CARE OF CHILDREN WITH SPECIAL NEEDS

MANUAL ON THE MANAGEMENT OF CHILDREN WITH GROSS MOTOR DELAY

By

Family Health Development Division
Ministry of Health Malaysia

OCTOBER, 2001
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PREFACE

National policies and programme for the disabled have been formulated and implemented by various organizations. The Ministry of Health, as the organization responsible for prevention of causes of disabilities and rehabilitation, began implementing rehabilitation services at the health centres for Children with Special Needs in 1996. The aim is to maximize the potential of children with special needs in order for them to be as independent as possible and enjoy a better quality of life.

One problem identified in the rehabilitation programme was the lack of training manual and standard guideline for reference. A series of six manuals in the management of Children With Special Needs have been produced or in the process of preparation. These included:


Knowledge in normal development is crucial in the understanding of rehabilitation for children with special needs. Information on normal developmental milestones can be obtained from “Senarai Semak Perkembangan Dan Panduan Stimulasi Awal Kanak-Kanak Bawah 1 Tahun”, published by Family Health Development Division in 2001. Key information on normal developmental milestones and stimulation activities were tabulated according to age. It can be used as quick reference by primary care providers for all newborn children through first year of life.

While this manual provides further detail in the management of children with gross motor delay. It contains the following information:

1. Warning signs of gross motor delay
2. Handling and Positioning
3. Stimulation activities for children with gross motor delay
4. Rehabilitative Equipment for gross motor function

It can be used by primary care provider’s i.e. public health nurses and therapists, as a guide to manage children with gross motor delay. It can also be used as health education material to guide teachers and parents who care for these special children.
CONTENTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Introduction</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1.1. Definition Of Gross Motor Delay</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1.2. Action To Be Taken By Public Health Nurse</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Warning Signs Of Gross Motor Delay At Various Ages</td>
<td>7</td>
</tr>
<tr>
<td>3.</td>
<td>Handling And Positioning</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>3.1. Method of Correct Handling (Lifting &amp; Carrying)</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>3.2. Methods of Correct Positioning</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>3.3. Range of motion Exercises</td>
<td>25</td>
</tr>
<tr>
<td>4.</td>
<td>Stimulation Activities</td>
<td>31</td>
</tr>
<tr>
<td>5.</td>
<td>Rehabilitative Equipment For Gross Motor Function</td>
<td>43</td>
</tr>
<tr>
<td>6.</td>
<td>Appendix</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>6.1. Other Associated Developmental Problems</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>6.2. Normal Gross Motor Development</td>
<td>53</td>
</tr>
<tr>
<td>7.</td>
<td>Reference &amp; Bibliography</td>
<td>57</td>
</tr>
<tr>
<td>8.</td>
<td>Acknowledgement &amp; Contributors</td>
<td>59</td>
</tr>
</tbody>
</table>
INTRODUCTION

1.1 Definition of Gross Motor Delay
1.2 Action To Be Taken By Public Health Nurse
INTRODUCTION

A child goes through a process of growth and development. Growth refers to the increase in body size and mass. Development on the other hand relates to the maturity of the central nervous system. In general, child development can be divided into 4 main areas. They are:

- Gross motor
- Fine motor
- Psychosocial
- Communication and language

Motor development includes both gross and fine motor. Gross motor skills describe posture and mobility and it involves large muscles of the body. Fine motor skills describe the fine manipulation activities of the hand and fingers involving small muscles that require eye and hand coordination skills. The majority of cases of Children with Special Needs with gross motor delay seen at the Health Centre, are those with Cerebral Palsy and Down’s Syndrome.

There are 4 principles that influence the development of motor skills:

- Cephalo-caudal development - Gross motor development starts from head to toe. This includes the development of head control, trunk & limb control, balance and movements. A child with normal gross motor development will go through a sequence of developmental milestone i.e. from the ability to control head, turn to prone, crawl, sit, pull to stand and walk. Therefore when a child is unable to control his head, he is not ready to sit.

- Proximal distal development - The ability to control muscles closest to the body midline (trunk) develop first before the ability to control the muscles away from the midline. For example the ability to control shoulder movements precedes the ability to control hand and finger movement.

- Central to peripheral development - Control of body movement begins from midline outwards. For example reaching for objects in midline precedes the ability to reach for objects placed at the side.

- Non-specific movement precedes purposeful movement - It is natural for a newborn to move all the limbs most of the time. With maturation of the brain, the child will begin to develop skills beginning from hand regard and later the ability to reach for object. For example, stepping reflex (primitive reflex / non-specific movement) in a newborn will later disappear and later progress to a purposeful walking.

Children with gross motor problem have difficulty in controlling their muscle action. This can either be due to increased muscle tone (spasticity), decreased muscle tone (floppy / hypotonia), or mixed muscle tone (spastic & hypotonia).

Children with gross motor delay commonly have other associated development problems. It is therefore important for a thorough examination that includes, both physical and developmental assessment. Some common associated problems are described in Appendix 1.
The severity of gross motor delay depends on the severity of brain damage. No matter how severe the brain damage, it is important to start the intervention as early as possible, as this will help to improve the quality of life of the child and reduce carers burden. It is also important to understand that in order to optimise the effect of intervention, the intervention stimulation activities should be systematic, consistent and regular.

**Important points to remember:**
In order to optimise the effect of intervention, the intervention stimulation activities should be systematic, consistent and regular.

**Case Definition**

A child with gross motor delay is one who fails to achieve the normal gross motor milestones. The table below serves as a guide for the definition of cases.

<table>
<thead>
<tr>
<th>Gross Motor Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor head control by 6 weeks</td>
</tr>
<tr>
<td>Unable to roll over by 6 months</td>
</tr>
<tr>
<td>Unable to sit with support by 9 months</td>
</tr>
<tr>
<td>Unable to stand with support by 12 months</td>
</tr>
<tr>
<td>Unable to walk by 15 months</td>
</tr>
</tbody>
</table>
OBJECTIVE

The objective of the manual is to provide Public Health Nurses:

1. Basic information on how to identify children and when to refer children who have Gross Motor Developmental Delay.

2. Suggestions on stimulation activities to facilitate early intervention.


ACTION TO BE TAKEN BY
PUBLIC HEALTH NURSE (P.H.N.)

1. Any child identified with gross motor delay needs to be referred to the Doctor / Family Medicine Specialist at the Health Centre as soon as possible.

2. Start Nursing Care Plan:
   i. Assessment
   ii. Nursing Diagnosis
   iii. Established Intervention Goals
   iv. Identify the appropriate stimulation activity / activities.
   v. Established Care Plan
   vi. Implement Intervention Plan
   vii. Evaluation and Reassessment

3. Implement the appropriate Stimulation Activity

4. Once the case has been referred to a Specialist Clinic by the Doctor at the Health Centre, the PHN needs to follow-up the case at the Health Centre and at home.

5. Ensure that stimulation activities are carried out systematically, consistently and regularly.

6. Ensure that the child is registered with the Social Welfare Department and Special Education Department.
WARNING SIGNS OF GROSS MOTOR DELAY AT VARIOUS AGES
<table>
<thead>
<tr>
<th>Normal Gross Motor Milestones</th>
<th>Assessment Technique</th>
<th>Warning Signs / When to refer</th>
<th>Action required</th>
</tr>
</thead>
</table>
| Head control at 4 – 6 weeks   | In supine position - Pull to sit | **Gross head lag by 6 weeks** | ❖ Refer Doctor (Health Centre)  
❖ Meantime carry out Stimulation Activity. Refer to page 34  
❖ Review one month later |
<p>| | | | |
|                               |                      |                               |                 |
| Observe for                   |                      |                               |                 |
| ❖ Head control                |                      |                               |                 |
| ❖ Elbow slightly flexed       |                      |                               |                 |
|                               |                      | Observe for                   |                 |
|                               |                      | ❖ Gross head lag               |                 |
|                               |                      | ❖ Both arms straight           |                 |
| Head control 6 weeks to &lt; 3 months | Place baby in prone position | <strong>Still maintaining newborn posture by age 3 months</strong> |                 |
|                               |                      |                               |                 |
| Observe for                   |                      |                               |                 |
| ❖ Ability to lift chin off couch momentarily |                      |                               |                 |
| ❖ Bottom flat                 |                      |                               |                 |
| ❖ Forearm support             |                      |                               |                 |
|                               |                      | Observe for                   |                 |
|                               |                      | ❖ Inability to turn head to one side, and no attempt to raise the head up |  |</p>
<table>
<thead>
<tr>
<th>Normal Gross Motor Milestones</th>
<th>Assessment Technique</th>
<th>Warning Signs / When to refer</th>
<th>Action required</th>
</tr>
</thead>
</table>
| Roll over at                 | Put baby in supine position  
                            | Observe any attempt to roll over | Unable to roll over by 6 months | Refer Doctor (Health Centre)  
                            | Meantime carry out stimulation activities – refer to page 355... |
### WARNING SIGNS OF GROSS MOTOR DELAY AT VARIOUS AGES

<table>
<thead>
<tr>
<th>Normal Gross Motor Milestones</th>
<th>Assessment Technique</th>
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</thead>
</table>
| Sitting at 6 – 9 months       | • Put child to sit   | Unable to sit even with support by 9 months | • Refer Doctor (Health Centre)  
• Meantime carry out stimulation activity- refer to page 37 |
|                               | • Observe ability to sit with / without support |                               |                 |
| Crawling at 8-10 months       | • Put child in prone position and observe the child’s attempt to initiate crawling | Unable to crawl by 10 months  | • Refer Doctor (Health Centre)  
• Meantime carry out stimulation activity- refer to page 36 |
|                               | Note:               |                               |                 |
|                               | Not all children crawl, there are some children who bottom shuffle. Bottom shufflers are children who move about with their buttocks and legs. As long as they move about – it’s okey. |                               |                 |
### WARNING SIGNS OF GROSS MOTOR DELAY AT VARIOUS AGES

<table>
<thead>
<tr>
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<th>Assessment Technique</th>
<th>Warning Signs / When to refer</th>
<th>Action required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand with support at 9 - 12 months</td>
<td>❖ Put child to stand&lt;br❖ Observe the child's ability to stand (with / without support)</td>
<td><strong>Unable to stand with support by 12 months</strong></td>
<td>❖ Refer Doctor (Health Centre)&lt;br❖ Meantime carry out stimulation activity - refer to page ...39...</td>
</tr>
<tr>
<td>Walking at 12 – 15 months</td>
<td>❖ Observe child's walking ability</td>
<td><strong>Unable to walk a few steps by 15 months</strong></td>
<td>❖ Refer Doctor (Health Centre)&lt;br❖ Meantime carry out stimulation activity - refer to page ...40...</td>
</tr>
<tr>
<td>Running at 18 – 24 months</td>
<td>❖ Observe child's ability to run</td>
<td><strong>Unable to run / run awkwardly</strong></td>
<td></td>
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</table>

### NOTE

Any child with abnormal gait e.g. limping, crouching, tip-toeing, hemiplegic scissoring by 24 months must be referred to FMS/Pediatrician and physiotherapist for further management.

Public Health Nurse must then ensure that the activities planned by physiotherapist is carried out properly by carers.
HANDLING AND POSITIONING

3.1 Method of Correct Handling (Lifting & Carrying)
3.2 Methods of Correct Positioning
3.3 Range-of-Motion Exercises
CHILDREN KNOW A MOVEMENT BY ‘FEELING’ IT AND TRIING IT OUT. A CHILD WITH ABNORMAL POSTURE, ABNORMAL PATTERNS OF MOVEMENT AND INCOORDINATION OF MOVEMENT SUCH AS IN CEREBRAL PALSY, REQUIRE PROPER EARLY HANDLING AND POSITIONING. THE OBJECTIVE IS TO REDUCE UNWANTED PATTERNS OF MOVEMENTS AND ESTABLISH POSTURAL CONTROL, THEREBY HELPING THE CHILD MAKE A MORE NORMAL PATTERN OF MOVEMENT.

**Important points to remember:**

**Correct handling and proper positioning of a child with gross motor delay will:**

- Provide good body support and balance
- Ensuring the safety of the child
- Avoid aggravation of abnormal tone and posture
- Minimise and prevent further deformity and injury
- Ensuring child is in comfortable position all the time.

**HANDLING**

Handling refers to the correct ways of moving children from one position or place to another during regular activities throughout the day. Correct handling provides support and guidance so that the child’s movements become less abnormal. Correct handling relaxes a stiff child, supports a floppy or athetoid child and allows ataxic children to control their movements better. Correct handling also helps the child to understand normal patterns of movement, for example, a child must first kneel, then half kneel and then pull himself / herself to stand.

**Important points to remember:**

1) Approach the child by playing to develop rapport. Avoid approaching from behind, as the child may startle, bringing about his / her abnormal movement and posture.

2) It is important to handle a child in a different position than the position she normally assumes, e.g. if the child tends to lie stiff and extended, with both legs straight out, it is advisable to carry the child with hips and knees bent.
POSITIONING

Children with gross motor delay have lack of postural stability, whereby they are unable to balance their body and may easily fall. Positioning involves giving the child external postural support to help them to maintain their balance. This can be done with the use of adaptive equipment or an adult body. The adult body can provide alternative support to position the child most effectively.

If a child is not stable, he / she will have difficulty carrying out his / her activities, such as play, feed, learn and communicate. In order for the child to be stable, proper positioning is necessary. Proper positioning means placing a child in a certain position (e.g. sitting in a corner seat) to facilitate him / her to carry out his / her activities.

There are several methods of positioning:-

1) Supine
2) Prone
3) Side lying
4) Side sitting
5) Long sitting
6) Cross legged sitting
7) High kneeling
8) Standing.

**Important points to remember:-**

1) Always change a child’s position at least every half hour (30 minutes).
2) Position selected should be appropriate to the child’s developmental age.
3) Positions need to be selected for function, e.g. sitting during meal times, i.e. NOT to feed a toddler in supine position
METHOD OF CORRECT HANDLING (LIFTING & CARRYING)

LIFTING TECHNIQUES

**Method of lifting to be avoided**

Her head pushes back

Reason: Extensor tone increases in supine from downwards, neck retraction, shoulder retraction, hip and leg extension

**Method of lifting to be encouraged**

Press down on her shoulders and till her head forward.

STEP 1

Her head falls back

Reason: Would cause complication of trauma to neck and shoulder

STEP 2

CARRYING TECHNIQUES

STEP 3
HANDLING ATHETOID CHILD - HANDLING UPPER LIMBS IN SITTING

HANDLING TO BE AVOIDED

When sitting unsupported an athetoid child's arm & leg movements may not be controlled. His body may push backward.

HANDLING TO BE ENCOURAGED

To support him in sitting: Hold around his shoulders. Press them down and in to bring the arms forward. When his sitting is steady, it is easier for him to look and listen.

HANDLING TO BE AVOIDED

When a young baby is held without adequate control, his body becomes stiff and handling him becomes difficult.

LIFTING AN ATHETOID CHILD

To make it easier to lift the child and prevent abnormal position: Roll him to one side and support his head. Bend his legs. Lift him close to your body. Put him down the same way.
HANDLING UPPER LIMBS - IN SITTING

HANDLING TO BE AVOIDED

A spastic child's arms may be bent and pulled back. Her fingers may be closed. If her muscle are spastic, never pull the fingers and thumb out by their tips. This will make the hand close more tightly.

HANDLING TO BE ENCOURAGED

To straighten her arms. Hold around her elbows. Turn the arms out as you bring her forward. If the arms are difficult to bend: Hold her around the elbows. Turn her arms in.

HANDLING TO BE AVOIDED

If an athetoid child is held below his armpits, he will sit with-based sitting. His head and truck will extend while his arms retracted backwards. This position makes it difficult for the child to support himself or to do any activity.

HANDLING TO BE ENCOURAGED

Place the child with his legs flexed and together. Stabilise the child holding his shoulder forward.
METHOD OF HANDLING - LOWER LIMBS

HANDLING TO BE AVOIDED

A spastic child’s body will be straight and his legs will press together or be crossed, when lying on his back. If the muscles are spastic, never pull the legs apart. This will make the legs pull together more.

HANDLING TO BE ENCOURAGED

Hold him around the knees. Keep his legs apart as you straighten them. This may help his feet to bend up more easily.

STEP 1

To part his legs:
Put something under his head and shoulders to hold them forward. Hold his knees. Bend his legs. As his hips bend the legs will part.

STEP 2
METHOD OF CORRECT POSITIONING

POSITION IN LYING

POSTURE TO BE AVOIDED

![Posture to be avoided](image1)

A floppy child may lie with his legs apart.

POSTURE TO BE ENCOURAGED

![Posture to be encouraged](image2)

SIDE- LYING POSITION

Advice mother to place the child in a side-lying position with a pillow in between the arms and legs.

Change position at least every 2 hourly (Any child with lack of self mobility)

Avoid position that worsens the abnormal posture and tone.
(For both spastic and floppy child)

A spastic child usually lie with his head backwards bringing his shoulders up and forwards. His legs will press together or crossed.

PRONE POSITION

![Prone position](image3)
POSITIONING IN SITTING

The child with delayed sitting will need more support. She will require the support for a longer time than other children. She may need a special chair to help her to sit in a good position so she can use her hands better and chew and swallow more easily. The child who is learning to sit, should also practise standing activities.

**POSITION TO BE DISCOURAGED**

Hips too straight. She pushes back and slide out of the chair.

**POSITION TO BE ENCOURAGED**

Head slightly forwards. Back straight, no leaning to one side. Bottom level against the back of the chair. Knees over feet. Legs slightly apart. Feet flat on the floor or supported by a foot rest.

**W-sitting**

It can increase contractures and loosen or damage hip, knee and ankle joint. However, if it is the only way a child can sit and use her hands, it should be allowed.

Long sitting with hands support on the knee.

Reason:

It is more stable with sufficient support while preventing deformities.
Long sitting with hands support on the side
Reason:
It is more stable with sufficient support while preventing deformities

Side sitting
Reason:
It is more stable with sufficient support while preventing deformities

Long sitting with hands support in front
Reason:
It is more stable with sufficient support while preventing deformities

Cross sitting
Reason:
It is more stable with sufficient support while preventing deformities

NB:
Do not place the child in any one of the suggested position for too long. Encourage variations as this will be more interesting and beneficial.
POSITIONING IN STANDING

Children with delayed standing can benefit from standing in a good position. Standing encourages the muscles that hold the body up to work. It prevents contractures and strengthens leg bones. The child has his hands free for play, can see more and can communicate more easily with others.

**Good standing**

Body in a straight line and feet flat with equal weight on both of them. Hips are straight.

---

**POSITION TO BE DISCOURAGED**

He may stand on the sides of his feet with knees together, may cause deformity or contractures.

---

**POSITION TO BE ENCOURAGED**

To stand with his feet flat:
Hold around the knees, turn both knees out. Holding a stick with both hands will give him more control of his arms while standing.

Support her by holding her hips or her elbows.
RANGE - OF - MOTION EXERCISES

Range-of-motion exercises are regular, repeated exercises that straighten or bend one or more joints of the body, in the direction the joint can normally move.

The aim of the range-of-motion exercise is;

i) To reduce spasticity
ii) To maintain circulation
iii) To stretch muscles to maintain their full length – especially muscles which lie over 2 joints eg. Hamstrings in the leg and the biceps in the arm.
iv) To maintain joint mobility

Range-of-motion exercises should start as soon as possible, especially in children with conditions that are prone to develop joint stiffness, contractures and deformities. An example of such condition is a child with Cerebral Palsy or any neuro-motor conditions. Under such a condition, the exercises need to be continued throughout life, as it is the best way to prevent joint stiffness, contractures and deformities.

Range-of-motion exercises should be

- done at least twice (2x) per day
- should be done at least 10 times.
- needs to be done more often if there is joint stiffness, contractures or deformities.

These exercises mostly involve stretching of muscles, which may cause discomfort and sometimes pain (if not done correctly) to the child. It is advisable to carry out the exercises as part of the child’s play or his daily activities, such as while changing nappy, as this would be more fun and less stressful both for the carer and the child.

When doing the range-of-motion exercises, it is advisable to start with the least affected joint first, that is starting with the joint that has fairly good range of motion, leaving the most affected one to the last. Preferably all affected joints should be exercised daily.

**Important points to remember when carrying-out the exercises:**

i) Do one joint at a time
ii) Always protect the joint. Hold the limbs both above and below the joint. Support the limbs as much as you can.
iii) Be gentle but firm, move the joint ‘SLOWLY’. (Moving spastic joints rapidly makes them more stiff)
iv) **NEVER FORCE THE MOVEMENT.** Range-of-motion exercises may cause some discomfort but should NOT be painful.
v) Do it as part of the child’s activities either as play or during his/her daily activities.
1. SHOULDER FLEXION (arm up and down)
   - Starting position
     Place child lying on back/sitting
   - Hand Placement
     Place one hand just above the shoulder joint (stabilize) to prevent it from lifting. Hold wrist with the other hand.
   - Motion
     Raise the arm straight, forward and up, so the hand is over the head. Bring arm down. Repeat the motion.

2. SHOULDER EXTENSION (arm back and forward)
   - Starting position
     Place child lying on back/sitting
   - Hand Placement
     Place one hand just above the shoulder joint (stabilize) to prevent it from lifting. Hold wrist with the other hand.
   - Motion
     Move arm all the way back. Then move arm all the way forward over the chest. Repeat the motion.

3. SHOULDER ROTATION
   - Starting position
     Place child lying on her back. Position arm straight out to the side, with elbow bent.
   - Hand Placement
     Hold arm straight out to side. Hold forearm with the other hand.
   - Motion
     Turn the arm all the way up, then turn the arm all the way down. Repeat movement.

4. SHOULDER ABDUCTION
   - Starting position
     Place child lying on back
   - Hand Placement
     Place one hand just above the shoulder joint (stabilize) to prevent it from lifting. Hold forearm with the other hand.
   - Motion
     Raise the arm straight out to the side, away from the body. Then bring arm back to side. Repeat motion.
5. ELBOW FLEXION AND EXTENSION

- Starting position
  Place child lying on back, elbow straight, arm away from body

- Hand Placement
  Stabilise elbow, place one hand above elbow joint, hold wrist with the other hand

- Motion
  Bend the elbow gently, then straighten the elbow. Repeat activity.

6. FOREARM SUPINATION AND PRONATION (forearm rotation)

- Starting position
  Lay child on back, elbow bent, arm close to body

- Hand Placement
  Stabilise upper arm with one hand, hold the wrist with other hand

- Motion
  Holding the wrist, rotate the hand up. Then rotate the hand down gently. Repeat activity.

7. WRIST FLEXION AND EXTENSION

- Starting position
  Place child lying on back.

- Hand Placement
  Stabilise forearm with one hand. Hold child's hand with your other hand

- Motion
  Bend wrist forward and back. Repeat activity.

8. FINGERS

- Motion
  Spread each finger one at a time

9. THUMB for grasping

- Motion
  Bend thumb towards base of little finger
<table>
<thead>
<tr>
<th>1. HIP EXTENSION (straighten)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting position</td>
</tr>
<tr>
<td>Place child prone</td>
</tr>
</tbody>
</table>

- Hand Placement
  Place one hand on the child's buttock. Place the other hand under child's knee.

- Motion
  Lift leg straight up while holding buttock down. Then bring leg down. Repeat activity.

<table>
<thead>
<tr>
<th>2. HIP FLEXION AND EXTENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting position</td>
</tr>
<tr>
<td>Place child supine</td>
</tr>
</tbody>
</table>

- Hand Placement
  Place one hand on above the knee joint. Grasp the foot at the ankle.

- Motion
  Bend knee to chest. Then straighten all the way down. Repeat activity.

<table>
<thead>
<tr>
<th>3. HIP ABDUCTION AND ADDUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting position</td>
</tr>
<tr>
<td>Place child supine</td>
</tr>
</tbody>
</table>

- Hand Placement
  Stabilise joint with one hand on hip. Grasp child's heel with other hand.

- Motion
  Spread hips open as far as possible by sliding leg out to side (a) then slide leg back in (b). Repeat activity.
  DO NOT let knee roll outward or inward.

<table>
<thead>
<tr>
<th>4. HIP ROTATION (straighten)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting position</td>
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<tr>
<td>Place child supine</td>
</tr>
</tbody>
</table>

- Hand Placement
  Place one hand on thigh. Grasp heel with other hand.

- Motion
  Roll LEG in and then roll LEG out, using hand on the thigh. Repeat activity.
4. KNEE FLEXION AND EXTENSION

- Starting position
  Place child prone

- Hand Placement
  Stabilise knee joint with one hand placed above the knee. Hold lower leg with other hand.

- Motion
  Bend knee as much as possible. Then straighten knee as much as possible.

5. ANKLE DORSIFLEXION

- Starting position
  Place child supine

- Hand Placement
  Stabilise ankle joint with one hand place on lower leg. Grasp heel with other hand.

- Motion
  Pull heel down and bend ankle as much as possible

**IMPORTANT**

To stretch a tight heel, pull heel down as you push foot up

Push heel harder than you push on foot, or you may dislocate foot upward instead of stretching the ankle cord and muscles.
STIMULATION ACTIVITIES
STIMULATION ACTIVITIES

The severity of gross motor delay depends on the severity of brain damage. No matter how severe the brain damage, early intervention stimulation activities will benefit the child and the family. To ensure maximum benefit, the following points must be applied.

1. Start stimulation activities as soon as the delay is detected.
2. Stimulation activities should be systematic, consistent and regular.
3. Develop rapport with the child and the family.
4. Before carrying out stimulation activities you must:
   - Handle and position the child correctly
   - Carry out range of motion exercises
5. Reduce assistance as the child ability improves.

There are many ways to carry out stimulation activities for delayed gross motor skills. Public Health Nurses are advised to be creative in incorporating them with play and daily functional activities. Here are some of the suggested activities.
STIMULATION ACTIVITIES FOR HEAD CONTROL

Infants / child with gross head lag.

1. STROKING TECHNIQUE

Put the infant prone on your lap, using your thigh as a "bolster" [as shown in figure]. Stroke along the spine upwards towards base of neck to encourage the infant to lift head-up.

3. You can also use both methods while carrying your child over the shoulder or placing your child in supine, on your stomach, while you are lying down.

You can also encourage child to lift head-up by attracting the child's attention.

Put child in prone with a bolster under his chest. Have someone in front of the child to attract child's attention. This will encourage the child to lift head-up. If the child shows no attempt to lift head-up, try the stroking technique.

4. Pull to sit
This technique should be carried out when the child has shown some ability to lift head-up. Hold child by the hands, gently pull him towards you until he is in sitting position.
STIMULATION ACTIVITIES TO ENCOURAGE ROLLING OVER

1) Facilitating roll over
2) Pay attention to position of hand to facilitate rolling
3) To turn the child to the right, extend the right arm over the head

(Refer Picture below)

(4) Flex left leg, keep right leg straight. (Refer Picture below)

(5) Gently push left leg and buttock to the right (Refer Picture below)

(6) You can encourage the child to roll over on their own by placing toys (within their reach) then encouraging him/her to reach for the object by rolling over.
STIMULATION ACTIVITIES TO ENCOURAGE CRAWLING

Stimulate the child by encouraging:

- 4 point kneeling
- crawling

<table>
<thead>
<tr>
<th>4 point kneeling activities</th>
<th>Crawling</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the child has difficulty to begin crawling, hold him up with a towel, or use swing. Initially, encourage him to bear weight on both arms and legs (knees). (4 point kneeling). When the child is able to bear some weight proceed to the crawling activities. <strong>Remember</strong>: A child needs to be able to 4 point kneel before crawling.</td>
<td>Using a towel or a swing, or supported and facilitated by the carer, placed child in 4 kneeling position. Then, encourage him to lift one hand off the ground and shift his weight to the other. Then help him to move forward.</td>
</tr>
</tbody>
</table>

Note - Not all children crawl. There are some who bottom shuffle. Bottom shufflers are children who move about with their buttocks and legs. As long as they move about - it's okay.
STIMULATION ACTIVITIES TO ENCOURAGE SITTING

Stimulate the child to sit using the following techniques:-

1. from side lying to sitting
2. from prone to side sitting

1. **Side lying to sitting**
   - child in supine
   - approach from behind, carer in squating position
   - put carier's hand below child's ampit and gently pull the child to sit

2. **Prone to side sitting**
   - carers at child's leg end
   - put both hands at the child's hip joints
   - pull back gently until both child's knees flex and gradually pull the child to side sitting
TYPES OF SITTING POSITION

(A) Long Sitting
Technique to initiate sitting. Long sitting with slightly flexed knee.

a) Sit child with legs stretched in front
b) To straighten the back: Hold him around his hip. Press down.
c) If he is very floppy: Support his chest with one hand. Press down on his lower back with your other hand.
d) Encourage child to support with both hands on the front/on the side.

(B) Long Sitting With Hand Support In Front

a) Hold her knees for support
b) Tilt her forwards so she can catch herself and lean on her arms for support.

(C) Side Sitting

a) Sit her to one side by flexing both legs
b) Hold her other arm straight so she can support herself

(D) Cross Sitting

a) Put the child in sitting position with both legs flexed and cross over each other. To straighten back, hold him around his hips.
b) Encourage child to support by placing his hand in front/side.
**STIMULATION ACTIVITIES TO ENCOURAGE STANDING WITH SUPPORT**

Stimulate the child by encouraging:

- 4 point kneeling, if the child cannot 4 point kneel (refer page ...36...)
- kneeling
- pull to stand activities

<table>
<thead>
<tr>
<th>Kneeling (Standing on knees)</th>
<th>Pull to stand</th>
</tr>
</thead>
<tbody>
<tr>
<td>The child must be able to kneel (standing on the knees) before he is able to pull himself to stand. The progression are as follows:</td>
<td></td>
</tr>
<tr>
<td>➢ Kneeling on both knees</td>
<td></td>
</tr>
<tr>
<td>➢ Half-kneel (kneeling on one knee)</td>
<td></td>
</tr>
<tr>
<td>➢ Pull to stand.</td>
<td></td>
</tr>
<tr>
<td>For this activity, you can encourage him to pull to stand from either:</td>
<td></td>
</tr>
<tr>
<td>➢ kneeling or half kneeling position OR</td>
<td></td>
</tr>
<tr>
<td>➢ sitting on a stool position.</td>
<td></td>
</tr>
<tr>
<td>Pull to stand from sitting on a stool position</td>
<td></td>
</tr>
</tbody>
</table>

**Points to remember:** To move from kneeling to standing
- Press down on one knee
- Keep the other knee well back while he leans well forward
- As he stands support his chest.

**Points to remember:** When the child stands.
- When stands, support him with your leg, hold his hips straight and forward over his knees.
- Shift his weight from side to side.
STIMULATION ACTIVITIES TO ENCOURAGE WALKING

Below are some activities to initiate independent walking:

- cruising
- walk with support

**STEP 1 – Walk side way with support (cruising)**

Put child to stand by holding onto something stable with assistant from behind. Encourage child to step sideways. You can support the child by holding his hips.

Gradually reduce your support until child is able to cruise on his own.

**STEP 2 – Walk forward with support**

Support the child against your leg and help her to shift her weight from one foot to another.

As the child improves, support her by holding her hips or her elbows. Help her to shift her weight to take steps. Decrease your support as the child progresses.
STEP 3: Encourage child to walk with minimal assistance

As the child further improves, encourage the child to walk with minimal assistance, eg. using trolley, or parallel bars, etc.
REHABILITATIVE EQUIPMENT
FOR GROSS MOTOR FUNCTION
REHABILITATIVE EQUIPMENT FOR GROSS MOTOR FUNCTION

There are several types of equipment use for gross motor rehabilitation. Below are some of the basic equipment and its function

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physiotherapy Mats</td>
<td>Provide safe area for stimulation activities to be carried out</td>
</tr>
<tr>
<td>2. Mirror</td>
<td>Show and assist child to imitate and understand movements</td>
</tr>
<tr>
<td>3. Physiotherapy Balls</td>
<td>For postural control</td>
</tr>
<tr>
<td></td>
<td>Strengthening the trunk muscle</td>
</tr>
<tr>
<td></td>
<td>Facilitate relaxation – if done properly will help reduce muscle tone</td>
</tr>
<tr>
<td></td>
<td>of spastic child</td>
</tr>
<tr>
<td>4. Wedges</td>
<td>Facilitate head lifting to develop head and trunk control</td>
</tr>
<tr>
<td></td>
<td>Facilitate weight bearing of forearms</td>
</tr>
<tr>
<td></td>
<td>Allows child to have free use of their hands – for better hand eye</td>
</tr>
<tr>
<td></td>
<td>coordination</td>
</tr>
<tr>
<td>5. Rolls / Bolster</td>
<td>Facilitate head lifting to develop head and trunk control</td>
</tr>
<tr>
<td></td>
<td>Allows child to have free use of their hands – for better hand eye</td>
</tr>
<tr>
<td></td>
<td>coordination</td>
</tr>
<tr>
<td></td>
<td>Facilitate weight bearing of all limbs – in four point kneeling position</td>
</tr>
<tr>
<td></td>
<td>Develop balance, equilibrium and saving reactions activities</td>
</tr>
<tr>
<td>6. Corner seat chair</td>
<td>For positioning – allows child to have free use of their hands</td>
</tr>
<tr>
<td></td>
<td>Long sitting using corner seat will help prevent deformity by stretching</td>
</tr>
<tr>
<td></td>
<td>hamstring muscle</td>
</tr>
<tr>
<td></td>
<td>Facilitate shoulder flexion [Bring shoulder forward] – to reduce body</td>
</tr>
<tr>
<td></td>
<td>stiffness hence facilitating hand and arm function</td>
</tr>
<tr>
<td>7. Parallel bar</td>
<td>Facilitate standing activities</td>
</tr>
<tr>
<td></td>
<td>Preparation for walking</td>
</tr>
<tr>
<td>8. Standing frame</td>
<td>Allow weight bearing activities for lower limbs</td>
</tr>
<tr>
<td></td>
<td>Better body and head alignment</td>
</tr>
<tr>
<td></td>
<td>Improves psychological and mental state, as it allows one to be in</td>
</tr>
<tr>
<td></td>
<td>upright position</td>
</tr>
<tr>
<td>9. Walking Aid / Rollator</td>
<td>Allow mobility to the child – with appropriate support</td>
</tr>
<tr>
<td></td>
<td>Develop mobility independence</td>
</tr>
<tr>
<td>10. Graduated Stools / Stools</td>
<td>Facilitate movement from crawling to high kneeling to sitting, then to</td>
</tr>
<tr>
<td>of varying height</td>
<td>standing (sequencing of movement)</td>
</tr>
<tr>
<td></td>
<td>Develop trunk control – trunk rotation</td>
</tr>
</tbody>
</table>

Equipment used should be user friendly:-

1. Easy to use
2. Safe to use
3. Minimal breakage
4. Easy to handle for therapist, carer and child
5. Good design and attractive
SUGGESTED IMPROVISED REHABILITATIVE EQUIPMENT FOR GROSS MOTOR FUNCTION AT HOME

Adaptive seating and equipment for the child with gross motor dysfunction aims to;

a. Correct and control postural asymmetry
b. Improve involuntary upper arm control
c. Enhance communication, feeding, social skills and learning

1. CORNER SEAT

i) If the child’s legs press together use a sit astride seat.

This chair is can be made of wood or cardboard box. Sit the child astride roll of cardboard or a filled sack covered with towel.

ii) If the child’s knee bending muscles are in danger of shortening, sit her with her legs straight.

Corner seat can be made from wood or cardboard box

Use the corner seat, sit her with her legs straight.
iii) If child pushes backwards [hyperextension], add base to chair to stop the chair from tipping backwards.

iv) If child cannot sit with a straight back and straight knees (even with knee gaiters) raise the chair off the floor so the knees can bend.

(adapted from: Promoting the development of young children with cerebral palsy – WHO 1993)

2. WEDGE
3. ROLL/ BOLSTER

4. STANDING FRAME

5. PARALLEL BARS
APPENDIX
# OTHER ASSOCIATED DEVELOPMENTAL PROBLEMS

1. **Delayed Fine Motor Development**
   - (a) Persistence of finger fistig after 3 months of age
   - (b) No hand regards by 5 months of age
   - (c) No attempt to reach object by 6 months of age
   - (d) Persistence taking object with all fingers (palmer grasp) by 9 months
   - (e) Fail to develop mature / good pincer grasp by 1 year

2. **Delayed Language Development**
   - (a) Too quite or crying excessively during first 3 months of life.
   - (b) No cooing by 4 months of age.
   - (c) No vocalisation (e.g. e-e-e, ah-ah, uh-uh-uh), or any sound or very quiet by 5 months of age – CHECK HEARING
   - (d) No babbling (e.g. da-da, ba-ba) by 8 months of age
   - (e) No single word with meaning by 15 months of age
   - (f) Less than 25 understanding words by 2 years of age
   - (g) Unable to talk two words sentences by 21/2 years of age.
   
   - PLEASE CHECK HEARING FOR (a) – (e)

3. **Delayed Social Development**
   - (a) No face regards by 2 months of age
   - (b) No responsive smile by 3 months of age
   - (c) No laughing by 6 months of age
   - (d) Persistence of hand regards after 5 months of age
   - (e) Falling to bring object to mouth by 8 months of age
   - (f) Persistence stranger anxiety by 12 months of age.
<table>
<thead>
<tr>
<th>4. Other Associated Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Feeding problems</td>
</tr>
<tr>
<td>- Poor sucking since birth</td>
</tr>
<tr>
<td>- Frequent regurgitation</td>
</tr>
<tr>
<td>- Poor bite, chew and swallow</td>
</tr>
<tr>
<td>- Persistent tongue thrust</td>
</tr>
<tr>
<td>- Persistence of excessive drooling of saliva</td>
</tr>
<tr>
<td>- Difficulty in care of personal hygiene</td>
</tr>
<tr>
<td>(b) Complications of abnormal tone</td>
</tr>
<tr>
<td>- Pain</td>
</tr>
<tr>
<td>- Contracture</td>
</tr>
<tr>
<td>- Postural deformity</td>
</tr>
<tr>
<td>- Hip dislocation</td>
</tr>
<tr>
<td>- Difficulty in care of personal hygiene</td>
</tr>
<tr>
<td>(c) Sensory problems</td>
</tr>
<tr>
<td>- Vision problem</td>
</tr>
<tr>
<td>- Hearing problem</td>
</tr>
<tr>
<td>(d) Respiratory problems</td>
</tr>
<tr>
<td>- Recurrent chest infection</td>
</tr>
<tr>
<td>- Aspiration pneumonia</td>
</tr>
<tr>
<td>- Recurrent hyperactive airway</td>
</tr>
<tr>
<td>- Gastro-esophageal reflux [Sandifer Syndrome]</td>
</tr>
</tbody>
</table>
NORMAL GROSS MOTOR DEVELOPMENT

The aim of gross motor development is to enable a person to sit, stand and walk.

In order to achieve functional movements, a child must;
- lose his primitive reflexes,
- have normal muscle tone,
- have good postural control and balance

Primitive Reflexes

Primitive reflexes present in the newborn are important for their survival. Primitive reflexes facilitates normal development in the early life.

Some of the example of the primitive reflexes are:-
- Moro reflex
- Rooting reflex
- Grasp / plantar reflex
- Stepping reflex
- Walking reflex

For a child to achieve normal developmental milestone, most of the primitive reflexes should disappear. For example, stepping reflex & walking reflex should disappear by 3 months before the child can stand and coordinate purposeful walking.

Details on primitive reflexes can be obtained from 'Manual Latihan Perkembangan & Stimulasi Awal Kanak-kanak Bawah Satu Tahun', page 5-6 and 13-15.

Posture

Posture describes the position of the person's body in relation to space, that is the way we lie, sit, stand or move. Maintaining good posture is important to produce good functional movement. Children with poor posture may develop scoliosis or hamstring tightness that limits movement.
NORMAL GROSS MOTOR DEVELOPMENT

1. Newborn up to age three months - Head Control

<table>
<thead>
<tr>
<th></th>
<th>Newborn</th>
<th>6 weeks</th>
<th>3 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>newborn</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Poor head control</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Mild head lag</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Both arms flexed slightly</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>No head lag</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Moderate head control</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>All limbs in flexion and bottom up</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Face turned to one side</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Chin off couch momentarily</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Bottom flat</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Supported on forearms</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Flexion of both elbows</td>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
</tbody>
</table>

2. Three months to six months - Head and Trunk Control

<table>
<thead>
<tr>
<th></th>
<th>&gt; 3 months - 6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>Good head control</td>
<td>![Image]</td>
</tr>
<tr>
<td>Good head control</td>
<td>![Image]</td>
</tr>
<tr>
<td>Anticipate to sit</td>
<td>![Image]</td>
</tr>
<tr>
<td>Good head control</td>
<td>![Image]</td>
</tr>
<tr>
<td>Straight spine on sitting</td>
<td>![Image]</td>
</tr>
<tr>
<td>One arm extended</td>
<td>![Image]</td>
</tr>
<tr>
<td>Chest up from couch</td>
<td>![Image]</td>
</tr>
<tr>
<td>Both arms extended</td>
<td>![Image]</td>
</tr>
<tr>
<td>Able to roll over: from supine to prone and prone to supine</td>
<td>![Image]</td>
</tr>
</tbody>
</table>
3. **Six to nine months – sitting and crawling**

<table>
<thead>
<tr>
<th>&gt; 6 months - 9 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SITTING</strong></td>
</tr>
<tr>
<td>Sitting with both hands to support</td>
</tr>
<tr>
<td>Sitting with lateral hand support</td>
</tr>
<tr>
<td>Sitting without support</td>
</tr>
<tr>
<td><strong>CRAWLING</strong></td>
</tr>
<tr>
<td>Attempt to crawl but not able to move forward. Buttocks high</td>
</tr>
<tr>
<td>Develop 4-point kneeling. Able to move forward</td>
</tr>
<tr>
<td>Able to crawl freely and takes up different posture</td>
</tr>
</tbody>
</table>

4. **Nine to eighteen months– standing and walking**

<table>
<thead>
<tr>
<th>&gt; 9 months - 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STANDING</strong></td>
</tr>
<tr>
<td>Good weight bearing. Stand with minimal support</td>
</tr>
<tr>
<td>Pull to stand</td>
</tr>
<tr>
<td>Cruising along furniture</td>
</tr>
</tbody>
</table>
### > 12 months - 18 months

<table>
<thead>
<tr>
<th>WALKING</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand without support</td>
<td>Walk a few steps</td>
<td>Walking independently with broad base</td>
</tr>
</tbody>
</table>

#### 5. Eighteen to twenty four months

<table>
<thead>
<tr>
<th>&gt; 18 months - 24 months</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Run fast</td>
<td>Kick ball</td>
<td>Climb stairs</td>
</tr>
</tbody>
</table>

#### 6. Twenty four to sixty months

<table>
<thead>
<tr>
<th>&gt; 18 months - 24 months</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump on the spot</td>
<td>Paddle tricycle</td>
<td>Stand on one foot Jump forward and hop</td>
</tr>
</tbody>
</table>
REFERENCE & BIBLOGRAPHY
REFERENCES LIST & BIBLOGRAPHY


Kementerian Kebajikan Masyarakat Dari Buku Panduan “Training Disabled People In the Community - WHO. RHB / 83.1. Latihan Orang Cacat Dalam Komunity;


Denver Developmental Screening Test.


ACKNOWLEDGEMENT & CONTRIBUTORS
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</tr>
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<td>Family Health Development Division, Kuala Lumpur.</td>
</tr>
</tbody>
</table>

## Editors

<table>
<thead>
<tr>
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<th>Designation</th>
<th>Place</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Aminah Bee Mohd Kassim</td>
<td>Principal Assistant Director</td>
<td>Family Health Development Division, Ministry of Health</td>
</tr>
<tr>
<td>Madam Cheoh Siew Tin</td>
<td>Public Health Sister</td>
<td>Family Health Development Division, Ministry of Health</td>
</tr>
</tbody>
</table>