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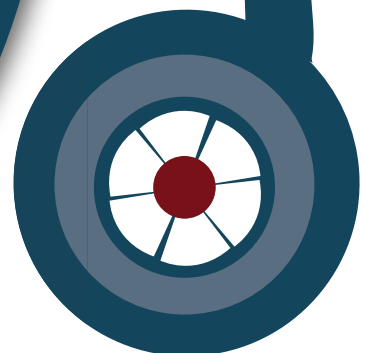


USAID
FROM THE AMERICAN PEOPLE

WHEELCHAIR SERVICE TRAINING PACKAGE

Reference Manual for Participants

INTERMEDIATE LEVEL





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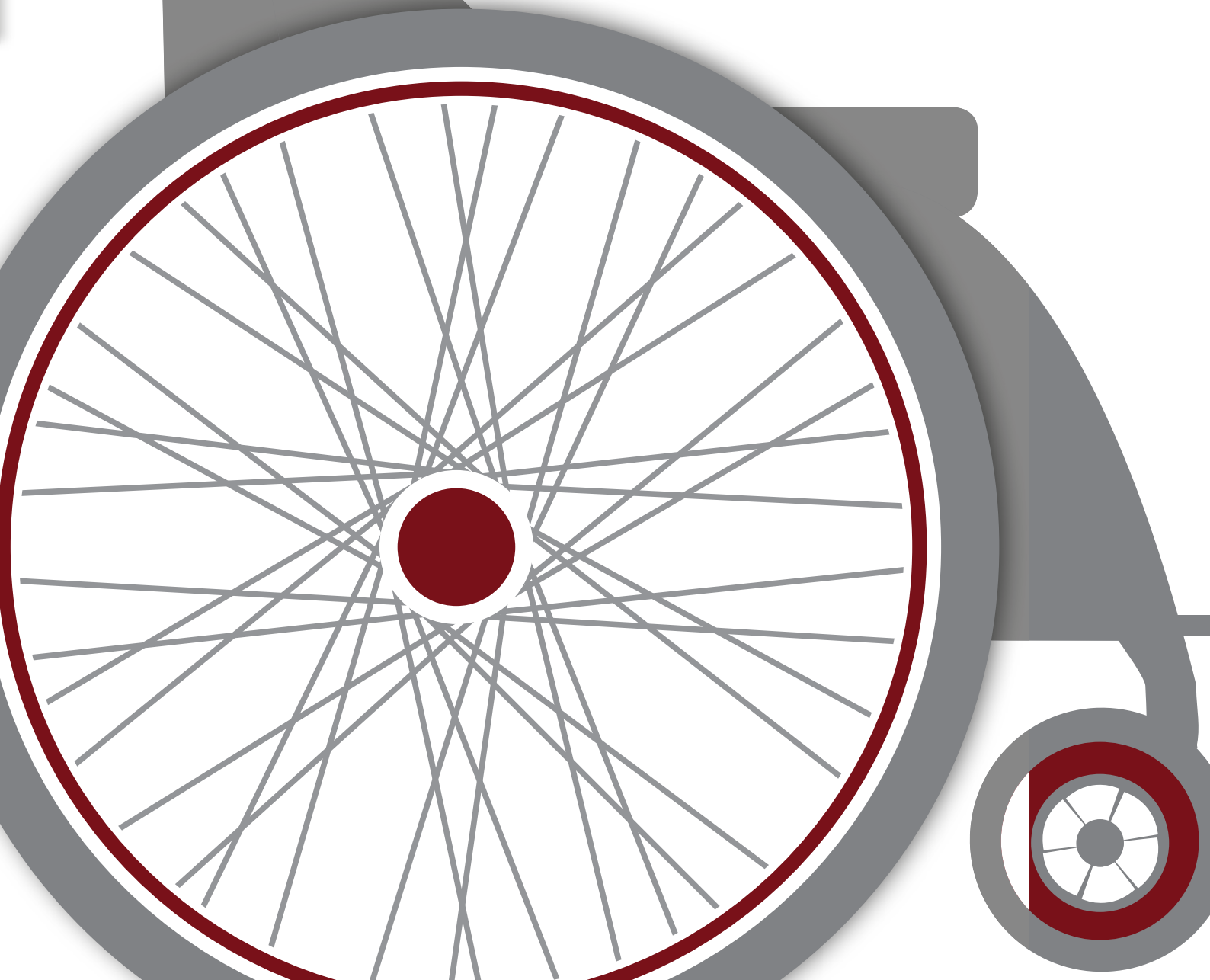


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Reference Manual for Participants

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|------------------------|--|
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| Financial support: | US Agency for International Development and Australian Agency for International Development |
| Partner organizations: | ASSERT East Timor, Association for the Physically Disabled of Kenya (APDK), Community Based Rehabilitation Unit of Solomon Islands Ministry of Health and Medical Services, Education Development Center (EDC), Handicap International, International Committee of the Red Cross (ICRC), International Society for Prosthetics and Orthotics (ISPO), Kilimanjaro Association of the Spinally Injured (KASI), Mobility India, Motivation Australia, Motivation Charitable Trust (Motivation), Motivation Romania, and Tanzania Training Centre for Orthopaedic Technologists (TATCOT) |

WHO Library Cataloguing-in-Publication Data

Wheelchair service training package: intermediate level / edited by Chapal Khasnabis and Kylie Mines.

1. Wheelchairs – standards. 2. Disabled persons – rehabilitation. 3. Teaching materials. I. Khasnabis, Chapal. II. Mines, Kylie. III. World Health Organization.

ISBN 978 92 4 150576 5 (NLM classification: WB 320)

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Printed in Malta

Design by Inís Communication – www.iniscommunication.com

Terminology

The following terms used throughout the training package are defined below.

| | |
|--------------------------------------|---|
| Appropriate wheelchair | A wheelchair that meets the user's needs and environmental conditions; provides proper fit and postural support; is safe and durable; is available in the country; and can be obtained and maintained and services sustained in the country at an affordable price. |
| Manual wheelchair | A wheelchair that is propelled by the user or pushed by another person. |
| Postural support device (PSD) | A physical device that provides additional postural support – an essential element of intermediate level wheelchair service. |
| Wheelchair | A device providing wheeled mobility and seating support for a person with difficulty in walking or moving around. |
| Wheelchair modification | A change made to a wheelchair. |
| Wheelchair provision | An overall term for wheelchair design, production, supply and service delivery. |
| Wheelchair service | That part of wheelchair provision concerned with providing wheelchair users with appropriate wheelchairs. |
| Wheelchair service personnel | Persons skilled in the provision of an appropriate wheelchair. |
| Wheelchair user | A person who has difficulty walking or moving around and uses a wheelchair for mobility. |

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Preface

The wheelchair is one of the most commonly used assistive devices for enhancing personal mobility, which is a precondition for enjoying human rights and living in dignity and assists people with disabilities to become more productive members of their communities. For many people with disabilities, an appropriate, well designed and well fitted wheelchair can be the first step towards inclusion and participation in society.

The United Nations Standard Rules on the Equalization of Opportunities for Persons with Disabilities, the Convention on the Rights of Persons with Disabilities and World Health Assembly Resolution WHA58.23, which deals with disability including prevention, management and rehabilitation, all emphasize the importance of wheelchairs and other assistive devices. To ensure that people with disabilities can access an appropriate wheelchair, especially in less resourced parts of the world, WHO developed the **Guidelines on the provision of manual wheelchairs in less resourced settings**, in partnership with the United States Agency for International Development (USAID) and the International Society for Prosthetics and Orthotics (ISPO).

In order to train adequate number of human resources appropriately and facilitate a good wheelchair delivery system based on the *Wheelchair* guidelines, WHO has taken an initiative to develop a series of **Wheelchair Service Training Package (WSTP)** for different levels of health and rehabilitation personnel responsible for managing different levels of intervention, as outlined in the wheelchair guidelines. After a successful launch of the **Wheelchair Service Training Package – Basic Level (WSTP-B)** in June 2012, we are pleased to release the **Wheelchair Service Training Package – Intermediate Level (WSTP-I)**. In addition to extending the skills and knowledge gained through the Wheelchair Service Training Packages – Basic Level; the Wheelchair Service Training Packages – Intermediate Level has an increased focus on children, as many children, due to the nature of common developmental disabilities, require a wheelchair for both mobility and postural support.



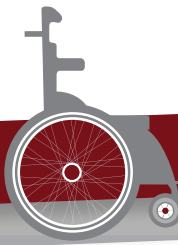
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About the Wheelchair Service Training Package: Intermediate Level

Introduction

Following the release in 2008 of the **Guidelines on the provision of manual wheelchairs in less resourced settings**⁽¹⁾ and in 2012 of the **Wheelchair Service Training Package – Basic level (WSTP-B)**; the World Health Organisation (WHO) in partnership with United States Agency for International Development (USAID) has developed this **Wheelchair Service Training Package – Intermediate Level (WSTP-I)**. The WSTP Intermediate Level is the second part of the WHO **Wheelchair Service Training Package (WSTP)** series focussing more on addressing the needs of people who have severe difficulties in walking and moving around and also poor trunk control. While developing this training package, special attention was given on provision of appropriate wheelchair for children who have poor trunk control and cannot sit upright on their own.

The wheelchair is one of the most commonly used assistive devices for enabling personal mobility. For people who have difficulties walking, a wheelchair, which meets their physical, lifestyle and environmental needs is an essential tool, enabling them to enjoy vastly improved health, social and economic well-being. Mobility opens up opportunities for wheelchair users to study, work and engage in cultural activities, as well as to access services such as health care.

The importance of mobility is reflected in the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), which advocates for “effective measures to ensure personal mobility with the greatest possible independence for persons with disabilities”. To ensure effective personal mobility, wheelchair users need a wheelchair, which fits them correctly and meets their specific needs. This requires an approach, which is responsive to individual needs.

An effective way of meeting the individual needs of wheelchair users is the provision of wheelchairs through wheelchair services. However, statistics show that less than 5% of those in need actually have access to a properly fitted wheelchair. In addition, there are limited training opportunities for personnel to gain the skills needed to prescribe a wheelchair effectively.

1 World Health Organization. *Guidelines on the provision of manual wheelchairs in less resourced settings*. Geneva, 2008 (<http://www.who.int/disabilities/publications/technology/wheelchairguidelines/en/index.html>, accessed 15 December 2011).

The WSTP-I is intended to support the training of personnel fulfilling the clinical and technical roles in a wheelchair service (see *Guidelines on the provision of manual wheelchairs in less resourced settings*, Table 4.2) at intermediate level. The Training Package supports the delivery of the theory and practice needed to begin working with wheelchair users who require additional postural support in order to be able to sit upright. The training package includes how to assess individual needs; assist in selecting and setting up the most appropriate wheelchair with additional postural support; train users and caregivers how to use and maintain their wheelchair and carry out follow up.

The training package can be delivered in 35–40 hours, although this period may be extended or reduced according to the specific needs and resources available in each context. Further practise with a mentor is encouraged to build competencies and enhanced capacity for independent work.

Wheelchair Service Training Package is intended to be delivered as a stand-alone short training programme for personnel already working in the field as well as integrated into the curricula of training programmes for health and rehabilitation personnel.

Target audience

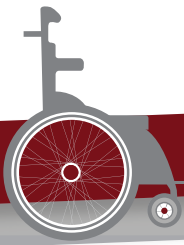
This training package is for all personnel or volunteers working who are expected to carry out intermediate level wheelchair service delivery in their place of work. This may include health, rehabilitation or technical personnel such as occupational therapists, physiotherapists, prosthetists, orthotists, community health care workers and community-based rehabilitation (CBR) workers.

Purpose

The Intermediate Level training package is designed to support the training of personnel or volunteers to provide an appropriate manual wheelchair and cushion for girls, boys, women and men who need additional postural support to be able to sit upright.

The main purpose of this training package is to develop the skills and knowledge of personnel involved in wheelchair service delivery. Delivery of this training package will help to:

- increase the number of wheelchair users who receive a wheelchair, which meets their needs;
- increase the number of personnel trained in intermediate level wheelchair service delivery;



- improve the competencies of wheelchair service delivery personnel;
- increase the quality of wheelchair service delivery for people who need comparatively a higher level of intervention than basic level;
- include this training package in regular paramedical/rehabilitation training programmes and
- achieve greater integration of wheelchair service delivery within rehabilitation services.

Scope

The training package covers:

- how to assess mobility and posture support needs of children and adults who need wheelchair with additional postural support
- how to work with them to identify the best possible mobility solution;
- knowledge and practical tips necessary to provide a manual wheelchair with an appropriate cushion and additional postural support;
- training of wheelchair users and where appropriate their family members/ caregivers to make the best use of their wheelchair;
- following up wheelchair users to ensure that their wheelchair continues to meet their needs.

Required knowledge and skills

Previous experience in wheelchair service delivery is essential for participants to gain the most from this intermediate level training. The intermediate level programme has been designed assuming that participants are able to demonstrate the competencies taught in the WHO's Wheelchair Service Training Package – Basic Level and have practical experience in basic level wheelchair service delivery.

Structure

The Wheelchair Service Training Package: Intermediate Level is designed to be delivered by trainers who are skilled in intermediate level wheelchair service delivery and can confidently demonstrate the competencies taught in this training programme. There is a range of teaching resources, including:

- Trainer's Manual and trainer's tools;
- Reference Manual for Participants (referred to as Reference Manual);
- Participant's Workbook;
- Wheelchair service forms;
- Wheelchair service checklists;
- Visual aids, including PowerPoint slides, videos and posters.

Development process

Following the release of the *Guidelines on the provision of manual wheelchairs in less resourced settings*, WHO formed a working group to develop the Wheelchair Service Training Package. The first working group meeting was convened by WHO in October 2008 to determine the scope and content of the Training Package. Following circulation and receipt of feedback from over 20 experts in the field on the proposed Training Package content, a core group of contributors worked to prepare each training package for field piloting.

In 2011, the Intermediate Level training package was piloted in Romania, Kenya and East Timor. Each pilot was observed by members of the WHO Wheelchair Training Package working group. Feedback from trainers, trainee participants and wheelchair users participating in the practical sessions has been incorporated into the final drafts. In addition to the pilots, the Intermediate Level training package was circulated for peer review. 15 wheelchair experts peer reviewed the document and their valuable feedback and input were considered in finalizing the document.

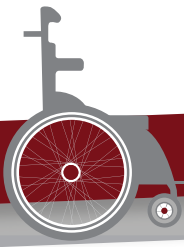
All the authors involved in the development of the training package completed a Declaration of Interest (DOI) and none declared any conflict of interest related to the subject matter.

How to use the Reference Manual

This Reference Manual gives a summary of the knowledge given in the wheelchair service delivery intermediate level training. Participants may use the Reference Manual after the training programme to remind them of the key points taught in each session. The manual is divided into two sections:

A: Core knowledge

B: Wheelchair service steps.



A: Core knowledge – this section covers information that is relevant to all of the wheelchair service steps. In some contexts, depending on the learning needs of participants, trainers may choose to add more information into this section.

B: Wheelchair service steps – this section covers information that will help participants to carry out each of the eight service steps of wheelchair service delivery (see World Health Organisation **Guidelines on the provision of manual wheelchairs in less resourced settings** ⁽²⁾, page 76) at intermediate level.

Basic and intermediate wheelchair service delivery training

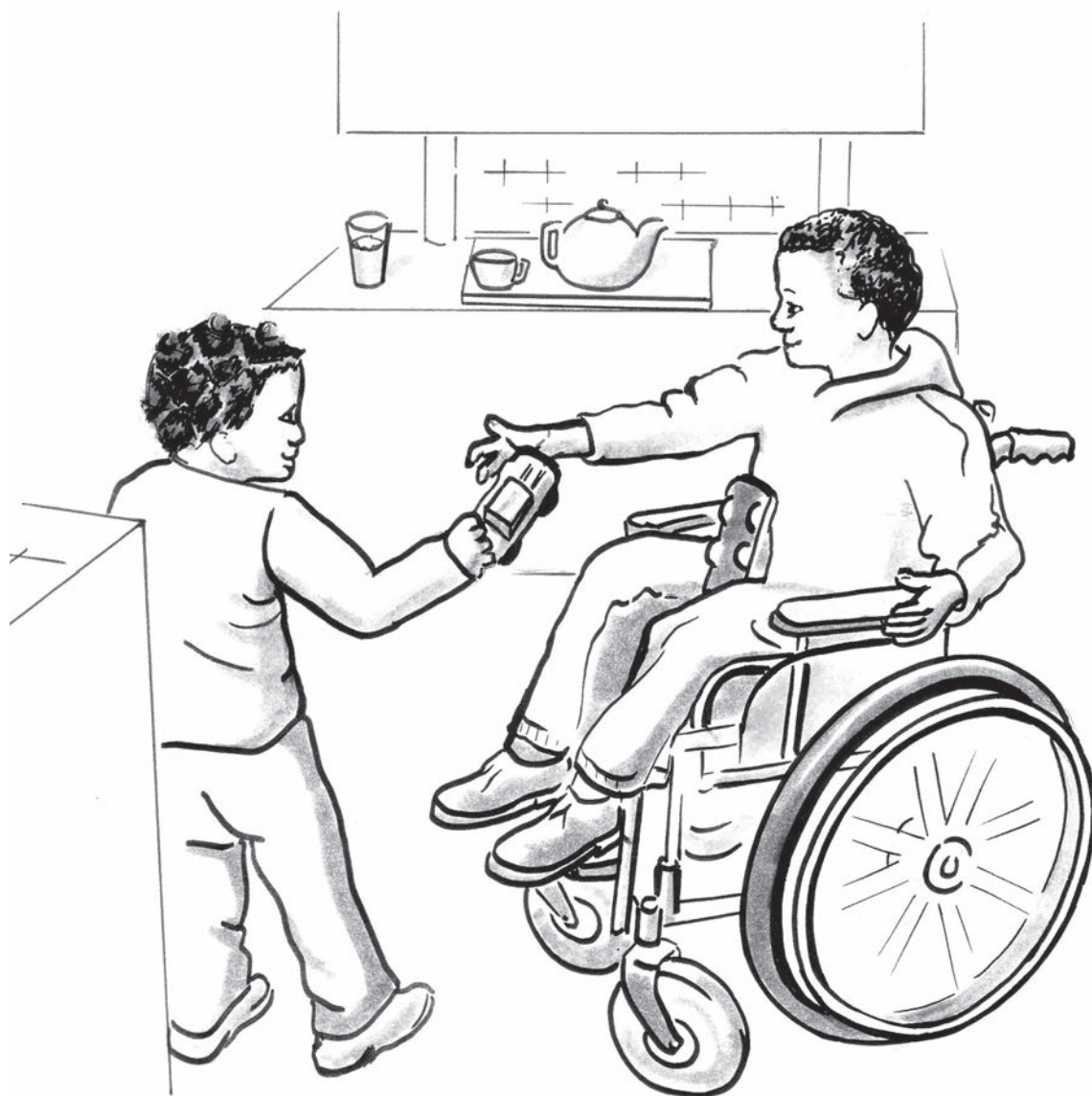
To help provide the right training for wheelchair service personnel the WHO Training Package provides training at two levels – basic and intermediate.

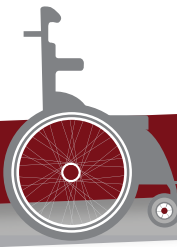
- **The basic level** teaches participants how to provide a wheelchair for children and adults *who have difficulties in walking and moving around but can sit upright without additional postural support.*
- **The intermediate level** teaches participants how to provide a wheelchair for children and adults *who need additional support to sit upright.*

The intermediate level training programme builds on the information and skills participants gained in the basic level.

2 World Health Organization. *Guidelines on the provision of manual wheelchairs in less resourced settings*. Geneva, 2008 (<http://www.who.int/disabilities/publications/technology/wheelchairguidelines/en/index.html>, accessed 15 December 2011).

A: Core knowledge





A.1: Wheelchair users who benefit from additional postural support

Wheelchair users are people who already have a wheelchair or who can benefit from using a wheelchair because their ability to walk is limited. Wheelchair users include:

- children, adults and the elderly; girls, boys, women and men;
- people with different health conditions, lifestyles, life roles and backgrounds;
- people living and working in different environments including rural, semi-urban and urban.

The needs of each wheelchair user will vary. However, all wheelchair users need an **appropriate** wheelchair.

Every well-fitting wheelchair provides the user some postural support. The backrest, cushion, footrests and armrests all provide postural support when adjusted to suit the wheelchair user's size. However many children and adults need additional postural support in their wheelchair.

Additional postural support can be provided by a Postural Support Device (PSD) – a physical device that provides additional postural support. Postural Support Device is an essential element of intermediate level wheelchair service. This includes any addition or modification to a wheelchair for providing additional postural support. Throughout this Manual, a Postural Support Device is referred to as a PSD.

Wheelchair users who benefit from additional postural support

Some people are not able to sit upright without additional support. Some people need a lot of additional support, and some need just a few changes to their wheelchair. Additional postural support can be provided in different ways. Some solutions are very simple, and can be made in a basic workshop. Other solutions may be more complicated.

When is additional postural support needed?

People need additional postural support for different reasons. Usually it is clear when a wheelchair is not giving enough support to help the wheelchair user sit upright as outlined below. Often wheelchair users, or the family member/caregiver will have good suggestions themselves about what further support they may need.

Reasons for needing additional support include:

- cannot sit upright;
- uncontrolled movements or spasms;
- joint stiffness;
- tightness;
- weakness;
- fatigue;
- pain or discomfort;
- difficulty balancing.

Definition: Postural Support Device (PSD)

Postural Support Device (PSD) is a physical device that provides additional postural support.

PSD is an essential element of intermediate level wheelchair service.

How does additional postural support help?

There are four very important ways that additional postural support can benefit wheelchair users;

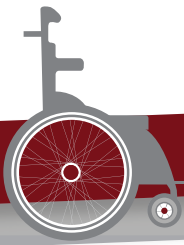


1. Improves balance, posture and stability

Improving balance, posture and stability can help a wheelchair user to carry out activities that are not possible or very difficult for them without additional postural support.

2. Improves comfort

Additional postural support can make a wheelchair much more comfortable and can increase the time wheelchair users are able to sit in their wheelchair before becoming tired.



3. Helps to prevent the development of pressure sores

A pressure sore can develop very quickly. Good postural support helps to prevent pressure sores by making sure that one part of the body is not overloaded.

One benefit of sitting upright is that weight is evenly distributed. This helps to reduce the risk of a pressure sore.

When a wheelchair user does not sit upright, their weight is unevenly distributed. One part of their body will take more weight than other parts. If that additional weight is on skin, which lies over a bony area, there is a high risk of pressure sores.

Examples of bony areas include the seat bones (ischial tuberosity), ribs, hips (trochanters), spine (vertebra) or tail bone (coccyx).

When a wheelchair user is not well supported, he/she tends to slide on the seat. This causes shear, which leads to pressure sores. Sitting well supported prevents sliding and shearing.

4. Helps to slow down or prevent the development of problems with posture in the future Good postural support can prevent problems with posture developing. If a problem with posture has already started, good postural support can slow down or prevent this from getting worse. Good postural support in lying, sitting and standing, started as early as possible is important.

Eating and drinking safely



Some wheelchair users who have difficulty sitting upright also have problems with swallowing safely. For these people, eating and drinking can be uncomfortable, sometimes frightening, and often dangerous. When people have difficulty swallowing safely, small pieces of food and drink may go into the lungs. This can cause a chest infection, making them very ill or even choking leading to death.

Additional postural support in a wheelchair ensures that the wheelchair user can sit upright when eating and drinking.

Improving postural support is just one part of the solution for anyone who has problems with swallowing. If at all possible, children or adults with problems swallowing should be referred to someone who has experience in managing this. This could be a paediatrician, speech language therapist, or any allied health or community health worker who has knowledge and training in helping people manage problems with swallowing.

What do wheelchair users want?

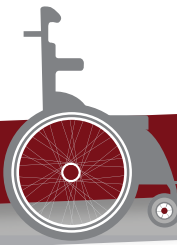
Wheelchair users want to be comfortable and able to get on with their lives. It is important that additional support in the wheelchair does not make day-to-day activities harder.

For example, additional postural support should not interfere with transferring in and out of the wheelchair, propelling the wheelchair, accessing desk or workspace and transport.



A wheelchair and additional postural support should always:

- be practical and easy to use;
- be comfortable and not cause additional discomfort;
- help wheelchair users to do things and not make them more difficult;
- look good and not be too 'obvious'.



Sometimes wheelchair users find it hard to get used to a wheelchair with additional postural support. There are different reasons for this including:

- the wheelchair user may be used to sitting in a certain way. The additional postural support, which changes their habitual posture, feels uncomfortable or restrictive;
- the wheelchair user may not understand why the additional support has been prescribed;
- the wheelchair user may feel the additional postural support does not look good and makes his/her disability more obvious.

For these reasons, it is very important that wheelchair service personnel work closely with the wheelchair user and their family/caregiver throughout the assessment, prescription, fitting, user training and follow up steps. Always discuss solutions with the wheelchair user and always respect their input and final decisions.

The best way to make sure additional postural support will be used by wheelchair user is to:

- fully involve the wheelchair user and their family member/caregiver in their assessment, prescription, fitting, user training and follow up;
- help the wheelchair user and their family member/caregiver to understand why and how additional postural support will help them;
- always let the wheelchair user make the final decision.

Good posture can increase self-esteem



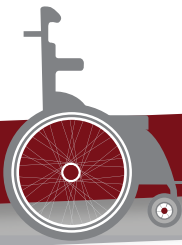
An important benefit of good additional postural support is that it can help wheelchair users feel good about themselves. Being well supported in a more upright posture can help wheelchair users feel more confident.

With proper support, wheelchair users can be more involved in community life. For example, mobility and additional posture support enables the wheelchair user to go to work or school; visit friends; attend religious services or other community activities.

Checklist to help make sure that a wheelchair with additional postural support meets the user's needs

The following checklist can help wheelchair service personnel to ensure that any additional postural support they prescribe is most likely to be successful for the wheelchair user.

| | |
|--|--------------------------|
| Checklist: | ✓ |
| The wheelchair user and their family member/care giver is fully involved in the prescription decisions | <input type="checkbox"/> |
| The wheelchair user is able to try the wheelchair with the prescribed PSDs <i>before it is finalized</i> (in the centre and at home if possible) and give their feedback | <input type="checkbox"/> |
| The wheelchair and PSDs help the wheelchair user to do the things he/she wants to do: | |
| • PSDs improve the wheelchair users' ability to do things | <input type="checkbox"/> |
| • PSDs do not prevent easy transfers in and out of the wheelchair | <input type="checkbox"/> |
| • PSDs do not make the overall wheelchair too heavy | <input type="checkbox"/> |
| The wheelchair and PSDs are comfortable for the wheelchair user: | |
| • PSDs provide support and allow the wheelchair user to sit for longer in their wheelchair than without the PSDs | <input type="checkbox"/> |
| • PSDs provide just enough support and do not support the wheelchair user closer to upright sitting posture than is comfortable for them | <input type="checkbox"/> |
| The wheelchair and PSDs look good (to the wheelchair user) | <input type="checkbox"/> |
| The wheelchair and PSDs are safe: | <input type="checkbox"/> |
| • The finish of any PSD is smooth and there is good padding and pressure relief | <input type="checkbox"/> |
| • Any structural changes to the wheelchair frame have been checked by a qualified person | <input type="checkbox"/> |
| • The wheelchair does not easily tip forwards, backwards or sideways with the wheelchair user in the chair | <input type="checkbox"/> |
| The wheelchairs and PSDs are practical: | |
| • Upholstery can be cleaned or removed for washing | <input type="checkbox"/> |
| • The number of separate parts is as few as possible to prevent them getting lost/used incorrectly | <input type="checkbox"/> |
| • The wheelchair can be easily loaded into a car/public transport | <input type="checkbox"/> |
| • The wheelchair fits easily within the wheelchair user's home | <input type="checkbox"/> |



A.2: Children with disabilities

When providing a child with a wheelchair, it is important to think about how children's lives are different from adults'. These differences affect the way the wheelchair service personnel work with children and choices about wheelchairs and additional postural support. Some important differences are:

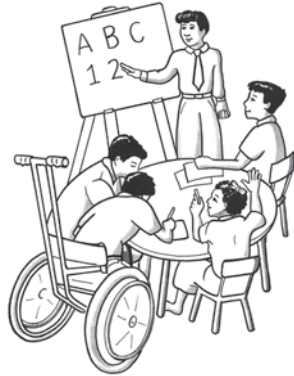
- the activities children carry out are different to activities of adults (play, school);
- children are often very active and do not stay in one position for very long;
- children are in the care of adults;
- children cannot always speak for themselves;
- children are still developing;
- young children have a different sitting posture to adults;
- children are still growing.

Wheelchairs that meet children's needs

The wheelchairs children use should help them be a part of the activities that children carry out every day. Features in a wheelchair that are important for children include:



- If children push themselves, the wheelchair should:
 - fit well to allow them to reach the push rims with comfort;
 - be light enough for children to control, particularly going up or down hill.
- Try always to make sure the child is more visible than his/her wheelchair.
- Extended push handles can help family members or caregivers push the wheelchair without having to bend over.
- A wheelchair that can ride over uneven and soft surfaces such as grass and sand will make it easier for children to play with their friends.



- A child's wheelchair should make it easier for them to get to school:
 - if most children in the child's community walk to school – think about whether a wheelchair can travel on these paths? Does the child need a wheelchair that is good for rough terrain?
 - if the child will go to school in transport (for example car, bus, rickshaw, taxi), think about how the wheelchair will be transported.
- The wheelchair should make it easy for them to be at school. The child should be able to pull up to a desk, or the wheelchair needs a tray as a work surface.

Ideally, children's wheelchairs should:

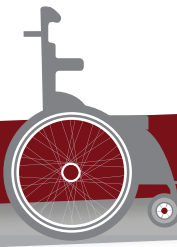
- enable children to push themselves (if they are able);
- have push handles to allow adults to assist;
- be able to ride over uneven and soft surfaces such as grass and sand;
- make it easier for children to get to school;
- attractive enough in terms of design, size and colour;
- make it easier for children to be at school.

Different positions

Children do not usually spend much time sitting down. They change the activity they are doing and their position many times during the day. This means that although a wheelchair is important, children should not spend all day in a wheelchair.

Wheelchair service personnel need to think about other positions children can use during the day. This is particularly important if the child has very limited movement, tends to sit in the same posture all the time and cannot change position.

Some examples of different postures and positions are:

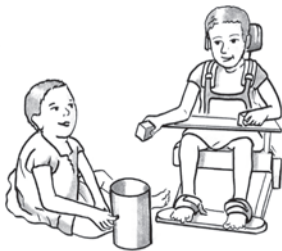


Sitting

Some different ways to support children sitting independently closer to the floor are:



- Sitting astride a roller or tightly rolled blanket.
- Sitting with support from a family member/caregiver:
 - This illustration shows a mother supporting her child with a disability between her legs to help him sit up to eat a biscuit while also supporting her younger child.



- Providing a supportive seat, which is low to the ground:
 - A seat like this is less expensive than a wheelchair with supportive seating and can be a good option for small children.

Standing

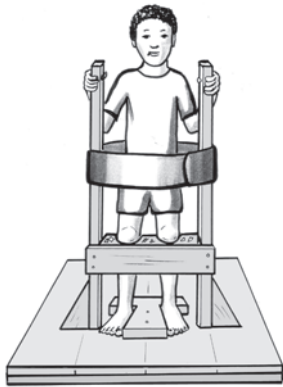
Standing is another important position for children. Standing is an important part of every child's development. Standing helps to form the hip joints and the normal curves of the trunk.

Anyone who spends a lot of time sitting can develop stiff hip, knee and ankle joints. Standing stretches out the muscles around the hip, knee and ankle joints and helps to prevent these joints from becoming stiff.



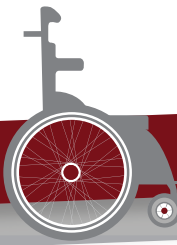
When a child cannot stand independently, a standing frame can help. To prescribe a standing frame, wheelchair service personnel need to fully understand standing posture and the different ways that standing can be supported.

If a standing frame is being provided, always check that there is no pressure applied directly onto the child's knee caps. The best place to support the legs to prevent the knees from bending is just below the knee cap on the shin bone.



If a standing frame is used, wheelchair service personnel should advise family members/care givers how long each day a child should use their standing frame. This is a general guide:

- when first starting 5–10 minutes each day;
- never leave a child in a standing frame for longer than 1 hour;
- provide a tray or table and encourage family members/caregivers to find a fun activity that the child can do in their standing frame.
- when providing children under the age of five with a standing frame, there are some important things to remember:
 - the child's legs should be apart and their feet at least as far apart as the hips are wide;
 - the child's feet and knees should point outwards slightly;
 - the child's hips and knees should be slightly bent;
 - never force a young child's knees and hips completely straight.



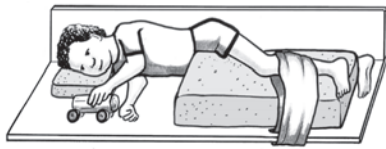
Lying



Lying is another important position. For children, lying on the floor to play is natural.

A child may need some support to lie comfortably on the floor. Blankets, foam, towels or pillows can be used to give support.

Children under the age of five who are lying on their stomach should be supported with a roll under their chest to keep their hips in a slightly bent posture.



Children spend a lot of time sleeping. If a child sleeps in the same posture every night, they may become fixed or stiff in that posture.

Wheelchair service personnel can provide advice to family members/caregivers about how to position the child in different ways while they are sleeping.

Remember – keep the hips and knees of children under the age of five slightly bent in all lying and standing positions.

Importance of an early referral for children

Early referral for children is important, however often parents or referral sources do not refer a child for a wheelchair until the child becomes too heavy to carry. Some of the reasons for this include:

- it is sometimes thought that if a child is given a wheelchair, the child will no longer try to walk;
- while children are young and light, it is easier to carry them than manage a wheelchair over what may be difficult terrain and inaccessible environments;
- parents may not have funds to pay for a wheelchair and will delay until it becomes too difficult to carry the child.

It is important to reassure parents and referral sources that a wheelchair will not usually prevent a child from walking. It is more likely that early provision of a wheelchair with good postural support will help the child.

Here are some reasons why early referral is better than delaying:

- Children who have difficulty sitting upright can develop postural problems if not well supported. If a child is referred late some postural problems may have become fixed ⁽³⁾. This can make it difficult for the child to sit comfortably even with support.
- Without the experience of sitting and being mobile, a child's development can be delayed ^(3, 4).
- For children who have some ability to walk – using a wheelchair may make their daily life easier and allow them to do more things in a day ⁽³⁾.

For these reasons it is better if children come to a wheelchair service earlier.

Educating parents and referral sources

Wheelchair service personnel can play a role in educating parents and referral sources about the importance of early referral.

The age at which children without a disability learn to sit, stand and walk varies. However, it is generally agreed that a child should be able to:

- sit upright on their own without support between 6–8 months;
- pull themselves up to stand between 8–10 months;
- stand alone without any support and may also be able to walk while holding hands 10–12 months and
- walk alone between 12–18 months.

Wheelchair services can encourage referral networks to refer children who:

- have difficulty sitting upright or are not pulling up to stand by the age of 1; or
- are not walking alone by the age of 2.

Where there is a programme of early intervention screening (for example where community health workers are trained to screen children for early intervention), wheelchair services can provide more detailed information to these networks. For example – wheelchair services can suggest that any child identified with a significant physical problem or delay could be referred to the wheelchair service for an assessment or advice.

For very young children, wheelchair services may offer a supportive seat instead of a wheelchair at the initial stage. This can be used inside the home or play school.

3 World Health Organization. (1996). Promoting the development of infants and young children with spina bifida and hydrocephalus. Retrieved from http://whqlibdoc.who.int/hq/1996/WHO_RHB_96.5.pdf

4 Muscular Dystrophy Campaign. (2011). Wheelchair provision for children and adults with muscular dystrophy and other neuromuscular conditions: Best practice guidelines. Retrieved from <http://www.muscular-dystrophy.org/>



Good practice when working with children

Whenever working with children it is important to work in a way that both respects and protects children. Key things to remember are:

Respect children by:

- explaining what you are doing and why in a way that they can understand;
- asking permission before beginning physical assessments;
- involving children in decision making in a way that suits their age;
- if seeing children in a centre, try to make the area as child friendly as possible.

Keep children safe by:

- always seeing children with their family member/caregiver present;
- allowing time for breaks during appointments as children can easily become tired;
- seeking permission from the child and family member/caregiver before taking photographs.

B. Wheelchair service steps





Step 1: Referral and appointment

- See Step 1: Referral and appointment of the Wheelchair Service Training Package – Basic Level Reference Manual for general information about referral and appointment.
- See session A.2: Children with disabilities of this Reference Manual on the importance of early referral for children.

Step 2: Assessment

Assessment overview and assessment interview

Assessment

Assessment is a second wheelchair service step. Information collected from the assessment will help the wheelchair service personnel and wheelchair user to:

- choose the most appropriate wheelchair from those available;
- work out what possible additional postural support may be needed;
- decide what training or support the wheelchair user family member/caregiver may need to use and maintain their wheelchair.

Assessment at both basic and intermediate level is carried out in two parts:

- assessment interview;
- physical assessment.

Assessment interview

The first part of the assessment is the assessment interview. During this part of the assessment the wheelchair service personnel gather information about the wheelchair user, which will help to identify the most appropriate wheelchair for the wheelchair user.

The assessment interview components at basic and intermediate level are very similar. These include:

- information about the wheelchair user;
- physical;
- lifestyle and environment;
- existing wheelchair.

Even though the assessment interview components at basic and intermediate levels are very similar, more information is gathered at intermediate level about the wheelchair user's diagnosis and any physical issues.

Intermediate wheelchair assessment form:

I: Assessment interview

Information about the wheelchair user

| | | | |
|------------|--|-------------------------------|---------------------------------|
| Name: | | Number: | |
| Age: | | Male <input type="checkbox"/> | Female <input type="checkbox"/> |
| Phone no.: | | Address: | |

Goals: _____

The 'Information about the wheelchair user' part of the intermediate wheelchair assessment form has an administrative purpose and ensures that the wheelchair service has the wheelchair user's basic personal and contact information. It also helps the wheelchair service to collect statistical information about wheelchair users seen at the centre.

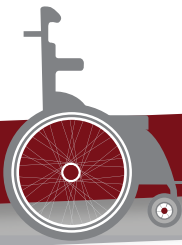
Wheelchair service personnel should also record here what the wheelchair user's goals are for a new or improved wheelchair. The word 'goal' may not be familiar to a wheelchair user. It is up to the wheelchair service personnel to ask questions to find out what the wheelchair user's goal or goals are.

The following are examples of possible questions wheelchair service personnel may ask to find out what the wheelchair user's goal or goals are:

- Why did you come to the wheelchair service today?
- What should your wheelchair help you do?

The following are examples of possible goals:

- I need to be able to reach the well to collect water.
- I need to be able to get into a lift to reach my apartment.
- I need to be able to get my wheelchair into a small car.
- I would like to be more comfortable when sitting.
- I would like to be able to sit for longer in my wheelchair before I get tired.
- I need to be able to get in and out of the wheelchair myself.
- I need to be able to sit at a desk to use the computer.
- I would like to be able to visit my family and need a wheelchair that I can take on the bus.

**Physical**

Diagnosis: Brain Injury Cerebral Palsy Muscular Dystrophy Polio
Spina Bifida Spinal Cord Injury Stroke Unknown Other _____

Is the condition likely to become worse? Yes No

Physical issues: Frail Spasms/uncontrolled movements Muscle tone (high/low)

Lower limb amputation: R above knee R below knee L above knee L below knee

Fatigue Hip dislocation Epilepsy

Problems with eating, drinking and swallowing Describe: _____

Pain Describe location: _____

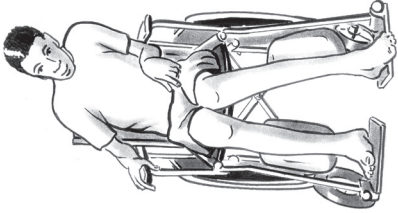
Bladder problems Bowel problems

If the wheelchair user has bladder or bowel problems, is this managed? Yes No

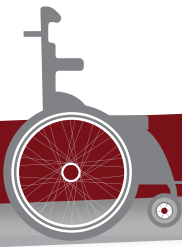
The 'diagnosis/physical issues' part of the intermediate wheelchair assessment form is important because some of the features of different diagnosis and physical issues can affect the choice of wheelchair and additional postural supports.

The table on the next few pages provides a brief overview of the different diagnosis and physical issues listed on the intermediate wheelchair assessment form. Common characteristics of each diagnosis/physical issue that relate to wheelchair provision are described, and suggestions for wheelchair provision are given.

Brain Injury

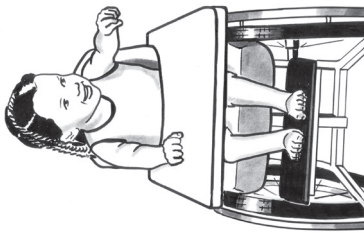
| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|---|---|
| <p>Brain injury refers to any damage to the brain that occurs after birth. Damage can be caused by an accident or trauma ^(5,6), brain infection, meningitis ⁽⁷⁾, cerebral malaria, alcohol or drug abuse ⁽⁵⁾.</p>  <p>The problems caused by a brain injury vary depending on the part of the brain that has been damaged and the severity of the injury ⁽⁶⁾. Brain injuries can affect a person's whole body, or a part of the body. Even though brain injury is a permanent injury to the brain, the effects of the injury on the person's abilities might change over time ⁽⁶⁾.</p> <p>*Please note for the purposes of this training programme the term brain injury refers to acquired and traumatic brain injury only.</p> | <ul style="list-style-type: none"> • difficulty with moving, poor coordination and strength ⁽⁶⁾; • poor sitting and/or standing balance ⁽⁶⁾; • high muscle tone (stiffness of muscles) ⁽⁶⁾, which can cause the whole body to straighten (full body extension) or curl up (full body flexion); • difficulty with eating, drinking and swallowing ⁽⁶⁾; • difficulty with talking, reasoning and understanding ⁽⁶⁾; • changes in personality or behaviour ⁽⁶⁾; • seizure ⁽⁶⁾; • difficulty controlling bowel and bladder, which increases the risks of development of pressure sores ⁽⁶⁾. | <p>If the wheelchair user does not have the ability to propel their wheelchair with their arms, identify whether foot propelling would be possible.</p> <p>Find out if the wheelchair user has high muscle tone as this may affect the strength required of PSDs. Frequent follow up is important as the wheelchair user's physical abilities may change over time ⁽⁶⁾. This means that the amount of support needed in the wheelchair may change.</p> <p>Be aware and sensitive to possible changes in personality or behaviour related to individual's health condition ⁽⁶⁾.</p> <p>For information on:</p> <p>Muscle tone – high and low – see page 34.</p> <p>Epilepsy – see page 40.</p> <p>How can pressure sores be prevented? – see the Wheelchair Service Training Package – Basic Level Reference Manual.</p> |

- 5 World Health Organization. (2006). Neurological disorders: Public health challenges. Retrieved from http://www.who.int/mental_health/neurology/chapter_3_b_neuro_disorders_public_h_challenges.pdf
- 6 World Health Organization, United States Department of Defense Drucker Brain Injury Center, Moss Rehab Hospital. (2004). Rehabilitation for persons with traumatic brain injury. Retrieved from http://whqlibdoc.who.int/hq/2004/WHO_DAR_01.9_eng.pdf
- 7 World Health Organization. (2011). Meningococcal meningitis. Retrieved from <http://www.who.int/mediacentre/factsheets/fs141/en/>



| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|--|---|
| <p>Cerebral palsy is one of the most common childhood physical disabilities (8,9) and is caused by an injury to the developing brain (10).</p> <p>The way in which cerebral palsy affects each person is different (10), however most commonly it affects the way that a person moves (8,10,11). Not every person with cerebral palsy needs to use a wheelchair (10).</p> <p>However, children and adults with cerebral palsy who use a wheelchair frequently require additional postural support for them to be functional and comfortable in their wheelchair.</p> | <ul style="list-style-type: none"> • difficulty with lying, sitting or standing up (10); • poor balance (10); • difficulty controlling one part of the body whilst moving another – for example, sitting still while writing or taking a drink from a cup and swallowing; • high or low muscle tone (10); • spasms/uncontrolled movements; • poor coordination (10); • a tendency to sit in the same posture all the time (habitual posture) (10); • other physical concerns such as visual, hearing, epilepsy, speech or communication difficulties (10); • may have difficulty controlling their bowel and bladder, which may increase the risk for development of pressure sores (11,8); • can be difficult to be able to get to a toilet and sit on or squat over the toilet independently; • hip dislocation (the head of the femur comes out of the hip socket), which can limit movement and be painful. | <ul style="list-style-type: none"> • For most wheelchair users with cerebral palsy, good postural support is important to help improve posture, balance and how easily they can control their body to do things. • Be aware that changes in posture may at first feel strange for a wheelchair user with cerebral palsy. The wheelchair user may need time to adjust. Consider changing postural support gradually to allow him/her to reach a more neutral posture over time. • Other physical issues can have an impact upon the wheelchair and postural support solutions. Find out during the assessment what other difficulties a wheelchair user with cerebral palsy may have. <p>For information on:</p> <ul style="list-style-type: none"> • Hip dislocation – see page 38. |

Cerebral palsy



8 Rosenbaum, P. (2003). Cerebral palsy. What parents and doctors want to know. *British Medical Journal*, 326, 970–974

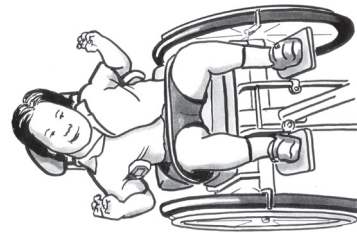
9 Cerebral Palsy Australia. (n.d.). Cerebral palsy – the facts. Retrieved from <http://www.cerebralpalsyaustralia.com/index.php/site/learningcentre/thefacts>

10 World Health Organization. (1993). Promoting the development of young children with cerebral palsy: A guide for mid-level rehabilitation workers. Retrieved from http://whqlibdoc.who.int/hq/1993/WHO_RHB_93_1.pdf

11 Kigger, K. (2006). Cerebral Palsy: An overview. *American Family Physician*, 73(1), 91–100.

12 Roijen, L., Postema, K., Limbeek, v.J., & Kuppevelt, v.H.J.M. (2001). Development of bladder control in children and adolescents with cerebral palsy. *Developmental Medicine and Child Neurology*, 43, 103–107.

| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|--|--|
| <p>Duchenne muscular dystrophy (DMD) is one of 20 types of muscular dystrophy. All the muscular dystrophies result in muscle weakness⁽⁹⁾. DMD is an inherited condition that weakens the muscles gradually over time to move that help the body condition progresses, the muscles of the heart and lungs are also affected^(14,11).</p> <p>It is progressive, which means that people who have muscular dystrophy gradually lose the ability to walk^(13,14,12), and will require a wheelchair⁽¹³⁾. At first, a person can independently propel the wheelchair with a good posture⁽¹³⁾. However, the ability to maintain good posture and propel themselves decreases as the condition progresses⁽¹³⁾.</p> <p>Note: some other progressive neurological conditions have similar features and require similar approaches when providing a wheelchair.</p> | <ul style="list-style-type: none"> • pain and discomfort⁽¹³⁾; • fatigue⁽¹⁷⁾; • progressive muscle weakness; by the time the person needs a wheelchair, weakness around the pelvis, trunk and shoulders affects posture⁽¹⁷⁾; • changes in posture: <ul style="list-style-type: none"> – due to weak muscles around the stomach and the hip joint a person with muscular dystrophy may sit with their pelvis in anterior pelvis tilt (top of pelvis forward) and an increased lumbar curve (lordosis)⁽¹⁷⁾; – as muscle weakness progresses there is a high risk of the spine curving sideways (scoliosis)⁽¹⁶⁾; • difficulties in breathing due to changes in posture and muscle weakness⁽¹⁷⁾; • a risk of developing a pressure sore due to: <ul style="list-style-type: none"> – difficulty changing position; – being under-weight or over-weight. | <ul style="list-style-type: none"> • As soon as someone with muscular dystrophy (or other progressive neurological conditions) begins to need their wheelchair on a daily basis, a thorough assessment of their postural support is needed. • Good postural support provided early can help to prevent future postural problems⁽¹⁷⁾. • Additional postural support should focus on supporting a neutral posture and providing increased support as needed⁽¹⁷⁾. • Supportive footwear and angle adjustable footrests can help maintain a neutral (or close to neutral) feet position. Where available, an ankle-foot orthosis (AFO) may also be helpful⁽¹⁷⁾. • Arm support is important when weakness affects the shoulders⁽¹⁷⁾. <p>For information on:</p> <ul style="list-style-type: none"> • Pain – see page 27. • Fatigue – see page 37. • Progressive conditions – see page 31. |



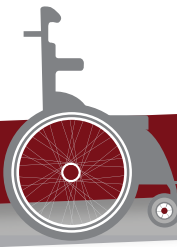
13 Muscular Dystrophy Campaign. (2002). Duchenne muscular dystrophy. Retrieved from <http://www.muscular-dystrophy.org/>

14 Centers for Disease Control and Prevention. (n.d.). Duchenne muscular dystrophy: Fact sheet. Retrieved from http://www.cdc.gov/ncbddd/actearly/pdf/parents_pdfs/Duchenne.pdf

15 Newsom Davis, J. (1980). The respiratory system in muscular dystrophy. *British Medical Bulletin*, 36, 135–138.

16 Brooke, M.H., et al. (1989). Duchenne muscular dystrophy: Patterns of clinical progression and effects of supportive therapy. *Neurology*, 39, 475–481.

17 Muscular Dystrophy Campaign. (2011). Wheelchair provision for children and adults with muscular dystrophy and other neuromuscular conditions: Best practice guidelines. Retrieved from <http://www.muscular-dystrophy.org/>



| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|--|---|
| <p>Polio</p> <p>Polio is an infectious disease caused by a virus ⁽¹⁸⁾. The virus only attacks the nerves that control movement ^(19, 20).</p> <p>One in 200 people who have polio develop some form of permanent muscle paralysis as a result ⁽¹⁸⁾.</p> <p>Polio usually affects children under the age of five ⁽¹⁸⁾. The number of countries that are affected by polio has dramatically decreased in recent decades ⁽¹⁸⁾.</p> | <ul style="list-style-type: none"> • loss of movement in affected muscles (paralysis) – usually of both legs ⁽¹⁹⁾; • thin legs and often buttocks due to muscle wasting; • fixed non-neutral posture around the ankles, knees and hips ⁽¹⁹⁾; • weakness in the trunk muscles ⁽¹⁹⁾. In this case, fixed curves of the spine may develop – including scoliosis, increased thoracic curve (kyphosis), anterior pelvis tilt and increased lumbar curve (lordosis) ⁽¹⁹⁾; • strong arms developed to compensate for the weakness in their legs. | <ul style="list-style-type: none"> • People with polio have often found ways to move and carry out different activities despite the paralysis and any postural problems that they may have developed. • As for any wheelchair user – talk with the person about what postural support he/she wants. Carefully consider the effect of any postural correction. For example – some people with polio sit with their legs further apart or cross-legged and this helps them to balance. Trying to correct this could make their balance worse – and therefore make them less independent. • As many people with polio have strong arms: <ul style="list-style-type: none"> – make sure the wheelchair is set up to enable an efficient propelling position; – consider suggesting a tricycle (where available) as this is a good mobility option for longer distances. • If a wheelchair user with polio has a shortened trunk – consider increasing the height of the cushion to place them in a more efficient position for pushing. For more information on: <ul style="list-style-type: none"> • Wheelchair set up for arm propelling – see the Wheelchair Service Training Package – Basic Level Reference Manual. |

18 World Health Organization. (2012). Poliomyelitis. Retrieved from <http://www.who.int/mediacentre/factsheets/fs114/en/>

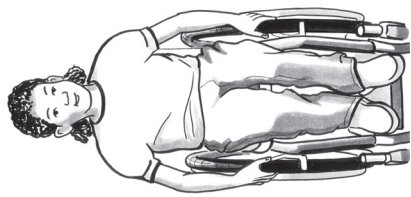
19 World Health Organization. (1993). Rehabilitation surgery for deformities due to poliomyelitis. Retrieved from <http://whqlibdoc.who.int/publications/1993/9241544570.pdf>

20 Polio Global Eradication Initiative. (n.d.). Polio and prevention. Retrieved from <http://www.polioeradication.org/Polioandprevention.aspx>

Spina Bifida

General information

Spina bifida occurs before birth ^(21, 22). The bones of the spine do not close fully around the spinal nerves, leaving them unprotected ^(21, 22). As a result, the part of the spinal cord, which lies under these



bones, may not develop correctly or be damaged ⁽²¹⁾.

Damage to the spinal cord might affect the control of the bladder and bowels ^(21, 18, 19).

Spina bifida can affect people differently, depending on the size of the area affected and the level of nerve damage ⁽²¹⁾.

Common characteristics that may affect wheelchair provision

- movement difficulties will depend on where the spina bifida is located over the spine and how much nerve and spine cord damage is present ⁽²¹⁾;
- difficulty controlling the bladder and bowel ⁽²¹⁾;
- able to walk short distances with the use of mobility devices ⁽²¹⁾;
- may have a bulge at the level of spinal cord, which is damage due to the spine not developing properly (particularly if there has been no surgical intervention) ⁽²¹⁾;
- reduced muscle control and sensation makes sitting upright more difficult;
- may have a larger head (hydrocephalus) caused by a build-up of fluid ⁽²¹⁾. The main treatment for hydrocephalus is to surgically insert a 'shunt', which allows the trapped fluid to drain away – usually into the child's stomach ⁽²¹⁾. If the build-up is not treated it can lead to damage of the brain;
- at risk of developing a pressure sore due to lack of sensation below the level of the injury and the presence of moisture if bowel and bladder is not effectively managed ⁽²¹⁾.

Considerations for wheelchair provision

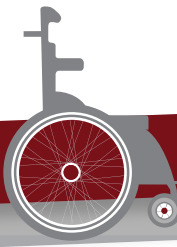
- Ensure the wheelchair is set up to enable efficient propelling.
 - The amount of postural support will depend on the level of injury. The higher the level, the more support is likely to be needed.
 - If orthotics are to be worn in the day, ask the wheelchair user to wear their orthotics during the wheelchair assessment.
 - If a bulge is present, avoid any pressure on that area. This may require shaping the backrest or adjusting the backrest upholstery to accommodate the bulge.
 - Good postural support provided early can help to **prevent postural problems** ⁽²⁰⁾. This is particularly important at times of growth.
 - If a child has a 'shunt', be aware of its position if providing a headrest.
 - If the child has hydrocephalus, which is not being treated, refer him/her to a doctor.
- For information on:
- Wheelchair set up for arm propelling – see the Wheelchair Service Training Package – Basic Level Reference Manual.
 - How can pressure sores be prevented? – see the Wheelchair Service Training Package – Basic Level Reference Manual.

21 World Health Organization. (1996). Promoting the development of infants and young children with spina bifida and hydrocephalus. Retrieved from http://whqlibdoc.who.int/hq/1996/WHO_RHB_96.5.pdf

22 Malone, P., Wheeler, R., & Williams, J. (1994). Continence in patients with spina bifida: Long terms results. Archives of Disease in Childhood, 70, 107–110.

23 McDonnell, G. V., McCann, J. P. (2000). Issues of medical management in adults with spina bifida. Child's Nervous System, 16, 222–227.

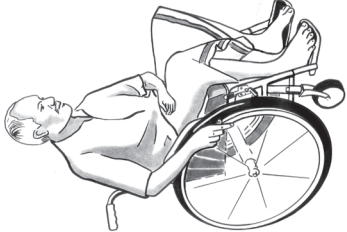
24 Muscular Dystrophy Campaign. (2011). Wheelchair provision for children and adults with muscular dystrophy and other neuromuscular conditions: Best practice guidelines. Retrieved from <http://www.muscular-dystrophy.org/>



| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|---|---|---|
| <p>Spinal Cord Injury</p> <p>A spinal cord injury (SCI) is damage to the spinal cord that results in reduced movement and/or sensation below the level of the injury⁽²⁶⁾. The spinal cord also controls the bladder and bowels so these may also be affected after injury⁽²⁶⁾. A SCI may be caused by an accident, violence, disease or infection⁽²⁶⁾. The effects of spinal cord injury depend on the type and level of the injury⁽²⁶⁾.</p> <p>Type: A complete injury is when a person has no sensation or voluntary movement below the damaged part of the spinal cord⁽²⁶⁾. An incomplete injury is when the person has some sensation or voluntary movement below the damaged part of the spinal cord⁽²⁶⁾.</p> <p>Level: The level of spinal cord injury can be described as tetraplegia/quadruplegia, high level paraplegia or low level paraplegia⁽²⁶⁾. A quadriplegia/tetraplegia occurs in the neck, and the arms, trunk, pelvis and legs are affected⁽²⁶⁾. A high level paraplegia occurs in the upper back, and the trunk, pelvis and legs are affected^(26, 27). The arms are not affected. A low level paraplegia occurs in the lower back and the legs are affected⁽²⁶⁾. The pelvis may also be affected⁽²²⁾.</p> | <ul style="list-style-type: none"> • complete loss of movement and sensation if the injury is complete or partial loss of movement and sensation if the injury is incomplete⁽²⁶⁾; • children and adults with quadriplegia/tetraplegia and high level paraplegia will have poor balance due to the loss of muscle movement control and sensation around the trunk. This makes sitting upright more difficult and long-term postural problems can develop quickly without the correct support from the wheelchair; • possible difficulty with controlling bowel or bladder⁽²⁶⁾; • potential spasms/uncontrolled movements of lower legs⁽²⁶⁾; • children and adults with a SCI are at risk of developing a pressure sore due to: <ul style="list-style-type: none"> – lack of sensation below the level of the injury⁽²⁶⁾; – presence of moisture if their bowel and bladder is not effectively managed. | <ul style="list-style-type: none"> • Always prescribe a pressure relief cushion to help prevent pressure sores. • The amount of postural support required for a wheelchair user with an SCI will depend on the level of injury. The higher the level, the more postural support is likely to be needed⁽²⁷⁾. • In the early stages after injury, additional support for the trunk and arms may be necessary – particularly for high level injuries. • Most paraplegics and some quadriplegics/tetraplegics can self-propel very effectively⁽²⁶⁾. Ensure the wheelchair is set up to enable an efficient propelling position. <p>For information on:</p> <ul style="list-style-type: none"> • Wheelchair set up for arm propelling – see the Wheelchair Service Training Package – Basic Level Reference Manual. • How can pressure sores be prevented? – see the Wheelchair Service Training Package – Basic Level Reference Manual. |

25 World Health Organization. (1996). Promoting independence following a spinal cord injury: A manual for mid-level rehabilitation workers. Retrieved from http://whqlibdoc.who.int/hq/1996/WHO_RHB_96.4.pdf

26 Bromley, I. (2006). Tetraplegia and paraplegia: A guide for physiotherapists. Retrieved from <http://xa.yimg.com/kq/groups/16749867/2144244149/name/Tetraplegia+and+Paraplegia.pdf>

| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|---|--|--|
| <p>Stroke is a type of brain injury caused by a failure of the blood supply to the brain ^(27, 28, 29, 30, 31). Damage or disease can cause blood vessels to block or burst, causing damage or death to that part of the brain ^(28, 29, 30, 31, 32).</p> <p>How a stroke affects each individual varies, depending on the area of the brain, which has been affected and how severely it has been affected ^(29, 31) – however often just one side of the body is affected (hemiplegia) ^(28, 31, 28).</p>  | <ul style="list-style-type: none"> Weakness, less muscle control and sometimes pain on the affected side of the body (affecting the arm, trunk and leg) ⁽²⁸⁾; reduced or altered sensation on side of the body, which has been affected ⁽²⁸⁾; may have a lack of awareness of side of the body, which has been affected and this may lead to increased risk of falls during transfers ⁽²⁸⁾; may have difficulty sitting upright with a tendency to lean or fall towards the affected side of the body ⁽²⁸⁾; may be able to stand up, and take a few steps (maybe using different gait) ⁽²⁸⁾; may have difficulty speaking, as well as swallowing, which makes eating and drinking difficult ⁽²⁸⁾; may have difficulty controlling bowel and bladder ⁽²⁸⁾, and it can also be difficult to be able to get to a toilet quickly enough. | <ul style="list-style-type: none"> Provide postural support to encourage a balanced and symmetrical (both sides the same) posture. Flip up or swing away footrests are often very helpful for wheelchair users with a stroke who can manage a standing transfer. As one arm is likely to be affected, many people who have had a stroke cannot push the wheelchair using their arms. Find out if a wheelchair user can propel with their unaffected arm and steer with their unaffected leg. If the wheelchair user has other problems, which are not yet being addressed, refer them for further help if available. <p>For more information on:</p> <ul style="list-style-type: none"> Wheelchair set up for foot propelling – see the Wheelchair Service Training Package – Basic Level Reference Manual. |

27 World Health Organization. (1999). Promoting independence following a stroke. Retrieved from http://whqlibdoc.who.int/hq/1999/WHO_DAR_99.2.pdf

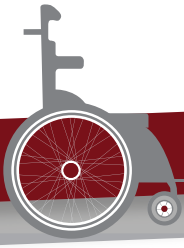
28 World Health Organization. (2012). Stroke, Cerebrovascular accident. Retrieved from http://www.who.int/topics/cerebrovascular_accident/en/

29 World Health Organization. (2006). Neurological disorders: Public health challenges. Retrieved from http://www.who.int/mental_health/neurology/chapter_3_b_neuro_disorders_public_h_challenges.pdf

30 Collins, C. (2007). Pathophysiology and classification of stroke. *Nursing Standard*, 21(28), 35–39.

31 Frizzei, J. (2005). Acute stroke: Pathophysiology, diagnosis, and treatment. *Advanced Practice in Acute and Critical Care*, 16(4), 421–440.

32 Herman, B., et al. (1982). Epidemiology of stroke in Tilburg, the Netherlands. The population-based stroke incidence register: 2. Incidence, initial clinical picture and medical care, and three-week case fatality. *Stroke*, 13(5), 629–634.



General information

Some conditions are known to get worse over time. These are known as progressive conditions. Some common progressive conditions are:

- muscular dystrophy;
- Parkinson disease;
- multiple sclerosis; and
- motor neurone disease.

Considerations for wheelchair provision

Providing the right support at the right time can help prevent problems with posture. This can ensure the wheelchair user is able to continue living as full a life as possible for as long as possible. Certain factors need to be taken into consideration:

- delays in assessment can cause posture to become worse;
- delays between assessment and provision may mean that a wheelchair and/or seating may no longer be suitable by the time it is provided;
- frequent follow up is important as mobility and posture support needs can change quickly.

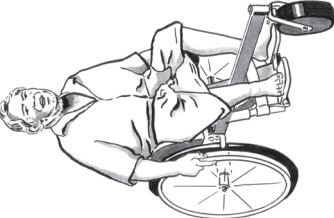
Progressive conditions

If a wheelchair user has a diagnosis that is not listed, write down the name of the diagnosis. If you do not know about this diagnosis, it is a good idea to find out more about it. Think about the main characteristics of this diagnosis and how this will affect the choice of a wheelchair.

What if the diagnosis or condition is not known?

Sometimes the wheelchair user may not know the name of their diagnosis or condition. It is also possible that no diagnosis has been made. In this case identify any specific physical issues and continue the assessment.

Some physical issues that wheelchair users may experience can have a direct impact on choosing the most appropriate wheelchair.

| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|---|---|---|
| <p>Frail</p>  <p>Frail people are likely to become tired easily, are usually less physically active and weaker than previously and may walk very slowly⁽³³⁾. Older adults are at a higher risk of being frail^(34, 30, 31). Often elderly people who are frail are given very basic wheelchairs without good postural support that do not meet their needs^(32, 33). However, providing an appropriate wheelchair with good postural support for frail people and elderly people who are frail can have a very positive impact on the person's quality of life^(37, 34, 35).</p> | <ul style="list-style-type: none"> • get tired quickly; • have limited strength to self-propel; • may find it difficult to maintain an upright posture due to fatigue and general weakness; • may be at risk of developing a pressure sore due to: <ul style="list-style-type: none"> – thin/papery skin, which bruises easily; – slow healing time for bruises/sores; – if very weak, may be unable to reposition independently. | <ul style="list-style-type: none"> • Assess the amount of postural support needed carefully – considering that the longer the wheelchair user sits in the wheelchair the more tired he/she is likely to become, and the more the support that may be required. • Wheelchair features that may be useful include: <ul style="list-style-type: none"> – armrests – provide additional postural support and assist with pushing up for transfers; – footrests that swing out of the way to facilitate standing transfers for those that are able to stand; – push handles to enable other people to assist with pushing; – a lightweight wheelchair, which will require less energy for the wheelchair user to push himself/herself. <p>For more information on:</p> <ul style="list-style-type: none"> • How can pressure sores be prevented? – see the Wheelchair Service Training Package – Basic Level Reference Manual. |

33 Fried, L., et al. (2001). Frailty in older adults: Evidence for a phenotype. *Journal of Gerontology*, 56, 146–156

34 Bortz, W. (2002). A conceptual framework of frailty: A review. *Journal of Gerontology*, 57A(5), M283–M288.

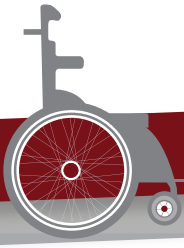
35 Lang, P., Michel, J. P., & Zekry, D. (2009). Frailty syndrome: A transitional state in dynamic process. *Gerontology*, 55, 539–549.

36 Rader, J., Jones, D., & Miller, L. (2000). The importance of individualized wheelchair seating for frail older adults. *Journal of Gerontological Nursing*, 26, 24–32.

37 Krasilovsky, G. (1993). Seating assessment and management in a nursing home population. *Physical and Occupational Therapy in Geriatrics*, 11(2), 25–38.

38 Trefler, E., Fitzgerald, S., Hobson, D., Bursick, T., & Joseph, R. (2004). Outcomes of wheelchair systems intervention with residents of long term care facilities. *Assistive Technology*, 16, 18–27.

39 Huntington's Disease Society of America. (2010). *Physical and Occupational Therapy: Family guide series*. Retrieved from <http://www.hdsa.org/images/content/1/1/11697.pdf>



General information

Some people have problems with sudden uncontrolled movements. These can be called spasms.



Spasms can be triggered in different ways including:

- the position of the person's hip, knee and ankle;
- touch;
- movement of the wheelchair, particularly over rough/bumpy ground.

Considerations for wheelchair provision

- Find out how the uncontrolled movements affect the wheelchair user and problem solve with them.
- Some supported or adjustments to the wheelchair may help to reduce spasms and uncontrolled movements including:
 - supporting to help control the posture of the pelvis;
 - adjusting the wheelchair seat to backrest angle so that the wheelchair user sits with their hips bent slightly more than neutral;
 - positioning the footrests so that the knees are bent slightly more than neutral, 'tucking' the feet in;
 - trying different angles of footrests.
- Straps may help give a wheelchair user more control over their legs and feet. If a strap is used, it should fasten with Velcro so that it will release if the wheelchair user falls out of the wheelchair.
- If the movements are very strong, consider:
 - a solid seat and backrest support;
 - selecting a wheelchair with an adjustable rear wheels position. The rear wheels can be positioned in the 'safe' position to make the wheelchair more stable/less tippy;
 - providing an anti-tip bar to stop the wheelchair from tipping over backwards.
- This is why it is very important for a wheelchair user to propel the wheelchair at the end of a fitting, to see whether any spasms are triggered.

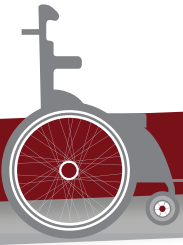
Spasms/uncontrolled movements

| Muscle tone – high and low | General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|---|---|---|
| <p>The term muscle tone refers to the resistance/tension in resting muscle when it is being moved ⁽⁴⁰⁾. Normal muscle tone allows the limb or joint to be moved freely and easily. However some people may have muscle tone that is too high or too low.</p> <p>High muscle tone: There is more resistance/tension – so it is harder to move a limb or joint ⁽⁴¹⁾. A person with high muscle tone will usually find it difficult/awkward to move the affected limb or joint, and movement may be slow. Some people with high tone can move only in a certain ‘fixed’ pattern ⁽⁴²⁾. If the muscle tone is very high, almost no movement is possible.</p> <p><i>(continued on the next page)</i></p> | <p>The degree of difficulty caused by muscle tone depends on how severe the problem is, and which muscles are affected. Some possible difficulties for wheelchair users who have problems with muscle tone include:</p> <ul style="list-style-type: none"> • reduced balance ⁽⁴²⁾; • difficulty sitting upright and comfortably ⁽⁴³⁾; • reduced muscle control ⁽⁴³⁾, which can affect how easily the wheelchair user can carry out different tasks including propelling their wheelchair and transferring; <p><i>(continued on the next page)</i></p> | <p>When touching or helping to move a wheelchair user who has high or low muscle tone, these tips may help:</p> <ul style="list-style-type: none"> • explain what you are going to do before you do it ⁽⁴²⁾; • move slowly and allow for the time it takes for a wheelchair user with low or high muscle tone to react; • provide firm, comfortable support with your hands and arms so that the wheelchair user is well supported; • when strong high tone causes the whole body or whole limb to straighten, the tone can sometimes be calmed by bending one joint. For example, if a whole leg straightens, bending the knee or hip can reduce the tone. <p><i>(continued on the next page)</i></p> | |

40 Martin, K., Kaltenmark, T., Lewallen, A., Smith, C., & Yoshida, A. (2007). Clinical characteristics of hypotonia: A survey of pediatric physical and occupational therapists. *Pediatric Physical Therapy*, 19, 217–226.

41 World Health Organization. (1993). Promoting the development of young children with cerebral palsy. Retrieved from http://whqlibdoc.who.int/hq/1993/WHO_RHB_93.1.pdf

42 World Health Organization, United States Department of Defense, Drucker Brain Injury Center MossRehab Hospital. (2004). Rehabilitation for persons with traumatic brain injury. Retrieved from http://whqlibdoc.who.int/hq/2004/WHO_DAR_01.9_eng.pdf



| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|---|--|--|
| <p>Low tone: There is less resistance – so it is easy to passively move the limb or joint ⁽⁴¹⁾. However, a person with a low muscle tone may find it difficult to begin movement, and may also find controlling their movement difficult. Low muscle tone is sometimes described as ‘floppy or flaccid’ ⁽⁴¹⁾. If the tone is very low, it may be very difficult for the person to move.</p> <p>Who has problems with muscle tone? Problems with muscle tone can be a problem for some wheelchair users. It is a common problem for people who have cerebral palsy ⁽⁴²⁾, brain injury ⁽⁴³⁾, SCI ⁽³⁹⁾, and stroke ⁽⁴⁰⁾.</p> | <ul style="list-style-type: none"> • When there is considerable high or low muscle tone, there can be difficulty with eating, drinking, swallowing and breathing ⁽⁴¹⁾. Aspiration (breathing in pieces of food or liquid) is a life-threatening problem ⁽⁴³⁾. • Increased risk of the development of fixed non-neutral postures ⁽⁴²⁾. <p>For some wheelchair users, high muscle tone can become greater with emotion, or when he/she is trying very hard to do something ^(42, 43)</p> <p>High and low muscle tone can be a risk factor for hip dislocations ⁽⁴²⁾.</p> | <p>The amount of postural support needed will depend on a wheelchair user’s assessment. However some particular considerations for wheelchair users with high tone include:</p> <ul style="list-style-type: none"> • postural supports must be made strong enough to be effective with high muscle tone; • high tone can cause points of high pressure between the user’s body and the wheelchair: Reduce this by distributing force over a larger surface area. Check for pressure. Teach the wheelchair user or his/her family member/caregiver to check the skin for signs of pressure; • reducing the thigh-to-trunk angle can help to reduce strong patterns of high tone. |

Muscle tone – high and low (continued)

43 World Health Organization. (1996). Promoting independence following a spinal cord injury: A manual for midlevel rehabilitation workers. Retrieved from http://whqlibdoc.who.int/hq/1996/WHO_RHB_96.4.pdf

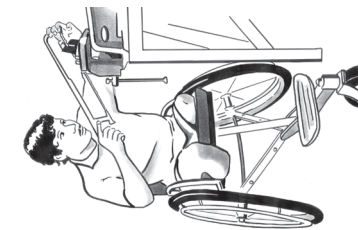
44 American Heart and Stroke Association. (n.d.). Spasticity. http://www.strokeassociation.org/STROKEORG/LifeAfterStroke/RegainingIndependence/PhysicalChallenges/Spasticity_UCM_309770_Article.jsp

45 Redstone, F., & West, J. (2004). The importance of postural control for feeding. *Pediatric Nursing*, 30, 97–100.

46 Driscoll, S., & Skinner, J. (2008). Musculoskeletal complications of neuromuscular disease in children. *Physical Medicine and Rehabilitation Clinics of North America*, 19, 163–194.

Lower Limb Amputation

General information



Lower limb amputation may happen as a result of trauma, e.g. road traffic accident, work injury or war injury ^(47, 48, 49).

In other situations, lower limb amputation may be a planned surgical procedure.

An increasing number of people have a unilateral or bilateral lower limb amputation as a secondary issue associated with diabetes ^(50, 51, 52).

Many people who have had one or both limbs amputated will be able to continue to walk with the use of prosthetics and/or walking aids ^(48, 49). However, some people may need a wheelchair for some time or all the time ^(48, 49, 50).

Common characteristics that may affect wheelchair provision

- can be very active in a wheelchair if they are provided with the help to learn good wheelchair mobility skills;
- the wheelchair balance changes as there is less weight at the front of the chair;
- amputees who have diabetes may be at a greater risk of developing pressure sores as their skin may not heal well from cuts or knocks ⁽⁴⁹⁾.

Considerations for wheelchair provision

- When setting up a wheelchair for the first time for a person with an amputation, set the rear wheels in the furthest back position (if adjustable) to reduce the chance of the wheelchair tipping backwards. Active users may quickly learn to balance the wheelchair, and then move the rear wheels forward.
- When teaching mobility skills:
 - always be careful when an amputee first tries a wheelchair;
 - teach mobility skills carefully as there is a greater chance that the wheelchair user will tip backwards.
- It is important to know whether the wheelchair user would prefer to wear their prosthetic limb(s) when using the wheelchair, as this may change the fit of the wheelchair.

For more information on:

- How can pressure sores be prevented? – see the Wheelchair Service Training Package – Basic Level Reference Manual.

47 Burger, H., Marincek, C., & Isakov, E. (1997). Mobility of persons after traumatic lower limb amputation. *Disability and Rehabilitation*, 19(7), 272–277.

48 Narang, I., Mathur, P., Singh, P., & Jape, V. (1984). Functional capacities of lower limb amputees. *Prosthetics and Orthotics International*, 8, 43–51.

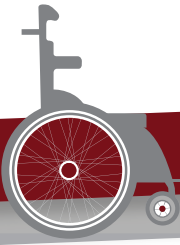
49 World Health Organization, United States Department of Defence, Moss Rehab Amputee Rehabilitation Program Moss Rehab Hospital. (2004). *The rehabilitation of people with amputations*. Retrieved from <http://www.posna.org/news/Amputations.pdf>

50 World Health Organization. (2005). *World diabetes day: Too many people are losing lower limbs unnecessary to diabetes*. Retrieved from <http://www.who.int/mediacentre/news/releases/2005/pr61/en/>

51 Pecorro, R., Reiber, G., & Burgerss, E. (1990). Pathways to diabetic limb amputation: Basis for prevention. *Diabetes Care*, 13(5), 513–521.

52 Trautner, C., Haastert, B., Giani, G., & Berger, M. (1996). Incidence of lower limb amputations and diabetes. *Diabetes Care*, 19(9), 1006–1009.

53 World Health Organization. (2010). *Wound and lymphoedema management*. Retrieved from http://whqlibdoc.who.int/publications/2010/9789241599139_eng.pdf



| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|--|---|
| <p>Some wheelchair users may regularly become tired during the day. This may be because of the additional effort and energy they use to sit upright and carry out activities, or the nature of their condition.</p> <p>Fatigue can be a problem for some elderly people, or some people with progressive conditions ^(50, 51).</p> | <ul style="list-style-type: none"> • may be able to sit upright, however cannot stay upright for long due to fatigue; • if wheelchair users find it hard to maintain an upright posture due to fatigue, they are at more risk of developing postural problems. | <ul style="list-style-type: none"> • Try to find out what it is that makes the wheelchair user tired. This will help you to find the best solution for them. • When deciding how much postural support to provide, consider the effect of fatigue. During the wheelchair assessment the wheelchair user may have more energy, and appear to need less support. Discuss carefully with the wheelchair user how much support he/she needs when they are most tired. • Consider alternative resting positions – for example a tray with a cushion can allow someone to lean forward on their arms; tilt in space is another resting position. • Planning to have rests out of the wheelchair during the day may make it possible to sit more comfortably for longer. |

Fatigue

54 World Health Organization. (2008). Atlas: Multiple sclerosis resources in the world. Retrieved from http://www.who.int/mental_health/neurology/Atlas_MS_WEB.pdf

55 Parkinson's Disease Foundation. (n.d.). Fatigue. Retrieved from http://www.pdf.org/en/fatigue_.pdf

General information

There is a higher prevalence of the hip dislocation in children who have never been able to walk independently^(56, 57, 58). This is because the socket (acetabulum) on the pelvis is soft when children are born, and the round head of the femur shapes the socket when the leg is moving, or when weight is pushing through it when standing. If the hip joint does not form correctly, this can lead to dislocation.

It is also very common with children who have tight muscles and high tone around the hip and pelvis and tend to always sit or lie with their legs to one side⁽⁵⁵⁾. This can be a problem for people with cerebral palsy^(57, 60) or traumatic brain injury⁽⁶⁰⁾.
(continued on the next page)

Considerations for wheelchair provision

- Some indications that a person may have a dislocated/subluxed hip are:
 - one leg appears shorter than the other leg⁽⁶⁰⁾;
 - their leg is always positioned closer to the mid line;
 - there is pain when the hip is moved⁽⁶⁰⁾;
 - when carrying out a range of motion of the hip it may not be possible to take the thigh to the neutral position or to the outside of the body;
 - it is not possible to fully straighten the hips.
- Research shows that the following can help to reduce the tendency for hip dislocation:
 - supporting a neutral posture in sitting and lying from an early age. For young children this includes supporting the hips/thighs in abduction^(61, 62);
 - standing in a neutral posture (for example in a standing frame)⁽⁶³⁾.

(continued on the next page)

56 Soo, B., et al. (2006). Hip displacement in cerebral palsy. *The Journal of Bone and Joint Surgery*, 88, 121–129.

57 Scrutton, D., Baird, G., & Smeeton, N. (2001). Hip dysplasia in bilateral cerebral palsy: incidence and natural history in children aged 18 months to 5 years. *Developmental Medicine and Child Neurology*, 43, 486–600

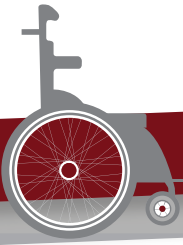
58 Lonstein, J., & Beck, K. (1986). Hip dislocation and subluxation in cerebral palsy. *Journal of Pediatric Orthopaedics*, 6, 521–526.

59 Children's Hospital Boston. (n.d.). A guidebook for hip surgery in children with cerebral palsy. Retrieved from <http://childrenshospital.org/clinicalservices/Site1166/Documents/CPLBook.web2.pdf>

60 World Health Organization, United States Department of Defense, Drucker Brain Injury Center MossRhab Hospital. (2004). Rehabilitation for persons with traumatic brain injury. Retrieved from http://whqlibdoc.who.int/hq/2004/WHO_DAR_01.9_eng.pdf

61 Pountney, T., Mandy, A., Green, E., & Gard, P. (2009). Hip subluxation and dislocation in cerebral palsy – a prospective study on the effectiveness of postural management programmes. *Physiotherapy Research International*, 14(2), 116–127.

62 Health Centre for Children. (2011). Evidence for practice: Surveillance and management of hip displacement and dislocation in children with neuromotor disorders including cerebral palsy. Vancouver, BC: Tanja Mayson.



| General information | Considerations for wheelchair provision |
|--|---|
| <p>For children who haven't walked and have a tendency to lie with both legs to one side (windswept): the hip, which is closest to the mid line of the body (adducted) and turned in (internally rotated) is the one most likely to dislocate ⁽⁶³⁾.</p> <p>When children have low tone around the hip joint, they can also be at risk of hip dislocation. This is because the muscles and ligaments are not strong enough to hold the two parts of the hip joint together (the acetabulum and the head of the femur). A dislocated hip is not always painful ^(64, 65, 66).</p> | <ul style="list-style-type: none"> • When assessing a child or adult who has any of the signs of a possible dislocated hip, move the hips gently and avoid causing pain. • If you are not sure if a child or adult has dislocated hips refer the child to a doctor/paediatrician or experienced physiotherapist (if possible) for further advice. • When providing a wheelchair and postural support for any child or adult with a hip dislocation or suspected hip dislocation: <ul style="list-style-type: none"> – avoid postures, which cause pain; – support their pelvis and trunk in neutral (as close to neutral as possible); and then support the hips and thighs as close to neutral as possible. Avoid 'overcorrecting' the leg posture as this may cause the pelvis to move away from neutral and/or cause pain; – check what position the person sleeps in. Advise on a sleeping position that avoids windsweeping of the legs, and the legs from being squeezed tightly against each other. |


Dislocated hips (continued)

63 Pope, P. (2007). Severe and complex neurological disability: Management of the physical condition. Philadelphia: Elsevier Limited.

64 Sherk, H., Pasquariello, P., & Doherty, J. (2008). Hip dislocation in cerebral palsy: Selection for treatment. *Developmental Medicine and Child Neurology*, 25(6), 738–746.

65 Moreau, M. et al. (1979). Natural history of the dislocated hip in spastic cerebral palsy. *Developmental Medicine and Child Neurology*, 21(6), 749–753.

66 Knapp, R., & Cortes, H. (2002). Untreated hip dislocation in cerebral palsy. *Journal of Pediatric Orthopaedics*, 22, 668–671.

| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|--|---|
|  <p>Epilepsy is a disruption of the normal activity of the brain that results in seizures ^(67,68,69,70). Under certain circumstances anyone can have a seizure ⁽⁷⁰⁾. The term epilepsy is used only for recurrent, unprovoked seizures ^(69,70). (continued on the next page)</p> | <p>What to do if a wheelchair user has a seizure during a wheelchair assessment:</p> <p>When a wheelchair user has a minor seizure, wait for it to be over and then continue with the assessment.</p> <p>If a wheelchair user has a major seizure the first priority is to protect him/her from injury ⁽⁷¹⁾. If the wheelchair user falls forward, try to ease the fall. If the wheelchair user is a child or a small adult, it may be possible to safely lift them onto the floor. If He/she is a large adult, it will be necessary for the wheelchair user to remain where he/she is (due to potential risk of injury to those assisting) and once the seizure stops, gradually lift him/her with the help of co-workers/family members or caregivers. (continued on the next page)</p> | <p>When providing a wheelchair for a person who has epilepsy remember:</p> <ul style="list-style-type: none"> the wheelchair user will need straps that can be undone easily to help them out of the wheelchair; <p>(continued on the next page)</p> |

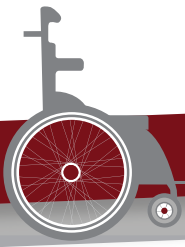
67 McNamara, J. (1994). Cellular and molecular basis of epilepsy. *The Journal of Neuroscience*, 14(6), 3413–3425.

68 World Health Organization. (2005). Atlas: Epilepsy care in the world. Retrieved from http://www.who.int/mental_health/neurology/Epilepsy_atlas_r1.pdf

69 World Health Organization. (2002). Epilepsy: A manual for medical and clinical officers in Africa. Retrieved from http://www.who.int/mental_health/media/en/639.pdf

70 World Health Organization. (2006). Neurological disorders: Public health challenges. Retrieved from http://www.who.int/mental_health/neurology/chapter_3_a_neuro_disorders_public_h_challenges.pdf

71 Epilepsy Foundation. (n.d.). First aid. Retrieved from <http://www.epilepsyfoundation.org/aboutepilepsy/firstaid/index.cfm>



| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|--|---|
| <p>Some wheelchair users may have epilepsy. Seizures may be partial or generalized ⁽⁷⁰⁾. During a partial seizure a person may or may not have impaired consciousness ⁽⁷⁰⁾. If the consciousness is not impaired the seizure lasts less than a minute and a person is usually experiencing uncontrolled movements ⁽⁷²⁾. If the consciousness becomes impaired, the seizure lasts one or two minutes and the person is slightly aware of what is going on but cannot respond or change his behaviour ^(70,73). During a generalized seizure, a person has a complete loss of consciousness ⁽⁷⁰⁾. A person experiencing a generalized seizure may suddenly fall unconsciousness and injure themselves ⁽⁷⁰⁾.</p> | <p>During the seizure:</p> <ul style="list-style-type: none"> do not try to remove the wheelchair user from the wheelchair – unless there is food, water or vomit in their mouth. In this case, remove the wheelchair user from their wheelchair and lie them on the side, so that saliva and mucus can run out of the mouth ^(70,73); make space around the wheelchair user to protect him/her from injury or move them away from anything that can harm them ⁽⁷⁰⁾; protect the wheelchair user's head by placing soft padding underneath it ^(70,73); loosen tight clothing, remove any objects that can harm them and make sure the wheelchair is secure ^(70,73); time the duration of the seizure and give this information to the wheelchair user or his/her caregiver after the seizure ⁽⁷⁰⁾. <p>Wait calmly with the wheelchair user until the seizure is over. Seek medical attention if:</p> <ul style="list-style-type: none"> the wheelchair user does not regain consciousness when the seizure has ended ⁽⁶⁹⁾; the seizure lasts longer than five minutes ⁽⁷⁰⁾. | <ul style="list-style-type: none"> if a wheelchair user often has seizures, which cause him/her to fall forward suddenly, pad his/her tray (if used) so that he/she does not hurt his/her head; if a wheelchair user has epilepsy, which is not being treated, refer him/her to a doctor. |

Epilepsy (continued)

72 Epilepsy Australia. (2009). Seizure first aid. Retrieved from <http://www.epilepsyaustralia.net/userData/docs/First%20Aid/%20Brochure%2009.pdf>

73 Epilepsy Canada. (n.d.). Retrieved from <http://old.epilepsycanada.test.glacier-digital.com/scans/brochure/seizuresFirstAid.html>

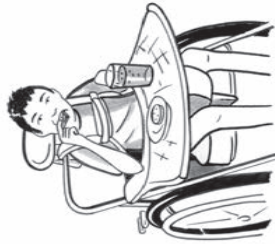
74 Epilepsy Canada. (n.d.). Retrieved from <http://www.epilepsy.ca/en-CA/Diagnosis-and-Treatment/First-Aid.html>

Problems with eating, drinking and swallowing

General information

Some children and adults may have difficulties with eating, drinking and swallowing.

Difficulties with eating and drinking may be caused by problems taking the food or drink to their mouth. For example, if wheelchair users have difficulty controlling their arms or hands they cannot easily manage eating or drinking.



Alternatively, the difficulty may be caused by problems with the muscles around the head, neck, mouth as well as those, which control swallowing⁽⁷⁵⁾. Poor balance, difficulty sitting upright and difficulty maintaining an upright and balanced position of the head can make this worse⁽⁷⁶⁾.

Swallowing problems can cause food or drink to go into the lungs. This can potentially lead to chest infections^(77, 78, 79, 80, 81), which can make the person dangerously ill⁽⁸²⁾.

Signs that a person has problems with swallowing include:

- often coughing when drinking⁽⁸³⁾;
- often choking when eating or drinking⁽⁸⁴⁾;
- constant drooling.

Considerations for wheelchair provision

When providing a wheelchair for a person who has problems with eating, drinking and swallowing remember:

- good postural support can improve balance, posture, head and hand control and reduce problems with eating, drinking and swallowing;
- a tray and/or a headrest are often needed.

If a wheelchair user has problems with swallowing that are not being addressed, refer the wheelchair user to someone who can help. For example, a paediatrician, speech language therapist, occupational therapist or experienced child health worker.

75 Logemann, J., & Byrrell, D. (1979). Swallowing disorders in three types of head and neck surgical patients. *Cancer*, 44, 1075–1105.

76 Redstone, F., & West, J. (2004). The importance of postural control for feeding. *Pediatric Nursing*, 30(2), 97–100.

77 Teasell, R., Mcrae, M., Marchuk, Y., & Finestone, H. (1996). Pneumonia associated with aspiration following stroke. *Arch Phys Med Rehab*, 77, 77–709.

78 Loughlin, G. (1989). Respiratory consequences of dysfunctional swallowing and aspiration. *Dysphagia*, 3, 126–130.

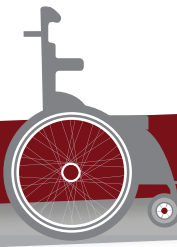
79 World Health Organization, United States Department of Defense, Drucker Brain Injury Center MossRhab Hospital. (2004). Rehabilitation for persons with traumatic brain injury. Retrieved from http://whqlibdoc.who.int/hq/2004/WHO_DAR_01.9_eng.pdf

80 Schmidt, J., Holas, M., Halvorson, K., & Reding, M. (1994). Videofluoroscopic evidence of aspiration predicts pneumonia and death but not dehydration following stroke. *Dysphagia*, 9, 7–11.

81 Perry, L., & Love, C. (2001). Screening for dysphagia and aspiration in acute stroke: A systematic review. *Dysphasia*, 16, 7–18.

82 <http://www.who.int/mediacentre/factsheets/fs331/en/>

83 Prasse, J., & Kikano, G. (2009). An overview of pediatric dysphagia. *Clinical Pediatrics*, 48(3), 247–251.



| General information | Common characteristics that may affect wheelchair provision | Considerations for wheelchair provision |
|--|---|--|
| <p>It is very important to know whether the wheelchair user has any pain, as this may affect their ability to sit comfortably in their wheelchair.</p> | <ul style="list-style-type: none"> If a wheelchair user is regularly experiencing pain, wheelchair service personnel should refer them to a doctor/health clinic to identify the cause of the pain, because ignoring pain can be dangerous. | <ul style="list-style-type: none"> To avoid pain during the wheelchair assessment: <ul style="list-style-type: none"> ask whether any positions make the pain worse; such positions should be avoided; ask whether any movements or positions make the pain less; these positions must be considered during the wheelchair assessment; if the wheelchair user cannot communicate using speech, find another method to communicate before the wheelchair assessment begins; good support and change of position can prevent or reduce pain. |
| <p>Some wheelchair users can have difficulty controlling their bladder or bowels. These problems can often be managed with the right equipment (e.g. catheters), medication, bladder and bowel training programmes.</p> <p>It is important to identify who in your area can offer advice and training to avoid these complications (for example, specialist doctors and nurses).</p> | <ul style="list-style-type: none"> Sometimes wheelchair users who have poor bladder or bowel control have difficulty communicating when they need to go to the toilet. They are at risk of having bladder or bowel accidents. Wheelchair service personnel need to be aware that when working with wheelchair users who have bladder or bowel problems it is possible that they may get soiled. Good hand washing facilities and a means to clean the clinic area are important. A damp or soiled cushion can cause the skin to break down. In addition, bacteria present in faeces rapidly lead to infected pressure sores. The waste products in urine and faeces can also infect sores and burn the skin. | <ul style="list-style-type: none"> The cushion and cover should be easily removable to allow the user/caregiver to clean them. Provide a cushion with a waterproof cover. If possible provide two covers to enable the wheelchair user to continue with their day-to-day activities while one cover dries. If there is no waterproof cover, provide two cushions. Refer the wheelchair user to someone who can help them to manage their bowel and bladder to stay healthy and avoid accidents. |

Pain

Bladder and bowel problems

Lifestyle and environment

Describe where the wheelchair user will use their wheelchair: _____

Distance travelled per day: Up to 1 km 1–5 km More than 5 km

Hours per day using wheelchair: Less than 1 1–3 3–5 5–8 more than 8

When out of the wheelchair, where does the wheelchair user sit or lie down and how (posture and surface)? _____

Transfer: Independent Assisted Standing Non-standing Lifted Other

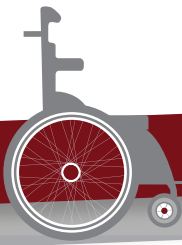
Type of toilet (if transferring to a toilet): Squat Western Adapted

Does the wheelchair user often use public/private transport? Yes No

If yes, what kind: Car Taxi Bus Other _____

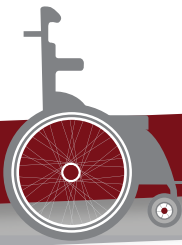
The 'lifestyle and environment' part of the intermediate wheelchair assessment form gathers information about where the wheelchair user lives and the things that he/she needs to do in their wheelchair. It is important to consider how the wheelchair and any additional postural support provided will help the wheelchair user to manage to the best of their abilities considering their immediate environment and their lifestyle.

| Lifestyle and environment questions on the intermediate wheelchair assessment form | Discussion |
|--|--|
| Describe where the wheelchair user will use their wheelchair | <ul style="list-style-type: none"> • The wheelchair needs to be practical for the wheelchair user's home, work or school. For example: <ul style="list-style-type: none"> – if the wheelchair will be used at home, the wheelchair user needs to be able to move about the home easily to carry out important day-to-day activities; – a wheelchair user who works in an office will need a wheelchair, which can fit easily into the office space; – a wheelchair user who goes to school will need the wheelchair to fit comfortably in the classroom and under a desk, or will need a tray built on to the wheelchair; – a wheelchair user who needs to travel to the market or to work on a rough track needs a wheelchair, which works well on rough terrain. |



| Lifestyle and environment questions on the intermediate wheelchair assessment form | Discussion |
|--|---|
| <p>Distance travelled per day</p> | <ul style="list-style-type: none"> • Just as someone may walk if going a short distance, but use a bicycle for longer distances, a wheelchair user may use a wheelchair for shorter distances and a tricycle for longer distances. • A tricycle takes less energy to cover the same distance and is faster. |
| <p>Hours per day using the wheelchair</p> | <ul style="list-style-type: none"> • The longer the wheelchair user sits in the wheelchair, the greater the risk of fatigue or a pressure sore. Think about how much support the wheelchair user needs and whether the cushion provides enough pressure relief and comfort. • For any wheelchair user who is 'active' in their wheelchair during the day, the wheelchair should be set up to make pushing and other activities as efficient as possible. The position of the wheels is important. It is also important to check that the backrest supports the wheelchair user, but does not restrict freedom of movement of the shoulder blades. |
| <p>When out of the wheelchair, where does the wheelchair user sit or lie down and how (posture and surface)?</p> | <ul style="list-style-type: none"> • If a wheelchair user stays in the same position for long periods of time, he or she can become stiff and eventually stuck in that position. It may become impossible to sit comfortably in the wheelchair. • It is very important to avoid this situation and provide the wheelchair user with various options of comfortable positions to sit or lie in when not in the wheelchair. • Does the wheelchair user always sit or lie in the same position? <ul style="list-style-type: none"> – if possible, ask him or her to demonstrate the position; – it is important to know what the preferred position is so that a 'counter' (opposite) position can be suggested. It may not always be possible to go straight to the 'counter' position. If the wheelchair user has used his or her preferred posture for a long time, going for a completely opposite position straight away may be too uncomfortable, strange and potentially frightening; – work out ways in which to support the trunk and limbs to position them in more neutral and comfortable positions. • Is the wheelchair user able to change his or her position? <ul style="list-style-type: none"> – if the wheelchair user is not able to change position, he or she is more at risk of developing problems with posture or pressure sores. |

| Lifestyle and environment questions on the intermediate wheelchair assessment form | Discussion |
|---|--|
| Transfer | <ul style="list-style-type: none"> • Armrests and footrests can affect how a wheelchair user gets in and out of the wheelchair: <ul style="list-style-type: none"> – for standing transfers, it is helpful to have footrests, which move out of the way and armrests that the wheelchair user can use to push up; – for non-standing transfers, removable armrests or armrests, which follow the profile of the wheels can make the transfer easier; – when providing additional postural support, check that the wheelchair user can transfer easily. For example, by adding a seat or a cushion with a wedge, it may be more difficult for the wheelchair user to transfer. A change in technique may be needed, or a different PSD selected. |
| Type of toilet | <ul style="list-style-type: none"> • The type of toilet and physical access to the toilet will affect how easy it is for the wheelchair user to use it. • It may not be possible to use the toilet because of the design. For example, most wheelchair users find it very difficult to use squat toilets. • By asking about the toilet and where the toilet is, the wheelchair service personnel can offer advice on how to transfer to and from the toilet. Wheelchair service personnel may also offer advice on how to adapt the toilet. |
| Does the wheelchair user often use public/private transport? | <ul style="list-style-type: none"> • If a wheelchair user frequently uses transport, he/she will need to be able to transport the wheelchair easily. Different features of a wheelchair, which make transporting the wheelchair easier include the following: <ul style="list-style-type: none"> – lighter wheelchairs are easier to lift in and out; – removable wheels and folding frame and/or backrest make a wheelchair easier to transport. • If using public transport, removable parts can be an advantage, as this makes the wheelchair easier to load. However, removable parts can also be a disadvantage, as parts may become separated and lost or stolen. |

**Existing wheelchair (if a person already has a wheelchair)**

Does the wheelchair meet the user's needs? Yes No

Does the wheelchair meet the user's environmental conditions? Yes No

Does the wheelchair provide proper fit and postural support? Yes No

Is the wheelchair safe and durable? (Consider whether there is a cushion) Yes No

Does the cushion provide proper pressure relief (if user has pressure sore risk)? Yes No

Comments: _____

*If yes to all questions, the user may not need a new wheelchair. If no to any of these questions, the user needs a different wheelchair or cushion; **or** the existing wheelchair or cushion needs repairs or modifications.*

If a wheelchair user already has a wheelchair, it is important to find out if it is meeting his or her needs.

The 'existing wheelchair' part of the intermediate wheelchair assessment form helps to guide the wheelchair service personnel and wheelchair user in assessing whether the existing wheelchair is appropriate for the wheelchair user.

When looking at the condition of the wheelchair, look at the surfaces as these can give clues to how a wheelchair user is sitting. For example, a dented cushion on one side can mean there is more pressure going through one seat bone; damaged armrest on one side might mean a wheelchair user is leaning heavily on that side. If you notice anything unusual, ask the wheelchair user about it.

If the wheelchair is not meeting the wheelchair user's needs, the wheelchair service personnel should find out why. Sometimes the wheelchair is appropriate, but it may not have been correctly adjusted for the wheelchair user. Modifications, additional postural supports or repairs may help.

Good communication skills during an assessment interview

Using good communication skills is always important to help to gather the right information in a way, which is respectful and sensitive to the feelings and needs of the wheelchair user.

Some ways to help make the assessment interview run smoothly are:

- always address the wheelchair users unless they are small children or they are unable to understand or answer your questions;
- explain to the wheelchair user that the information he/she provides will help choose the most appropriate wheelchair to meet their needs;

- questions do not need to be asked in the order given on the intermediate wheelchair assessment form. Sometimes wheelchair users will volunteer information before asked, or it may be more natural to ask questions in a different order.



Sometimes, communicating through speech may be difficult. For example, the wheelchair user may not be able to hear or may not be able to speak clearly enough for you to understand.

When communication is difficult, try to find a way to communicate directly with the wheelchair user. Ask the people who know the wheelchair user well, how you can best communicate. Take the time to understand how the wheelchair user communicates.

If you cannot find a way to communicate directly, make sure that you have someone who knows the wheelchair user well close by at all times. Ask this person to help you communicate with the wheelchair user.

Recognizing pain when a wheelchair user cannot speak

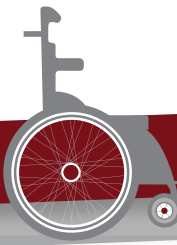
When wheelchair users are unable to speak, it can be difficult for them to communicate that they are experiencing pain. However, it is important for the wheelchair service personnel to know if anything they are doing is causing or increasing a wheelchair user's pain.

Non-verbal signs of experiencing pain can include:

- crying, shouting, fidgeting or sweating;
- pushing the assessor's hand away or trying to move away;
- resisting a movement or being unable to maintain a specific posture;
- expression on face – frowning and/or grimacing;
- the way someone sits, stands or walks.

Ensure that you do not cause or increase existing pain by:

- encouraging the wheelchair user to let you know if he/she experiences pain during assessment;
- if communication is difficult – agree a signal for pain before starting the assessment;
- avoiding positions that make pain worse;
- using positions or movements that make pain less.



Physical assessment – sitting posture without support

Physical assessment is the second part of the assessment. It includes:

- identifying the presence, risk of or history of pressure sores;
- identifying the method of pushing;
- finding out how the wheelchair user sits and what additional postural support he or she may need through:
 - observing sitting posture without support;
 - carrying out a pelvis and hip posture screen. Pelvis and hip posture screening helps to understand how any problems around the pelvis or hips may be affecting the wheelchair user’s sitting posture;
 - carrying out hand simulation. The wheelchair service personnel uses their hands to ‘simulate’ the support that a wheelchair and additional postural supports may provide;
- taking measurements.

Information from each of these sections of the intermediate wheelchair assessment form will help wheelchair service personnel to decide how much support the wheelchair user needs.

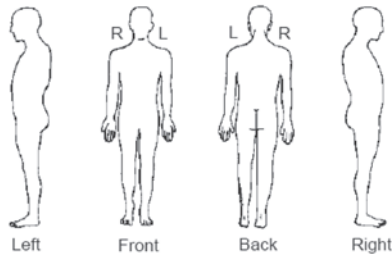
Review of presence, risk of or history of pressure sores and method of pushing

Presence, risk of or history of pressure sores

/// = does not feel

○ = previous pressure sore

● = existing pressure sore



Can feel normally? Yes No

Previous pressure sore? Yes No

Current pressure sore? Yes No

If yes, is it an open sore (stage 1–4)? Yes No

Duration and cause: _____

Is this person **at risk*** of a pressure sore? Yes No

**A person who cannot feel or has 3 or more risk factors is at risk of pressure sores. Risk factors: cannot move, moisture, poor posture, previous/current pressure sore, poor diet, ageing, under or over weight.*

Method of pushing

How will the wheelchair user push his or her wheelchair? Both arms Left arm
Right arm Both legs Left leg Right leg Pushed by a helper

Comment: _____

Upright sitting posture

| Common abbreviations in this section | |
|--------------------------------------|--------------|
| Anatomical structure | Abbreviation |
| Anterior Superior Iliac Spine | ASIS |
| Posterior Superior Iliac Spine | PSIS |
| Ischial Tuberosity | IT |

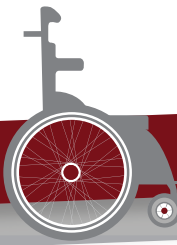
Can every wheelchair user sit in an upright or neutral posture?

Not every wheelchair user can sit in an upright posture, even with support. Wheelchair users who have difficulty sitting upright will demonstrate a range of different sitting postures. The different postures are caused by part (or parts) of the body not being positioned in neutral.

During the assessment, the wheelchair service personnel and wheelchair user need to find the most upright sitting posture the wheelchair user can safely and comfortably achieve and maintain without losing function. The wheelchair and PSDs should support this posture.

There are three different final results that can be found when assessing posture. These are:

- **Fixed posture** - the wheelchair user has a part of the body that is 'fixed'. With gentle force there is no movement (strong force should never be used). Wheelchair service personnel should provide support to accommodate the non-neutral (fixed) posture.
- **Flexible to neutral posture** – with gentle force the parts of the wheelchair user's body that are not in neutral can be brought to neutral. In this situation the right support should be given to help the wheelchair user maintain a neutral sitting posture.
- **Flexible part way to neutral posture** – with gentle force the parts of the wheelchair user's body that are not in neutral can be moved only part way toward neutral. In this situation support is given to help the wheelchair user sit as close to neutral posture as is comfortable and functional for them.



Upright sitting posture for young children

Children under the age of five do not have the same upright sitting posture as older children and adults. The sitting posture develops over the first five years of the child's life.



The most important differences before the age of five are:

- the child's back is flat and there are no lumbar or thoracic curves;
- the child's ear and hips are in line however their shoulders are slightly further forward;
- legs are rolled outwards and apart – not parallel.

When working with children under the age of five, wheelchair service personnel need to remember that children under the age of five should not be given support that encourages an adult upright sitting posture. This would be uncomfortable and could cause harm to the child.

Observing sitting posture



A starting point for understanding the wheelchair user's posture and what support may be needed is to observe his/her sitting posture – without support.

For this part of the physical assessment the wheelchair user sits on an assessment bed.

Make sure the wheelchair user is safe and that his/her feet are supported. Have an assistant or family member/caregiver sit with him/her if he/she cannot independently, sit safely. Observe whether the wheelchair user can sit in a neutral/upright sitting posture without support.

The purpose of observing sitting posture without support is to understand the wheelchair user's postural tendency/habits. Observing sitting posture is a skill, which takes time and practice to develop.

How to tell if a wheelchair user is sitting upright

The upright sitting posture described here should be used by wheelchair service personnel as a guide. When working with wheelchair users, the aim is to support each wheelchair user as close to this posture as is comfortable, functional and practical for them.

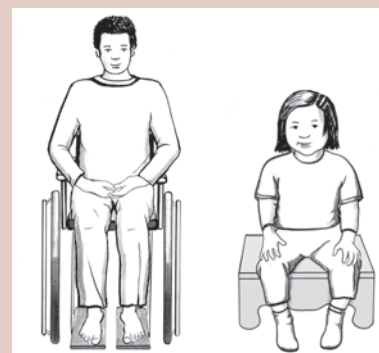
Look from the side and check:

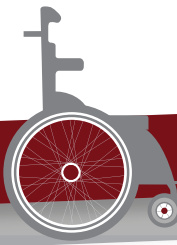
- ✓ Pelvis upright – ASIS and PSIS level;
- ✓ Trunk upright;
- ✓ Back following the three natural curves;
- ✓ Adult – ear, shoulder and hip in line.
Child – ear and hip in line with shoulders slightly forward;
- ✓ Hips bent to around 90 degrees;
- ✓ Knees and ankles bent to around 90 degrees;
- ✓ Heels directly below the knees or slightly forward or back;
- ✓ Feet flat on the floor or footrests.



Look from the front and check:

- ✓ Pelvis level – both ASIS are level;
- ✓ Shoulders level and relaxed, arms are free to move;
- ✓ Legs slightly open (abducted);
- ✓ Head upright and balanced over the body.





Recording posture

On the intermediate wheelchair assessment form there is space to record the wheelchair user's sitting posture without support.

Sitting posture without support

Describe or draw a sitting posture without support:

The record will help wheelchair service personnel to remember the wheelchair user's sitting posture after the assessment. It can also help the wheelchair service personnel to track changes in the wheelchair user's sitting posture over time.

There are a few different ways to record sitting posture including:

- describing posture in words;
- drawing a picture;
- taking photographs (only with permission from the wheelchair user).

Below are examples of simple line drawings that can be used to record sitting posture.



Sitting posture line drawing from the side. Sitting posture line drawing from the front.

Remember!

- Not everyone can sit upright.
- During assessment, the wheelchair service personnel and wheelchair users work together to find out how close to upright posture the wheelchair user can sit comfortably.
- A wheelchair with additional postural support should help to support a wheelchair user to sit as close to upright as is comfortable for them.

Physical assessment – pelvis and hip posture screen

Pelvis and hip posture screen

Sitting posture is influenced by what is happening around the pelvis and the hips. In this part of the assessment wheelchair service personnel need to find out:

- if the wheelchair user's pelvis is level when viewed from the front (this may be with or without support);
- if the wheelchair user's hips are able to bend to a neutral sitting posture (trunk to thigh angle is more than 90 degrees). This may be with or without support.



If the pelvis is not level or the hips cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees), the wheelchair service personnel must find out more information. It is important to know:

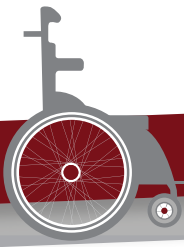
- can the wheelchair user sit in neutral posture with the support?
- if not – how close to the neutral posture can he/she sit?

If the wheelchair user cannot sit in a neutral sitting posture, it is also important to know if the difficulty is due to:

- a limit (or restriction) above the pelvis (in the lumbar spine); or
- a limit within the pelvis (at the hip joint).

In order for the wheelchair service personnel to answer all the questions above it is necessary to carry out a 'pelvis and hip posture screen' part of the assessment.

This is not a full Range of Motion assessment. The purpose of the pelvis and hip screen taught in this training programme is only to identify the factors noted above. Skilled wheelchair service personnel may choose to carry out a full Range of Motion in order to gather more detailed information.



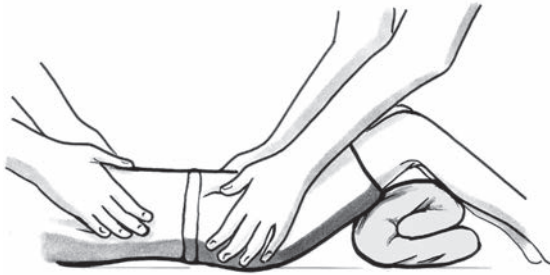
Carrying out a pelvis and hip posture screen

Prepare:

- explain to the wheelchair user what you are going to do and why it is important;
- ask the wheelchair user to lie down on their back on an assessment bed.

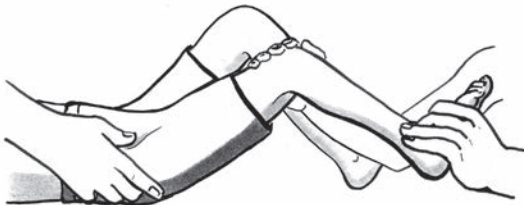
(Note: in these instructions, the person carrying out a pelvis and hip posture screen is called the 'assessor' and the person who assists the assessors is called 'assistant', who could be a co-worker, trained assistant, family member or caregiver).

Pelvis posture screen:



- assessor bends both the wheelchair user's knees slightly and provides some support, which helps to relieve tension on the hips;
- assistant places their hands firmly on the wheelchair user's trunk, around their lower ribs;
- assessor grips the pelvis gently with thumbs on the ASIS;
- assessor checks if thumbs/ASIS are level;
- if not level, assessor gently but firmly tries to align the pelvis so that both ASIS are level;
- assistant reports if he/she feels the trunk move, which means that there is some restriction to the movement;
- note how close to neutral/level it is possible to bring the pelvis;
- assessor records if the pelvis can be level on the intermediate wheelchair assessment form.

Hip posture screen:

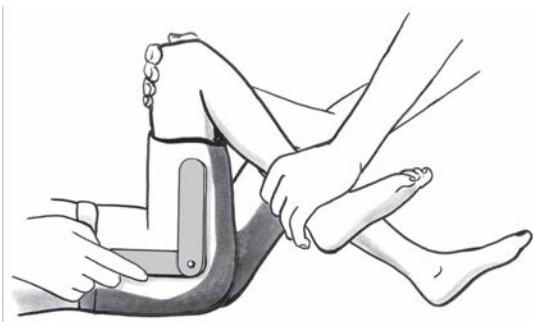


- assistant gently but firmly holds the wheelchair user's pelvis;
- assessor bends the leg that is not being tested slightly at the knee, resting the foot on the mat. This helps to reduce the tension in the hip being tested. This leg may need to be supported.

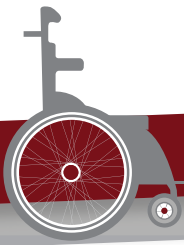
Hip posture screen:



- assessor gently moves the leg being tested into the neutral sitting posture;
- assistant reports if he/she feels the pelvis move, which means that there is some limit (restriction) to the movement;
- assessor feels how freely the hip joint can move;
- assessor repeats on the other side and compares;
- assessor records if right and left hip can bend to neutral sitting posture on the intermediate wheelchair assessment form.



- assessor records how close to neutral posture each hip can reach with a goniometer with the help of an assistant;
- assessor places the pivot point of the goniometer on the hip joint. Assessor positions one arm of the goniometer along the thigh bone and one arm in line with the trunk;
- assessor holds the two arms together firmly;
- assessor records right and left hip angle degree measurements on the intermediate wheelchair assessment form. Assessor can also draw the angle of the goniometer on a separate piece of paper or on the back of the intermediate wheelchair assessment form.



Recording the pelvis and hip posture screen

Pelvis and hip posture screen

Check if pelvis is level and hip flexion range when lying

Can pelvis be level? Yes No

Can hip bend to neutral sitting posture?

Right hip: Yes No Angle: _____

Left hip: Yes No Angle: _____

If pelvis cannot be level or hips cannot bend to neutral sitting posture – accommodate with temporary support.

Record the results of the pelvis and hip posture screen on the intermediate wheelchair assessment form.

Tick whether the pelvis can be level.

Then tick whether each hip can bend to neutral sitting posture (90 degree angle). If either the right or left (or both) hip cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees), record the angle.

As mentioned above, wheelchair service personnel can also draw the angle of the goniometer on a separate piece of paper or on the back of the intermediate wheelchair assessment form.



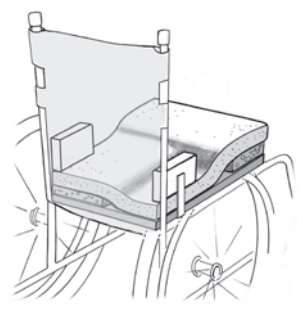


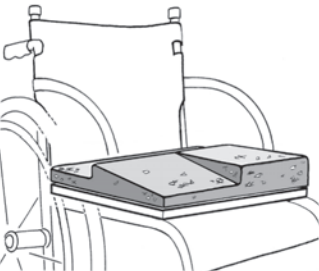

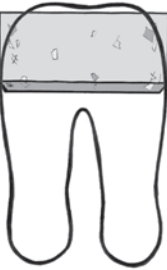
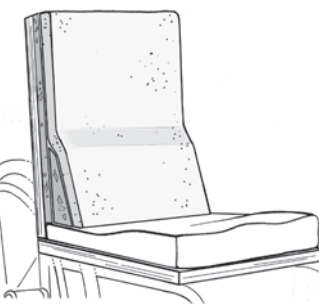


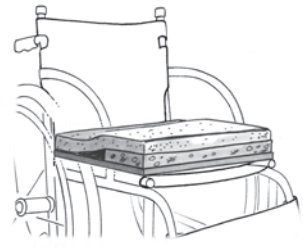
Temporary supports for fixed unlevel pelvis and for the hips that cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees)

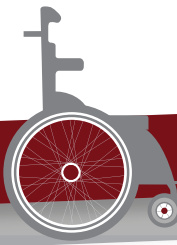
If the pelvis cannot be level or the hip cannot bend to a neutral sitting posture (trunk to thigh angle is more than 90 degrees), it will need to be supported in the non-neutral posture in the final wheelchair. To continue the assessment, a temporary support should be made for the wheelchair user to sit on.

During an assessment, the temporary support will:

- help the wheelchair user to sit with more stability and balance;
- stop the wheelchair user from compensating for the unlevel pelvis or hips that cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees);
- allow the wheelchair service personnel to carry on the assessment and concentrate on the rest of the wheelchair user's posture including pelvis, trunk, head, neck and legs.

A temporary support can be made of firm foam. The table below shows the different postural problems, temporary supports and possible permanent support for these problems.

| Postural problem | Temporary support | Permanent support (built into the wheelchair user's cushion) |
|--|--|---|
| <p>Fixed unlevel pelvis (lateral tilt)</p>  | <p>Add a build-up under the higher seat bone and thigh</p>  |  |
| <p>Hip cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees)</p>  | <p>Add a build-up under both seat bones and the thigh of the hip that can bend to neutral sitting posture – sharp edges need to be bevelled before the trial</p>  |  |
| <p>Both hips cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees)</p>  | <p>Add a build-up to increase the angle between the seat and the backrest.</p>  |  |
| <p>One or both hips cannot open to neutral sitting posture (trunk to thigh angle less than 90 degrees)</p>  | <p>Provide a wedge-shaped support in front of the seat bones under the thighs</p>  |  |



Physical assessment – hand simulation

Hand simulation helps to identify what support the wheelchair user needs. During the hand simulation, the wheelchair service personnel use their hands to find out:

- can the wheelchair user sit in neutral posture with support?
- if not – how close to the neutral posture can he/she sit?
- what support is needed and where.

During a hand simulation, the wheelchair service personnel work with the wheelchair user and an assistant or family member/caregiver to provide support with hands.

How to carry out a hand simulation

Important aspects to remember when carrying out a hand simulation are:



Prepare

- Explain to the wheelchair user what you are going to do and why.
- Ask the wheelchair user to sit on a firm but padded, flat surface. An assessment box is ideal, the wheelchair service personnel and assistant or family member/caregiver can easily reach the wheelchair user to provide support from the front, back and sides.
- If the wheelchair user cannot safely sit without support ask an assistant or family member/caregiver to support them.
- Ensure the wheelchair user's feet are supported at the correct height for them. If the pelvis is unlevel or if one of the hips cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees), provide a temporary support as described in the previous session.



Work as a team

- It is often necessary to have more than one pair of hands.
- Take help from the assistant, who could be a co-worker, trained assistant, family member or caregiver.
- Involving family member/caregiver will help him/her to better understand the final PSD solution.

Use good communication

- The wheelchair service personnel should communicate gently (preferably in local language) with the user and the family member/caregiver.
- If the wheelchair user cannot talk, find an appropriate method of communication with them and use it.
- Remember to explain to the wheelchair user what you are doing at each step.
- Ask the wheelchair user for their feedback after each change.

Think carefully about what your hands are doing

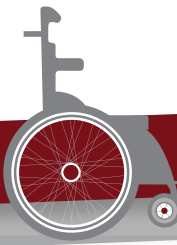
- Your hands are providing the support that will later be provided by the wheelchair and PSDs. During a hand simulation, pay careful attention to:
 - where your hands are placed;
 - the direction of force/support;
 - how much force/support is being used;
 - how much surface area your hands are covering (for example, are you using just one finger or a whole hand);
 - if it is cold, warm up your hands before you begin the hand simulation.
- This information will help you to prescribe the final wheelchair and PSDs.

Always provide support at the pelvis first

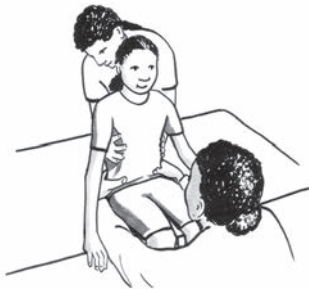
- The posture of the pelvis will affect the rest of the body.
- If the wheelchair user's pelvis is not in neutral, use your hands to encourage the pelvis towards neutral.
- When the pelvis has been supported, focus on other parts of the body in this order:
 - trunk/arms;
 - head and neck;
 - hips and thighs;
 - lower legs.

Make one change at a time

- Always make only one change at a time. For example – do not try to change the posture of the trunk at the same time as changing the posture of the pelvis.
- Observe how changes in one part of the body affect other parts.
- Ask for feedback from the wheelchair user.

**In order to begin hand simulation part of the physical assessment:**

- kneel or squat in front of the wheelchair user;
- gently place hands on both sides of the wheelchair user's pelvis;
- if the wheelchair user's pelvis is not in neutral – use hands to bring the pelvis as close to neutral as is comfortable;
- do not use very strong force;
- find how close to neutral the pelvis can be supported;
- observe how moving the pelvis towards neutral affects the wheelchair user's trunk, hips, head and neck.
- when the pelvis is supported as close to neutral as possible, the wheelchair service personnel can then consider what support is needed at the trunk;
- ask the assistant to hold the pelvis in the posture that you have identified as 'as close to neutral as possible' for this wheelchair user;
- explain carefully to the assistant where to hold and how to hold the pelvis. Check that he/she is able to do this before moving on.

**Provide support at the trunk (if needed):**

As for the pelvis, if the wheelchair user's trunk is not in neutral sitting posture, use your hands to provide support. Work in this order:

- stabilize the pelvis with your hands;
- straighten out the trunk so both shoulders are level (or as close to level as is possible) by providing support with your hands at both sides of the trunk;
- bring the trunk upright with head and neck balanced over the pelvis by providing support at the back and sometimes at the front with your hands;
- observe the contour of the pelvis and trunk from the side. This is important to plan the shape of the backrest to provide the best support.

Pay close attention to how trunk support affects the rest of the body. For example, does the trunk support help improve head and neck posture? Even with good pelvis and trunk support, some wheelchair users may find it hard to hold their head upright. Some suggestions to help improve head and neck posture are:

- allow the wheelchair user to recline slightly backwards;
- observe whether the wheelchair user is then able to better balance their head over their trunk;
- provide additional support for the arms.

During the hand simulation, ask the assistant supporting the pelvis if he/she feels any changes as you support the trunk. Remember to always ask the wheelchair user for their feedback.

Provide support for other body parts (if needed)

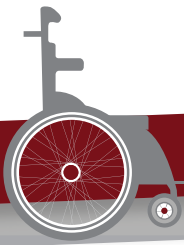


- Once the pelvis and trunk are supported in the most neutral sitting posture that is comfortable, check the posture of the head and neck, hips, thighs and lower legs.
- Use your hands to find out how close to neutral each body part can comfortably move. Continue to check how any change affects the rest of the body. Continue to ask the wheelchair user for their feedback.

Recording the results from a hand simulation

Results of the hand simulation are recorded on the intermediate wheelchair assessment form. There is space to:

- record with a tick whether the wheelchair user is able to achieve a neutral sitting posture for each body part *with hand support*;
- describe or line draw the final sitting posture achieved by the wheelchair user with the hand support; and
- describe or line draw the support provided for the wheelchair user to achieve that sitting posture.

**Hand simulation: support needed to sit in neutral posture / as close to neutral posture as is comfortable**

For each body part: If neutral sitting posture is possible **with hand support**, tick yes. If not, tick no.

| Part | Yes | No | Describe or line draw final sitting posture achieved by the wheelchair user with hand support and describe or line draw the support provided to achieve that sitting posture. |
|---------|--------------------------|--------------------------|--|
| Pelvis | <input type="checkbox"/> | <input type="checkbox"/> | |
| Trunk | <input type="checkbox"/> | <input type="checkbox"/> | |
| Head | <input type="checkbox"/> | <input type="checkbox"/> | |
| L Hip | <input type="checkbox"/> | <input type="checkbox"/> | |
| R Hip | <input type="checkbox"/> | <input type="checkbox"/> | |
| Thighs | <input type="checkbox"/> | <input type="checkbox"/> | |
| L Knee | <input type="checkbox"/> | <input type="checkbox"/> | |
| R Knee | <input type="checkbox"/> | <input type="checkbox"/> | |
| L Ankle | <input type="checkbox"/> | <input type="checkbox"/> | |
| R Ankle | <input type="checkbox"/> | <input type="checkbox"/> | |

Physical assessment – taking measurements**Measuring a wheelchair user to select the correct wheelchair size and location of PSDs**

On the measurements part of the intermediate wheelchair assessment form there are twelve body measurements listed. Five measurements are the same measurements that were previously introduced in the Wheelchair Service Training Package – Basic Level. One additional backrest height body measurement is added to the intermediate wheelchair assessment form. Seat to top of shoulder measurement is used to measure a wheelchair user for a high backrest. There are six more measurements, which will help to decide the size and/or location of PSDs.

Sometimes it may be necessary to take more measurements, depending on the PSDs prescribed. There is space on the intermediate wheelchair assessment form to record 'other' measurements.

How body measurements relate to the size and location of the wheelchair and PSDs

Each body measurement that is taken relates to the size of the wheelchair or the location and size of PSDs.

On the intermediate wheelchair assessment form the body measurements are listed on the left hand side and the components that each body measurement relates to are listed on the right hand side.

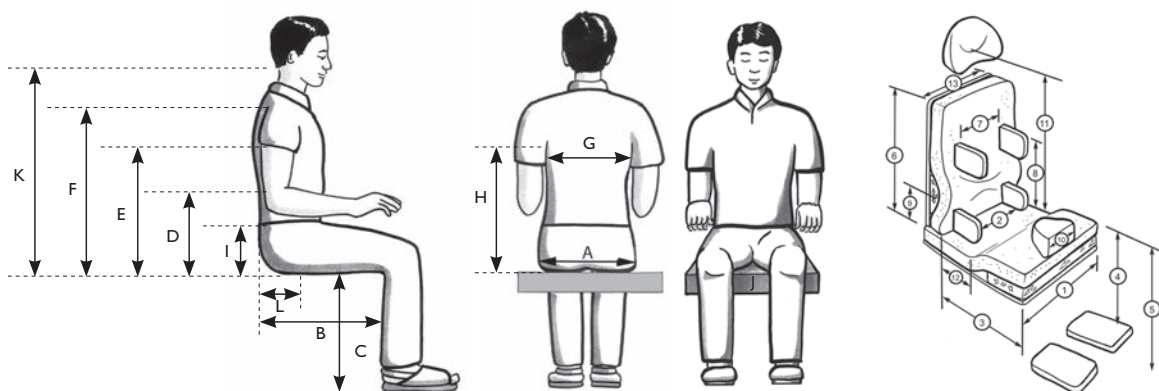
For example:

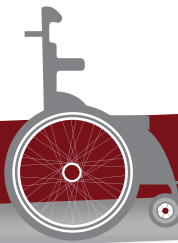
- a wheelchair user's hip width (body measurement A) equals the wheelchair seat width or the distance between the pelvis side pads (component measurements 1 or 2);
- a wheelchair user's seat to axilla (armpit) (measurement H) less 30 mm is the **maximum** distance between the top of the cushion and the top of trunk side pads/wedges (wheelchair component measurement 8).

The examples above demonstrate that the body measurement does not always equal the wheelchair component measurement and some calculations are needed. In some cases there is a formula to help work out the wheelchair component measurement.

Adjustments are often needed at the fitting. However accurate body measurements can help to prepare the wheelchair well ahead of the first fitting.

The illustrations on the intermediate wheelchair assessment form help to guide wheelchair service personnel as they take the body measurements and relate them to the location and size of PSDs.





Taking measurements

| Body measurements (mm) | | Wheelchair component measurements (mm) | | | |
|--|---|--|--|----|--|
| Seat width, depth and footrest height | | | | | |
| A | Hip width | | = seat width OR | 1 | |
| | | | = distance between pelvis side pads | 2 | |
| B | Seat depth (back of pelvis to back of the knee) | L | B less 30–50 mm = seat depth (if L, R lengths are different, use shorter) | 3 | |
| | | R | | | |
| C | Calf length | L | = distance between top of the seat to footrest OR = distance between top of the seat to floor for foot propelling | 4 | |
| | | R | | 5 | |
| Backrest height | | | | | |
| D | Seat* to bottom of rib cage | | = distance between top of the seat to top of backrest (measure D, E or F – depending on the wheelchair user's need) | 6 | |
| E | Seat* to bottom of shoulder blade | | | | |
| F | Seat* to top of shoulder | | | | |
| Modifications and/or PSDs | | | | | |
| G | Trunk width | | = distance between trunk side pads/wedges | 7 | |
| H | Seat* to axilla (armpit) | L | H less 30 mm = maximum distance between the top of the seat and the top of trunk side pads/wedges (adjust according to hand simulation) | 8 | |
| | | R | | | |
| I | Seat* to top of the pelvis (PSIS) | | = distance between the top of the seat and mid-height of rear pelvis pad | 9 | |
| J | Distance between knees | | = width of knee separator pad | 10 | |
| K | Seat* to base of skull | | = distance between the top of seat to middle of headrest | 11 | |
| L | Back of pelvis to seat bones | | L plus 20–40 mm = distance from the backrest support to the beginning of the pre seat bone shelf. | 12 | |
| Other | | | | | |
| | | | | | |

*When taking body measurements, the 'seat' is the surface on which the seat bones are sitting.

How to take accurate measurements

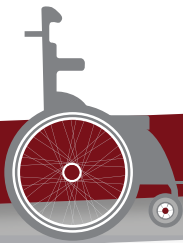
Mistakes in measuring can cause big problems. However taking accurate measurements can sometimes be difficult. This is particularly a problem when a wheelchair user is very small or finds it hard to sit still or has difficulty sitting upright.



Some ways to help take accurate measurements include:

- always use a firm tape measure – not a ‘dress makers’ tape measure; the firm tape measure will not bend as much, resulting in an inaccurate measurement;
- use of calipers can help to increase the accuracy of measurements;
- take measurements of the wheelchair user sitting upright, in the posture that has been identified as the most upright, comfortable and functional for them during the hand simulation. If a wheelchair user is measured lying down, the measurements will not be accurate because when lying down the wheelchair user may lengthen or stretch out. It is better to get assistance to support the wheelchair user sitting upright than to lie them down.

| How to measure: | Wheelchair component: | Comments: |
|---|--|---|
| A: Hip width | Seat (width) | |
| <p>Check there is nothing in the wheelchair user’s pockets before measuring. Measure the wheelchair user’s hips or the widest part of his/her thighs.</p> <p>Hold two clip boards against each side of the wheelchair user to help to get an accurate measurement. Calipers can also be used.</p> | <p>Hip width equals the seat width or the distance between pelvis side pads.</p> | <p>If pelvis side pads are provided, the wheelchair seat width may need to be wider.</p> <p>Always try to keep the wheelchair width to a minimum.</p> <p>In countries with cold climates where thick clothes may be worn, some allowance may be needed.</p> |

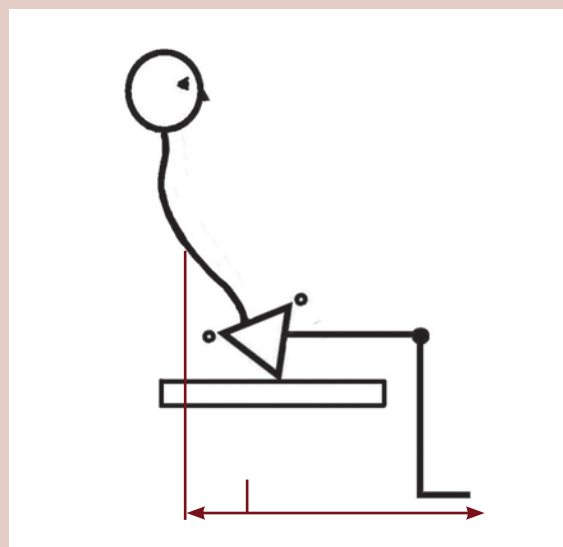


| How to measure: | Wheelchair component: | Comments: |
|---|---|--|
| B: Seat depth | Seat (depth) | |
| <p>Place a clip board at the back of the wheelchair user to help get an accurate measurement. Measure from the back of the wheelchair user's pelvis to the back of his/her knee in a straight line.</p> <p>Always measure both legs.</p> <p>If there is a difference between the left and right side, check that the wheelchair user is sitting upright with their pelvis level. If there is still a difference, make the wheelchair prescription for the shorter side.</p> | <p>Seat depth less 30–50 mm equals the depth of the seat of the wheelchair.</p> | <p>For a wheelchair user whose knees are bent a lot less than 90 degrees, the seat depth may need to be slightly shorter.</p> <p>See the box 'For wheelchair users with a fixed posterior tilt of the pelvis or fixed forward bent trunk'.</p> |

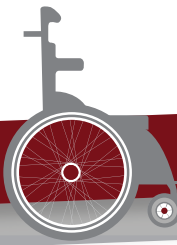
For wheelchair users with a fixed posterior tilt of the pelvis or fixed forward bent trunk

If a wheelchair user has a fixed posterior tilt of the pelvis or fixed forward bent trunk, wheelchair service personnel need to think about how this will be accommodated in the wheelchair. This may change the way the seat depth measurement is taken.

- If the backrest is reclined (tilted back) to accommodate the pelvis/trunk, measure from the back of the pelvis to the back of the knee in a straight line as described above.
- If the backrest does not recline, supports will be made to accommodate the pelvis/trunk within the seat depth space. Measure from the furthest back point of the body (trunk/pelvis) to ensure that enough seat depth is allowed, as shown in the illustration.

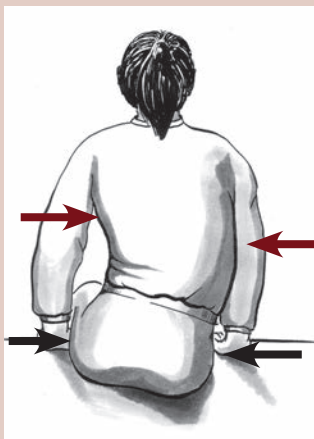


| How to measure: | Wheelchair component: | Comments: |
|---|--|--|
| <p>C: Calf length</p> <p>Measure from the back of the wheelchair user's knee to the base of his/her heel. Make sure the wheelchair user's ankles are bent at 90 degrees (if possible).</p> <p>Always measure both legs. If the wheelchair user wears shoes, measure with the shoes he/she wears most days.</p> <p>If the foot is fixed in plantar flexion (pointing downwards), measure to the toe.</p> | <p>Footrests (height)</p> <p>The calf length height equals the top of the cushion to the footrests OR the top of the cushion to the floor if the wheelchair user is foot propelling.</p> | <p>The exact footrest location will change slightly depending on how much the cushion compresses when the wheelchair user sits on it.</p> <p>Final adjustment is always needed at fitting.</p> |
| <p>D, E and F</p> <p>D: Seat to bottom of rib cage: Measure from the wheelchair user's seat to the bottom of the rib cage.</p> <p>To help find the bottom of the rib cage, place hands on both sides of the pelvis. Gently squeeze hands inwards and slide hands upwards. The bottom of the rib cage is just above the waist.</p> <p>E: Seat to shoulder blade: Measure from the wheelchair user's seat to the bottom of the shoulder blade in a vertical line.</p> <p>To help find the bottom of the shoulder blade ask the wheelchair user to shrug their shoulders.</p> <p>F: Seat to top of shoulder: Measure from the wheelchair user's seat to the top of the shoulder.</p> | <p>Backrest (height)</p> <p>Measurements D, E and F help decide the height of the backrest.</p> <p>The height depends on the needs of the wheelchair user.</p> <p>The information from assessment will guide wheelchair service personnel to decide how high the backrest needs to be to provide the right support for the wheelchair user.</p> | <p>If backrest recline or tilt in space is needed, the backrest height must be at least standard (up to the bottom of wheelchair user's shoulder blades).</p> <p>Remember to consider if the wheelchair users will be propelling the wheelchair themselves, they need freedom to move their shoulder blades.</p> |
| <p>G: Trunk width</p> <p>Measure the width of the wheelchair user's trunk just below the axilla (armpits).</p> | <p>Trunk side pads or wedges (distance between)</p> <p>Trunk width is the distance between trunk side pads or wedges.</p> | <p>The final position of the trunk side pads or wedges may change during fitting, if they are to be placed lower than just below the axilla.</p> |



| How to measure: | Wheelchair component: | Comments: |
|--|--|---|
| H: Seat to axilla (armpit) | Trunk side pads or wedges (height) | |
| <p>Measure from the seat to the axilla (armpit).</p> | <p>The seat to axilla measurement less 30 mm is the maximum distance between the top of the cushion and the top of trunk side pads/wedges.</p> | <p>This measurement is a guide. The final height depends on the assessment and fitting.</p> <p>Trunk side pads should never be high enough to put pressure into the axilla (armpit). This can be uncomfortable and cause permanent nerve damage. There should always be at least 30 mm clearance between the top of a trunk side pad and the axilla.</p> <p>See the box 'Measuring side trunk supports for a wheelchair user with scoliosis'.</p> |

Measuring side trunk supports for a wheelchair user with scoliosis (sideways curved trunk)

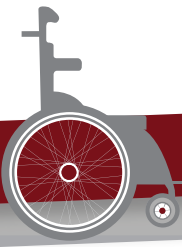


For a wheelchair user with a sideways curved trunk (scoliosis) one trunk side pad may be lower than the other to provide support where needed.

As shown in the illustration, the trunk side pad on one side will be positioned at the 'apex' of the curve. The trunk side pad on the other side will be positioned just below the axilla.

Remember – when providing trunk side pads for a wheelchair user with a scoliosis, also provide pelvis side pads on both sides.

| How to measure: | Wheelchair component: | Comments: |
|---|--|--|
| I: Seat to the top of the pelvis (PSIS) | Rear pelvis pad (mid-height) | |
| Measure from the seat to the top of the pelvis (PSIS). | The seat to the top of the pelvis (PSIS) measurement is used to locate the mid-height of the rear pelvis pad. | The depth (thickness) of a rear pelvis pad depends on the results of assessment. |
| J: Distance between knees | Knee separator pad | |
| Measure the distance between the two knees – with the knees placed as close to neutral as is comfortable for the wheelchair user. | The distance between the two knees equals the width of a knee separator pad. The distance will depend on the wheelchair user's sitting posture. | |
| K: Seat to base of skull | Headrest (height) | |
| Measure from the seat to base of skull. | The measurement from the seat to the base of the skull helps to locate the headrest. | |
| I: Back of pelvis to seat bones | Pre seat bone shelf | |
| Measure from the back of the pelvis to the seat bones. From the side of the wheelchair user place your hand (palms up) under the wheelchair user's bottom to find the seat bones. Locate the seat bones with one finger – and then withdraw your hand to the side of the wheelchair user. Measure from the back of the wheelchair user's pelvis to the finger that is located at the seat bones. Wheelchair service personnel may mark on the assessment bed in some way (for example with a piece of chalk) alongside the wheelchair user in line with their seat bones and measure from the mark to the back of the pelvis. | The measurement from the back of pelvis to seat bones plus 20–40 mm is the distance from the backrest support to the beginning of the pre seat bone shelf. | If a wheelchair user has a fixed posterior tilt of the pelvis or fixed forward bent trunk the measurement may be different (see the box 'For wheelchair users with a fixed posterior tilt of the pelvis or fixed forward bent trunk'). |

**Remember:**

- When taking body measurements, the 'seat' is the surface on which the seat bones are sitting.
- For all vertical measurements (C,D,E,F,H,I,K); the location of the corresponding component will be affected by any changes to the seat and cushion height.
- The exact location of all wheelchair components is always checked at the fitting.

Step 3: Prescription (selection)

Selecting wheelchairs and cushions

Prescription (selection) is the third step in wheelchair service delivery. Prescription/selection means finding the best match possible between the wheelchairs available and the needs of the wheelchair user.

When prescribing a wheelchair for a wheelchair user who needs additional postural support to sit upright, prescription includes:

- selecting the type and size of wheelchair most suitable for the wheelchair user;
- describing any specific set-up for that wheelchair;
- selecting the type and size of cushion;
- selecting what PSDs or modifications are needed to provide the wheelchair user with additional postural support he/she needs.

The prescription is always decided in full partnership with the wheelchair user. On the intermediate wheelchair prescription form used in this training programme, three signatures are needed, which include the wheelchair user, assessor (wheelchair service personnel) and wheelchair service manager.

Type of wheelchair and cushion

Type of wheelchair

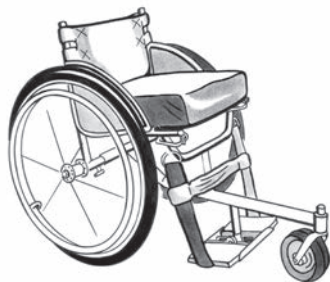
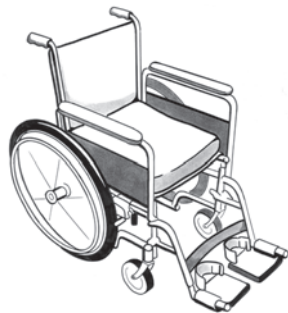
To prescribe a wheelchair, wheelchair service personnel need to know these things about the wheelchair:

- the type of frame;
- the size available and size range;
- features available;
- adjustments possible and adjustment range.

This knowledge will help the wheelchair service personnel to select the most appropriate wheelchair for the wheelchair user and describe how it should be set up. The relevant part of the intermediate wheelchair prescription form is shown below.

2. Wheelchair type, size and set-up

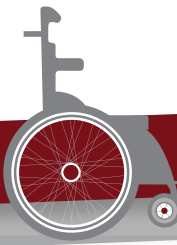
| Type of wheelchair (list available wheelchairs below) | | Wheelchair dimensions (mm) | |
|---|--------------------------|----------------------------|--|
| | <input type="checkbox"/> | Seat width | |
| | <input type="checkbox"/> | Seat depth | |
| | <input type="checkbox"/> | Backrest height | |
| | <input type="checkbox"/> | Footrest height | |
| Wheelchair set-up | | | |
| Rear wheel position | | Other: | |
| Tilt | | | |



The type of frame

Wheelchair service personnel need to know the different types of frames that are available locally. For example is the wheelchair a three-wheel or four-wheel wheelchair; a cross-folding or rigid frame; tilting frame; long or short wheelbase.

For more information about different types of wheelchair frames, refer to the Wheelchair Service Training Package – Basic Level.

**Size available and size range**

Wheelchair size is usually described by the wheelchair seat width and seat depth.

The wheelchair seat width is measured from the outside of one seat rail to the outside of the opposite seat rail or between armrests if these sit on top of the seat rail. The wheelchair seat depth is measured from the front of the seat to the backrest.

Other important wheelchair dimensions include:

- the height of the seat to the floor (this can be important for wheelchair users who propel with their feet);
- the height of the backrest.

Features available

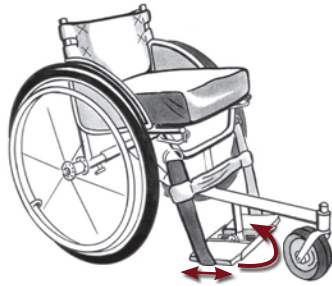
Possible features include the type of seat, backrest, footrests, armrests, castor wheel, rear wheel and PSDs (for example side trunk pads, headrest, straps).

Adjustments possible and range of adjustment

Wheelchair service personnel should be familiar with the different adjustment range of the locally available wheelchairs. This includes the highest and lowest setting for the footrests, whether the backrest height is adjustable, and whether there are adjustments possible in the rear axle position.

To find the 'adjustment range' of any adjustable components it may be necessary to measure the lowest and highest adjustment.

Some manual wheelchairs have more features or adjustments than others. Some features or adjustments can be very helpful for wheelchair users who need additional postural support. These features include:



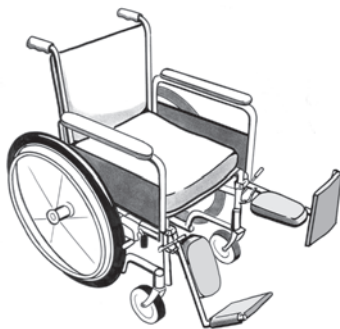
Adjustable footrests:

Most wheelchairs have footrests that can be adjusted up and down.

Some wheelchairs have additional adjustments including:

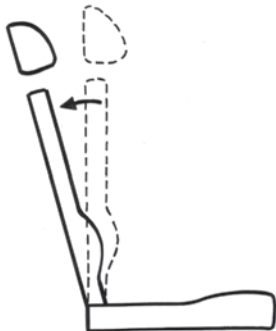
- footrests can move forwards or backwards;
- footrest angle can be increased or decreased.

These adjustments give more flexibility for where the wheelchair user's feet will be placed.



Elevating leg rests:

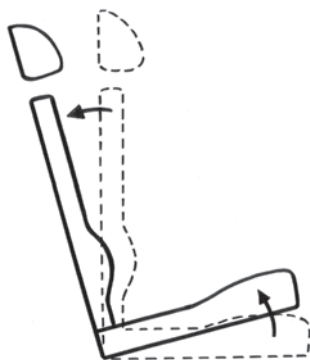
Elevating leg rests can help hold the foot up with the knee extended. This can be helpful for wheelchair users who cannot bend their knee to neutral for sitting.



Backrest recline:

Backrest recline (tilting the backrest rearwards) can help accommodate:

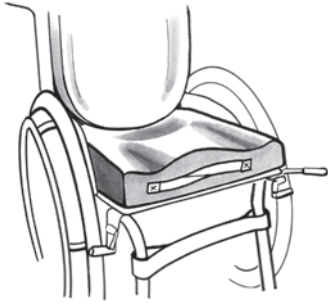
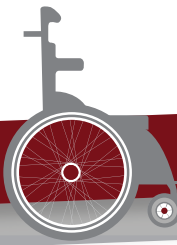
- hips that cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees);
- fixed posterior pelvis tilt;
- fixed bent posture of the lower trunk.



Tilt in space:

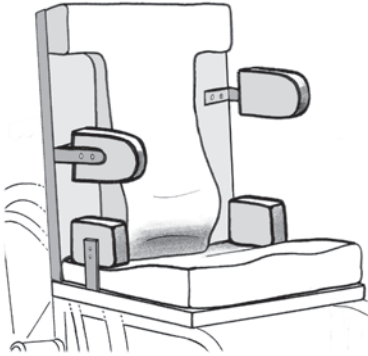
Some wheelchairs have what is called 'tilt in space'. This means that the backrest and the seat tilt back together. The open seat to backrest angle stays the same. Tilted seat position can help:

- fixed posterior pelvis tilt with hip and knee flexion contractures;
- low sitting tolerance or discomfort during normal sitting position;
- to increase comfort and rest.

**Rigid seat:**

Some wheelchairs have a rigid seat base instead of a slung seat. This can provide:

- a good base to build additional postural support for the pelvis and hips;
- more stability than a slung seat. This can be useful if a wheelchair user has strong uncontrolled movements or is very heavy.

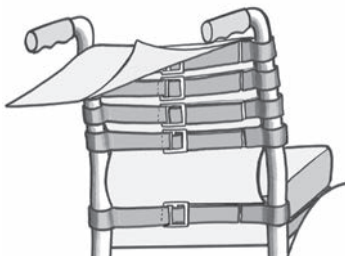
**Rigid backrest:**

Some wheelchairs have a rigid backrest. As for a rigid seat, this can provide a good base to build on additional postural support.

A rigid backrest can also provide:

- more stability than a slung/canvas backrest. This can be useful if a wheelchair user has strong uncontrolled movements;
- more support for wheelchair users who are taller and heavier and/or have very floppy trunks.

The illustration shows a rigid backrest that has had foam added to provide support for the trunk in just the right place, and side support pads bolted onto the backrest.



Some wheelchairs come with a tension adjustable backrest instead of a simple slung backrest. A tension adjustable backrest allows easy adjustment of the support provided by a backrest. The individual straps are pulled tighter or made looser to give more or less support.

It is not necessary to have all of these features to provide additional postural support. Many of the features above can be made as modifications to a basic manual wheelchair.

Gathering information about locally available wheelchairs

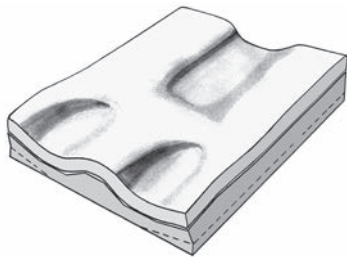
The intermediate wheelchair summary form on the following page can be used to gather and record information about locally available wheelchairs.

What to consider before modifying a wheelchair

When selecting a wheelchair that will need to be modified to provide the support needed by a wheelchair user, wheelchair service personnel should consider:

- Is the wheelchair in good working order?
- Are the locally available materials and the way that things are made locally, compatible with the wheelchair?
- If the wheelchair were to be damaged, can parts be locally repaired or replaced?

Type of cushion

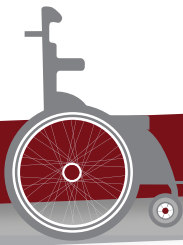


Wheelchair service personnel should know the types of cushions that are available for them to prescribe. Features to consider include:

- the material cushions are made from;
- whether the cushion provides pressure relief;
- how easy it is to modify the cushion;
- whether the cushion cover is water resistant.

For more information on cushions including pressure relief cushions, refer to the Wheelchair Service Training Package – Basic Level.

The type of cushion and size selected is recorded on the intermediate wheelchair prescription form under 'Cushion type and size'.



3. Cushion type and size

| Type of cushion | | Size |
|------------------------------|--------------------------|------|
| E.g. Pressure relief cushion | <input type="checkbox"/> | |
| | <input type="checkbox"/> | |

If a cushion needs modification to make the correct PSD – the details of this are described in a later section on the intermediate wheelchair prescription form.

Intermediate Wheelchair Summary Form

| | | |
|---------------------------------|--|-----------------------------|
| Name of wheelchair: | | <i>Insert picture here:</i> |
| Manufacturer / supplier: | | |
| Sizes available: | | |
| Overall weight: | | |

Description:

| | | | | | | |
|-----------------------|------------------|--------------------------|---------------|--------------------------|--------------------|--------------------------|
| Frame: | Fixed / rigid | <input type="checkbox"/> | Folding | <input type="checkbox"/> | Frame length | |
| Backrest: | Slung / canvas | <input type="checkbox"/> | Solid | <input type="checkbox"/> | Tension Adjustable | <input type="checkbox"/> |
| Seat: | Slung / canvas | <input type="checkbox"/> | Solid | <input type="checkbox"/> | Tension Adjustable | <input type="checkbox"/> |
| Cushion: | No cushion | <input type="checkbox"/> | Flat foam | <input type="checkbox"/> | Foam contoured | <input type="checkbox"/> |
| | Fluid | <input type="checkbox"/> | Other | <input type="checkbox"/> | | |
| Footrests: | Fixed | <input type="checkbox"/> | Removable | <input type="checkbox"/> | Other: | |
| Castor wheels: | Pneumatic | <input type="checkbox"/> | Diameter: | | | |
| | Solid | <input type="checkbox"/> | Width: | | | |
| Rear wheels: | Pneumatic | <input type="checkbox"/> | Diameter: | | Push rims | <input type="checkbox"/> |
| | Solid | <input type="checkbox"/> | Width: | | Adjustable axle | <input type="checkbox"/> |
| | Solid inner tube | <input type="checkbox"/> | | | Removable | <input type="checkbox"/> |
| Brakes: | Short lever | <input type="checkbox"/> | Long lever | <input type="checkbox"/> | Other: | |
| Armrest: | Curved | <input type="checkbox"/> | Square | <input type="checkbox"/> | Other: | |
| | Fixed | <input type="checkbox"/> | Removable | <input type="checkbox"/> | Other: | |
| Push handles: | Push handles | <input type="checkbox"/> | | | | |
| PSDs: | Pelvis strap | <input type="checkbox"/> | Calf strap | <input type="checkbox"/> | Shoulder harness | <input type="checkbox"/> |
| | Foot straps | <input type="checkbox"/> | Anti-tip bars | <input type="checkbox"/> | Trunk side pads | <input type="checkbox"/> |
| | Tray | <input type="checkbox"/> | Headrest | <input type="checkbox"/> | Pelvis side pads | <input type="checkbox"/> |
| | Other: | | | | | |

Measurements, adjustment options and range of adjustment:

| | Measurements (if the wheelchair is available in different sizes list all sizes) | Is this adjustable? | | Range of adjustment (adjustment range that is possible for this chair) |
|------------------------|---|--------------------------|--------------------------|--|
| | | Yes | No | |
| Seat width | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Seat depth | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Seat height | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Backrest height | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Backrest recline | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Footrest height | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Footrest angle | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Push handles height | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Frame length | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Wheel base length | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Backrest to seat angle | | <input type="checkbox"/> | <input type="checkbox"/> | |
| Tilt in space | | <input type="checkbox"/> | <input type="checkbox"/> | |

Intermediate Wheelchair Prescription (Selection) Form

This form is for recording the choice of wheelchair, cushion and PSDs for a wheelchair user who cannot sit upright comfortably without support. Keep this form in the wheelchair user's file.

1. Wheelchair user information

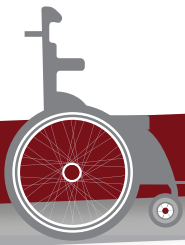
Wheelchair user's name: _____ Number: _____
 Date of assessment: _____ Date of fitting: _____
 Assessor's name: _____

2. Wheelchair type, size and set-up

| Type of wheelchair (list available wheelchairs below) | Wheelchair dimensions (mm) |
|---|----------------------------|
| <input type="checkbox"/> | Seat width |
| <input type="checkbox"/> | Seat depth |
| <input type="checkbox"/> | Backrest height |
| <input type="checkbox"/> | Footrest height |
| Wheelchair set-up | |
| Rear wheel position | Other: |
| Tilt | |

3. Cushion type and size

| Type of cushion | Size |
|------------------------------|--------------------------|
| E.g. pressure relief cushion | <input type="checkbox"/> |
| | <input type="checkbox"/> |



4. PSDs or modifications required

| PSD checklist | | | Describe/draw and provide dimensions |
|-------------------|--|---|--------------------------------------|
| Seat / cushion | Add solid seat | <input type="checkbox"/> | |
| | Pre-seat bone shelf (= 3 less 12) | <input type="checkbox"/> | |
| | Lower seat front | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Raised seat front | <input type="checkbox"/> | |
| | Wedge for anterior tilt | <input type="checkbox"/> | |
| | Build-up under pelvis | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Pelvis side pads (= 2) | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Outside thigh wedges | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Outside thigh pads | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Inside thigh wedge (= 10) | <input type="checkbox"/> | |
| Other | Knee separator pad (= 10) | <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |
| PSD checklist | | | Describe/draw and provide dimensions |
| Seat and backrest | Open seat to backrest angle | <input type="checkbox"/> | |
| | Seat and backrest tilt (tilt in space) | <input type="checkbox"/> | |
| Backrest | Add solid backrest | <input type="checkbox"/> | |
| | Rear pelvis pad (= 9) | <input type="checkbox"/> | |
| | Adjust backrest shape | <input type="checkbox"/> | |
| | Tension adjustable backrest | <input type="checkbox"/> | |
| | Backrest recline | <input type="checkbox"/> | |
| | Trunk side pads (= 7) | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Trunk side wedges (= 7) | L <input type="checkbox"/> R <input type="checkbox"/> | |
| Other | <input type="checkbox"/> | | |
| Tray / armrests | Tray | <input type="checkbox"/> | |
| | Modify armrests | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |

| | | | |
|---------------------------|------------------------|----------------------------|----------------------------|
| Head supports | Flat headrest (= //) | <input type="checkbox"/> | |
| | Shaped headrest (= //) | <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |
| Lower leg supports | Footrest build-ups | L <input type="checkbox"/> | R <input type="checkbox"/> |
| | Footrest wedges | L <input type="checkbox"/> | R <input type="checkbox"/> |
| | Lower leg supports | L <input type="checkbox"/> | R <input type="checkbox"/> |
| | Other | <input type="checkbox"/> | |
| Straps | Pelvis strap | <input type="checkbox"/> | |
| | Calf strap | <input type="checkbox"/> | |
| | Foot straps | L <input type="checkbox"/> | R <input type="checkbox"/> |
| | Shoulder harness | <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |

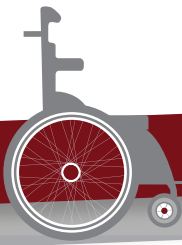
5. Agreement signatures

Wheelchair user: _____ Assessor: _____

Wheelchair service manager: _____

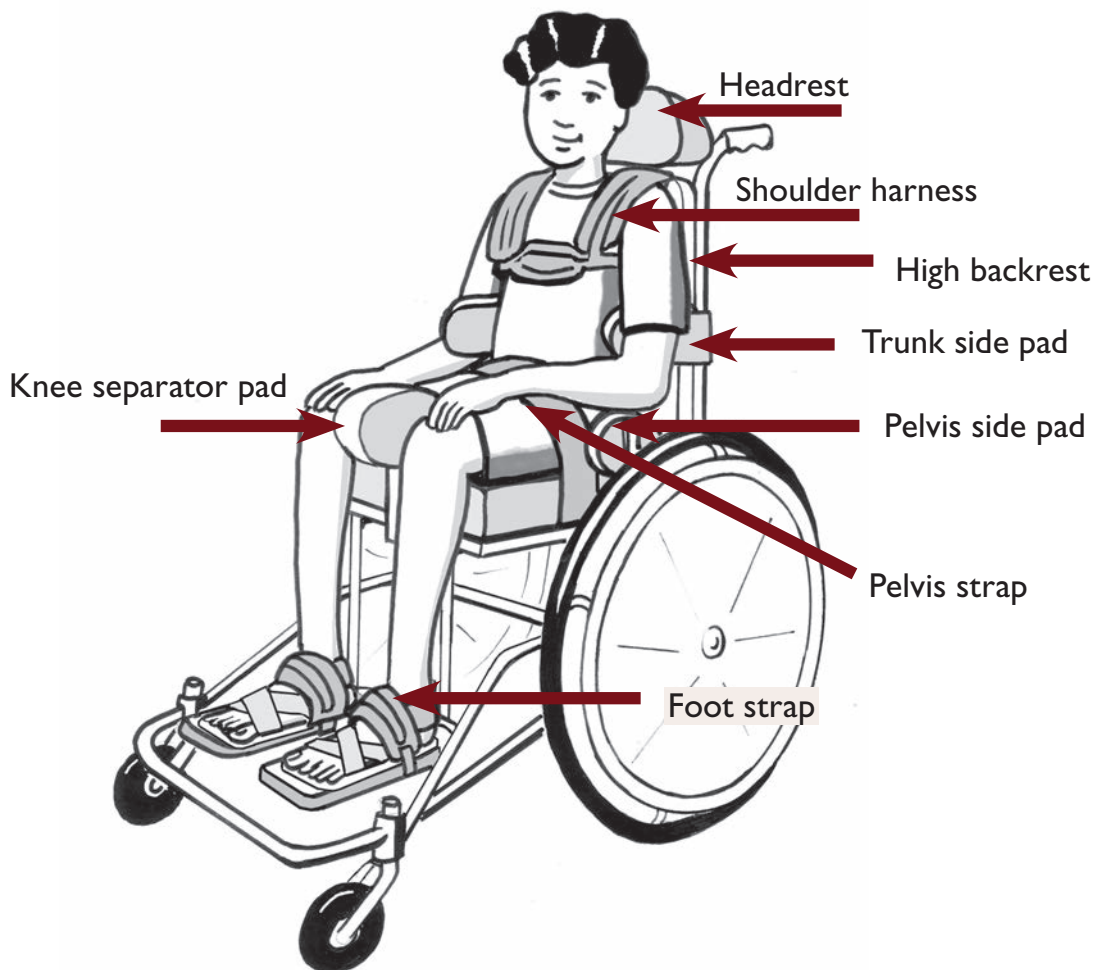
Prescription (selection) of PSDs – introduction

There are many different designs of PSDs and many different ways that a wheelchair can be modified to provide a wheelchair user with additional postural support. Several different PSDs are often combined for one wheelchair user to give the overall support he/she needs.



What is a PSD?







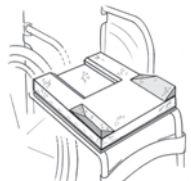

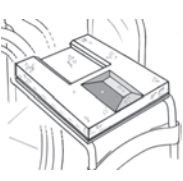






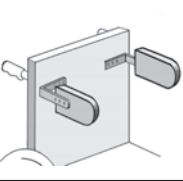


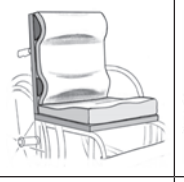
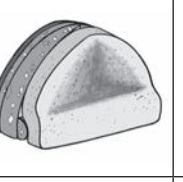
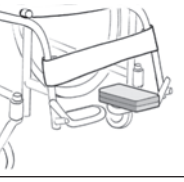


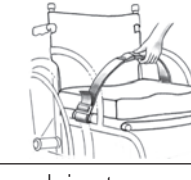


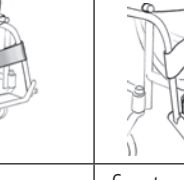
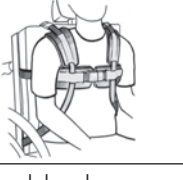
Postural Support Device (PSD) is a physical device that provides additional postural support – an essential element of intermediate level wheelchair service. The Postural Support Device (PSD) Table (afterwards referred to as PSD Table) and Postural Support Device (PSD) Reference Table (afterwards referred to as PSD Reference Table) on the following pages give an overview of the different PSDs introduced throughout this training programme. Some examples of PSDs are shown in the illustration below.

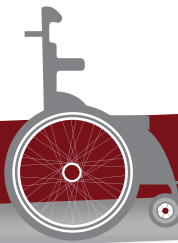


Different names for the same thing

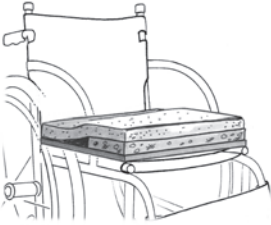
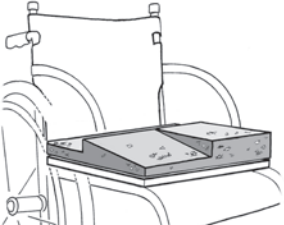
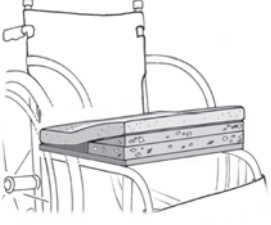
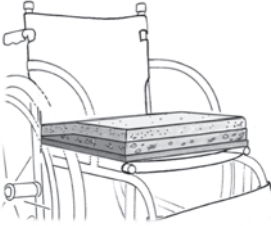
The same PSDs may have different names, depending on the wheelchair service, location or manufacturer. In this Reference Manual simple descriptive names have been given to each PSD. In each wheelchair service, wheelchair service personnel and wheelchair users can use the terms most familiar and comfortable to them.

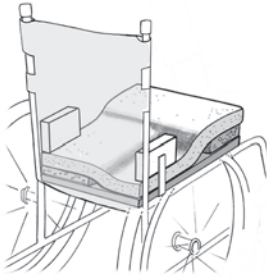
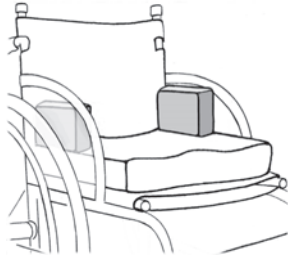
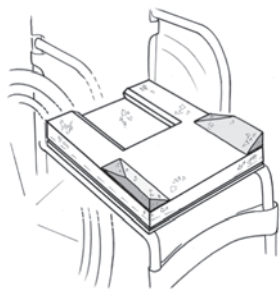
Postural Support Device (PSD) table

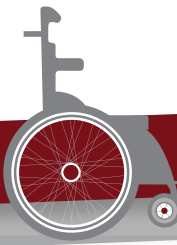
| Seat/cushion | | | | | |
|---|---|---|--|---|---|
|  |  |  |  |  |  |
| pre seat bone shelf | lower seat front (one side) | raised seat front | wedge for anterior tilt | build-up under pelvis | pelvis side pads |
| Seat/cushion | | | Seat & backrest | | |
|  |  |  |  |  |  |
| outside thigh wedges | outside thigh pads | inside thigh wedge | knee separator pad | open seat to backrest angle | seat & backrest tilt (tilt in space) |
| Backrest | | | | | |
|  |  |  |  |  |  |
| rear pelvis pad | adjust backrest shape | tension adjustable backrest | backrest recline | trunk side pads | trunk side wedges |
| Tray | Head supports | | Lower leg supports | | |
|  |  |  |  |  |  |
| tray | flat headrest | shaped headrest | footrest build-ups | footrest wedges | lower leg supports |
| Straps | | | | | |
|  |  |  |  |  | |
| pelvis strap | anterior tilt four-point strap | calf strap | foot straps | shoulder harness | |

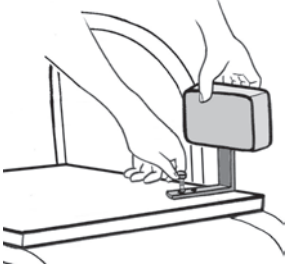
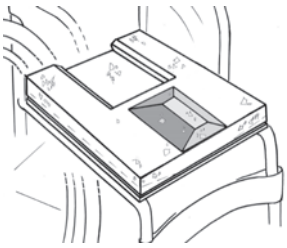



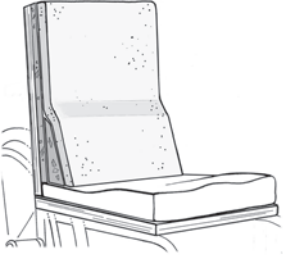
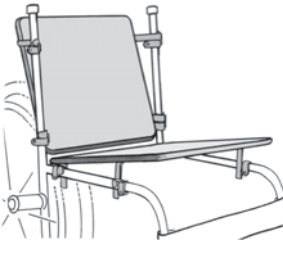
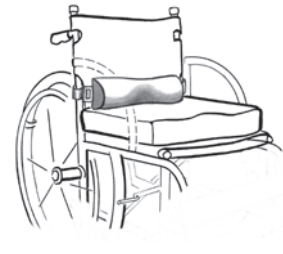
Postural Support Devices (PSD) Reference Table

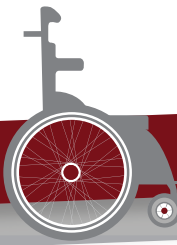
| PSD | Purpose | Fit |
|--|---|---|
| Seat/cushion | | |
| <p>Pre seat bone shelf</p>  | <p>A pre seat bone shelf helps to:</p> <ul style="list-style-type: none"> • keep the pelvis upright; • stop the pelvis from sliding forward; • reduce a tendency to sit with a slumped posture. | <p>The beginning of the pre seat bone shelf should sit just in front of the seat bones.</p> |
| <p>Lower seat front (one side)</p>  | <p>Lowering the seat front on one side as shown can accommodate one hip, which does not bend to neutral posture for sitting (trunk to thigh angle is more than 90 degrees).</p> | <p>The amount that the seat is lowered will depend on the angle of the wheelchair user's hip.</p> <p>There should be even contact under the wheelchair user's seat bones and both thighs.</p> |
| <p>Raised seat front</p>  | <p>Raising the seat front can accommodate both hips that cannot to open to neutral sitting posture (trunk to thigh angle less than 90 degrees).</p> <p>Raising the seat front can also help to reduce strong uncontrolled movements or high tone, which causes the body to straighten.</p> | <p>The amount that the seat is raised at the front will depend on the wheelchair user's trunk to thigh angle.</p> <p>There should be even contact under the wheelchair user's seat bones and both thighs.</p> |
| <p>Wedge for anterior tilt</p>  | <p>A backwards sloping wedge placed under the seat bones can be helpful for a wheelchair user with a flexible anterior tilt pelvis.</p> <p>The wedge encourages the pelvis to roll backwards.</p> | <p>The wedge for anterior tilt should stop just in front of the seat bones and level out under the thighs.</p> <p>When providing a wedge for anterior pelvis tilt, 'mock-up' the wedge first during assessment. This will allow the wheelchair user to feel the effect of the wedge, and for the wheelchair service personnel and the wheelchair user to find the best angle and assess how effective the wedge is.</p> |

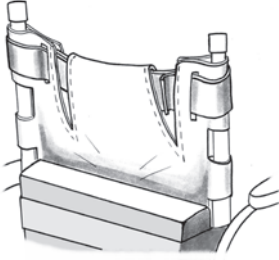
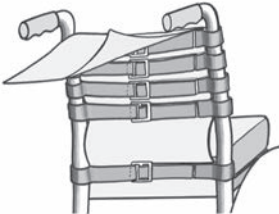
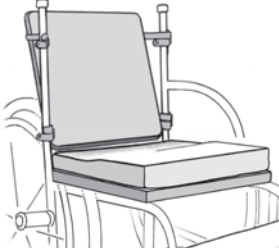
| PSD | Purpose | Fit |
|--|--|---|
| <p data-bbox="240 427 523 461">Build-up under pelvis</p>  | <p data-bbox="555 427 975 528">A build-up can be used to accommodate a wheelchair user who has a fixed unlevel pelvis.</p> <p data-bbox="555 544 839 577">The build-up helps to:</p> <ul data-bbox="555 584 954 719" style="list-style-type: none"> • increase stability for the wheelchair user; • avoid unsafe pressure on the low side of the pelvis. | <p data-bbox="1013 427 1342 495">The build-up is under the high seat bone and thigh.</p> <p data-bbox="1013 510 1326 611">There should be even contact under both seat bones and thighs.</p> <p data-bbox="1013 627 1366 795">When prescribing a build-up under the pelvis it may be necessary to adjust the footrests (one may need to be higher than the other).</p> <p data-bbox="1013 810 1394 976">Pelvis side pads will also help to support the pelvis and should be added for anyone with a build-up under the pelvis.</p> |
| <p data-bbox="240 987 448 1021">Pelvis side pads</p>  | <p data-bbox="555 987 858 1021">Pelvis side pads help to:</p> <ul data-bbox="555 1028 986 1229" style="list-style-type: none"> • stop the pelvis from moving sideways where the chair is too wide, or where the hips are narrower than the trunk; • reduce a tendency for the pelvis to tilt sideways. | <p data-bbox="1013 987 1390 1088">Pelvis side pads should provide firm contact on both sides of the pelvis.</p> <p data-bbox="1013 1104 1382 1368">Remember that young children should sit with their thighs more apart than adults. For this reason, make sure that pelvis side pads do not come too far forward and push a child's thighs together.</p> |
| <p data-bbox="240 1379 528 1413">Outside thigh wedges</p>  | <p data-bbox="555 1379 895 1447">Outside thigh wedges can provide gentle support to:</p> <ul data-bbox="555 1453 986 1621" style="list-style-type: none"> • help maintain neutral alignment of the thigh; • reduce a tendency for a wheelchair user's legs to draw in or roll outwards. | <p data-bbox="1013 1379 1390 1547">Outside thigh wedges should comfortably support the thighs in neutral alignment when the wheelchair user is stationary and moving.</p> <p data-bbox="1013 1563 1366 1722">If there continues to be a tendency for the thighs to fall or roll outwards, firmer support may be necessary (see outside thigh pads).</p> |

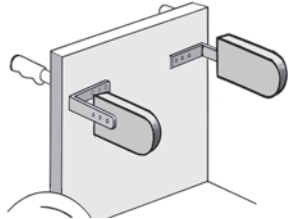




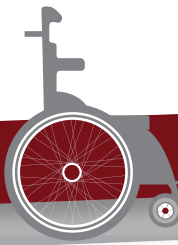
| PSD | Purpose | Fit |
|--|---|--|
| <p>Outside thigh pads</p>  | <p>Outside thigh pads can provide firm support to help prevent a wheelchair user's legs from falling or rolling outwards.</p> | <p>Outside thigh pads should comfortably support the thighs in neutral alignment when the wheelchair user is stationary and moving.</p> <p>There should be even contact between the pad and the wheelchair user's leg.</p> |
| <p>Inside thigh wedge</p>  | <p>An inside thigh wedge provides gentle support to help:</p> <ul style="list-style-type: none"> • maintain neutral alignment of the thigh; • reduce a tendency for legs to draw together/pull inwards. | <p>An inside thigh wedge should comfortably support the thighs in neutral alignment when the wheelchair user is stationary and moving.</p> <p>Check that the thigh wedge does not make it more difficult for the wheelchair user to transfer in and out of the wheelchair.</p> |
| <p>Knee separator pad</p>  | <p>A knee separator pad provides firm support to help maintain neutral alignment of the thigh.</p> <p>A knee separator pad can be very useful for people who have a strong tendency to draw both legs in together.</p> | <p>A knee separator pad should comfortably support the thighs in neutral alignment when the wheelchair user is stationary and moving.</p> <p>There should be even contact on the wheelchair user's knee and thighs.</p> <p>A knee separator pad should not contact the groin area at all. Provide a pre seat bone shelf and pelvis strap if there is a risk that the wheelchair user will slide forward into the knee separator pad.</p> |


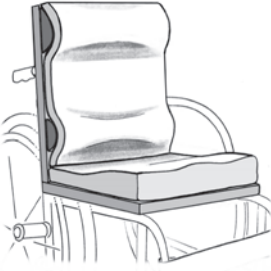
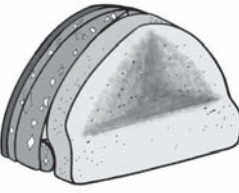

| PSD | Purpose | Fit |
|--|--|---|
| Seat & backrest | | |
| <p>Open seat to backrest angle</p>  | <p>Opening (increasing) the seat to backrest angle can be helpful for wheelchair users with a fixed posterior pelvis tilt or fixed hips.</p> <p>The increased angle accommodates the fixed posture and provides firm support to increase comfort and help prevent further postural changes.</p> | <p>There should be even contact under the wheelchair user's seat bones, at the back of their pelvis, lower and upper back. This may require some contouring of the foam, to provide the right support and contact.</p> <p>When opening the seat to backrest angle, care must be taken to ensure that the wheelchair user does not slide forward in the wheelchair. This can cause 'shearing', which can develop into a pressure sore.</p> |
| <p>Seat & backrest tilt (tilt in space)</p>  | <p>Seat and backrest tilt together can help to:</p> <ul style="list-style-type: none"> align the upper trunk and head in an upright posture after a fixed bent trunk posture has been accommodated if there is still some strain on the head; align the upper trunk and head in an upright posture for wheelchair users who have very floppy trunks. | <p>Tilting the seat and backrest together should only be tried if all other supports for the pelvis and trunk have not worked.</p> <p>Observe closely the effect of tilting, to determine the best angle and how effective it is.</p> <p>In the final tilt position, the wheelchair user should feel comfortable and their sitting posture should be as close to neutral as possible for them.</p> |
| Backrest | | |
| <p>Rear pelvis pad</p>  | <p>Provides support at the top of the pelvis to keep it upright.</p> <p>A rear pelvis pad is usually provided in combination with a pre seat bone shelf, and may also be provided with a pelvis strap.</p> | <p>The rear pelvis pad should provide firm contact on the back of the pelvis, at the level of the PSIS, and encourage the pelvis into a neutral, upright sitting posture.</p> <p>Check that there is no strong pressure on the vertebra between the two PSIS.</p> |


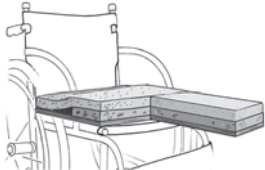
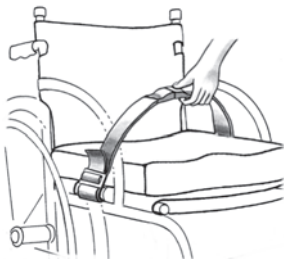
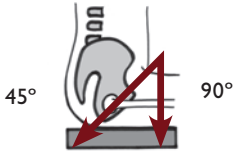


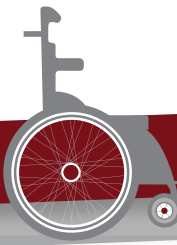
| PSD | Purpose | Fit |
|--|--|---|
| Adjust backrest shape  | <p>Adjust the backrest shape to better support the neutral sitting posture of the trunk (normal curves) or accommodate fixed non-neutral postures of the trunk.</p> <p>There are different ways to adjust the backrest shape including:</p> | <p>When adjusted, the backrest should provide even contact for the lower, middle and upper back.</p> <p>If a neutral posture is possible, the backrest should support the pelvis in an upright posture, and support the normal curves of the trunk.</p> |
| Tension adjustable backrest  | <ul style="list-style-type: none">• modifying the backrest fabric and adding a rear pelvis pad (first illustration);• providing a shaped foam backrest onto a solid backrest;• using a tension adjustable backrest (second illustration). | <p>If a fully neutral posture is not possible, the backrest should support the wheelchair user as close to neutral as possible.</p> |
| Backrest recline  | <p>Backrest recline can help to accommodate:</p> <ul style="list-style-type: none">• hips that cannot bend to neutral sitting position (trunk to thigh angle is more than 90 degrees);• fixed posterior pelvis tilt;• fixed flexed posture of the lower trunk;• accommodates a fixed forward curving trunk;• align the trunk and head. <p>A pre seat bone shelf, a pelvis strap and/or a wedge at the front of the cushion will help to prevent sliding forward.</p> | <p>Check that the backrest recline is supporting the wheelchair user in the best alignment possible for them.</p> <p>Ensure there is even contact between the wheelchair user's back and backrest.</p> <p>Check that the wheelchair user does not slide forward. A pre seat bone shelf, a pelvis strap and/or a wedge at the front of the cushion will help to prevent sliding forward.</p> |






| PSD | Purpose | Fit |
|--|--|--|
| <p data-bbox="240 427 451 461">Trunk side pads</p>  | <p data-bbox="555 427 991 528">Trunk side pads provide firm support to help keep the trunk in the centre of the back support.</p> <p data-bbox="555 539 979 640">If one trunk side pad is provided, another is always provided on the opposite side.</p> | <p data-bbox="1013 427 1394 595">Trunk side pads should always be at least 50 mm lower than the wheelchair user's axilla (armpits) and come only as far forward as needed.</p> <p data-bbox="1013 607 1394 909">There should be even pressure between the wheelchair user and the pad and no points of high pressure. If the support needs to be firm – increase the size of the pad to distribute pressure, and ensure there is enough padding.</p> <p data-bbox="1013 920 1394 1055">Trunk side pads should be as thin as possible, to allow the wheelchair user's arms to swing freely.</p> |
| <p data-bbox="240 1066 488 1099">Trunk side wedges</p>  | <p data-bbox="555 1066 986 1267">Provide gentle support to help maintain the wheelchair user's trunk in the centre of the backrest. These are useful when only a small amount of support is needed.</p> | <p data-bbox="1013 1066 1362 1267">Trunk side wedges should help to maintain the wheelchair user in a symmetrical sitting posture (trunk in the centre of the backrest).</p> <p data-bbox="1013 1279 1394 1413">The wedges should sit below the axilla (armpits), and come only as far forward as needed.</p> |
| <p data-bbox="240 1424 520 1491">Trunk side pads used with pelvis side pads</p>  | <p data-bbox="555 1424 975 1592">A combination of trunk side pads and pelvis side pads can be used to provide support for a wheelchair user who has a sideways curved trunk (scoliosis).</p> <p data-bbox="555 1603 967 1771">The pads are adjusted to provide support at the top of the curve, at the apex of the curve (opposite side) and at the bottom of the curve.</p> <p data-bbox="555 1783 959 1883">A pelvis side pad is needed on both sides to keep the pelvis in the centre of the seat.</p> <p data-bbox="555 1895 975 2029">Providing support in neutral for someone with a flexible scoliosis may also correct a flexible, unlevel pelvis.</p> | <p data-bbox="1013 1424 1374 1659">If the sitting posture is flexible, the wheelchair user may be able to sit in neutral sitting posture. If the sitting posture is fixed, support as close to neutral as is comfortable.</p> <p data-bbox="1013 1671 1394 1973">Ensure there is even pressure between the wheelchair user and each pad. Check for high pressure points. If firm support is needed – increase the size of the pad to distribute the pressure and ensure there is enough padding.</p> |




| PSD | Purpose | Fit |
|--|--|--|
| Moulded back supports | <p>A moulded back support can be used to provide support or accommodation for different trunk postures including falling forward and curved trunk.</p> <p>The back support is fixed to the wheelchair frame with brackets or straps.</p> <p>This option is not covered in the intermediate level.</p> | |
| Tray | | |
| Tray  | <p>Trays can be useful in a number of ways including:</p> <ul style="list-style-type: none"> • providing support for arms, which can help to reduce the tendency of the weight of a wheelchair user's arms pulling their trunk down and forward; • providing the wheelchair user with a surface close to his/her body to work/play on. | <p>Trays are usually positioned just above elbow height. A slightly higher position may be used if the purpose of the tray is to provide additional postural support.</p> <p>Trays should not be used to 'restrain' a wheelchair user in their seat. Tray should not add cause any pressure on the user.</p> |
| Headrest | | |
| Flat headrest  | <p>A flat headrest provides a resting place for the head and stops the head from falling backwards.</p> | <p>A headrest should provide good support while the wheelchair user is static and/or moving.</p> <p>The headrest should contact with the wheelchair user's head at the base of the skull.</p> <p>Check that the headrest is providing support in the correct alignment – and is not pushing the wheelchair user's head forwards, or allowing their head to fall backwards.</p> |
| Shaped headrest  | <p>A shaped headrest provides more support than a flat headrest by contouring around the base of the wheelchair user's skull.</p> | <p>Avoid providing support on the front of a wheelchair user's head.</p> |
| Lower leg supports | | |
| Footrest build-ups  | <p>A footrest build-up can be used when one or both feet cannot reach the footrest (and the footrest has been adjusted as high as it will go).</p> | <p>Check that there is even contact under both feet.</p> |

| PSD | Purpose | Fit |
|---|--|---|
| <p>Footrest wedges</p>  | <p>A footrest wedge can be used to support fixed non-neutral postures of the feet.</p> <p>A footrest wedge can help prevent further changes in the ankle.</p> <p>The aim of footrest wedges is to increase the contact area of the footrest with the wheelchair user's foot.</p> <p>Most footrest wedges are made individually, depending on the support needed by the wheelchair user's foot.</p> | <p>Check that there is even contact under both feet.</p> |
| <p>Lower leg supports</p>  | <p>Different lower leg supports can be used to support fixed non-neutral postures of the lower legs including knees that cannot bend to 90 degrees (trunk to thigh angle is more than 90 degrees).</p> | <p>Different solutions and their fit are discussed further in the product (wheelchair) preparation session</p> |
| <p>Straps</p> | | |
| <p>Pelvis strap</p>  | <p>The pelvis strap helps to hold the pelvis in place. It is particularly useful for people who have uncontrolled movements and/or a tendency to slide forward.</p> <p>A pelvis strap is often used in combination with a pre seat bone shelf and rear pelvis pad.</p> | <p>The pelvis strap should provide firm even contact. There should be no high pressure points. Padding on the strap where it contacts the wheelchair user's thighs is important.</p> <p>Where the strap is attached to the wheelchair will affect the angle/direction of pull.</p>  <p>The angle may be between 45 and 90 degrees. The most effective angle will vary depending on the needs of the wheelchair user.</p> <p>Always assess, discuss and if possible trial the angle of the pelvis strap with the wheelchair user to see which angle is most effective and most comfortable for the wheelchair user.</p> |



| PSD | Purpose | Fit |
|--|---|---|
| <p>Anterior tilt four-point strap</p>  | <p>An anterior tilt four-point strap provides support for a wheelchair user with anterior pelvis tilt. The strap can help to bring the pelvis into a more neutral sitting posture, or provide support to prevent further anterior pelvis tilt.</p> <p>This strap can be provided in combination with an anterior tilt wedge under the wheelchair user's seat bones.</p> | <p>Note that this strap is anchored downwards onto the seat rails; and backwards, onto the backrest uprights.</p> <p>The strap should not be able to slide up onto the stomach.</p> <p>It is important that any strap, which provides support over the two ASIS is well padded, to reduce the risk of pressure sores.</p> |
| <p>Calf strap</p>  | <p>A calf strap can help to prevent the lower leg from falling backwards.</p> <p>These straps are sometimes provided as standard with a wheelchair.</p> | |
| <p>Different types of foot straps provide support to help stabilize the wheelchair user's feet and help to keep the feet from moving forward/backward.</p> | | |
| <p>Foot straps – behind the heel</p>  | <p>A strap behind the heel helps to prevent the foot from sliding backwards. This can be combined with a calf strap to give more support.</p> | <p>Foot straps should provide even pressure, and be well padded – particularly if the wheelchair user is not wearing shoes.</p> |
| <p>Foot straps – around the ankle</p>  | <p>A foot strap around the ankle helps to keep the foot from moving forward and the heel from lifting.</p> | |
| <p>Foot straps – over the front of the foot</p>  | <p>A foot strap over the front of the foot helps to keep the toes from lifting.</p> | |

| PSD | Purpose | Fit |
|--|--|---|
| <p data-bbox="240 427 469 459">Shoulder harness</p>  | <p data-bbox="555 427 991 591">A shoulder harness can help to maintain an upright trunk when pelvis support, trunk support and tilting the seat and back have not worked.</p> <p data-bbox="555 611 986 808">The shoulder harness shown in this illustration has a chest strap, which provides additional support. The chest strap also helps to keep the shoulder straps in the right position.</p> <p data-bbox="555 824 986 925">A shoulder harness should always be used in combination with a pelvis strap.</p> | <p data-bbox="1018 427 1383 624">Never prescribe a shoulder harness without a pelvis strap. If used without a pelvis strap, the user can still slide down and the strap can cause strangulation.</p> <p data-bbox="1018 645 1383 775">Check that there is enough padding where the strap crosses the wheelchair user's shoulder.</p> <p data-bbox="1018 795 1383 893">A chest strap (as shown in the illustration) can help to keep the shoulder strap in place.</p> <p data-bbox="1018 913 1383 1171">The shoulder strap should fasten at the same height or higher than the user's shoulders. This avoids the strap applying a downward force on the wheelchair user's shoulders when fastened.</p> |

Recording PSDs on the intermediate wheelchair prescription (selection) form

The purpose of the intermediate wheelchair prescription form is to give clear information to the wheelchair service personnel preparing the wheelchair about:

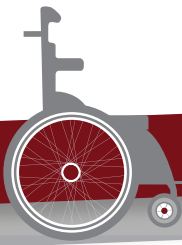
- the wheelchair type, size and set-up (covered earlier);
- the cushion type and size (also covered earlier);
- PSDs or modifications required.

The more detailed information that is provided on the intermediate wheelchair prescription form, the more accurately the wheelchair will be prepared for the first fitting.

As there can be a lot of variation in the PSDs that are prescribed, 'PSDs or modifications required' is the most complex part of the intermediate wheelchair prescription form.

Wheelchair service personnel can use the 'PSDs or modifications required' part of the intermediate wheelchair prescription form to:

- select which PSDs they wish to prescribe/select (using the check boxes) from the list of common PSDs. There is also space to list other types of PSDs under 'other';

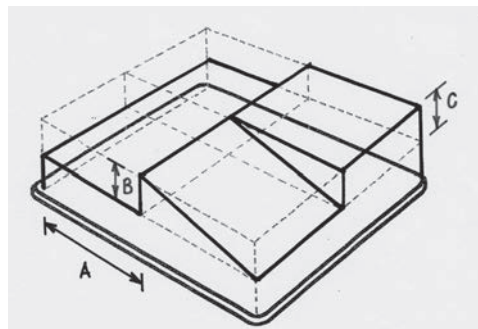


- draw over the shadow drawings to show the shape and provide dimensions for the PSDs they have prescribed (selected);
- write or sketch any additional information.

Note: The intermediate wheelchair prescription form does not necessarily say *how* the PSD should be made. This may be decided in discussion between the wheelchair service personnel preparing the wheelchair and the wheelchair service personnel who have carried out the assessment.

Below are two examples of completed ‘PSDs or modifications required’ part of the intermediate wheelchair prescription form (dimensions not included).

| PSD checklist | | | Describe/draw and provide dimensions |
|-------------------|--|--|--------------------------------------|
| Seat/cushion | Add solid seat | <input type="checkbox"/> | |
| | Pre seat bone shelf (=3 less 12) | <input checked="" type="checkbox"/> | |
| | Lower seat front | L <input type="checkbox"/> R <input checked="" type="checkbox"/> | |
| | Raised seat front | <input type="checkbox"/> | |
| | Wedge for anterior tilt | <input type="checkbox"/> | |
| | Build-up under pelvis | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Pelvis side pads (= 2) | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Outside thigh wedges | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Outside thigh pads | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Inside thigh wedge (= 10) | <input type="checkbox"/> | |
| | Knee separator pad (= 10) | <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |
| Seat and backrest | Open seat to backrest angle | <input type="checkbox"/> | |
| | Seat and backrest tilt (tilt in space) | <input checked="" type="checkbox"/> | |
| Backrest | Add solid backrest | <input type="checkbox"/> | |
| | Rear pelvis pad (= 9) | <input type="checkbox"/> | |
| | Adjust backrest shape | <input type="checkbox"/> | |
| | Tension adjustable backrest | <input type="checkbox"/> | |
| | Backrest recline | <input type="checkbox"/> | |
| | Trunk side pads (= 7) | L <input checked="" type="checkbox"/> R <input type="checkbox"/> | |
| | Trunk side wedges(= 7) | L <input type="checkbox"/> R <input checked="" type="checkbox"/> | |
| Other | <input type="checkbox"/> | | |



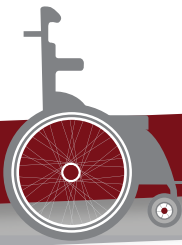
| PSD checklist | | | Describe/draw and provide dimensions |
|-----------------------|------------------------|--|--------------------------------------|
| Tray/ armrests | Tray | <input type="checkbox"/> | |
| | Modify armrests | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |
| Head supports | Flat headrest (= //) | <input type="checkbox"/> | |
| | Shaped headrest (= //) | <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |
| Lower leg supports | Footrest build-ups | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Footrest wedges | L <input checked="" type="checkbox"/> R <input type="checkbox"/> | |
| | Lower leg supports | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |
| Straps | Pelvis strap | <input checked="" type="checkbox"/> | |
| | Calf strap | <input type="checkbox"/> | |
| | Foot straps | L <input type="checkbox"/> R <input type="checkbox"/> | |
| | Shoulder harness | <input type="checkbox"/> | |
| | Other | <input type="checkbox"/> | |

Prescription (selection) of PSDs – stabilizing the pelvis

A number of PSDs are used to provide support to the pelvis. It is important to remember that although PSDs can be used in isolation, many of the PSDs work together. This session looks at different postural problems related to the pelvis and possible PSD solutions.

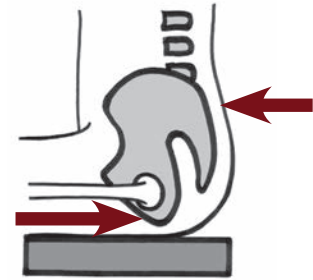
Stabilizing the pelvis first is the most important thing to do to help a wheelchair user sit upright

- When the pelvis is **not** in an upright posture, there are also changes to the posture of the trunk and hips.
- For this reason, supporting or stabilizing the pelvis is the most important thing to do to help a wheelchair user sit upright.
- Support provided at the pelvis can reduce the need for support elsewhere.

**Problem: Pelvis is in posterior tilt and/or slides forward****Support needed**

To bring the pelvis from posterior tilt to more neutral sitting posture, support is usually needed in two areas:

- at the back of the pelvis at the level PSIS;
- at the front of the pelvis at the seat bones (ischial tuberosities).

**PSD solutions**

A pre seat bone shelf provides support in front of the seat bones and helps to:

- keep the pelvis upright;
- stop the pelvis from sliding forward;
- reduce a tendency to sit with a slumped posture.

The pre seat bone shelf sits just in front of the seat bones.

A rear pelvis pad provides support at the top of the pelvis (at the level of PSIS) and helps to keep the pelvis upright.

The combination of a pre seat bone shelf and rear pelvis pad is often used to help wheelchair users to sit with a more upright pelvis and with more stability.

A pelvis strap can provide additional support for wheelchair users who have uncontrolled movements and/or a tendency to slide forwards. The pelvis strap helps to keep the pelvis in place, so that the pre seat bone shelf and the rear pelvis pad continue to provide support.



Problem: Pelvis is in lateral tilt (fixed unlevel pelvis)

Support needed

Support is needed under the higher seat bone and thigh to:

- increase stability for the wheelchair user;
- help to avoid unsafe pressure on the lower side of the pelvis.



PSD solutions

A build-up under the pelvis helps to:

- increase stability for the wheelchair user;
- avoid unsafe pressure on the low side of the pelvis.

Pelvis side pads provide further support for the pelvis and should be added for anyone with a build-up under the pelvis.



Problem: Pelvis moves to one side

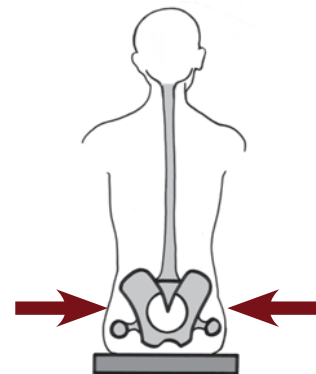
This problem is often associated with other postural problems. In the two illustrations you can see:

- the same man from earlier – who has lateral pelvic tilt (fixed unlevel pelvis) and his pelvis is more towards the left;
- a woman with a sideways curve in her spine; her pelvis is also more towards the left.



Support needed

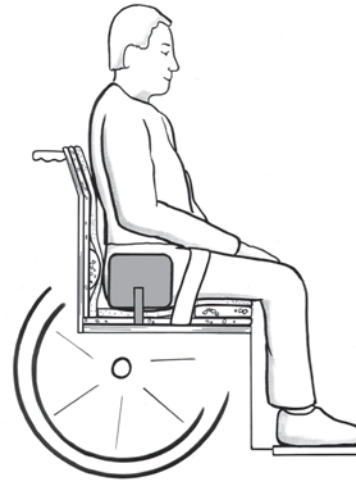
Support can be provided at the side of both hips.





PSD solution

Pelvis side pads.



Providing pelvis side pads for children



Young children should sit with their thighs more apart than adults.

This is important for the health and development of their hip joints.

This means it is particularly important for children that pelvis side pads do not push children's thighs together.

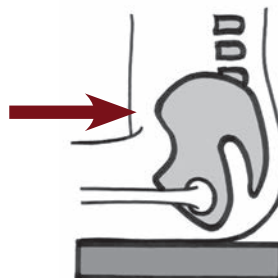
Problem: Pelvis is in anterior tilt (pelvis tilts forward)



Support needed

Support can be provided in two ways:

- support at the front of the pelvis (ASIS) pushing backwards; and
- encouraging the pelvis to roll backwards by changing the angle of the seat under the seat bones.



PSD solutions

A wedge for anterior tilt encourages the pelvis to roll backwards towards the backrest. The wedge for anterior tilt should stop just in front of the seat bones and level out under the thighs.



An anterior tilt four-point strap provides support at the top and front of the pelvis, encouraging a more neutral sitting posture.

Prescription (selection) of PSDs – supporting the hips

It is important to remember that any fixed/non-neutral postures of the hips will affect pelvis posture if not accommodated.

Supporting the hips

Problem: One hip cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees)

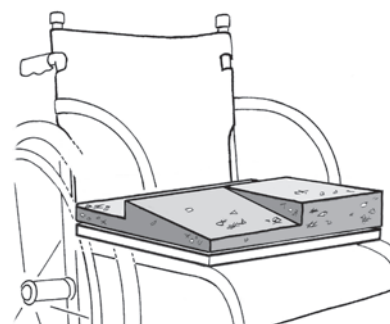
The temporary solution for this problem is to place a build-up (foam) under both seat bones and under the thigh of the hip that can bend to neutral sitting posture.

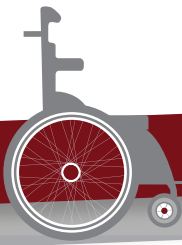
PSD solutions

Lower seat front on one side – This support can be built into the cushion to accommodate the hip that does not bend to neutral for sitting (trunk to thigh angle is more than 90 degrees).

Note: The final solution is to make an angled cut-out **on the side of the hip that cannot bend** to neutral for sitting. The angle of the cut-out in the foam will depend on the angle of the wheelchair user's hip – so this should be checked at the assessment.

Note: There is still a **pre seat bone shelf** in the cushion.





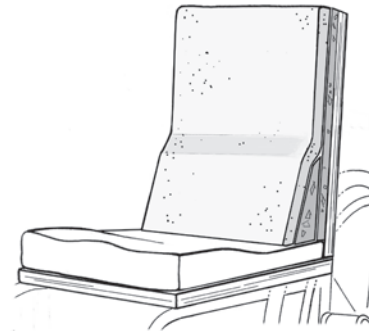
Problem: Both hips cannot bend to neutral sitting posture (trunk to thigh angle is more than 90 degrees)

The temporary solution for this problem is to place a build-up (foam) under both seat bones. However, this cannot work as a permanent solution as the wheelchair user would tend to slide forward out of their wheelchair.



PSD solutions

An open seat to backrest angle will allow for the greater trunk to thigh angle. The angle between the seat and backrest will depend on the wheelchair user's trunk to thigh angle – and this should be decided during the assessment.



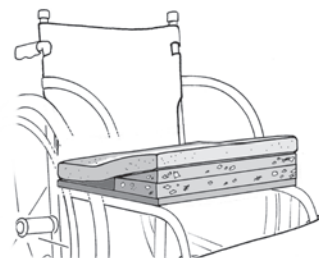
A possible permanent solution is to have a **pre seat bone shelf and pelvis strap**, which would stop the wheelchair user to slide forward out of their wheelchair.

Problem: One or both hips cannot open to neutral sitting posture (trunk to thigh angle less than 90 degrees)

The temporary solution for this problem is to place a build-up (wedge of firm foam) under the thigh/s that cannot open to neutral sitting posture (trunk to thigh angle less than 90 degrees).

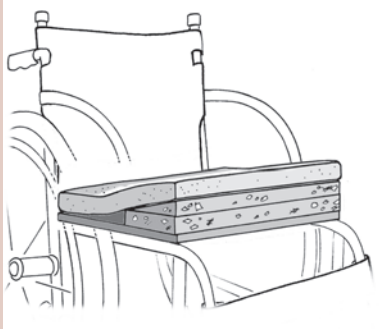
PSD solution

Raise the seat front – A possible permanent solution is to raise the seat front/place a wedge in front of the seat bones/under the thighs. This reduces the angle between the seat and the backrest. The amount that the seat front is raised will depend on the wheelchair user's trunk to thigh angle – so this should be decided during the assessment.



Note: Both seat bones should still sit on a level surface.

Helping to reduce uncontrolled movements, high tone or spasms



For some wheelchair users, raising the seat front to reduce the trunk to thigh angle at the hip to less than neutral can help to reduce uncontrolled movements, high tone or spasms.

Remember – the beginning of the ‘wedge’ should always be in front of the wheelchair user’s seat bones. Their seat bones should sit on a flat surface.

Prescription (selection) of PSDs – supporting the trunk

It is important always to consider first how to stabilize the pelvis, and then support the trunk. For many people, postural problems related to the trunk can be resolved or improved with good pelvis support.

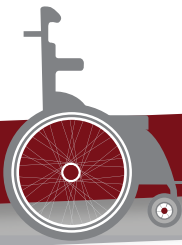
Supporting the trunk

Problem: Slumped posture, trunk forward and pelvis is in posterior tilt

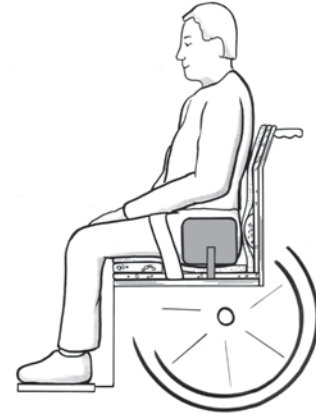
Support needed

- Support to bring the pelvis as close to neutral sitting posture as possible.
- Backrest support, which allows the natural curves of the trunk.
- Sometimes support at the front of the trunk is also needed.



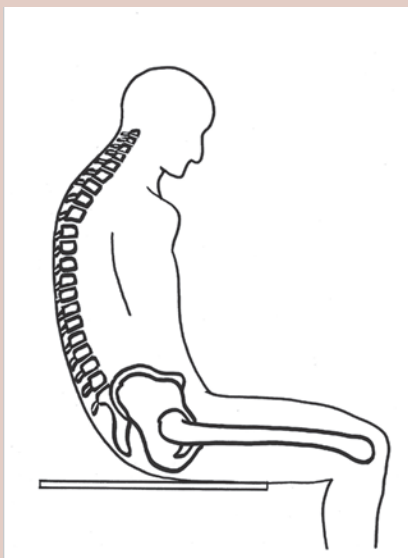
**PSD solutions**

- Pelvis support is provided by:
 - **pre seat bone shelf**;
 - **rear pelvis pad**;
 - **pelvis strap** (not always necessary);
 - **pelvis side pads** (not always necessary).
- Backrest support is provided by:
 - **adjusting the backrest shape** – to provide room for the trunk and allow the back to follow the natural curves. If the backrest continued straight upwards, it would push the wheelchair user forwards. This modification to his backrest shape is part of the PSD solution for him.



Additional support can be provided by:

- **tray** – a tray can provide additional support to help a wheelchair user maintain an upright trunk posture.
- **shoulder harness** – for a wheelchair user who tires easily, or falls forward – a shoulder harness can help.
- **seat and backrest tilt** – when other PSDs combined have not helped a wheelchair user to sit more upright, tilting the seat and backrest together may help.

**Backrests need to follow the natural curves of the spine**

A straight, upright backrest, that has no contouring to support the natural curves of the spine will usually either:

- push the top of the trunk forward;
- encourage a wheelchair user to move their pelvis forward, so that he/she can lean back into the backrest.

Unfortunately, many standard wheelchairs come with a straight up and down backrest. Some modification is usually needed to support the wheelchair user so that he/she can sit in the neutral posture comfortably.

Problem: Slumped posture, pelvis is in fixed posterior tilt and trunk curved forward

Support needed

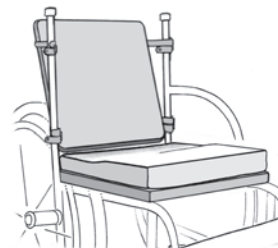
- Support to bring the pelvis as close to neutral sitting posture as possible.
- Backrest support to support the trunk as close to neutral sitting posture as possible and provide an improved head alignment (more able to look forward).



PSD solutions

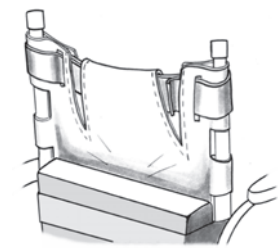
The solutions will vary depending on how much accommodation is required and the type of wheelchairs available. Some suggestions are listed below.

- Pelvis support is provided by:
 - **pre seat bone shelf;**
 - **rear pelvis pad AND opening up the seat to backrest angle** to accommodate and support the fixed pelvis posterior tilt;
 - **pelvis strap** (not always necessary).
- Backrest support is provided by:
 - **backrest recline** – to provide room for the fixed curve of the trunk. This may help to create a better alignment for the head and neck. This solution would also accommodate the fixed pelvis posterior tilt. (Note: upholstered foam needs to be added to any solid backrest).
 - **adjusting the backrest shape** – to provide room for the trunk and allow the back to follow the natural curves.



Additional support can also be provided by:

- **tray;**
- **shoulder harness;**
- **seat and backrest tilt.**



Think about PSD solutions in this order

Pelvis and hips → Trunk → Head and neck → Legs



Problem: Trunk leans or falls to one side

Support needed

- Stabilize pelvis.
- Provide support at the side of the trunk.



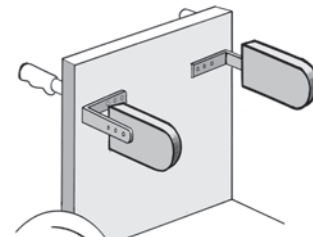
PSD solutions

- **Trunk side wedges** – provide gentle support to help maintain the wheelchair user's trunk in the centre of the backrest.



- **Trunk side pads** – trunk side supports provide firm support to help keep the trunk in the centre of the backrest support.

If one trunk side pad is provided, another one is always provided on the opposite side – may be at a different level.



Problem: Fixed or flexible sideways curve of the spine.

Support needed

- Support on the apex of the curve on one side and the top and bottom of the curve on the other side.



PSD solutions

- **Trunk side pads** combined with **pelvis side pads**.

If the posture is flexible, with this support the wheelchair user may be able to sit in neutral posture. If the posture is fixed, support as close to neutral sitting posture as is comfortable. Providing support in neutral sitting posture for a wheelchair user with a flexible scoliosis may also correct a flexible unlevel pelvis.



Prescription (selection) of PSDs – supporting the head, thighs and lower legs

Supporting the head

Problem: Head tends to fall backwards, forwards or sideways

Support needed

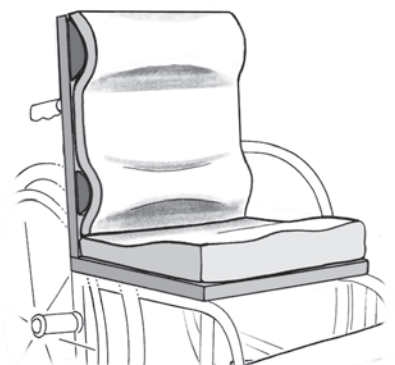
- Before providing headrest – always first:
 - stabilize the wheelchair user's pelvis;
 - provide good trunk support ensuring that the trunk is stabilized and balanced over the pelvis.
- If a wheelchair user continues to find it difficult to hold their head upright, support should be provided:
 - first at the base of the skull;
 - if necessary support can extend around the side of the wheelchair user's head.

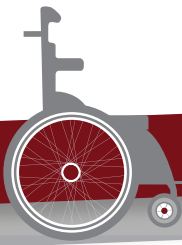


PSD solutions

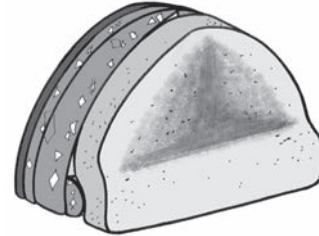
There are many different types of headrests. Two commonly used headrests are flat and shaped headrests.

- **Flat headrest** – a flat headrest is an extension of the backrest, which is contoured to provide support for the head. A flat headrest provides a resting place for the head and stops the head from falling backwards.





- **Shaped headrest** – a shaped headrest is shaped to ‘cup’ the base of the head. It may be extended at the sides and come forward to give more support at the side of the head. A shaped headrest provides more support than a flat headrest by contouring around the base of the wheelchair user’s skull.



When providing a headrest:

When providing support for a wheelchair user’s head, always remember that the posture of the head depends also on good pelvis and trunk posture.

Avoid providing support at the front of the wheelchair user’s head.

Supporting the thighs

Problem: Legs drawn outwards (abducted)

Support needed

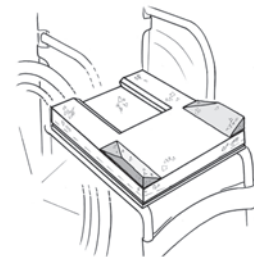
- First ensure that the wheelchair user’s pelvis and trunk are stabilized by providing the support required. This may help to bring the legs into a more neutral sitting posture.
- Support on the outside of the thighs.



PSD solutions

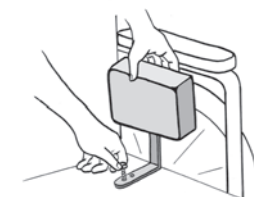
- **Outside thigh wedges** will provide gentle support.

Note: In this illustration outside thigh wedges have been added onto a firm foam layer of a cushion. The firm foam has a pre seat bone shelf built in. A soft layer of foam should be added over the top of the whole cushion.



- **Outside thigh pads** will provide firm support.

Note: In this illustration the thigh pad is attached to a wooden seat base with a bracket. Room is allowed for a cushion to be placed on top of the wooden seat.



Problem: Legs drawn inwards (adducted)

Support needed

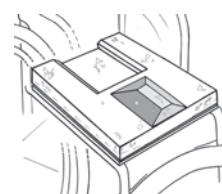
- First ensure that the wheelchair user's pelvis and trunk are stabilized by providing the support required. This may help to bring the legs into a more neutral sitting posture.
- Support on the inside of the thighs and the inside of the knees.



PSD solutions

- **Inside thigh wedges** will provide gentle support.

Note: In this illustration a thigh wedge has been added onto a firm foam layer of a cushion. The firm foam has a pre seat bone shelf built in. A soft layer of foam should be added over the top of the whole cushion.



- A **knee separator pad** will provide firm support.

Note: In this illustration the knee separator pad is attached to a wooden seat base with a bracket. Room is allowed for a cushion to be placed on top of the wooden seat.



Supporting the lower legs and feet

Problem: One or both knees bend and are fixed less than neutral sitting posture (trunk to thigh angle is more than 90 degrees)

The solution will depend on the needs of the individual wheelchair user.

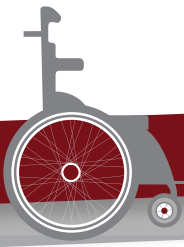
PSD solutions:

- Adjust the footrests backwards if possible.
- Adjust the angle of the footrest to match the foot if possible. If this is not possible, use footrest wedges.
- Provide a strap to the front of the lower legs for support and protection.
- If the front of the seat is pushing on the back of the wheelchair user's leg/legs it may be necessary to shorten the seat slightly, and bevel the cushion backwards.
- For a tall wheelchair user consider raising the seat front or tilting the seat and backrest. By doing this the wheelchair user's feet will be higher, more forward and possibly in the adjustment range of the standard footrests.



Note:

- When making any of the above adjustments – check that the castor wheels can still turn fully without bumping into the footrests or wheelchair user's feet.
- If these adjustments are not possible on the available wheelchairs or do not provide enough adjustment, some modification may be necessary.

**Problem: One or both knees cannot bend to neutral sitting posture****PSD solutions:**

- Provide a standard elevating leg rest if available.
- Adjust the footrests forward if possible.
- Consider providing a 3-wheeled wheelchair if available. Add footrests to the top of the horizontal centre bar.
- Extend the footrests forward by adding wood or metal.
- Extend the footrest hanger to be more forward – this may require welding and should only be carried out by someone with excellent technical knowledge and skills with metalwork.



Note: Whatever solution is decided – it is important to try to ensure that the overall length of the wheelchair is kept to a minimum.

Step 4: Funding and ordering

- See Step 4: Funding and ordering in the Wheelchair Service Training Package – Basic Level Reference Manual for general information about funding and ordering.

Step 5: Product (wheelchair) preparation**Product (wheelchair) preparation**

Product (wheelchair) preparation is the fifth step in wheelchair service delivery. Product (wheelchair) preparation means setting up the wheelchair and preparing any PSDs that have been prescribed (selected).

At the intermediate level training programme it is usually only possible to prepare the wheelchair to a certain point before a fitting is needed. The wheelchair service steps 'product (wheelchair) preparation' and 'fitting' may be repeated until the wheelchair fits correctly. Often PSDs are not fully fixed in place before the first fitting. This is to ensure that adjustments can be made to the wheelchair and PSDs after the fitting.

Additional postural support can be provided in different ways. Some solutions are very simple, and can be made in a simple workshop. Other solutions may be more complicated and require more technical skill and facilities.

Wheelchair service personnel do not have to fabricate PSDs themselves. Wheelchair service personnel can work in partnership with technicians. The

wheelchair service personnel can explain what they need made and how it should work and the technician can work out how this can be made with locally available materials. The wheelchair service personnel can remain involved and guide the fabrication process to ensure that the final product meets the wheelchair user's needs as intended.

There are often different PSD solutions that will achieve the same support. The solution used will usually depend on the resources available. This includes:

- the types of wheelchairs available – and what adjustments are possible;
- the materials that are available;
- workshop facilities and tools available;
- whether there are pre-fabricated supports available – for example pelvis side pads, trunk side pads, straps and headrests.

Planning and carrying out wheelchair and PSD preparation

Plan and prepare

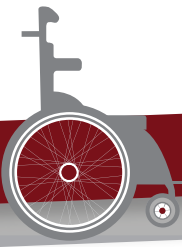
Before beginning to prepare the wheelchair, it is important to plan the work. Careful planning is particularly important if the work of wheelchair preparation is being handed over to someone else (for example a technician working in a workshop); or if more than one person is preparing the wheelchair. Planning and preparing may include the following steps:

Review the intermediate wheelchair prescription (selection) form:

- ensure that everyone understands all of the information on the form;
- ensure there is enough information on the form to be able to prepare the wheelchair. For example – are all the dimensions that are needed there? Are the descriptions of different PSDs detailed enough? Some further discussion or clarification may be needed.

Decide how to achieve the necessary support in the selected wheelchair:

- Look at the wheelchair that is going to be used and ask:
 - What adjustments can be made to the actual wheelchair to provide the necessary support?
 - What PSDs are already on the wheelchair?
- If modifications or PSDs need to be added, decide:
 - Are there pre-fabricated supports that can be used? If so – how will these be fitted to the wheelchair?
 - If modifications or PSDs need to be made from raw materials – what materials will be used, and how will the PSDs be fixed to the wheelchair?



- Remember to think about how the PSDs and wheelchair will work together.

Prepare a task list:

- list the tasks that need to be carried out to prepare the wheelchair;
- if more than one person is doing the work – decide who is responsible for which tasks.

What to remember when making PSDs

When preparing a wheelchair with additional postural support, remember the following four tips:

1. PSDs should provide just enough support

The amount of support for each wheelchair user will vary. PSDs should provide the support that is needed by the individual wheelchair user, in the right place, and over the right amount of surface area.

2. PSDs and wheelchairs work together as a whole system

Adding additional postural support to a wheelchair can change the overall system. For example, adding PSDs may change the inside dimensions of the wheelchair.

3. Avoid creating high pressure areas

PSDs can sometimes cause pressure on a particular part of a wheelchair user's body. For example, if a wheelchair user needs a lot of support to prevent them from leaning to the side, their trunk side pads could be a place of high pressure.

In situations like this, consider spreading the force by increasing the surface area. Always ensure there is enough padding on PSDs and under straps.

4. Ensure PSDs are practical and do not reduce function

Remember – wheelchair users need wheelchairs and seating that are practical and easy to use, and that help them to be as active as possible.

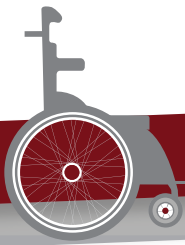
Workshop safety – five safety rules:

- Wear covered shoes in the workshop.
- Secure your work piece when cutting or drilling – use a jig or ask for help.
- Use safety glasses when using power tools or any other sharp tool.
- Keep the work area and walkways organized and clean.
- Never cut toward yourself or others.

Materials and tools needed to make PSDs and modifications

The table below gives examples of materials that can be used to make PSDs.

| Materials | PSDs or modifications that the materials may be used for: | What to look for when selecting materials for PSDs or modifications: |
|----------------------------|---|---|
| Metal/ plastic/ wood | <p>Metal/plastic/wood form the structure of a PSD e.g. rigid seats and backrests.</p> <p>Wood or metal can be used to make brackets to hold a trunk side pad onto the backrest.</p> | <p>12 mm plywood is very useful for making rigid seats and backrests. It is strong but relatively light in weight. Marine ply is the most durable; however it can be more expensive.</p> <p>3 mm aluminium sheet and 6 mm acrylic or ABS plastic sheet if available can also be used to make rigid backrests. Adding a fold in the sheet can add rigidity.</p> <p>When using any sheet material, take additional care to remove or pad the sharp edges for the safety of the wheelchair user.</p> |
| Foam/ padding | <p>Foam is used over all PSDs in the areas where PSDs are in direct contact with the wheelchair user's body.</p> <p>Firm foam, which holds its shape, is used to give PSDs the shape they need to provide the right support.</p> <p>Softer foam is used to add comfort and reduce pressure.</p> <p>Examples of the use of foam:</p> <ul style="list-style-type: none"> • foam should be added to straps to distribute pressure and add comfort; • a firm foam can be used to make a trunk side wedge, added to a cushion to make an outside thigh wedge or inside thigh wedge; • very firm foam (eg. EVA) can be used to make a footrest build-up or footrest wedge and trunk side pads. | <p>Look in the local markets and visit foam, shoe, mattress and furniture factories to find locally available foam.</p> <p>Try to find local examples of foam in different thicknesses (25 mm and 50 mm) and different firmness.</p> <p>EVA is an example of very firm foam, which is good for providing firm support and structure for a PSD. EVA can sometimes be found where shoes are manufactured.</p> <p>The firm rubber used to make flip-flops can be used in place of EVA.</p> <p>Good quality chip foam is an example of a medium firm foam. Chip foam can be used as the base of a contoured/layered cushion, to make a rear pelvis pad or pre seat bone shelf, or to provide contours on a rigid backrest.</p> <p>Soft 'mattress foam' is an example of soft foam used for comfort layers.</p> <p>The most commonly available, cheapest 'very soft' foam is not suitable on its own for making pressure relieving cushions without a firmer foam base.</p> <p>Coir (coconut fibre) can be used in place of firm foam.</p> |



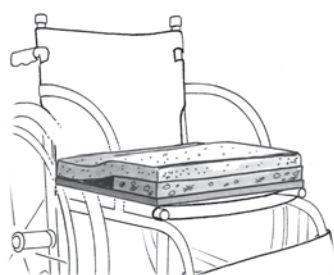
| Materials | PSDs or modifications that the materials may be used for: | What to look for when selecting materials for PSDs or modifications: |
|---------------------------------|---|--|
| Fabric | Fabric is used to cover PSDs. | <p>Look for a fabric that will be durable and easy to clean (by wiping down or removing for washing). A water-resistant fabric is useful for the seat, cushion and backrest if the wheelchair user is incontinent. A soft, T-shirt type material (cotton or cotton/Lycra) can be used for headrests and trunk side pads and trunk side wedges. A fabric with some stretch will more easily conform to the shape of PSDs.</p> <p>Synthetic fabrics usually make the person hotter than natural fabrics.</p> <p>Try to have at least a few different colours, and offer wheelchair users a choice if this is possible.</p> |
| Nylon webbing/ Velcro / buckles | Nylon webbing/Velcro/ buckles are used to make straps including pelvis strap, shoulder harness, calf and foot straps. | <p>25 mm, 35 mm and 50 mm nylon webbing is useful. The wider the strap, the more even the pressure. Melting the cut end of nylon webbing stops them from fraying. Cotton webbing is much less effective.</p> <p>Clip buckles (such as those used on backpacks) can be very easy to use. Use good quality buckles if available as these will last longer. Test them by clipping them together and trying to pull them apart. They should clip together and undo easily, and not pull apart unless released.</p> <p>Velcro is a good fastener, however it needs to be kept clean or it stops working.</p> <p>Soft foam pads should be placed under all webbing straps to protect the wheelchair user's body.</p> |
| Adhesives | Adhesives are used to bond wood and foam. | <p>Have a supply of wood glue (commonly known as white glue or PVA) and foam glue (contact adhesive, shoe glue or yellow glue).</p> <p>Ensure that anyone using adhesives knows how to use them correctly.</p> |
| Fasteners | Fasteners are used to attach PSDs to the wheelchair. | <p>Useful fasteners include:</p> <ul style="list-style-type: none"> • bolts with nuts (preferably lock-nuts) and washers; • T-nuts (fixed into plywood instead of a nut); • staples (for fixing upholstery). <p>Avoid using sharp screws as they may become a hazard if the PSD is damaged.</p> |

Workshop facilities and tools: A service that is making PSDs on a regular basis will benefit from setting up a workshop space, which has a workbench and vice, storage areas for materials and tools, good lighting and ventilation. The table below gives examples of tools that will help to make PSDs.

| Useful tools: | Used for: |
|---------------------------|---|
| Hand saw | Cutting wood, plastic or metal with no electricity. |
| Electric saw | Cutting wood, plastic or metal (check that the correct blade is used for the materials being cut) where there is electricity. |
| Drill and drill bits | Making holes for bolts. |
| Sharp, rigid blade | Cutting foam with no electricity. |
| Band saw | Cutting wood, plastic and foam where there is electricity. |
| File | Smoothing the edges of wood, metal or plastic. |
| Sanding machine | Smoothing the edges of wood, metal or plastic where there is electricity. |
| Spanners | Tightening nuts and bolts. |
| Industrial sewing machine | Sewing fabric upholstery, covers and straps. |

How to make PSDs

The following gives suggestions for how to make the PSDs covered in this training programme. Many of the principles can be applied to other PSDs.



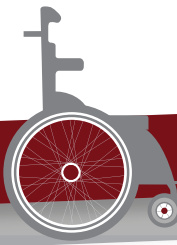
Pre seat bone shelf

A pre seat bone shelf is made of a piece of firm foam or similar material with a soft foam over the top.

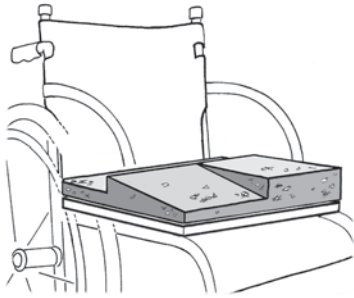
The shelf can be placed under the soft foam of a solid seat or between two layers of a layered foam cushion.

A pre seat bone shelf may be part of a pressure relief cushion.

A pre seat bone shelf sits just in front of the seat bones.



Lower seat front (one side)



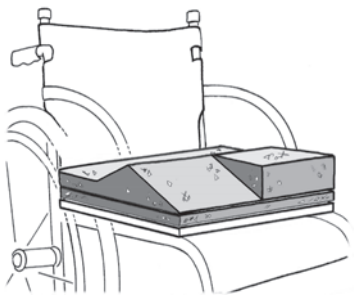
This PSD can be managed by modifying a foam cushion.

Cut away the firm foam (not the soft foam) at the front of the seat to the desired angle.

The piece of foam removed will be wedge shaped with the thick end at the front of the seat and the thin end just in front of the pelvis or seat bones.

If a solid seat is used, and a large angle is needed, part of the seat board can also be cut away to allow hip to open more.

Note: By keeping the other hip bent it is easier for the user to keep from sliding forward in the seat.

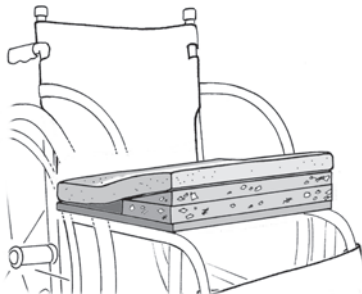


If a large angle is required it may be necessary to build up the entire seat with firm foam at the bottom before modifying but ensure no sharp edge – all the edges need to be bevelled.

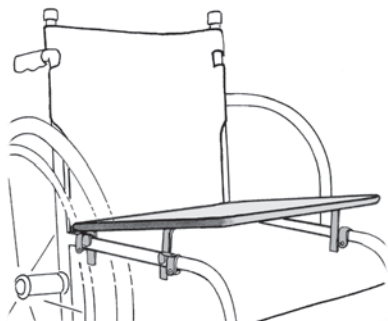
Check that a higher seat surface will not cause problems with the footrests or backrest height.

Raised seat front

The seat front may be raised in different ways. Two suggestions are:



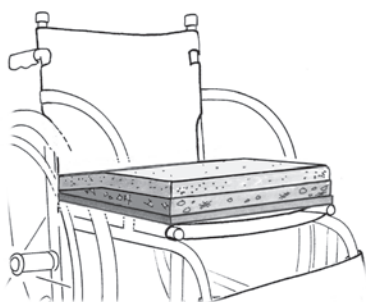
Place a firm foam wedge under the front of the cushion, ending just in front of the pelvis.



Remove the canvas seat and provide a solid seat. Mount the seat with brackets at the angle that is needed.

Always provide a cushion with a solid seat.

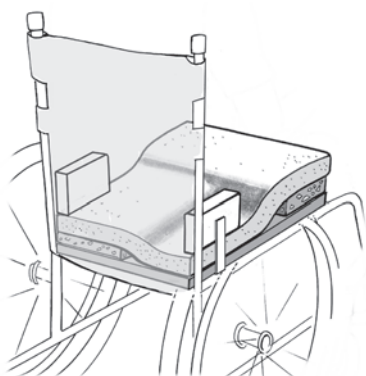
Wedge for anterior tilt



A wedge for anterior tilt can be made using the same principle as a pre seat bone shelf. A base layer of firm foam provides the shape for the cushion, and a soft layer of foam is placed over the top.

The wedge should be under the seat bones, and stop just in front of the seat bones. The cushion should be level under the thighs.

Build-up under pelvis

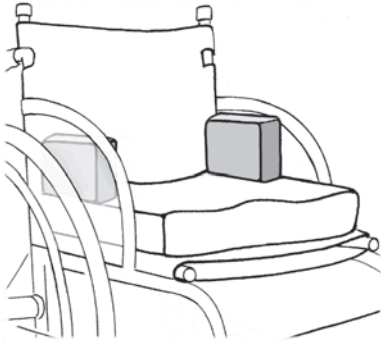
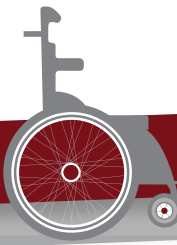


A build-up under the pelvis is made from firm foam or similar material with a soft layer over the top.

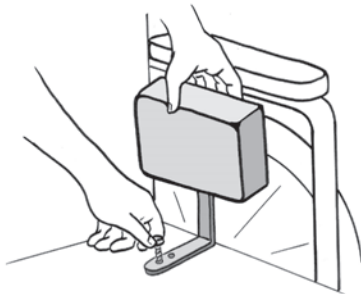
Build-up under the high side until the pressure under both seat bones feels the same.

Pelvis side pads

Pelvis side pads can be made in different ways depending on the wheelchair they will be fastened to and how much support is needed. Some suggestions are:



- if there are solid armrests that can be used to provide structure/support for the pad, a pelvis side pad can be made from a firm piece of upholstered foam mounted against the armrest.

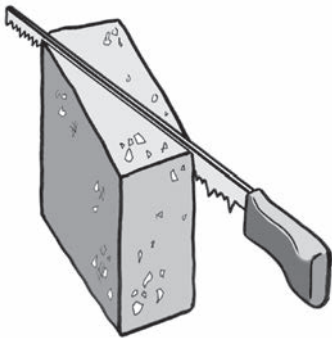


Where the armrest is open (as in this illustration on the left), a solid pelvis side pad may be made from a piece of wood with softer foam glued onto the inside. This should then be upholstered.

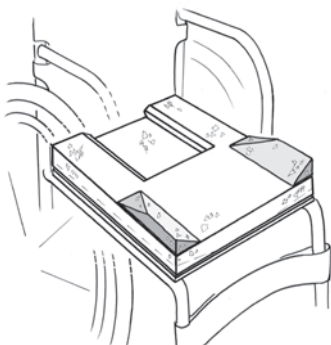
Mount the pelvis side pad to either the wheelchair frame or a solid seat (as shown) with a bracket.

In the illustration on the left, a cushion would then sit on top of the solid seat, protecting the wheelchair user from the bracket and bolts.

Outside thigh wedges



Cut blocks of firm foam (100 mm x 100 mm x 40 mm) diagonally in half to create two wedges. Keep a stock of these blocks for use during fitting wheelchairs.

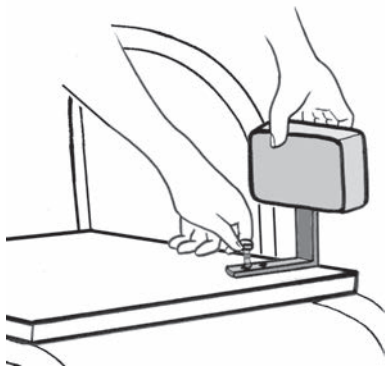


Glue the wedge onto the base foam of a cushion and under the soft foam. Trim corners as needed.



If using a moulded foam cushion, slice the cushion horizontally (approximately 20 mm from the top surface) and glue the wedge in place. Trim off any foam that sticks out.

Outside thigh pads



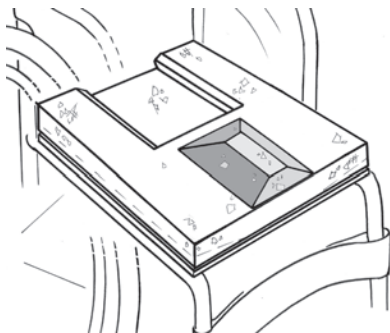
These pads are made in a similar way to trunk side pads.

Usually they are made of a piece of wood, plastic or metal with firm foam on the inside (the side that contacts the users leg) and a soft foam layer.

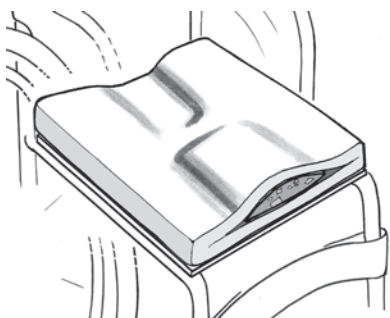
The pad is covered with a durable, comfortable fabric.

The pad can be fixed to a solid seat with a metal bracket or bracketed onto the wheelchair seat rail.

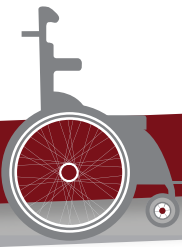
Inside thigh wedge



Cut a wedge (50 mm wide x 100 mm long) in half to create two equal pieces. Keep a stock of foam for use during fitting wheelchairs. Glue onto the base foam of a cushion and under the soft foam.



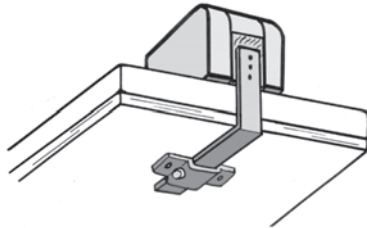
If using a moulded foam cushion, slice the cushion horizontally (approximately 20 mm from the top surface) and glue in place. Trim off any foam that sticks out.



Knee separator pad



Knee separator pads are often made of a piece of metal, plastic or wood with firm foam on the top, sides and back (the surfaces that contact the user). Thin, soft foam can also be used over the firm foam for comfort. The pad may be covered with a durable, comfortable fabric.

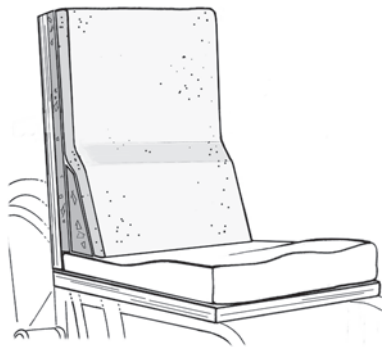


If a wheelchair user needs a knee separator pad, it is best to provide them with a rigid seat.

The knee separator pad can be fixed to a solid seat with an L-shaped bracket (as illustrated).

A simple and easy way to remove or swing away the knee separator pad is needed, so that the wheelchair user can transfer in and out of the wheelchair.

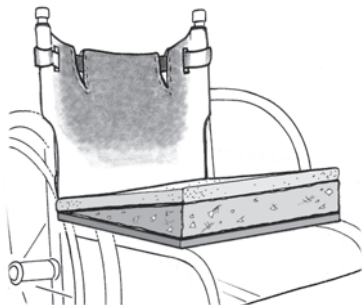
Open seat to backrest angle



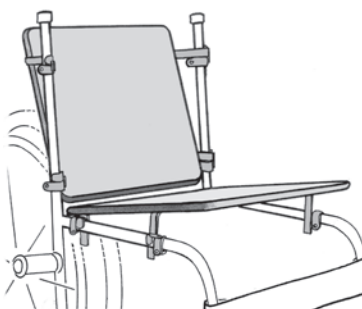
One way to make a more open seat to backrest angle is to add a firm foam wedge onto a solid backrest at the desired angle. This should be covered with a soft foam layer.

Seat and backrest tilt (tilt in space)

Some wheelchairs include a feature, which allows you to tilt the seat and backrest easily. The following suggestions are for the majority of wheelchairs in use, which do not have this feature.



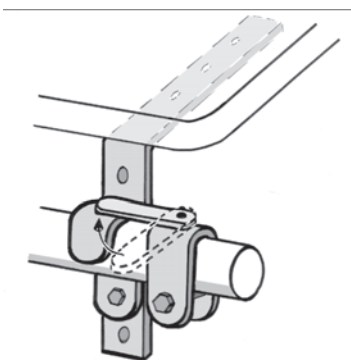
For wheelchairs without a solid seat and backrest place a firm foam wedge under the front of the cushion and adjust or recline the backrest.



Replace a canvas/slung seat and backrest with a solid seat and backrest.

Attach the brackets to achieve the desired angle for both the seat and the backrest.

Always line a solid backrest with firm foam and then a soft foam layer and upholster. Always provide a cushion with a solid seat.



This illustration provides an example of a bracket that can be used to attach a solid seat or backrest to a tube.

The bracket can be undone by swivelling the locking piece.

This allows the seat and backrest to be removed for transport (if the wheelchair is a cross-folding wheelchair).

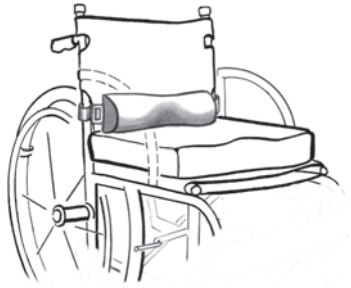
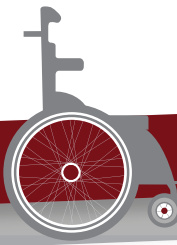
Rear pelvis pad

A rear pelvis pad should not be very deep. Depending on the wheelchair user, the pad may be 20–30 mm deep.

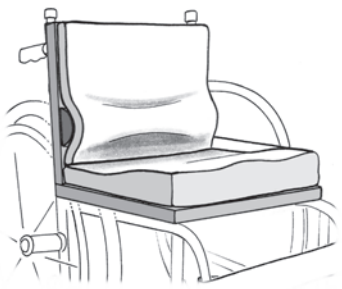
The pad should always provide support at the level of the PSIS.

For wheelchair users with sensitive skin or a particularly bony spine, the foam can be carved away where it passes across the spine to avoid causing a pressure area.

Different ways to make a rear pelvis pad are shown below:



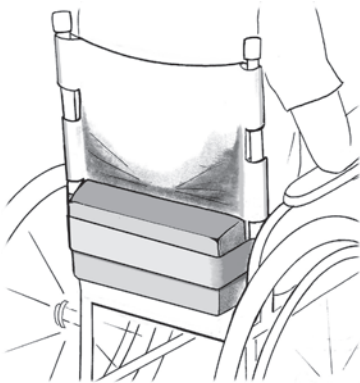
A rear pelvis pad can be made from a piece of firm upholstered foam strapped in front of a slung backrest fabric. This can be fastened with straps to the backrest uprights.



A piece of firm foam forming the rear pelvis pad may be mounted to a solid backrest with a layer of soft foam over the top.

The soft foam layer should be sufficient to ensure that the whole of the backrest is comfortable for the wheelchair user.

If not, a firm foam layer should be placed on the solid backrest, then the rear pelvis pad, and soft foam over the top.

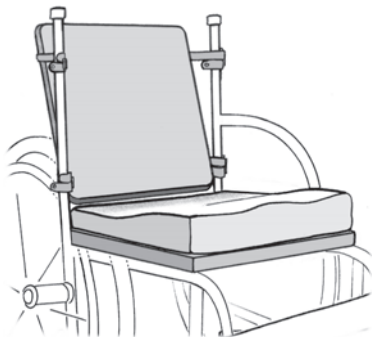


If mounted to a strong strap, a rear pelvis pad can be mounted to provide support from behind a slung backrest fabric.

In this case an additional calf strap can be looped around the backrest uprights at the desired height and tightened as needed using the Velcro.

Backrest recline and/or adjust backrest shape

There are different postural reasons why it can be helpful to be able to recline a backrest. If a wheelchair does not have this as a ready-made adjustable feature or there is no tension adjustable backrest, the support can be made by modifying the wheelchair. Below are two options:



With a wheelchair that has a slung backrest, remove the backrest fabric and **fix a solid backrest at the desired reclined angle.**

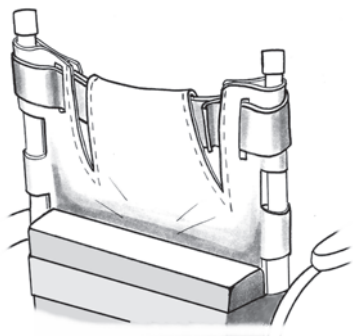
The solid backrest could be made of plywood (at least 12 mm thick).

Adjustable brackets can be used to attach the solid back to the backrest uprights.



Modify the existing slung backrest fabric:

- Make two vertical cuts through the backrest fabric next to the backrest uprights.
- Gradually increase the length of the cuts until the wheelchair user's trunk can relax over the pelvis and not slump forward.
- Support the wheelchair user's trunk with your hand from behind the fabric until you find the best position.

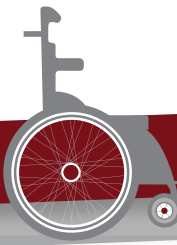


- Thread a strap (50 mm-wide nylon) between the layers of the backrest fabric and loop the ends around the backrest uprights. Stitch the strap and the backrest fabric at the desired position.
- An additional calf strap can often be used, which has Velcro at the ends and is the correct length. With Velcro, the strap tension can be adjusted easily. Alternatively, use eyelets and string.
- A piece of soft foam can be used to cover the top and front of the strap inside the backrest fabric. This will reduce the risk of developing pressure sores against the top of the backrest support.

Trunk side pads

Trunk side pads need to provide firm support, and at the same time should be thin enough to not restrict movement of the wheelchair user's arms.

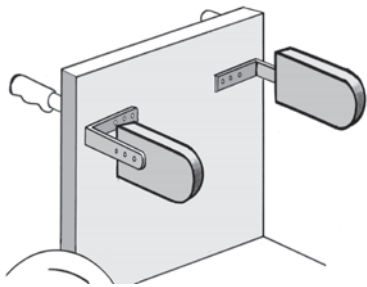
The main structure of the pad may be made from metal, plastic or wood. However trunk side pads always need to be covered in firm foam with a soft foam layer over the top. The foam should be on the inside of the pad (where it contacts the



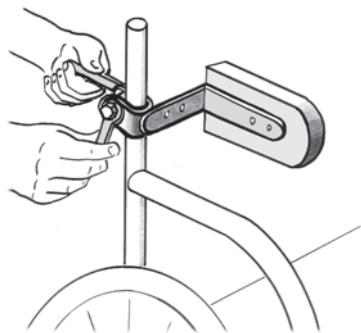
wheelchair user's body) and wrap over the top of the pad. The whole pad is then covered with a durable, comfortable fabric.

Trunk side pads may be flat, or shaped to match the wheelchair user's body. If they are shaped, the easiest way to create the shape is to carve the shape into firm foam. A shaped pad will need special sewing skills and a cover fabric, which can stretch.

Two different ways to fasten trunk side pads to the wheelchair are shown below:



A trunk side pad may be fastened to a rigid backrest, which is then covered in firm foam and a soft foam layer.



A trunk side pad may be fastened to the backrest uprights of the wheelchair with a metal bracket.

Trunk side pads – need to be thin



If a trunk side pad is too thick (over 2.5 cm) the pad will restrict arm movement and can also press on the underside of the arm.

This can reduce blood flow, damage nerves and interfere with hand function.

Use thinner materials that are strong enough to provide the support needed.

Trunk side wedges



A trunk side wedge can be made from firm foam and incorporated into a rigid backrest support, under the soft foam layer.

An external wedge-shaped pad with a separate cover can also be used on the surface of a backrest. This can be fastened with Velcro or straps.

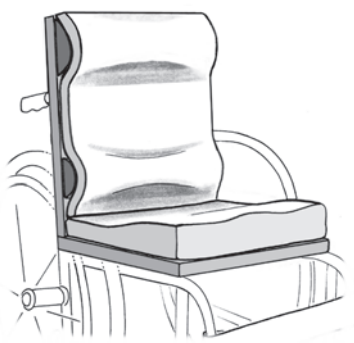
Tray



A tray is best made of plywood (10 mm to 18 mm depending on the quality/strength of the plywood) and can be attached to the wheelchair armrests with straps or metal or wooden brackets.

When deciding how a tray will be attached to the wheelchair, find a method that is easy for everyone to use. This is so that anyone can remove the tray quickly in an emergency (for example, if the wheelchair user is choking).

Headrest

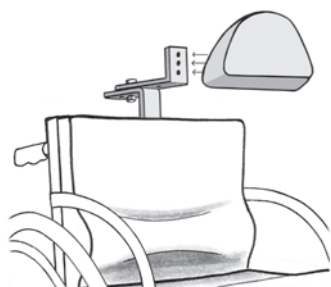


Flat headrest

A flat headrest can either be included in a tall rigid backrest support or attached to the rigid backrest support with a bracket.

The headrest is made from firm foam fixed onto a piece of wood/plastic, covered with a soft foam layer.

This option does not offer easy adjustment for growth or changes in the wheelchair user's body.



A separate headrest attached with a bracket allows for forward, backward and height adjustment.

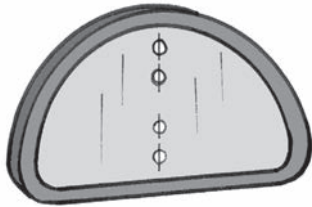


Shaped headrest

A shaped headrest can be made with firm foam fixed onto a piece of wood/plastic and covered with soft foam or similar material. The shaped headrest can include a shelf to support the base of the skull and wedges to the sides to help hold the head from falling sideways.

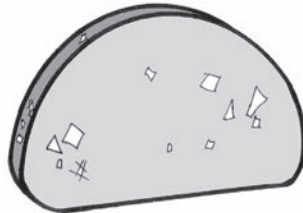
A comfortable fabric is used to cover the finished headrest. The cover can be made with T-shirt fabric as it is comfortable and stretches to follow the shape of the headrest. The cover can be made close-fitting or slightly loose. A “pull string” can secure the cover.

An example of how to make a shaped headrest is shown below:



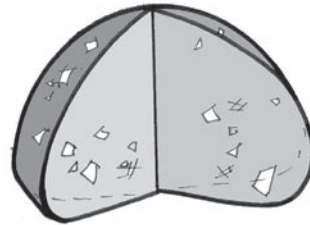
1.

Wooden base with holes drilled to be mounted onto headrest bracket.



2.

Firm foam first layer.



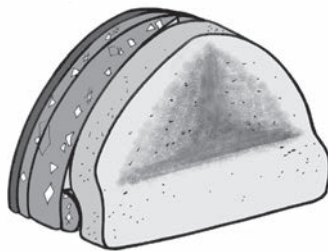
3.

Firm foam wedges to provide side support for the head.



4.

Foam roll for the base of the headrest, to fit under the base of the skull.



5.

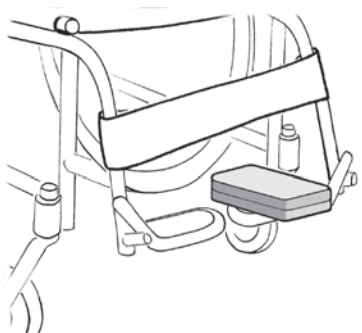
Soft layer of foam added. Headrest shape complete.

To complete:

- mount the headrest to the wheelchair;
- upholster.

Footrest build-ups and footrest wedges

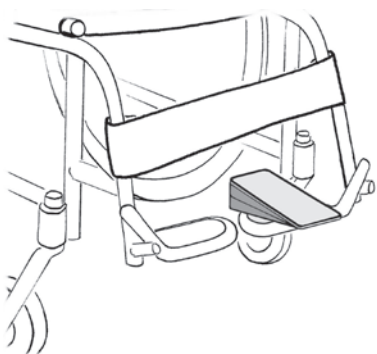
One of the best materials to use for foot build-ups is very firm foam (EVA or the sole from flip-flops). Wood may also be used, however ensure that the wood is smooth, without splinters, and there is no pressure risk.



Footrest build-ups

Cut very firm foam (EVA or flip-flop sole), wood or other similar material into block shapes (approximately 100 mm x 200 mm x 20 mm). Keep a stock of these blocks for use during wheelchair fitting.

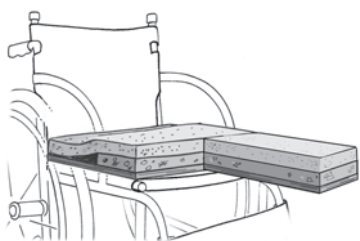
Glue the blocks to the footrests as needed.



Footrest wedges

Cut footrest build-up blocks diagonally in half to create two footrest wedges. Cut some blocks along the long side and some along the short side. Keep a stock of these blocks for use during wheelchair fitting.

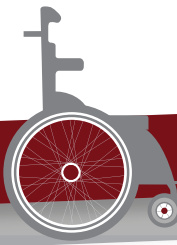
Attach a footrest wedge to the footrest as needed to support the sole of the foot.



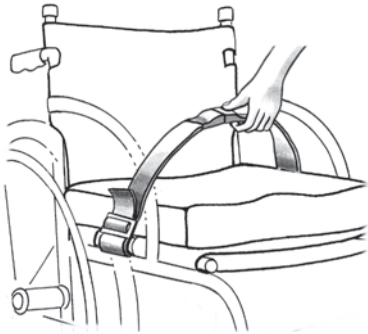
Lower leg supports

A solid seat can be made to extend forward from the front of the seat to support a straight leg.

This may make turning in small spaces and collapsing the wheelchair for transport difficult.



Pelvis strap



A pelvis strap can be made of nylon webbing such as the webbing found in a car seat belt or straps on a backpack.

The width of the strap can be about 25 mm wide for children and about 40–50 mm for adults.

Clip buckles are the easiest to do up and undo quickly. If these are unavailable, Velcro also works well. Make sure there is at least 100 mm (depending on the size of the wheelchair user) of overlapping Velcro.

A covered padding between the strap and the user (particularly where the buckle is), is more comfortable.



Where to fasten the ends of the strap?

- For most wheelchair users, the ends of the pelvis strap fasten directly below the front of the pelvis, as illustrated.
- Changing the location of the attachment will allow the strap to pull on the body from different angles. Placing the attachment directly below the front of the pelvis (ASIS) will pull at 90 degrees to the seat surface (as shown in the illustration). Placing the strap at the back of the seat will pull at 45 degrees to the seat surface. The angle of pull should be between 45–90 degrees unless the strap is designed to provide support for a wheelchair user with an anterior pelvis tilt.



If the wheelchair user tends to push the hips up or forward, an **anterior tilt four-point strap** provides support for a wheelchair user with anterior pelvis tilt.

Pelvis strap warning:

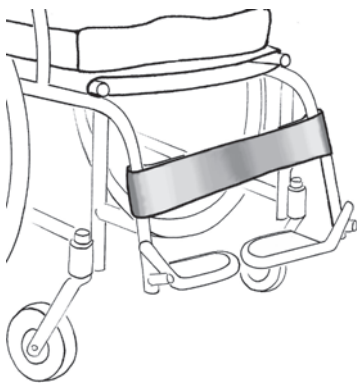
If a pelvis strap is too loose, a wheelchair user with limited physical control and/or awareness can slide down. If not attended, strangulation may result. Always teach caregivers how to do up the strap correctly and warn them of the risks of leaving a person unattended.



How is the pelvis strap and anterior tilt four-point strap fastened to the wheelchair?

- To fasten the strap to a solid seat:
 - fasten to a solid seat as shown in the illustration to the left. Fold the end of the strap, melt a hole and use a bolt through the wood along with two washers and a nut (preferably a locking nut);
 - note the washer placed between the folded end. This helps to slow down wear and tear on the webbing, which can eventually make the strap break.
- To fasten the strap to a wheelchair frame:
 - loop around the wheelchair frame and fix with a plastic or metal slide buckle (also known as “tri-glide”, “double D-ring” or 3-bar buckle);
 - the upholstery screw can also be used if it is in the correct position.

Calf strap



If the wheelchair does not come with a calf strap, one can be made by sewing Velcro onto a piece of 50 mm nylon webbing.

The calf strap should be approximately twice as long as the width of the wheelchair.



Foot straps

Foot straps can be made from 25 mm nylon webbing and Velcro or buckles.

One end can be folded and a hole burned through it for a screw, which can fix it to the footrest.

A covered pad should be used to keep the foot strap from rubbing against the skin and to distribute pressure.

Tips for fabricating and using straps:

- Fasten straps with Velcro or a buckle.
- Add padding onto the strap where it contacts the wheelchair user – this makes it more comfortable by spreading the pressure.
- Straps can be bolted to a solid seat or backrest or looped around the wheelchair frame with a slide buckle (also known as tri-glide, double D-ring or 3-bar buckle).
- Calf straps, which often come with a wheelchair, can be used in other ways. For example, a calf strap can be used to modify/adjust backrest fabric.

Shoulder harness

To make a shoulder harness it is best to use a sewing machine and a person with sewing experience. You will need nylon webbing, buckles, and soft foam for padding. Some tips include:



- Provide padding over the shoulder, particularly where it is bony.
- Ensure that the fixing point for the top of the shoulder harness strap is at the same level or slightly higher than the top of the wheelchair user's shoulder. If it is lower, the strap will pull the wheelchair user down.
- Never fix the bottom of a shoulder harness strap to a pelvis strap. This will pull the pelvis strap up.
- A chest piece, such as the one in this illustration, helps to keep the shoulder harness straps in place and provides support at the front of the trunk.

Shoulder harness warning:

A close-fitting pelvis strap must be used at all times when a shoulder harness or chest strap are in use. Failure to do this can lead to strangulation.

Carrying out the wheelchair safe and ready checklist

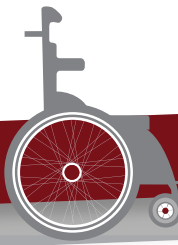
The final part of product (wheelchair) preparation is to check that the wheelchair is safe and ready to use and all parts are working properly.

The wheelchair safe and ready checklist on the next page helps to make sure nothing is forgotten. Wheelchair service personnel can make a copy of this checklist and pin it up at their wheelchair service centre as a reminder each time they prepare a wheelchair.

The wheelchair safe and ready checklist should be completed *before* the wheelchair user arrives for fitting.

If there is a problem identified during the wheelchair safe and ready check, the wheelchair service personnel may do the following:

- repair/fix the problem before the fitting;
- return the wheelchair to the wheelchair workshop to be fixed;
- contact the supplier of the wheelchair and ask for help with fixing the problem.



Intermediate Wheelchair Safe and Ready Checklist

Checklist: Is the wheelchair safe and ready to use?

| Whole wheelchair including PSDs | |
|---|--------------------------|
| PSDs are tightly fixed | <input type="checkbox"/> |
| There are no sharp edges | <input type="checkbox"/> |
| No parts are damaged or scratched | <input type="checkbox"/> |
| The wheelchair travels in a straight line | <input type="checkbox"/> |
| Front castor wheels | |
| Spin freely | <input type="checkbox"/> |
| Spin without touching the fork | <input type="checkbox"/> |
| Bolts are tight | <input type="checkbox"/> |
| Front castor barrels | |
| Castor fork spins freely | <input type="checkbox"/> |
| Rear wheels | |
| Spin freely | <input type="checkbox"/> |
| Axle bolts are tight | <input type="checkbox"/> |
| Tyres inflated correctly (with thumb pressure, wheel can be depressed less than 5 mm) | <input type="checkbox"/> |
| Push rims are secure | <input type="checkbox"/> |
| Brakes | |
| Function properly | <input type="checkbox"/> |
| Footrests | |
| Footrests are securely attached | <input type="checkbox"/> |
| Frame | |
| For a cross-folding wheelchair – the wheelchair folds and unfolds easily | <input type="checkbox"/> |
| For a wheelchair with fold-down backrest – the backrest folds and unfolds easily | <input type="checkbox"/> |
| Cushion | |
| The cushion is in the cover correctly | <input type="checkbox"/> |
| The cushion is sitting on the wheelchair correctly | <input type="checkbox"/> |
| The cushion cover fabric is tight but not too tight | <input type="checkbox"/> |
| If the wheelchair has a solid seat: the cushion fully covers the solid seat | <input type="checkbox"/> |

Step 6: Fitting

Fitting is the sixth of the eight steps of wheelchair service delivery. During fitting the wheelchair user and wheelchair service personnel make sure the wheelchair and PSDs fit well and support the wheelchair user as close to neutral sitting posture with comfort.

How to carry out a fitting

Use the intermediate wheelchair fitting checklist on the following pages to guide you during fitting. Check in this order:

- is the wheelchair ready?
- check wheelchair and PSDs fit;
- check posture;
- check pressure;
- check fit while the wheelchair is moving;
- * decide if any further action is required.

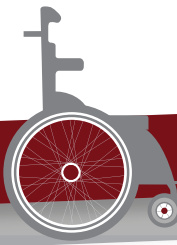
Remember:

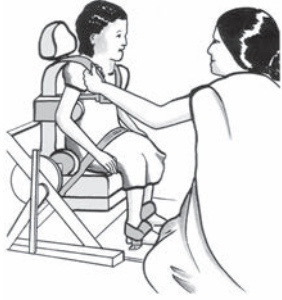
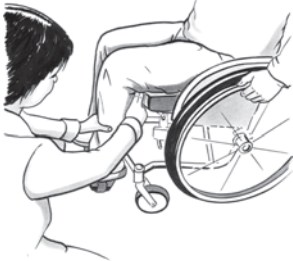

A wheelchair fitting for a wheelchair user who needs additional postural support takes longer than for a wheelchair user who does not need additional postural support. This is because there are more adjustments that may need to be made.





- Wheelchair users need to know that the fitting may take more time. They may need to get in and out of the wheelchair while adjustments are made.
- They may also need to come back for a second fitting if a lot of changes are needed.

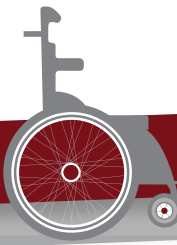
Is the wheelchair ready?




Always ensure that the wheelchair is ready for the wheelchair user to try.


**Check wheelchair and PSDs fit**

| Wheelchair width | |
|---|---|
| Correct fit: | Should fit closely. |
|  | <p>Make sure that:</p> <ul style="list-style-type: none"> • hips fit comfortably between armrests or pelvis side pads; • thighs fit comfortably between the armrests, mud/skirt guards or pelvis side pads and are not pushed together; this may happen if pelvis side pads extend too far forward; • trunk fits comfortably between the backrest uprights and/or trunk side wedges or trunk side pads. |
| Seat depth | |
| Correct fit: | There should be at least a 30 mm gap between the back of the knee and the front of seat/cushion. |
|  | <p>Make sure that:</p> <ul style="list-style-type: none"> • the wheelchair user is sitting as close to neutral sitting posture as is comfortable for them; <p><i>How to check:</i></p> <ul style="list-style-type: none"> • slide hand between the back of the knee and the cushion. Check there is at least a 30mm gap. Slide down the back of the calf and make sure the calf is not touching the seat/cushion. • check both sides. If there is a difference between right and left sides, use the shorter leg measurement to make prescription choices. |
| | <p>There may be a bigger gap for wheelchair users with long legs; up to 60 mm is acceptable.</p> <p>Correct fit gives the thigh good support. This will reduce pressure under the seat bones and helps to stop pressure sores. If the seat length is too long, the wheelchair user will not be able to sit upright.</p> |
| Pelvis | |
|  | <p>Make sure that:</p> <ul style="list-style-type: none"> • the pre seat bone shelf sits just in front of the seat bones (place your hand under the wheelchair user's bottom to check); • rear pelvis pad provides support at the PSIS and does not push on the lower trunk; • pelvis side pads fit snugly and are not located over the hip joint; • the pelvis strap can be tightened firmly and does not pinch the wheelchair user's skin (run hands between the strap and the wheelchair user to check). |

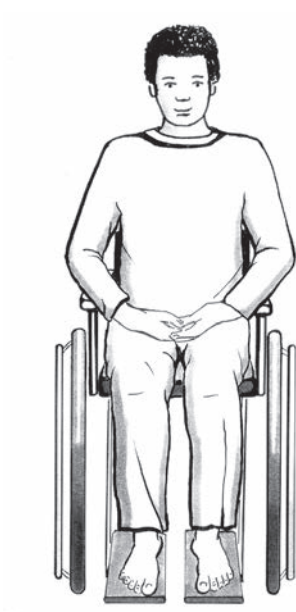
| Trunk | |
|---|---|
|  | <p>Make sure that:</p> <ul style="list-style-type: none"> • trunk side pads do not place any pressure into the armpits. There should be at least 50 mm between the wheelchair user's armpit and the top of a trunk side pad. • shoulder harness is done up comfortably and it does not pinch skin. • tray supports the length of the forearm and elbows and does not push on stomach. A modified tray cut-out may be close to the body, however it should not touch or rub on the wheelchair user's skin. • check backrest height and tilt. |
| Headrest | |
| <p>Correct fit:</p> | <ul style="list-style-type: none"> • The headrest should support the wheelchair user's head at the base of the skull. |
|  | <p>Make sure that:</p> <ul style="list-style-type: none"> • the headrest supports the user's head in a balanced and upright posture. |
| Thighs | |
|  | <p>Make sure that:</p> <ul style="list-style-type: none"> • there is no high pressure between the wheelchair user's thighs and thigh supports (including outside thigh pads, inside thigh wedge or knee separator pad). • knee separator pad is not putting any pressure onto the groin area. The knee separator pad should be 40–60 mm away from the groin area for children and 60–100 mm for adults. |
| Footrest height | |
| <p>Correct fit:</p> | <p>The thigh is fully supported on the seat/cushion with no gaps and the feet are fully supported on the footrests with no gaps.</p> |
|  | <p><i>How to check:</i></p> <ul style="list-style-type: none"> • slide hand between the thigh and the seat/cushion. There should be even pressure along the thigh and no gaps. • look at the foot on the footrest. The foot should be supported at the front and the back with no gaps. <p>If there are gaps under the thigh, the footrest may be too high. If there are gaps under the foot, the footrest may be too low.</p> |



| Backrest height | |
|--|--|
| Correct fit: | The correct fit should give the wheelchair user the support he/she needs and allow an active wheelchair user the freedom to move his/her shoulder blades to push (if self-propelling). |
| <p><i>How to check:</i></p> <ul style="list-style-type: none"> • ask the wheelchair user if the backrest is comfortable; • observe whether the trunk is balanced over the hips; • is the wheelchair user able to push the wheelchair without the backrest interfering? | |
| <p>The height of the backrest depends on the needs of the wheelchair user. Wheelchair users who push themselves need a backrest, which allows their shoulder blades to move freely. Wheelchair users who have difficulty sitting upright may need a higher backrest, which gives more support.</p> | |
|  | <p>A backrest, which provides support on a level with the bottom of the wheelchair user's rib cage is a good height if the wheelchair user:</p> <ul style="list-style-type: none"> • is fit and active; • can sit upright easily with good balance; • will be propelling actively themselves and needs good freedom of movement. <p><i>Backrest height D (seat to bottom of rib cage).</i></p> |
|  | <p>A backrest, which provides support on a level with the bottom of the wheelchair user's shoulder blades is a good height if the wheelchair user:</p> <ul style="list-style-type: none"> • is likely to get tired quickly: e.g. elderly or progressive condition; • has some difficulty sitting upright. <p>This backrest height still allows some freedom of movement around the shoulder blades for the wheelchair user to propel the wheelchair with their arms.</p> <p><i>Backrest height E (seat to bottom of shoulder blade).</i></p> |
| <p>A higher backrest, which provides support on a level with the top of shoulder is a good height for wheelchair users who need more support; have a backrest recline; have seat and backrest tilt (tilt in space); become tired/fatigued easily.</p> <p><i>Backrest height F (seat to top of shoulder).</i></p> | |
| Rear wheels position – for hand propelling | |
| Correct fit: | When hands are placed on the push rim, the wheelchair user's elbow should be at a right angle. |
|  | <p><i>How to check:</i></p> <ul style="list-style-type: none"> • ask the wheelchair user to grip the push rims at the top of the wheels. Their elbows should be bent at 90 degrees; • also check with the wheelchair user if the rear wheels are positioned correctly for balance (forward for active, back for safe). |

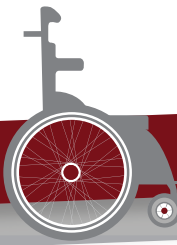
| | |
|--|--|
| | <p>If the wheelchair user needs the rear wheels to be positioned in the 'safe' (further back) position, this may mean that their arms are further back than is ideal for propelling. Explain this compromise to the wheelchair user.</p> <p>If any adjustments are made to the rear wheels position, the brakes will also need to be adjusted and rechecked.</p> |
| Seat height – for foot propelling | |
| Correct fit: | <ul style="list-style-type: none"> • With the wheelchair user sitting upright, and the back of their pelvis comfortably supported by the backrest, he/she should be able to rest their feet flat on the floor. |
|  | <p><i>How to check:</i></p> <ul style="list-style-type: none"> • ask the wheelchair user to sit upright or as close to upright as is comfortable in the wheelchair, with the back of their pelvis touching the backrest. Check whether their feet can sit flat on the floor. |
| | <p>If the seat height is too high, wheelchair service personnel can try:</p> <ul style="list-style-type: none"> • reducing the height of the cushion; • attaching a solid seat lower than the original seat (get technical advice or support to do this). <p>For a wheelchair user who is propelling with only one foot, with the other foot resting on the footrest – check the pressure under the seat bone of the side that is resting on the footrest.</p> |

Check posture



Observe how the wheelchair user is sitting in the wheelchair from the front and from the side. Is he/she sitting in an upright posture?

Look to see whether the wheelchair user is sitting in as upright a posture as is comfortable for them. This should be close to the posture identified in the hand simulation.



Specifically, check:

- is the pelvis upright and level? (if possible)
- is the trunk upright and symmetrical? (if possible)
- is the head balanced and upright? (if possible)
- are legs and feet supported as close to upright sitting posture as possible?
- ask the wheelchair user how he/she feels.

After looking at the wheelchair user's overall sitting posture, check that each PSD is providing support as intended. Specifically, remember to check (if provided):

- backrest height, recline and contours;
- tilt in space;
- pelvis side pads and trunk side pads;
- any thigh and lower leg supports.

Check pressure



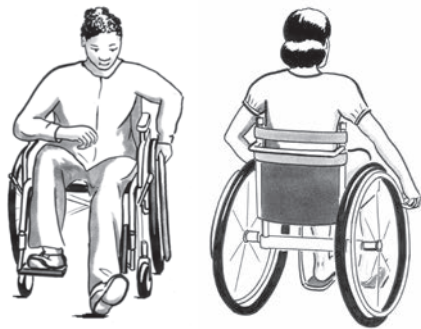
For every wheelchair user who is at risk of developing a pressure sore, the fitting step includes checking whether the pressure is safe under the seat bones and any other area at risk (e.g. under hip joint or tail bone).



For every wheelchair user who is using PSDs that provide firm support – check the pressure between the wheelchair user's body part and the PSD. Support should feel firm – but not tight.

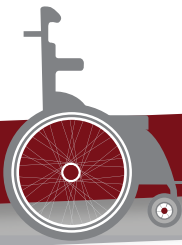
Check fit while the wheelchair is moving

The final part of fitting is to check how the wheelchair fits when the wheelchair is moving. If a wheelchair user cannot push the wheelchair themselves, ask a family member/caregiver to push them while you observe.



What to look for:

- does the backrest allow the wheelchair user freedom to move their shoulder blades to push?
- does movement of the wheelchair or the action of pushing cause the wheelchair user to change their posture or feel uncomfortable or unstable in any way?
- Hand propelling: Is the rear wheels position correct for the wheelchair user to push as well as he/she can?
- Foot propelling: Are the seat height and seat depth correct for the wheelchair user to push with their legs?
- Do the posture supports allow for unrestricted and safe wheelchair mobility?





Intermediate Wheelchair Fitting Checklist

1. Is the wheelchair ready?

| | |
|---|--------------------------|
| Has the wheelchair been checked to make sure it is safe and ready to use and all parts are working? | <input type="checkbox"/> |
|---|--------------------------|

2. Check wheelchair and PSDs fit

| | | |
|--|--|--------------------------|
| <p>Wheelchair width:</p> <ul style="list-style-type: none"> • hips fit comfortably between armrests or pelvis side pads; • trunk fits comfortably between the wheelchair frame backrest tubes or trunk side pads; • thighs fit comfortably between the armrests, mud/skirt guards or pelvis side pads and are not pushed together. | | <input type="checkbox"/> |
| <p>Seat depth:</p> <ul style="list-style-type: none"> • 30 mm gap between the back of each knee and the seat/cushion. | | <input type="checkbox"/> |
| <p>Pelvis:</p> <ul style="list-style-type: none"> • pre seat bone shelf sits just in front of the seat bones; • rear pelvis pad provides support at the PSIS; • pelvis side pads fit snugly and are not located over the hip joint; • pelvis strap can be tightened firmly and does not pinch skin. | | <input type="checkbox"/> |
| <p>Trunk:</p> <ul style="list-style-type: none"> • trunk side pads do not place any pressure into the armpits. There should be at least 30 mm between armpit and top of trunk side pad; • shoulder harness done up comfortably and does not pinch skin; • tray supports the length of the forearms and elbows and does not push on stomach; • check backrest height and tilt. | | <input type="checkbox"/> |
| <p>Headrest:</p> <ul style="list-style-type: none"> • the headrest should usually support the wheelchair user's head at the base of the skull; • supports the head in a balanced and upright posture. | | <input type="checkbox"/> |

| | | |
|---|---|--------------------------|
| <p>Thighs:</p> <ul style="list-style-type: none"> • there is no high pressure on thighs caused by the outside thigh pads or knee separator pad; • knee separator pad is 40–60 mm away from the groin area for children and 60–100 mm for adults. |  | <input type="checkbox"/> |
| <p>Footrest height:</p> <ul style="list-style-type: none"> • thighs are fully supported on the cushion with no gaps. Feet are fully supported on the footrests with no gaps; • foot straps can be done up firmly without pinching; • calf strap and behind the heel foot straps are supporting calf and feet. |  | <input type="checkbox"/> |

3. Check posture

| | |
|--|--------------------------|
| <p>Check from the front and side to see whether the wheelchair user is sitting as close to neutral sitting posture as is comfortable for them:</p> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Is their pelvis upright and level (or as close to this as is comfortable for the user)? | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Is the trunk upright and symmetrical (or as close to this as is comfortable for the user)? | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Is the head balanced and upright (as much as possible)? | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Are legs and feet supported as close to neutral as possible? | <input type="checkbox"/> |
| <p>Check that all PSDs are providing support as intended. In particular check (if provided):</p> | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Backrest height, recline and contours | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Tilt in space | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Pelvis side pads and trunk side pads | <input type="checkbox"/> |
| <ul style="list-style-type: none"> • Outside and inside thigh wedges, outside thigh pads and lower leg supports | <input type="checkbox"/> |
| <p>Check posture again after 15 minutes to see if there has been any change</p> | <input type="checkbox"/> |

4. Check pressure

| | |
|---|--------------------------|
| <p>Check pressure under both seat bones. Is the pressure safe on both sides?</p> <p>Level 1 = safe: Fingertips can wriggle up and down 5 mm or more.</p> <p>Level 2 = warning: Fingertips cannot wriggle, but can easily slide out.</p> <p>Level 3 = unsafe: Fingertips are squeezed firmly. It is difficult to slide fingers out.</p> | <input type="checkbox"/> |
| <p>Place your finger between the wheelchair user's body and each postural support including pads and straps.</p> | <input type="checkbox"/> |
| <p>Does the postural support make even contact with the body? Is the pressure safe?</p> | <input type="checkbox"/> |
| <p>If the wheelchair user has any particularly bony prominences, bulges or bumps – check there is no pressure on these areas.</p> | <input type="checkbox"/> |

**5. Check fit while the wheelchair is moving**

| | |
|--|--------------------------|
| Does the backrest allow the wheelchair user to move their shoulder blades to push? | <input type="checkbox"/> |
| Does movement of the wheelchair or the action of pushing cause the wheelchair user to change their posture or feel uncomfortable or unstable in any way? | <input type="checkbox"/> |
| Hand propelling: Is the rear wheel position correct for the wheelchair user to push as well as he/she can? | <input type="checkbox"/> |
| Foot propelling: Is the seat height and depth correct for the user to push with their leg/s? | <input type="checkbox"/> |
| Do the posture supports allow for unrestricted and safe wheelchair mobility? | <input type="checkbox"/> |

6. Decide if any further action is required

| | |
|---|--------------------------|
| Is there any further action necessary? Write any actions in the wheelchair user's file. | <input type="checkbox"/> |
|---|--------------------------|

Step 7: User training**User training**

Information and training about their wheelchair can help many wheelchair users really benefit from their wheelchair. Without this step, it is possible that the wheelchair will not help the wheelchair user as much as it could. It is important that family members/caregivers also receive the information and training.

What are helpful skills for wheelchair users?

Wheelchair service personnel can teach wheelchair users skills to help them to stay healthy, use their wheelchair safely and efficiently, and care for their wheelchair so that it will last longer. The following are good skills to teach all wheelchair users:

**Wheelchair handling:**

- How to fold and lift the wheelchair for transport.
- How to take off and put back on any PSDs that need to come off for transport.
- How to use features on the wheelchair – for example use of brakes, tilting and anti-tip bar, correct position of PSDs and cushion.

How long wheelchair users should sit in their wheelchair

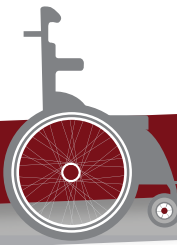
For some wheelchair users who have not been sitting very much, it may take time for them to become used to sitting in an upright posture. This can be particularly true for children. Wheelchair service personnel need to advise how long the wheelchair user should sit in their wheelchair. Give these guidelines:

- If the wheelchair user is used to sitting up, he/she should spend the same amount of time sitting in their new wheelchair. He/she can gradually increase the time, if needed.
- If the wheelchair user has not been sitting up, start with no more than 30 minutes followed by a break.
- Teach the wheelchair user or family member/caregiver to always check for pressure areas after the wheelchair user has sat in the wheelchair.

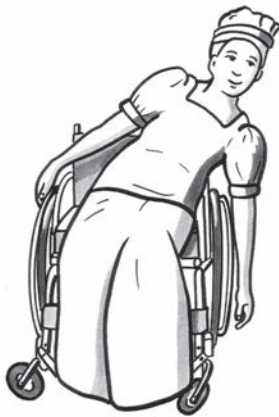


Transfers (how to get in and out of the wheelchair):

- A safe transfer method, which is:
 - comfortable for the wheelchair user; and
 - safe for any person assisting or lifting.
- How to sit correctly in the wheelchair (for example making sure that the wheelchair user is positioned well back in the wheelchair with seat bones behind any pre seat bone shelf).
- How to adjust PSDs correctly – for example how firmly straps need to be done up to work correctly.
- Remember that many wheelchair users will be able to transfer in and out of the wheelchair on their own. Independent and assisted transfers are described in the Wheelchair Service Training Package – Basic Level.

**Wheelchair use and mobility:**

- The skills that the wheelchair service personnel teach for wheelchair mobility will depend on the abilities of the wheelchair user and their environment.
- Always remember to teach the wheelchair user the best way to propel that suits their abilities.
- More information on basic wheelchair mobility skills including pushing correctly, going up and down slopes and steps and partial wheelie is available in the Wheelchair Service Training Package – Basic Level Reference Manual.

**Preventing pressure sores:**

- Pressure sores are caused by pressure on bony areas, friction and shear.
- For wheelchair users who may have difficulty sitting upright, think about:
 - ensuring they are not sliding – which can cause pressure sores from shear (bony areas sliding over soft tissue);
 - ensuring that weight distribution is even under both seat bones.
- For wheelchair users who use PSDs, ensure they regularly check their skin wherever the wheelchair or PSDs are in contact.
- More details on preventing pressure sores is given in the Wheelchair Service Training Package – Basic Level Reference Manual.

**How to care for a wheelchair at home:**

- Providing wheelchair users with basic information about how to maintain their wheelchair at home can help to increase the life of the wheelchair.
- There are six things that the wheelchair users can do at home to look after their wheelchair and cushion taught in the Wheelchair Service Training Package – Basic Level. This information applies to the intermediate level wheelchair users as well. Some additional care can be taken to check that PSDs are in good working order.

What to do if there is a problem:

Wheelchair users need to know what to do if there are any problems. Problems may include:

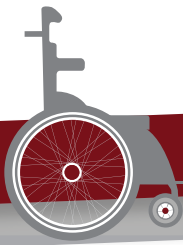
- the wheelchair needs repairs;
- the wheelchair does not fit or is not comfortable.

For any of these problems wheelchair users should be able to contact the wheelchair service for help and advice. Make sure that wheelchair users know how to get in contact with the wheelchair service centre.

How to make wheelchair user training successful

- Find out what the wheelchair user already knows.
- Explain, demonstrate and then allow the wheelchair user to practise.
- Use language that everyone can understand.
- Have wheelchair users teach other wheelchair users.
- Use good communication skills.
- Be encouraging.

Remember – practice is important when learning any new skill. Always try to teach a skill first by demonstrating, and then giving the wheelchair user an opportunity to practise.



Intermediate Wheelchair User Training Checklist

| | Skills to Teach | Skills Taught |
|--|--------------------------|--------------------------|
| Wheelchair handling | | |
| Folding and lifting the wheelchair | <input type="checkbox"/> | <input type="checkbox"/> |
| Taking off and putting back on any PSDs that need to come off for transport | <input type="checkbox"/> | <input type="checkbox"/> |
| Using quick release wheels | <input type="checkbox"/> | <input type="checkbox"/> |
| Using the brakes | <input type="checkbox"/> | <input type="checkbox"/> |
| Tilting and anti-tip bars (if used) | <input type="checkbox"/> | <input type="checkbox"/> |
| Correct position of PSDs when the wheelchair user is in the wheelchair | <input type="checkbox"/> | <input type="checkbox"/> |
| Using the cushion including positioning correctly | <input type="checkbox"/> | <input type="checkbox"/> |
| Transfers | | |
| Independent transfer | <input type="checkbox"/> | <input type="checkbox"/> |
| Assisted transfer | <input type="checkbox"/> | <input type="checkbox"/> |
| Other | <input type="checkbox"/> | <input type="checkbox"/> |
| Wheelchair use and mobility | | |
| Pushing correctly (using the wheelchair user's preferred method) | <input type="checkbox"/> | <input type="checkbox"/> |
| Up and down a slope | <input type="checkbox"/> | <input type="checkbox"/> |
| Up and down a step | <input type="checkbox"/> | <input type="checkbox"/> |
| On rough ground | <input type="checkbox"/> | <input type="checkbox"/> |
| Partial wheelie | <input type="checkbox"/> | <input type="checkbox"/> |
| How long to sit in the wheelchair (for children and adults with additional postural support needs) | <input type="checkbox"/> | <input type="checkbox"/> |
| Assisted pushing | <input type="checkbox"/> | <input type="checkbox"/> |
| Preventing pressure sores | | |
| Check areas of high pressure for pressure sores | <input type="checkbox"/> | <input type="checkbox"/> |
| Pressure relief lifts | <input type="checkbox"/> | <input type="checkbox"/> |
| Eat well and drink lots of water | <input type="checkbox"/> | <input type="checkbox"/> |
| What to do if a pressure sore develops | <input type="checkbox"/> | <input type="checkbox"/> |
| How to care for a wheelchair at home | | |
| Clean the wheelchair; wash and dry the cushion and cushion cover | <input type="checkbox"/> | <input type="checkbox"/> |
| Oil moving parts | <input type="checkbox"/> | <input type="checkbox"/> |
| Pump the tyres | <input type="checkbox"/> | <input type="checkbox"/> |
| Tighten nuts and bolts | <input type="checkbox"/> | <input type="checkbox"/> |
| Tighten spokes | <input type="checkbox"/> | <input type="checkbox"/> |
| Check upholstery | <input type="checkbox"/> | <input type="checkbox"/> |
| Check for rust | <input type="checkbox"/> | <input type="checkbox"/> |
| Check the cushion | <input type="checkbox"/> | <input type="checkbox"/> |
| What to do if there is a problem | | |
| Wheelchair needs repairs | <input type="checkbox"/> | <input type="checkbox"/> |
| The wheelchair does not fit or is not comfortable | <input type="checkbox"/> | <input type="checkbox"/> |

Step 8: Maintenance, repairs and follow up

The information about the maintenance, repairs and follow up was covered in the Wheelchair Service Training Package – Basic Level. At the intermediate level the particular importance of follow up for wheelchair users who use wheelchairs with additional postural support is discussed.

Follow up

Follow up is part of the eighth step in wheelchair service delivery.

Overview of follow up

All wheelchair users benefit from follow up. However, follow up is most important for:

- children;
- wheelchair users at risk of developing a pressure sore;
- wheelchair users who have a progressive condition;
- wheelchair users who need additional postural support in their wheelchair;
- wheelchair users who have had difficulty with any of the training or instruction given to them.

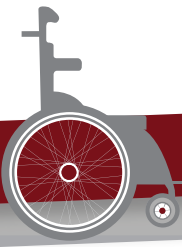
Most intermediate level wheelchair users need additional postural support – and therefore follow up is particularly important.

Managing follow up

There is no rule about when follow up should happen, as the best time to follow up will depend on the needs of the wheelchair user. However wherever possible, follow up within six weeks of providing a wheelchair can be very useful to ensure that the wheelchair is working well for the wheelchair user and to reinforce any user training. For children, it is ideal if follow up is every three to six months. This is because the needs of children change quickly as they grow.

Follow up can be carried out:

- in the wheelchair user's home; or
- at the wheelchair service centre;
- at any other location that suits the wheelchair user and the wheelchair service personnel.



The location depends on whether the wheelchair user is able to travel to the wheelchair service centre, and whether wheelchair service personnel can travel to the wheelchair user's home.

Follow up can be managed in a number of different ways including:

- wheelchair users may be given a follow up appointment when they receive their wheelchair;
- follow up may be carried out in the wheelchair user's home or in the wheelchair service centre;
- follow up visits may be part of routine visits to communities by community-based rehabilitation (CBR) personnel who have been trained to carry out follow up;
- follow up phone calls may be carried out where transport is difficult and the wheelchair user has access to a phone.

Wheelchair follow up form

A wheelchair follow up form (shown below) will help wheelchair service personnel to remember what questions to ask and what to do on a follow up visit. The wheelchair follow up form also has a place to write down any actions that need to be taken.

Common follow up actions

Common follow up actions include:

- **Providing more advice or training.**

For example if a wheelchair user is not using their wheelchair as expected, it may be because they is not confident about how he/she can get in and out of the wheelchair when he/she is alone. More training in transfers can help to solve this problem.

- **Re-adjusting the wheelchair.**
- **Carrying out minor repairs.**

Always encourage wheelchair users and their family members/caregivers to maintain the wheelchair by carrying for a wheelchair at home. Wheelchair service personnel can also help the wheelchair user to arrange for repairs if it is not possible to fix any broken parts immediately.

- **Referring the wheelchair user to another service for support or assistance.**

Follow up visit to Thusitha

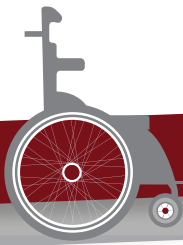
Thusitha is seven years old and lives at home with his parents and older sister. He has muscular dystrophy and received a wheelchair through the wheelchair service a year ago. At that time he could walk short distances. He was able to do a standing transfer in and out of the wheelchair on his own. He said he wanted a wheelchair because he is finding it hard to get to school.

At the follow up visit, Thusitha said that he is now finding it hard to get in and out of his wheelchair himself. He feels tired and uncomfortable by the afternoon at school. This makes it hard to concentrate. His wheelchair is the correct size and has a medium slung backrest with a simple comfort cushion.

During the follow up the wheelchair service personnel:

- Found out how Thusitha was getting in and out of his wheelchair. Thusitha was finding it hard to lift himself off the wheelchair. The wheelchair service personnel taught Thusitha how to transfer with a sliding board, which he found much easier.
- Reviewed Thusitha's additional postural support. It was decided that Thusitha would be better supported with a higher backrest and a cushion with posture control and pressure relief. The wheelchair service personnel took the measurements needed to be able to prepare this for fitting.

An appointment was made for Thusitha to visit the wheelchair service centre for a fitting for his new backrest and cushion.



Wheelchair Follow Up Form

I. Wheelchair user information

Wheelchair user name:

Number:

Date of fitting:

Date of follow up:

Name of person carrying out follow up:

Follow up carried out at: Wheelchair user's home Wheelchair service centre

Other: _____

2. Interview

Record action to be taken:

| | | |
|---|--|--|
| Are you using your wheelchair as much as you would like? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If no – why not? | | |
| Do you have any problems using your wheelchair? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If yes – what are the problems? | | |
| Do you have any questions about using your wheelchair? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If yes – what questions. Is further training needed? | | |
| Do you have any pressure sores? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Describe (location) | | |
| How would you rate your satisfaction with your wheelchair from 1–5? (<i>5 is very satisfied and 1 is not satisfied</i>) | Rate: | |
| Comment: | | |

3. Wheelchair and cushion check

| | | |
|--|--|--|
| Is the wheelchair in good working order and safe to use? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| Is the cushion in good working order and safe to use? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If no for either, what is the problem? | | |

4. Fitting check

| | | |
|---|--|--|
| Does the wheelchair fit correctly? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If no – what is the problem? | | |
| Pressure test level (<i>1 = safe, 2 = warning, 3 = unsafe</i>) (if user at risk of developing a pressure sore) | Left: | |
| | Right: | |
| Is the wheelchair user sitting upright comfortably when still, moving, and through the day? | Yes <input type="checkbox"/> No <input type="checkbox"/> | |
| If no – what is the problem? | | |

For more information, contact.

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ISBN 978 92 4 150576 5

