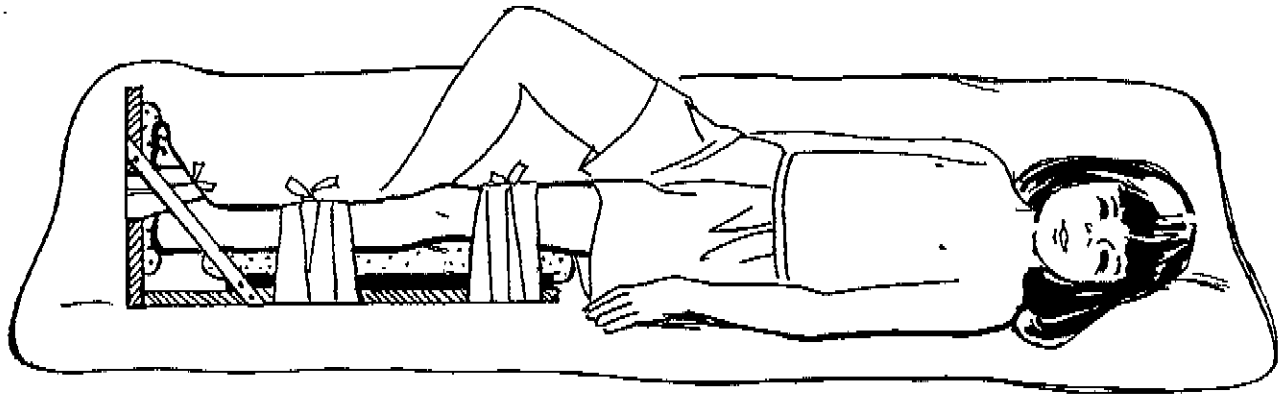


This splint can be used when the child is lying down or sitting.



Foot and Knee Splint for an Older Child or for a Younger Child if the Cardboard Splint does not Work

Make the splint as you would make the foot splint described on the previous page, but make the pieces which go under the leg longer.



Make the smaller piece long enough to fit under the child's leg from just above the ankle to the middle of the thigh. Make the larger piece long enough to go under the child's leg from the heel to the middle of the thigh. Use three strips of soft cloth to wrap the splint to the child's foot, lower leg, and upper leg.

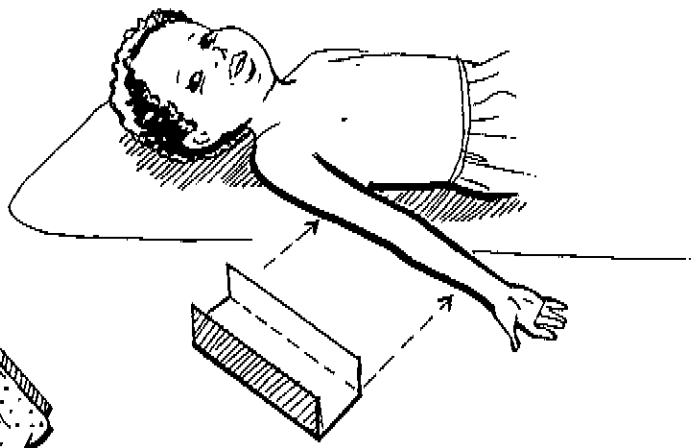
Elbow Splint for a Baby or an Older Child

A few children who have some weakness in their arms, may need elbow splints.

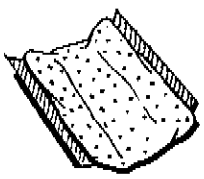
The child wears the splint at night to keep the elbow straight, but not during the day because it prevents the child from using the hand.

You can make an elbow splint out of cardboard in the same way that you can make a cardboard splint for the knee.

Cut a piece of cardboard the length of the child's arm from the middle of the upper arm to the middle of the lower arm. It should be wide enough to wrap around the child's arm from side to side and under the arm.

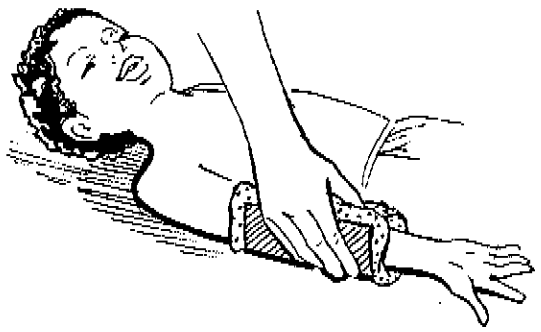


Put soft padding over the cardboard to protect the child's skin.

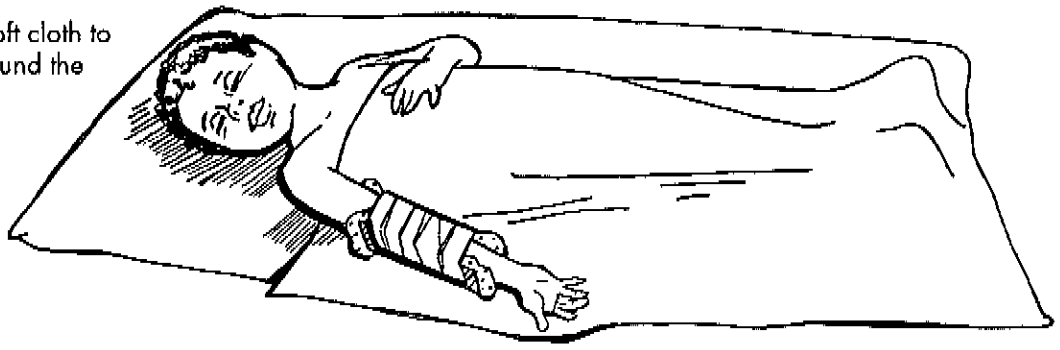


Straighten the child's arm with the palm of the hand turned up.

Place the arm in the splint. Make certain that the cardboard is not scratching or pressing into the skin.



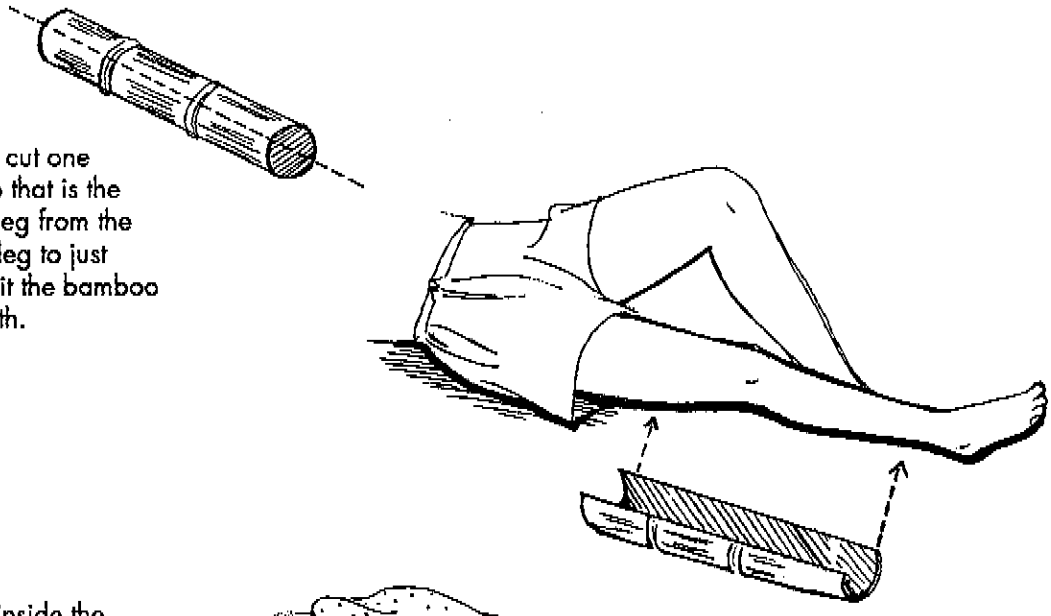
Use a strip of soft cloth to wrap the splint around the child's arm.



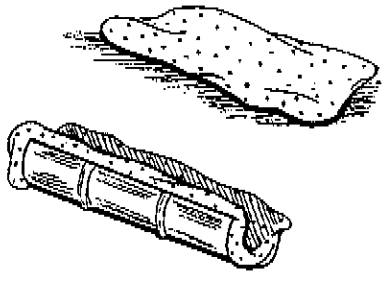
Splints Made from Bamboo

You can use bamboo for knee and elbow splints, but not for the foot. If bamboo is used for a knee splint, find another way to support the child's foot in the proper position.

It is necessary to split the bamboo open so that the limb can rest inside the curve. Make certain that the bamboo is wide enough to fit the limb without causing too much pressure on the skin.



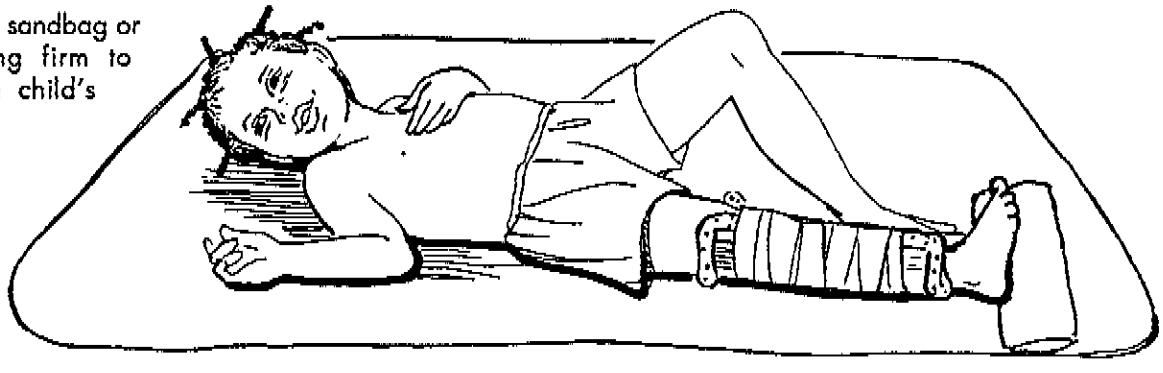
For a knee splint, cut one piece of the bamboo that is the length of the child's leg from the middle of the upper leg to just above the ankle. Split the bamboo in half along its length.



Put soft padding inside the bamboo to protect the child's skin.

Use two strips of soft cloth to tie the splint onto the child's leg.

Use a sandbag or something firm to hold the child's foot up.



4.2
Move the Child's Limbs Each Day

To prevent deformities, move the child's limbs through their full range of movement each day. Some movements will need to be done passively, while others may be done actively.

Passive movement is movement which is not done by the muscles. For example, if the leg muscles are paralyzed, and the child cannot straighten the knee, another person must straighten the knee for him or her. If the child is older, he or she can use the hands to straighten the knee. Since the leg muscles are not acting, the movement is passive. Each part of the child's limbs which are affected by polio will need passive movements each day.

Active movement is the movement done by the muscles. Muscles which are not affected by polio can work normally and move the limbs actively. Muscles which are partially paralyzed can do weak or partial movements. The child may be able to do part of a movement actively, and then require assistance to complete the movement passively. For example, if the muscles which straighten the hip are weak, the child may be able to straighten the hip partially from the fully bent position. Then a family member must help the child to straighten the hip fully. Hence, the child does some of the movement actively , and then the movement is completed passively.

4.2.1 Passive movement

The exercises shown on pages 32 to 42 show how a family member can do passive movements for the child's limbs. If done properly, each movement will help to keep a specific group of muscles lengthened so that the child will keep the full movement of the limb.

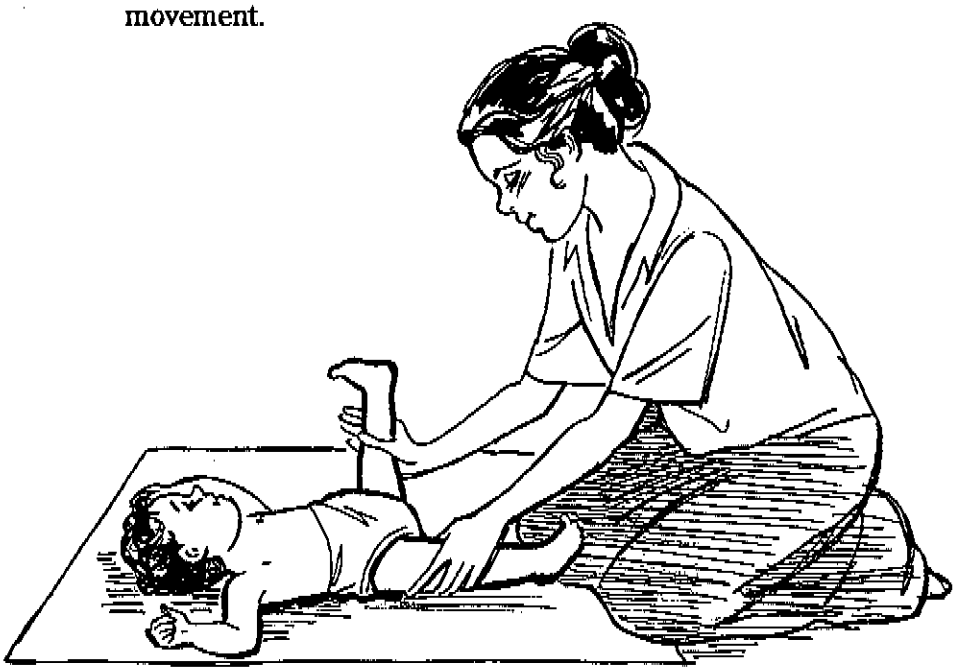
Most children who are affected by polio will not need to have all of these movements done passively. The health worker and a family member together can observe the child and see which movements he or she cannot do, or can do only partially. The family member should learn how to do those movements for the child.

- Do the passive movements carefully. Use the pictures as a guide for placement of the hands by the family member.
- Do each movement gently with moderate speed. Never do movements quickly. However, doing the movement too slowly may irritate the child, who will start to turn and move other parts of the body to get away from the exercises.

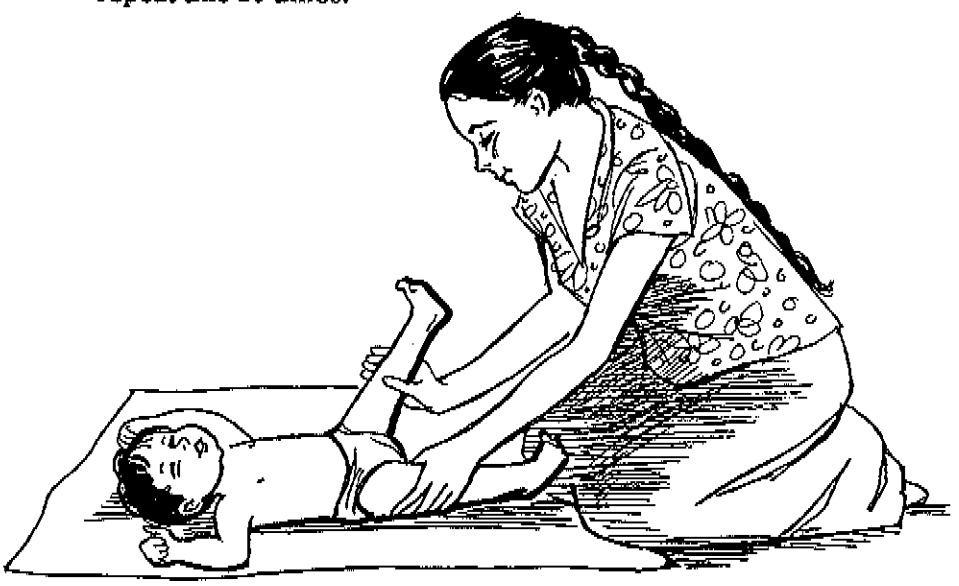
Start these exercises as soon as the child has passed the very painful phase of the acute illness. At this stage, all parts of the child's limbs will have full movement, and the exercises will help to keep this movement.

Some children may not be known to the health worker until after they have had polio for some time. These children may have tight muscles which limit the passive movements. In such a case, the family member should move the limb as much as possible, hold the limb at the limited point, and slowly count 1-2-3-4-5. Then the family member can take the limb to the starting position, pause and repeat the movement in the same way 10 times. This may slowly increase the range of passive movement.

The following picture from page 34 shows a family member bending a child's hip with the knee straight. This movement lengthens the muscles that bend the knee. This child has full movement.



This next picture shows another child who has some tightness in the muscles that bend the knee. The family member cannot bend the hip fully with the knee straight, She will hold the leg at the point of the limitation, count to 5, and lower the leg. She will repeat this 10 times.



Some children with limited passive movements may need more exercises. If a family member starts the exercises and there is no improvement after two weeks, it may be necessary to do the exercises twice a day, and to repeat them 10 times each. Do this until the movement increases and the child has the amount of passive movement that is shown in the pictures on pages 32 to 42. It is important to use splints to keep the child's limbs in the best position possible.

If a child was affected by polio two or more years before the health worker finds the child, he or she may have severe deformities which will not be changed by passive movements. Nonetheless, the family should try the exercises for three months to see if there is any improvement. If no progress occurs, the child may need surgery. Refer the child to a physician who can assess the deformities and decide if surgery is appropriate.

Children who have surgery to increase movement must have the same special care that is given to children who have just developed paralysis. Following surgery a cast is put on the limb to hold it in a good position during the healing of the surgical wound. After the cast is removed, the child must have passive movement each day to keep the movement achieved through surgery. Also use splints to position the limb properly at night and during part of the day. Surgery is often done for the lower limbs so that a child can be fitted with braces and walk. If the child wears the braces all day, and the knees are often straight in the braces, he or she may not need splints at night. However, the child should still sleep with the hips and knees straight. Lying on the stomach may be the best position to keep the hips and knees straight during the night.

4.2.2 Active movement

Children may do actively many of the passive movements shown on pages 32 to 42. However, babies and small children do not move their limbs in such precise ways. At first babies move their limbs randomly. Later they begin to make purposeful movements, such as reaching to grasp an object. The purposeful movements increase with age, so that small children move their limbs and body to roll, to sit, to crawl, to move to standing and to walk. Later they learn to do movements for self-care, such as eating and dressing, and movements for play, such as throwing a ball and running.

The family should encourage a child with polio to do as many of these activities as possible. The child should use his or her limbs actively for both random and purposeful movements.

During the recovery period, especially during the first six months, some muscles become stronger. The child may begin to do some movements partially that at first he or she could not do

at all. The child may also begin to do some movements fully that at first he or she could do only partially.

The health worker and family members should note carefully any improvements in movement. At the same time, a family member should continue to do the necessary passive movements until the child is able to do them fully actively.

A child of five years old or older can do more precise movements. Use the exercises shown on pages 32 to 42 as a guide for active exercises for the older child.

The family member should do a movement passively to show the child what to do, and then the child can try to do it actively.

If the child can do a particular movement actively 10 times, he or she can stop doing that exercise. The muscle used for the exercise is strong enough to be used in the child's normal daily activities.

If the child can do only part of a movement, or if the muscle tires after doing the movement for only a few repetitions, ask the child to do as much active movement as possible. Then complete the exercise with passive movements. If the muscle becomes strong enough to do the movement actively 10 times, the passive movements can be discontinued.

Exercises to do when the child is lying on the stomach

Exercise 1. Bend the child's knee.

This exercise stretches the muscles which straighten the knee.

Begin with the child's legs straight and close together.

Put one hand on the child's buttocks to prevent the hips from moving.

With the other hand, hold the ankle of the leg you will move.

Gently bend the knee, then straighten it. If the knee has full movement when it bends, the foot will touch the buttock.

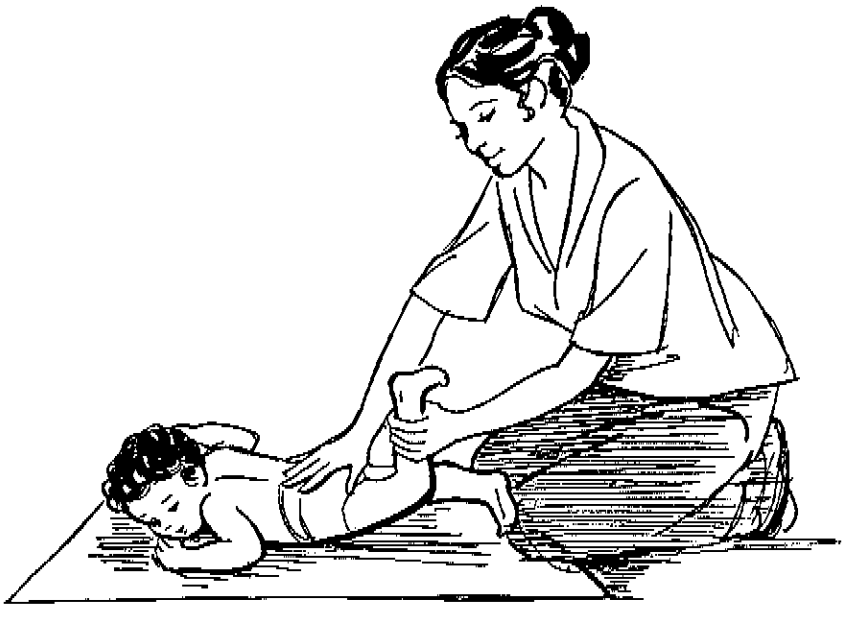
Repeat the movements of bending and straightening 6 times.

If the other leg is weak, do this exercise for the other leg.

Exercise 2. Straighten the hip by moving the leg backwards.

This exercise stretches the muscles which bend the hip.

Begin with the child's legs straight and close together.



Put one hand on the buttock of the leg you will not move.

With the other hand, hold the ankle of the leg you will move and bend the knee to a right angle.

Gently lift the leg so that the thigh is off the ground. Then lower the thigh to the ground.

Repeat the movements of lifting and lowering the thigh 6 times.

If the other leg is weak, do this exercise for the other leg.

Exercises to do when the child is lying on the back

Exercise 3. Bend the child's hip with the knee bent.

This exercise stretches two muscle groups. On the leg which is moved, the exercise stretches the muscles which straighten the hip. On the leg which remains straight down on the ground, this exercise stretches the muscles which bend the hip.

Begin with the child's legs straight and close together.

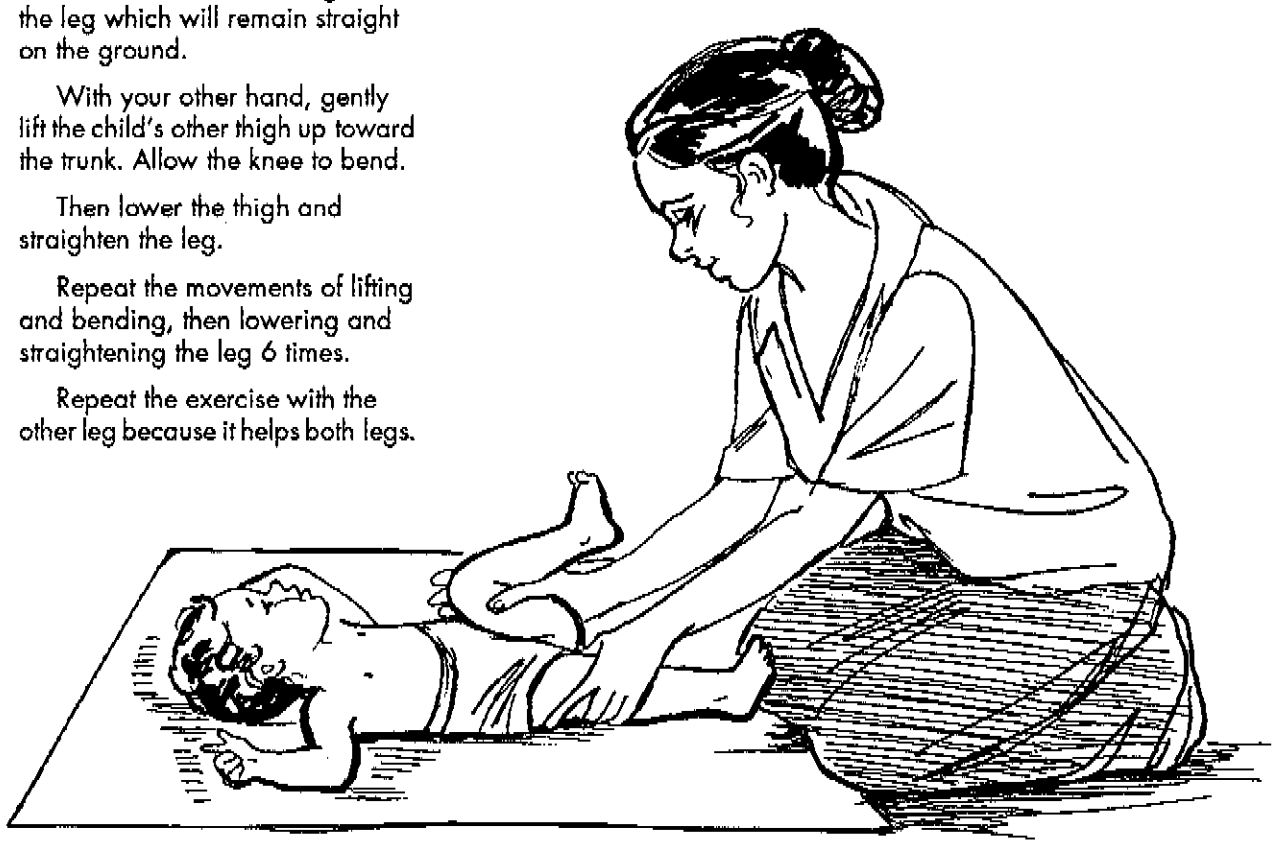
Put one hand on the thigh of the leg which will remain straight on the ground.

With your other hand, gently lift the child's other thigh up toward the trunk. Allow the knee to bend.

Then lower the thigh and straighten the leg.

Repeat the movements of lifting and bending, then lowering and straightening the leg 6 times.

Repeat the exercise with the other leg because it helps both legs.



Exercise 4 Bend the child's hip with the knee straight.

This exercise stretches the muscles which bend the knee.

Begin with the child's legs straight and close together.

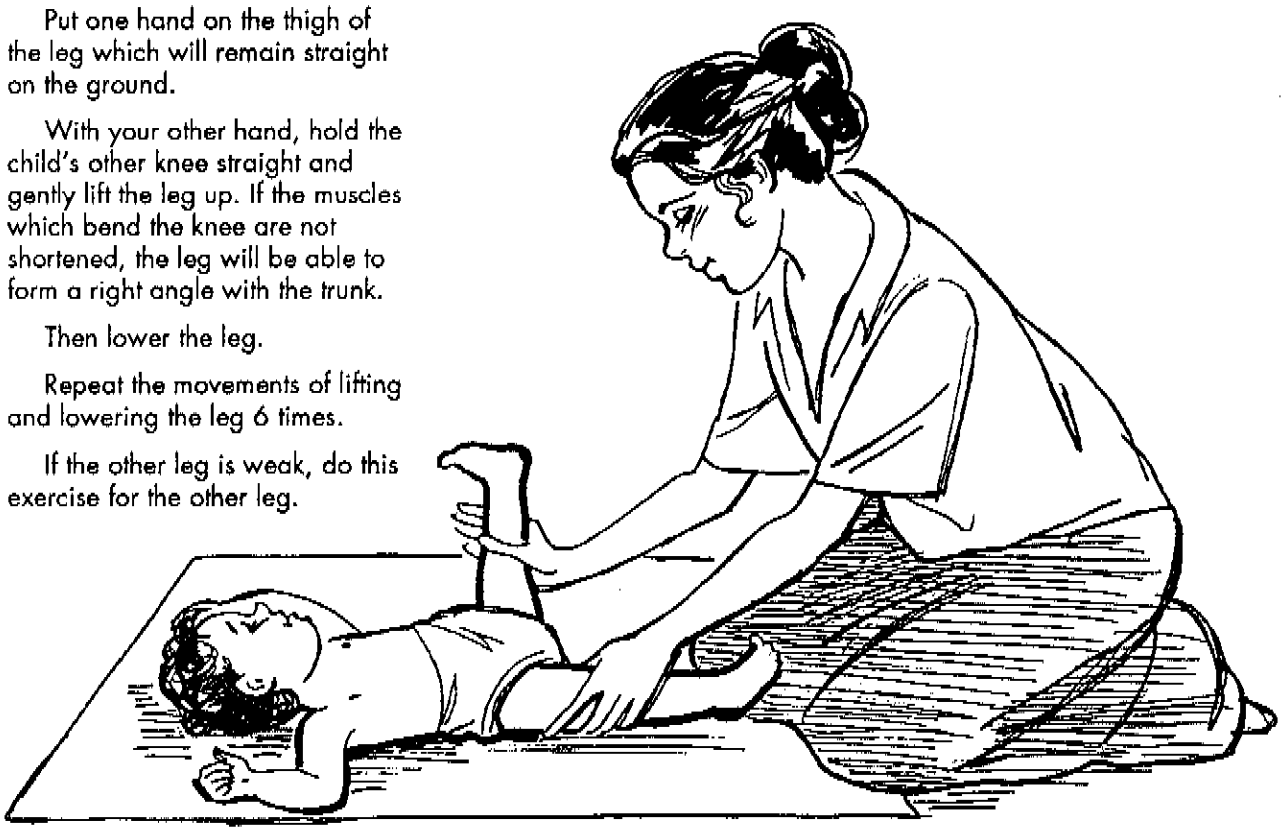
Put one hand on the thigh of the leg which will remain straight on the ground.

With your other hand, hold the child's other knee straight and gently lift the leg up. If the muscles which bend the knee are not shortened, the leg will be able to form a right angle with the trunk.

Then lower the leg.

Repeat the movements of lifting and lowering the leg 6 times.

If the other leg is weak, do this exercise for the other leg.



Exercise 5. Move the child's legs together, away from each other, and together again.

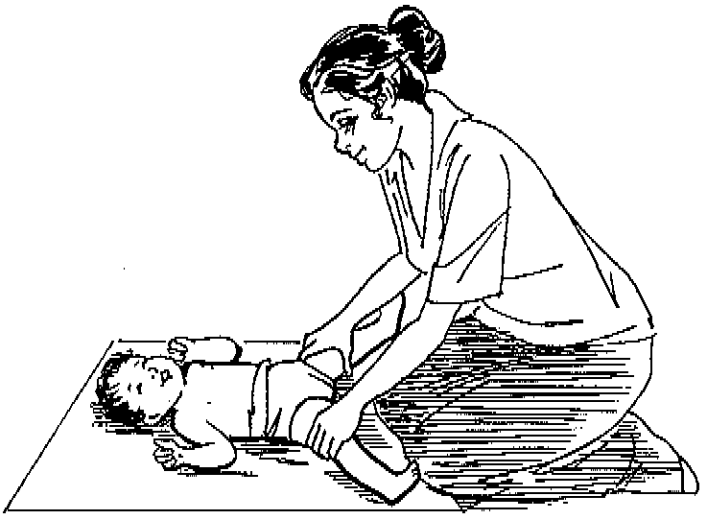
This exercise stretches the muscles which move the child's legs apart and the muscles which move the child's legs together.

Begin with the child's legs straight.

Put your hands around the child's knees and thighs.

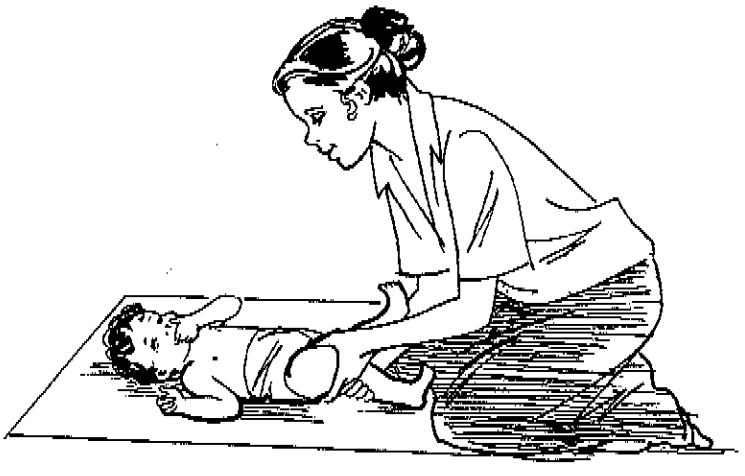
Gently move the legs together and cross the right thigh under the left one. Keep the knees straight. Do not turn the legs. Keep the legs as close to the ground as possible.

Then move the child's legs apart.



Then move the legs together and cross the left thigh under the right one.

Repeat these movements of the legs coming together and crossing under each other and then moving apart 6 times.



Exercise 6. Move the child's foot upward.

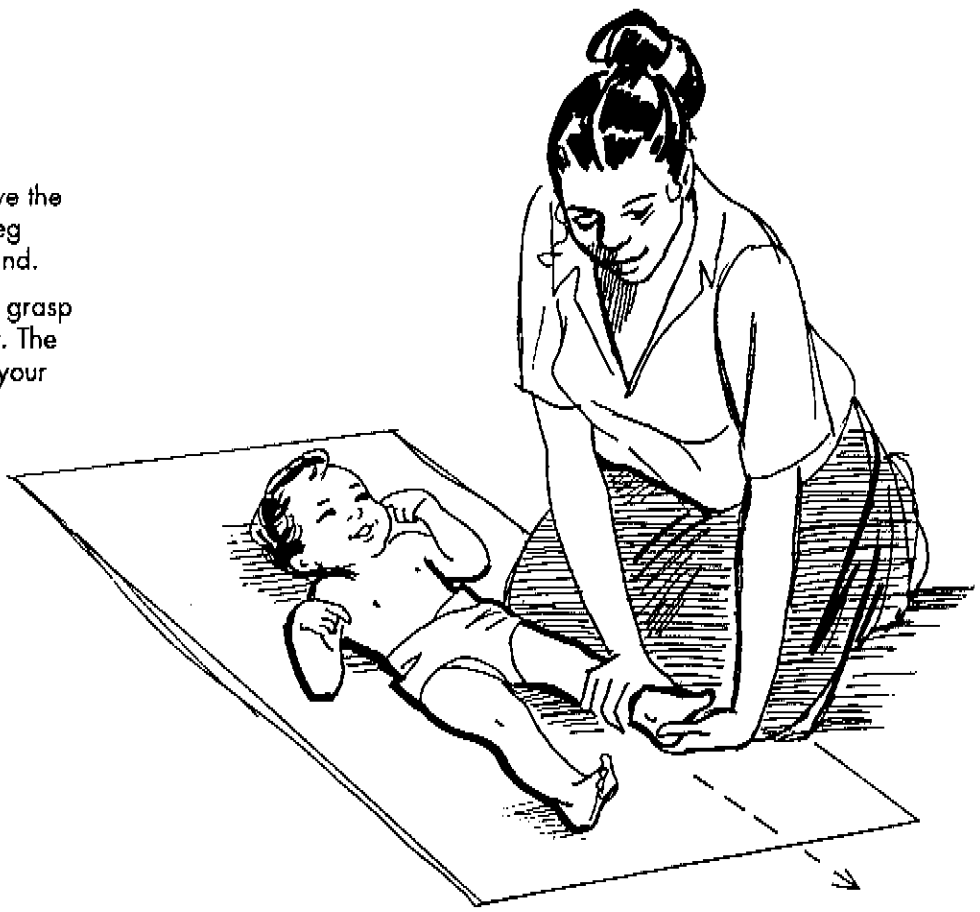
This exercise stretches the muscles which pull the foot down and in.

There are two movements for this exercise. First pull the heel (the back of the foot), then move the front of the foot upward.

Begin with the child's legs straight.

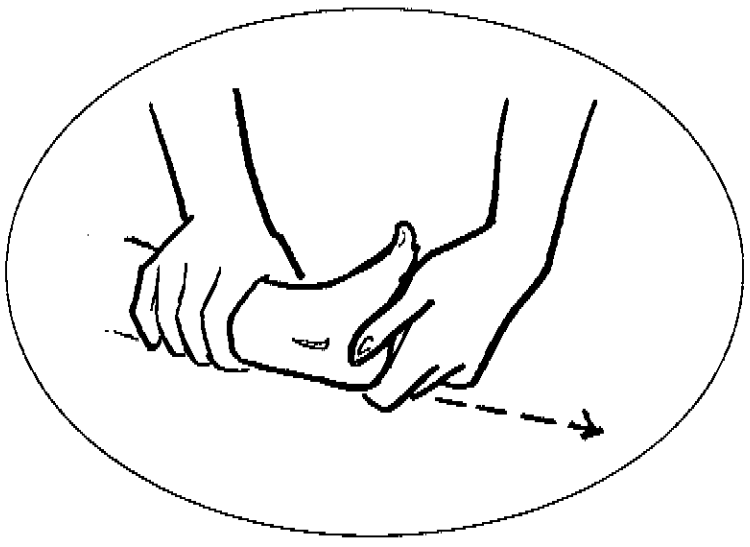
Put one hand just above the child's ankle to hold the leg straight down on the ground.

With your other hand, grasp the heel of the child's foot. The heel should rest between your thumb and fingers.

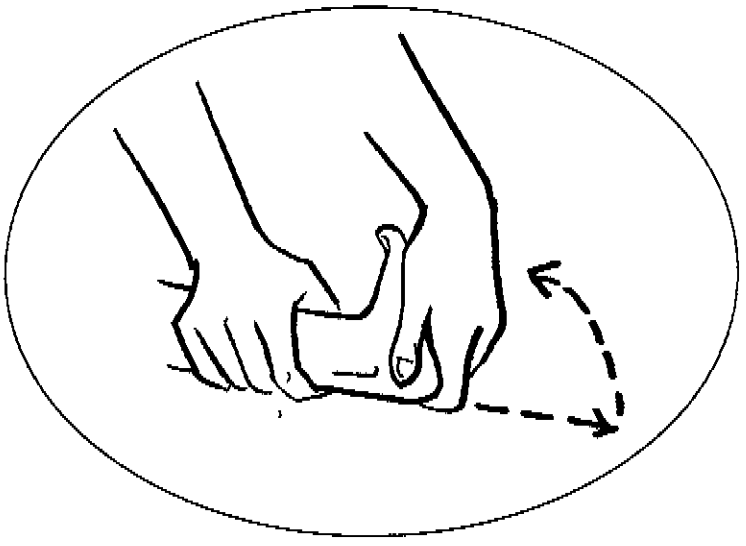


Gently pull the heel as if you were trying to make the leg longer.

Keep pulling with your thumb and fingers, and then begin to move the palm of your hand up to the child's foot.

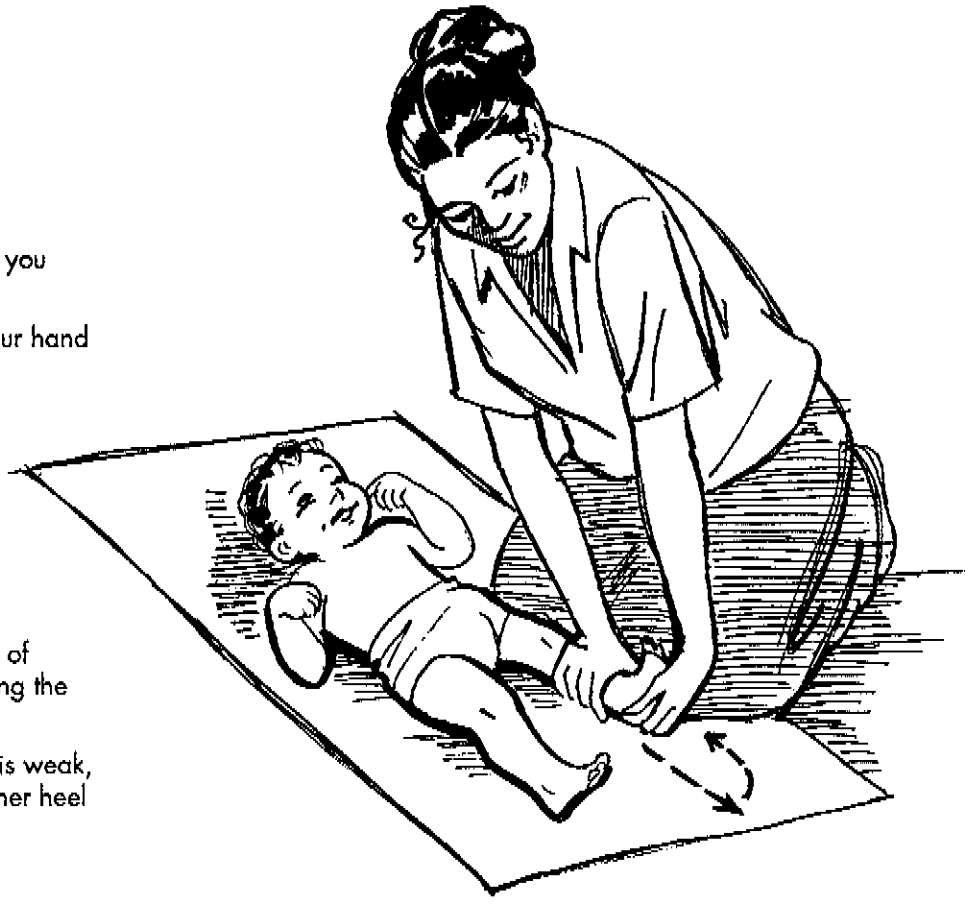


Keep pulling the heel and at the same time use the palm of your hand to push the foot up. Do not allow the foot to turn inward toward the other leg.



Hold the foot up while you count from 1 to 5.

Release the push of your hand and then the pull.



Repeat the movements of pulling the heel and moving the foot up 6 times.

If the child's other leg is weak, do this exercise for the other heel and foot.

Exercise 7. Lift the child's arm up over the head.

This exercise stretches the muscles which pull the arm down. Begin with the child's arm straight beside the trunk.

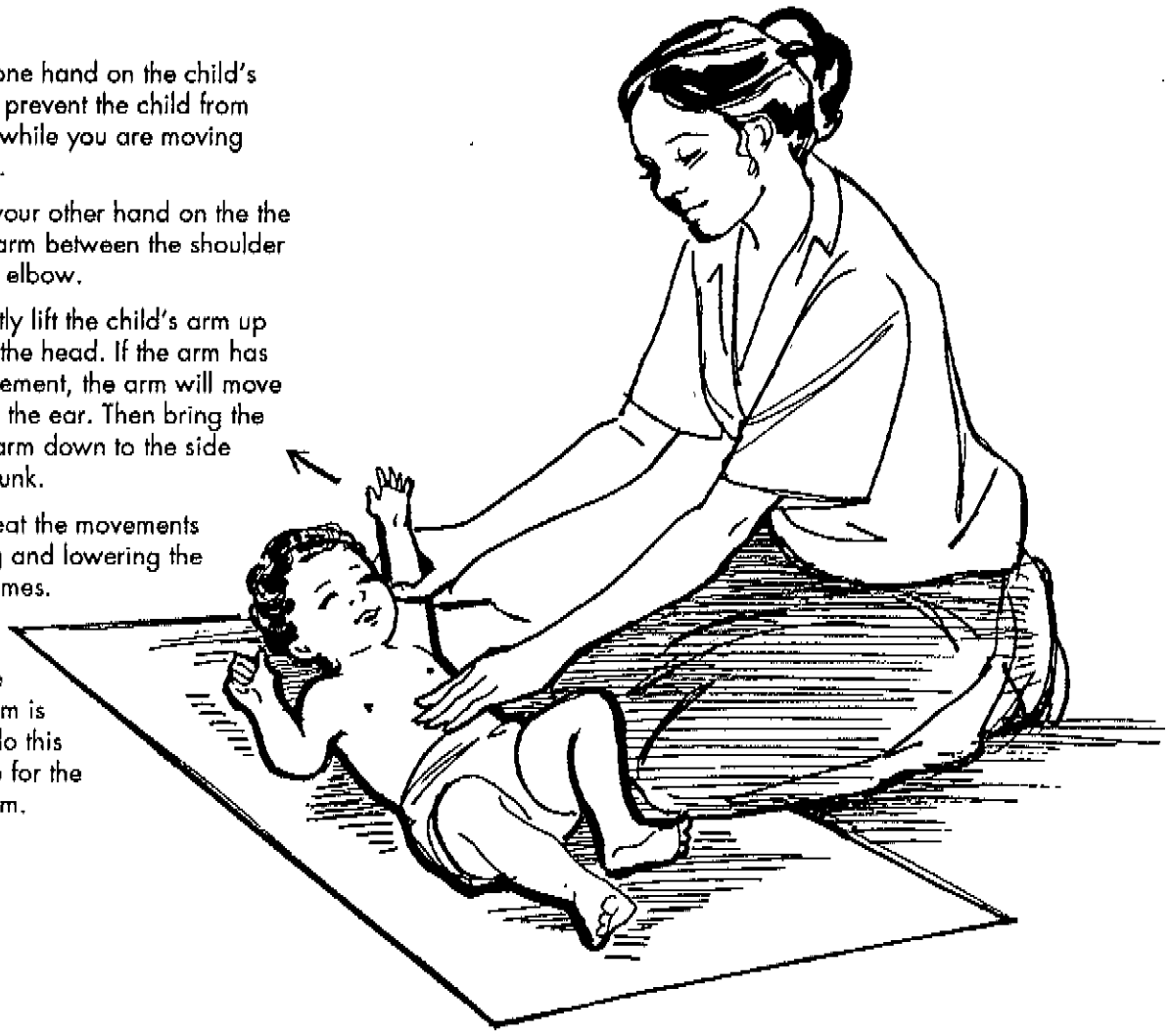
Put one hand on the child's trunk to prevent the child from turning while you are moving the arm.

Put your other hand on the the child's arm between the shoulder and the elbow.

Gently lift the child's arm up toward the head. If the arm has full movement, the arm will move up near the ear. Then bring the child's arm down to the side of the trunk.

Repeat the movements of lifting and lowering the arm 6 times.

If the other arm is weak, do this exercise for the other arm.



Exercise 8. Move the child's arm away from the body by moving it to the side.

This exercise stretches the muscles which pull the arm down close to the trunk.

Begin with the child's arm straight beside the trunk, palm of the hand turned up.

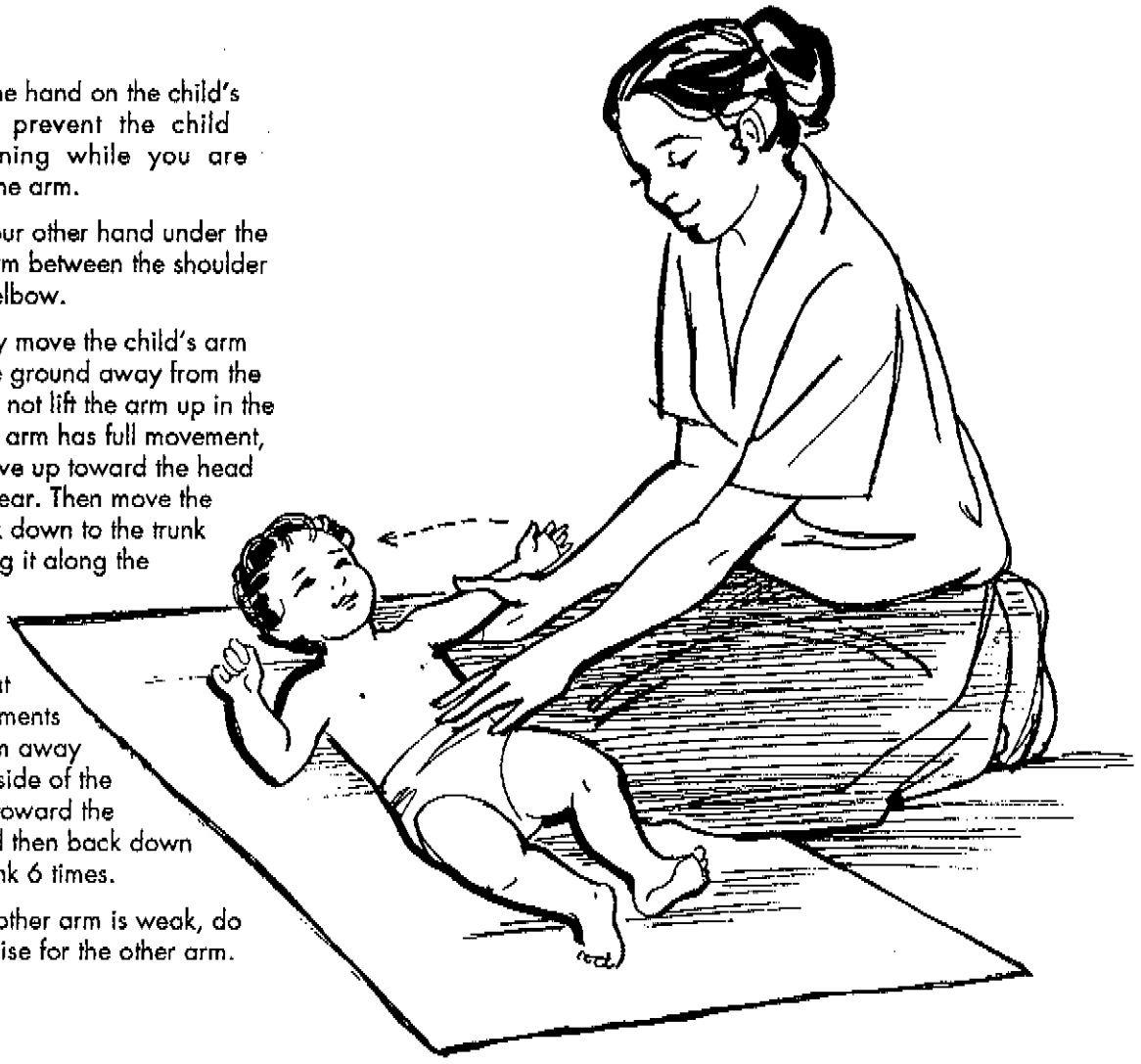
Put one hand on the child's trunk to prevent the child from turning while you are moving the arm.

Put your other hand under the child's arm between the shoulder and the elbow.

Gently move the child's arm along the ground away from the trunk. Do not lift the arm up in the air. If the arm has full movement, it will move up toward the head near the ear. Then move the arm back down to the trunk by moving it along the ground.

Repeat the movements of the arm away from the side of the trunk up toward the head and then back down to the trunk 6 times.

If the other arm is weak, do this exercise for the other arm.



Exercise 9. Straighten the elbow...and bend the elbow.

Straightening the elbow stretches the muscles which bend the elbow.

Bending the elbow stretches the muscles which straighten the elbow.

Begin with the child's upper arm beside the trunk.

Put one hand on the child's arm near the shoulder to prevent the upper part of the arm from moving.

With your other hand, gently straighten and bend the child's elbow.

When you straighten the elbow, the palm of the child's hand should be turned up so that the back of the child's hand touches the ground when the elbow is straight. Most children who have weakness in the arm have more difficulty straightening the elbow than bending it. Do the movement gently and straighten the elbow as much as possible.

When you bend the elbow the child's hand will touch the shoulder.

Repeat the movements of bending and straightening the elbow 6 times.

If the child's other arm is weak, do this exercise for the other arm.

Exercise 10. Turn the child's forearm so that the palm of the hand and the fingers are turned toward the child's face...and then away from the face.

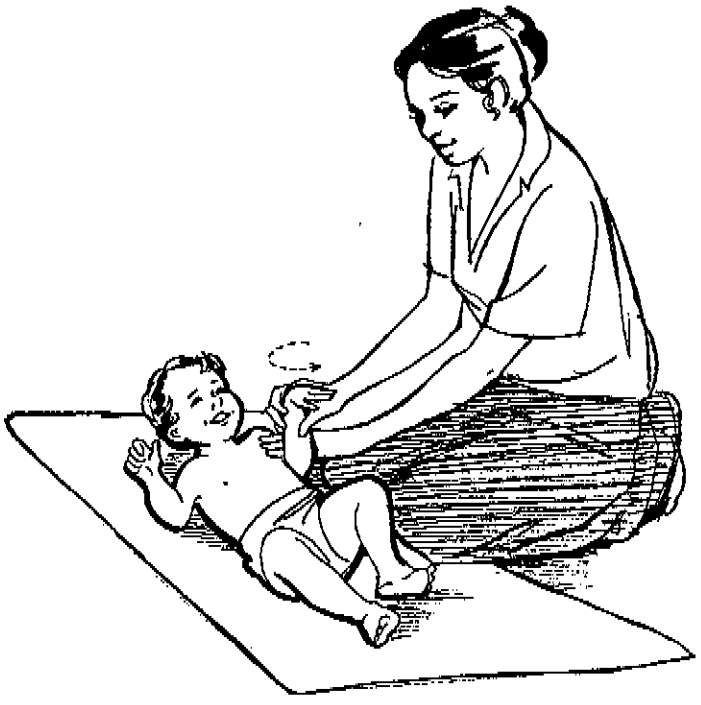
Turning the child's forearm stretches the muscles which cause the forearm and hand to turn.

Begin with the child's upper arm beside the trunk, elbow bent to a right angle.

Put one hand on the child's upper arm to prevent it from moving.

With your other hand, hold the child's forearm near the wrist. Do not put your hand on the child's hand.

Use your fingers and thumb to gently turn the child's forearm so that the palm of the hand and the fingers turn toward the child's face...



and then away from the face.

Repeat the turning movements 6 times in each direction.

If the child's other arm is weak, do this exercise for the other arm.

Exercise 11. Move the child's wrist so that the hand bends forward...and then backward.

This exercise stretches the muscles which move the hand forward and backward.

Begin with the child's upper arm near the trunk, elbow bent to a right angle.

Put one hand on the child's forearm, between the elbow and the wrist, to prevent this part of the arm from moving.

Use the fingers of your other hand to move the child's hand. Do not move the child's fingers.

Gently move the child's hand so that the palm of the hand bends forward...

and then backward.

Repeat the movements of the hand 6 times in each direction.

If the child's other arm and hand are weak, do this exercise for the other arm and hand.

4.3
Teach the Child to Do the Activities that Other Children Do

A child's normal physical and social activities help to prevent deformities, and also help to integrate the child into the family and the community.

- Physical activities include the developmental, self-care, play and work activities.
- Social activities include all of the interactions that a child has with family members, with children in the neighborhood and at school, and with adults outside the family.

4.3.1 Physical activities

A child develops from a baby who is totally dependent on others to change his or her position and to provide all of the care needed for survival. The child develops the physical ability to move from a lying position to standing and walking. The child also learns to do self-care activities, including feeding, toileting, bathing and dressing. In addition, the child does other physical activities, such as climbing, running and jumping, often in play with other children. The child learns activities which help within the household or family. These may include work within the house, running errands, or helping with work outdoors.

- A baby with polio may need special encouragement and attention from the family to learn physical activities. At least one family member should take responsibility for playing with the child and stimulating him or her to move from lying to sitting, to crawling, and to standing; and to use the hands for playing and eating.
- When the child is older, he or she may still need special attention to learn how to use the toilet, bath and dress. The family should also identify tasks which the child is able to do. This helps the child to feel just as important as other children within the family.
- The family should encourage the preschool child to play with other children. If the child cannot walk, the family can identify games which the child is able to play, and then invite other children to come and play the games. This helps the child to feel comfortable with children outside the family, and prepares the child for school.
- When the child is old enough to go to school, the family should find a way for the child to get to and from the school. This was discussed on page 14.

4.3.2 Social activities

Social activities can include physical activity, but the basis of social activity is communication with other people. A child affected by polio is able to communicate in the same way as other children. However, the communication cannot take place if the child cannot move to be with other people and others do not come to the child. To promote normal communication, the family can take the child to visit others and encourage others to spend time with the child.

The social barriers to a child's integration into family and community activities were discussed on pages 13 and 14. Discuss these with the family and encourage them to reduce or to eliminate possible barriers and to increase the child's opportunity to lead a normal life.

4.4 Provide Special Equipment if it Is Needed for the Child to Stand and to Walk

Many children affected by polio cannot participate in normal activities because they cannot walk for long distances, or they cannot walk at all. Providing the necessary appliances for standing and walking can provide these children with the opportunity to do more activities that other children do.

The children who can walk, but who have difficulty because of a drop foot, are those whose muscles for pulling the foot up are totally or partially paralyzed. These children can walk without a brace, but they walk better if they have a support to hold the foot up. They can use a brace which supports the foot.

The children who have difficulty standing and walking are those whose muscles for straightening the knee are totally or partially paralysed. The muscles at the hip may also be paralyzed.

- Most children with this type of paralysis have only one leg affected, so some of them find a way to walk by using one hand to hold the knee straight or by using a stick or a crutch for support. However, because they walk without proper support for the knee, these children develop deformities of the knee, and sometimes of the trunk. Children with this type of paralysis should have a brace which supports the foot and the knee.
- A child who has paralysis of the muscles at both knees cannot walk without braces. These children need two braces which support the feet and knees.

4.4.1 Splints for young children to stand

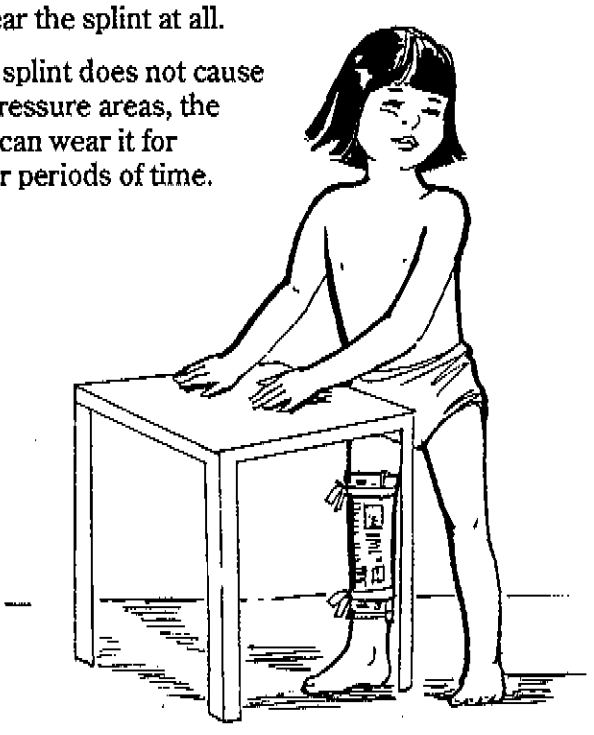
After one year of age, a child with polio should stand for some time each day. Between the ages of one to three years, a child's legs can usually be supported by simple splints made by the family. If metal or plastic braces are available, they are easier to use. These must be adjusted or replaced as the child grows.

If the family makes simple splints, they must be sturdy enough to prevent the child from falling. The splints presented on the bottom of page 20 and pages 21 to 25 are not strong enough, or do not stay in place well enough, in the standing position. The soft cloths which hold the leg in these splints will not support the leg in standing. Those splints are for keeping good positions of the limbs while in the lying or sitting position.

To enable a young child to stand, a thick cardboard or newspaper splint can be wrapped completely around the leg (see the top of page 20). The cardboard or newspaper should fit the leg from just below the hip to just above the ankle, and should be tied on above and below the knee.

Splints wrapped around the leg may put pressure on the skin on the front of the knee, especially when the child is standing. The family can try this type of splint on a young child. After the child stands for a short time (about 15 minutes), they should remove the splint to see if there are any pressure points (reddish areas) on the child's skin, especially in front of the knee.

- If there is a pressure area, they should keep splint off and look at the area again one half hour later.
  - If the redness has disappeared, it means that the child can use the splint, but only for very short periods of time.
  - If the redness has not disappeared, the child should not wear the splint at all.
- If the splint does not cause any pressure areas, the child can wear it for longer periods of time.



The child can stand in the splint with the support of a family member, or by leaning on a chair or a stool.

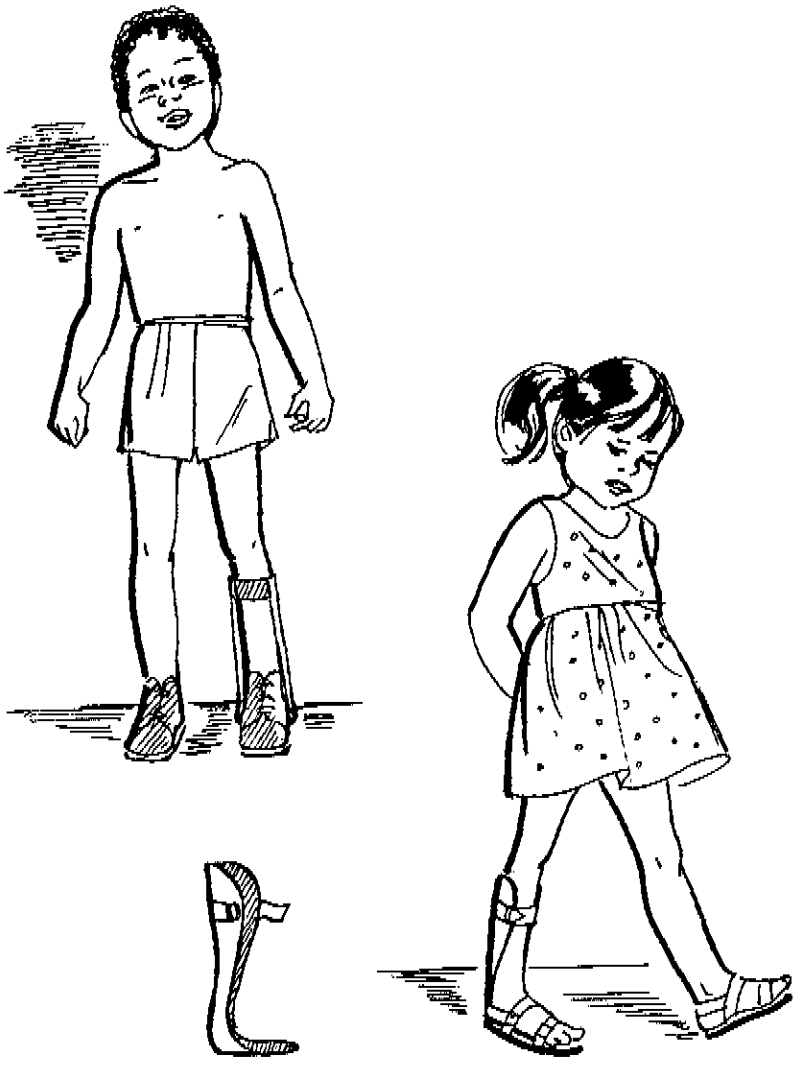
4.4.2 Brace for older children to walk

When the child who cannot walk, or who has difficulty walking, is three to four years old, he or she should have a brace which will provide sturdy support to the leg for walking. The brace for walking should be made by an orthotist who knows how to fit the brace properly so that it supports the child but does not cause pressure on the skin.

Brace to Support a Drop Foot

The muscles most frequently affected by polio are the muscles which pull the foot up. This means that most children who have had paralytic polio are likely to have a "drop foot". When the child walks, the foot drags on the ground, which can injure the skin on the foot, and can cause the child to stumble on rough ground.

Children with a drop foot can walk more easily if they have a brace to hold the foot up. The brace must be changed as the child grows.



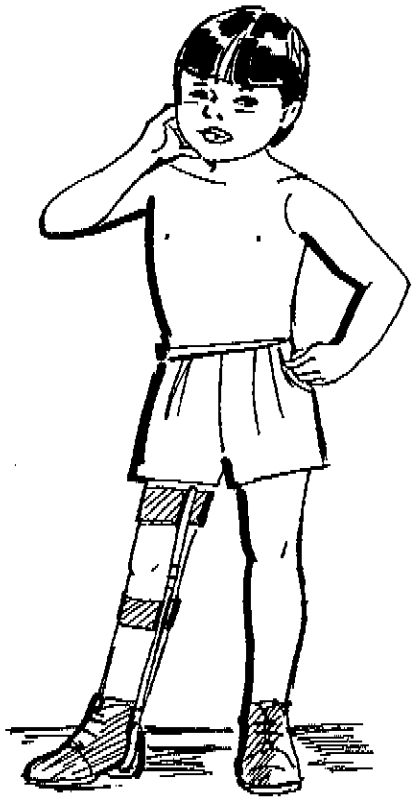
A brace to hold the foot up may be made of metal and attached to the child's shoe.

A brace may also be made of plastic and worn inside a sandal or shoe.

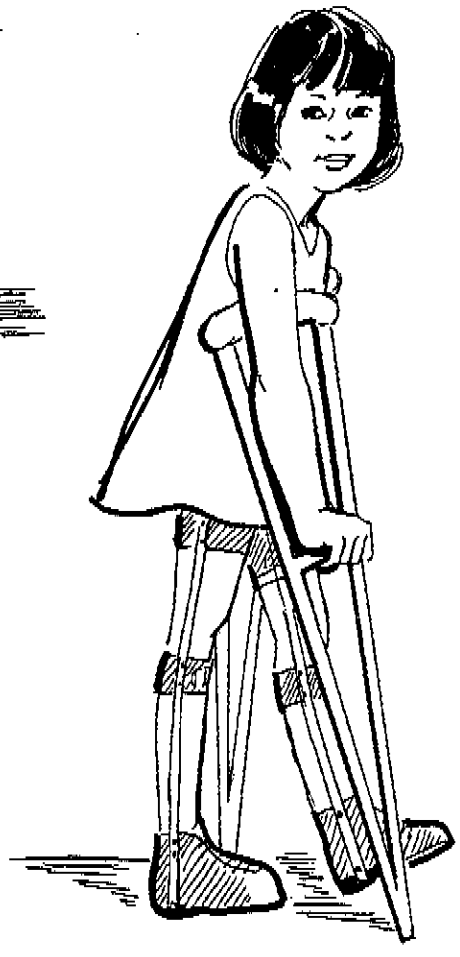
Brace to Support the Foot and Knee

When polio affects the muscles which straighten the knee on one leg, a child has difficulty walking. If these muscles are paralyzed in both legs, the child cannot walk without braces.

A child who needs a brace to support the knee usually needs support for the foot as well. Metal or plastic braces can provide support to the foot and the knee.



If the child needs a brace to support only one leg, he or she will probably be able to walk without crutches. The brace must be adjusted to fit the child as he or she grows.



If the child needs braces on both legs, he or she will need crutches. Both the braces and the crutches must be adjusted to fit the child as he or she grows.

5.
HOW TO TEACH FAMILY MEMBERS TO PREVENT DEFORMITIES

The health worker has an important role to play in the prevention of deformities in children with polio. The health worker must motivate, teach and encourage the family to carry out the daily activities that are necessary to prevent deformities.

- When the child first becomes paralysed, the health worker may spend time with the family each week to teach them how to care for the child.
- After the initial teaching, and for the first six months, the health worker may continue to see the child and the family every three to four weeks.
- When most of the recovery of muscle strength has taken place, the health worker may see the child every three to four months.
- Depending on the family, the health worker may continue the contact with them until the child is in school, or until the child is old enough to take care of himself or herself to prevent deformities.

5.1
Discuss With the Family

Discuss the child's condition with the family before teaching them about positioning and movements. Families usually do not know very much about the disease. They may know others in the community who have had polio and who have deformities. They will wonder if their child will have the same deformities. Discuss the following information and try to answer questions the family members may have.

- Explain the cause and the effects of polio.
- Talk about the stages of polio and explain that there may be some residual paralysis of the muscles.
- Tell them that if the polio has just occurred, they can help the child to get stronger.
- Explain that if the disease occurred more than one year ago, they will not be able to help the paralysed muscles get stronger, but they will be able to prevent deformities. If some deformity is already present, they can prevent it from getting worse.

- If the child has had polio for a long time, and has a lot of deformity, explain that passive movements can be tried, but they may not improve the child's movement.
- Explain that some of the activities may have to continue throughout the child's life.
- Also talk with the family about the importance of the child taking part in all of the activities of other children. Help the family to understand that the child with polio is just like other children except for the paralysis of some muscles.

After discussing this information with the family members, you can teach them how to position the child properly and how to do movements of the child's limbs.

5.2 Motivate the Family

At first the family may be motivated by the possibility of recovery of strength in the child's muscles. Later, when the positioning and movements are done only to prevent deformities, the family may need a lot of encouragement from the health worker to continue. If there is someone in the community who has a disability, he or she might convince the family that preventive measures are important. Ask that person to talk to the family to encourage them to prevent deformities in their child.

5.3
Teach the Family to Observe the Child

Teach the family to observe the child's muscles, to see which movements are absent and which movements are weak. Observe movements with the family before they begin the exercises. Then you and they will know how strong the muscles are at the beginning, and the family will be more aware of signs of recovery.

Keep a record of the child's movements, both active and passive. This can be done by writing a description of the movements, or by drawing angles to represent the amount of movement that the child can do with each limb, and the amount of movement that can be done passively.

If the child has had polio for some time, the family may have to do the activities only to prevent deformities. Some tightness may have developed in the muscles and one or more limbs may already lack movement. Teach the family to observe all passive movements carefully. Keep a record of all the limitations which exist before the exercises are done. Then you and the family can see the effect of the passive movements.

5.4
Teach the Family Preventive Activities

To learn how to do proper positioning and movements of the child's limbs, the family should:

- See the activity performed.
- Do the activity.
- Receive feedback.

Therefore, the health worker should:

- Demonstrate the preventive activities.
- Observe at least one family member doing the activities.
- Provide feedback to that family member.

Several family members may wish to learn how to take care of the child. However, one person should take primary responsibility for the daily care of the child. That person should know how to position and move the limbs, and will be responsible for ensuring that all of the activities are done each day. Often it is the mother who takes the primary responsibility, but it may be the grandmother, the father or an older sister or brother.

5.4.1 Demonstrate the preventive activities

- First, show the family the relevant pictures in this manual. If you can photocopy the pictures, you can give the family copies of the pictures that are appropriate for their child.
- Then put the child into the proper positions that will help to prevent deformities. Explain why each position is good for keeping the limbs straight.
- If the child needs splints, show the family the pictures, and ask them to collect the necessary materials. (The family may need some time to gather the materials, so this can be done on the second visit.) Then show the family how to put on the splints.
- Next, demonstrate the passive movements to the family. You and the family have observed the child's active movements, so you know which are weak or absent. Those are the movements which the family should do passively. For each passive movement, make sure that the family see:
  - how to hold the child's limb;
  - how far to move the limb.

  Repeat the movements several times.
- As you show the family what to do, explain why the position or movement is important, and try to answer any questions that the family members have.

5.4.2 Observe the family member doing the activity

Now, ask the family member who is primarily responsible for the child's care to do the activity. First, they should put the child into the proper position. They can explain to another family member why these positions are important, to show that they understand. Then the family member can do the movements. If many movements are needed, demonstrate one or two at a time, and let the family member repeat them one or two at a time. Before the first session ends, the family member should know what movements need to be done, and should be able to do them correctly.

If you have put a splint on the child's limb, take it off and ask the family to put it on again.

5.4.3 Give the family member feedback

When a family member positions or moves the child's limbs for the first time, give some feedback. Give praise for what they have done correctly, and explain what they need to do differently. For example, point out everything that is correct about the child's position. If something is not correct, such as the position of the feet, point that out too and explain how the family member can correct it.

When the family member does the passive movements, comment on the position of the hands, the amount of movement and the speed with which they did the movement. If the family member did these things correctly, praise them and encourage them to continue in the same way. This reinforcement is important. If the family member did something incorrectly, show them immediately how to do it correctly.

During following sessions, observe the family member doing both positioning and passive movements again. Most people cannot remember all of the activities after only one session. Therefore, they must continue to have feedback, either for praise and encouragement or for correction of what they are doing. When the family member has done the activities correctly in two sessions, it is no longer necessary to observe each activity in each session.

5.5 Follow-up with the Family

See the child and the family regularly for the first six months to one year, although visits can be less frequent as the year passes. After the family has learned how to do all of the activities to prevent deformities, continue to visit to encourage them in their care of the child.

Observe *active movements*, and look for an increase in the strength of the muscles. This is a good sign. Keep a record of the first observations of active movement and compare future observations to that. If the child does a full active movement that previously he or she had been doing only partially, the family should encourage that active movement and they can stop doing the movement passively. If the child does a movement partially that he or she did not do before, the family should also encourage the new movement but should continue the passive movement.

Observe passive movements to see if there is any tightness developing. You can either ask the family member to do the movements, or you can do them yourself.

Look for loss of passive movement. This is a bad sign. The child may not be positioned properly, or the passive movements may not be done each day. However, in some children, loss of passive movement occurs despite good care by the family. Some children have more tendency to get tight muscles than other children. Those who tend to get tight muscles need more attention. This means that the movements have to be done with more repetitions, or they have to be done twice a day. It also means that the child has to use splints all night and for longer periods of time during the day.

If the child has a brace, make certain that he or she is using it. Also, look at the brace on the child to see if it fits, or if the child has grown too tall for it. When the brace no longer fits, ask the family to have the brace adjusted or replaced.

The health worker plays an important role when he or she helps families of children with polio to prevent deformities. However, the children and the families may have other important needs. The health worker may help a family directly, or may identify other people who can meet those needs. For example, the health worker might help a family to *identify resources in the community* that could help their child participate in normal activities, such as transport to and from school. The health worker may also be able to *identify resources outside the community*, such as an orthopaedic service for braces.

Children with polio can lead normal lives if they receive proper care and are given the opportunities to participate in the activities that are available to other children. The role of the health worker is crucial. He or she can be the person who is aware of all of the needs of children with polio. He or she can facilitate not only the proper care, but also the opportunities for children with polio to develop in the most normal manner possible.