SECTION 7

Equipment for moving and handling people

Contents

- Using equipment for moving and handling people
- Types of equipment
- Examples of moving and handling equipment
  - Slide sheets
  - Transfer belts
  - Transfer boards
  - Air-assisted transfer devices
  - Electric profiling beds
  - Mobile hoists
  - Standing hoists
  - Ceiling hoists
  - Gantry hoists
  - Fixed wall hoists
  - Slings
  - Stretchers
  - Wheelchairs
  - Standing and pivoting aids (non-electric)
  - Shower and bath equipment
  - Emergency equipment
  - Other types of equipment and aids
- References and resources.

Note: All images and other references to equipment shown in this section are provided for illustrative purposes only. They are not, and should not be taken as, endorsements of specific equipment or suppliers.

7.1 Using equipment for moving and handling people

This section describes the main types and functions of equipment for moving and handling people. Section 8 of the Guidelines, 'Equipment management', covers equipment procurement systems, maintaining an equipment register and equipment storage, maintenance and replacement.

Equipment is a core component in effective moving and handling programmes, together with risk assessments, the use of correct techniques, staff training and appropriate facility design. The supply of equipment by itself will not lead to reduced rates of injury unless equipment use is part of a comprehensive moving and handling programme. Successful programmes provide both equipment and training in how to use specific items of equipment for lifting, transferring and repositioning clients.

The proper use of equipment is essential for the safety of both clients and carers and improves the quality of client care. Equipment can also facilitate client rehabilitation, decrease morbidity and preserve the dignity of clients. Compared with techniques that involve manual transfers of clients without equipment, the use of equipment lessens the forces required for moving and handling clients and can reduce the risks.

Moving and handling equipment also improves client outcomes, such as reducing their length of stay and the risk of complications such as deep vein thrombosis, chest infections, urinary tract infections, pressure ulcers, skin tears and falls.

Having 'fit-for-purpose' equipment is one of the most important aspects of moving and handling programmes. New moving and handling equipment is constantly being developed. With the increasing complexity of equipment and technological developments, information about specific equipment can become outdated. Managers responsible for purchasing equipment, and people providing training in equipment use, need to keep up to date with developments in equipment for moving and handling people. The primary focus of this section is on descriptions of equipment and specific features. Specific procedures for using equipment, such as slide sheets, slings and hoists, are described in Section 4 Techniques for moving and handling people.

7.2 Types of equipment

Table 7.1 shows the main types of equipment used for moving people, and examples of common uses. Some types of equipment are known by several names, as shown. Detailed descriptions of each type of equipment are provided later in this section. For some categories of equipment, there are several related types, which may have different names.

TABLE 7.1 COMMON TYPES OF EQUIPMENT

Type of equipment (and alternative names)	Description and common uses
Slide sheet (sliding sheet, slippery sam)	A sheet made of low-friction material and used under a client to allow easy repositioning in bed, sling attachment and lateral transfers
Transfer belt (handling belt, gait belt, walking belt)	A belt placed around a client's waist during several types of transfer and for assisted walking for rehabilitation. There are multiple types of belt
Transfer board (PAT slide, slide board, banana board)	A full-body-length board made from wood or plastic, used to bridge gaps for client transfers from one surface to another, such as from a stretcher or wheelchair to a bed. Smaller transfer boards can also be used for lateral, seated-to-seated transfers
Air-assisted transfer device	There are several types: inflatable mattresses for lateral (bed-to-bed) transfers and air-assisted lifting devices or 'jacks'
Electric profiling bed (electric bed)	An electrically operated bed that has a mattress platform split into two, three or four sections, which allows adjustment using a control handset or panel
Mobile hoist (floor hoist, floor lift, mechanical lift, portable hoist)	A hoist with wheels that can be moved along the floor – used for lifting a client inside a sling or on a stretcher designed for use with hoists
Standing hoist (sit to stand hoist, standing lift, stand-aid hoist)	A specific type of mobile hoist designed to assist people between sitting and standing positions. Standing hoists are designed to fit under and around chairs
Ceiling hoist (overhead hoist, ceiling lift, mechanical lift, gantry hoist)	A hoist attached to permanently mounted ceiling track that moves a client inside a sling. Gantry hoists have overhead tracks mounted on wheeled frames
Sling	A fabric support used for carrying a client while being moved with a hoist – there are multiple types of sling
Stretcher	A rigid frame used to carry a client in a lying or supine position. Often made of lightweight material and commonly used in ambulances and by emergency services. Wheeled stretchers are used in hospitals for transporting clients between locations, and should be electric
Wheelchair	A mobile chair used for transporting a client in a sitting or upright position. Bariatric wheelchairs must be powered or moved with bed pushers

The main types of equipment that are commonly used can be summarised within the four main groups of client moving and handling tasks. These groups of tasks are:

- Sitting, standing and walking
- Bed mobility
- Lateral transfers
- Hoisting.

Table 7.2 provides a summary of the common types of equipment used for these handling tasks. The recommended techniques for each of tasks in the table below are described in Section 5 of the Guidelines.

TABLE 7.2 HANDLING TASKS FOR WHICH EQUIPMENT MAY BE USED

Type of task	Examples of specific movements	Examples of equipment that could be used
Sitting, standing and walking	Sitting to standing from a chair	Transfer belt, standing hoist, mobile hoist, chair-lifter
	Standing to sitting on a bed	Transfer belt
	Assisted walking	Transfer belt, walker, gutter frame, hoist with walking harness
Bed mobility	Turning in bed	Slide sheets, electric bed with turning function
	Sliding client up in bed	Slide sheets, electric bed
	Sitting person up onto edge of bed	Slide sheets, electric bed, bed accessories
Lateral transfers	Lateral transfer from bed to stretcher	Slide sheets, transfer board, air mattress, standing hoist
	Transferring from chair to commode	Ceiling hoist, mobile hoist, seated transfer board, standing hoist
	Transferring to toilet	Ceiling hoist, mobile hoist
Hoisting	Fitting a sling to client in bed	Sling
	Hoisting from bed to chair	Ceiling hoist, mobile hoist, standing hoist
	Hoisting client from floor	Ceiling hoist, mobile hoist, air jack
	Transferring to toilet	Ceiling hoist, mobile hoist, standing hoist

7.3 Examples of moving and handling equipment

The next part of this section provides examples of the more commonly used types of equipment for client handling. Further information about specific types and functions of equipment can be obtained from the websites shown at the end of this section, and from companies supplying healthcare equipment in New Zealand and Australia. Training in proper use is essential for all types of equipment.

Slide sheets

Slide sheets are one of the most commonly used types of equipment in healthcare services. They are used to move clients horizontally on beds, trolleys and chairs without lifting. Slide sheets are relatively low cost, have many uses and are relatively simple to use. They avoid the need to lift clients, but despite their simplicity they do require training in their proper use.

FIGURE 7.1

Slide sheets

It is important that the use of slide sheets is consistent with current best practice, as described in Section 4 Techniques for moving and handling people. Training is necessary in the correct application and use of slide sheets. Incorrect use can cause injury to both carers and clients. Slide sheets are made from lightweight fabric and have low-friction surfaces that become very slippery when placed together. They come in different configurations: the fabric may be sewn together to make a double sheet, or they may come as single sheets that the carer folds over to form a double layer. Two sheets can also be used together. They may or may not have handles for hanging up. Two single sheets are preferable as they are multidirectional and allow optimal movement.

There are several handling techniques that use slide sheets (see Section 4 Techniques for moving and handling people). Using them underneath a person allows an independent or assisted sliding movement on a bed. They can be used for many tasks involving lateral transfers and repositioning, such as:

- Moving a client in bed
- Turning a client on to their side in bed
- Transferring a client from a bed to a bed with a transfer board
- For a client who has fallen into a confined space; slide sheets can be used to move the client along the floor to a location where a hoist can be used
- Facilitating independent bed mobility.

Slide sheets come in different sizes and they may be padded or unpadded. Slide sheets with loops can be stored on hooks beside clients' beds.

Points to note about slide sheets

- Always conduct a risk assessment prior to moving a client
- Most slide sheet transfers require two carers
- The risk assessment should include skin integrity, pressure areas, wounds, attachments and sensitivities
- Assess pain management
- Encourage mobility where possible
- When moving large clients, ensure there is a sufficient number of correctly sized slide sheets and enough staff for the transfer
- Infection control considerations require slide sheet use with one client only before being laundered
- Slide sheets should be accessible beside the bed of the client for whom they are required – a suitable storage facility is needed, such as a hook, container or fabric holding bag
- When a client is discharged or moved to another location, or the sheets become soiled, the slide sheets should be sent for laundering
- Bed-to-bed transfers should always use both slide sheets and a transfer board
- Most types of slide sheet are designed to be laundered (see Section 8, Table 8.2). The usual slide sheet lifespan is around 80 washes, depending on the quality
- Slide sheets must be inspected for tears and other damage before use.

FIGURE 7.2

Store slide sheets beside bed

Slide sheets can be used multiple times on the same client and require laundering when soiled, or before using with a different client. Organisations need to have a system for laundering slide sheets separately from regular laundry, as a hot wash destroys the fabric, reducing the lifespan of the slide sheet. Slide sheet care should be outlined in the organisation's moving and handling policy. There are also disposable slide sheets for single client use only, which are discarded when no longer needed for that client.

Transfer belts

Transfer belts are fastened around clients' waists or trunks during transfers and for assisted walking. They are primarily for clients who are mobile. The main function of transfer belts is to assist almost independent clients in mobilising. They can also

assist with clients who might be difficult to hold, either because of size, or discomfort (male walking female) or because the client is uncomfortable with being assisted. The belts can provide an extra layer between carers and clients. Belts designed specifically to assist clients when walking are sometimes referred to as 'gait belts'.

Transfer belts are used to assist the development of mobility and rehabilitation for clients who are minimally dependent, have weight-bearing capacity and are cooperative. Types of use include bed-to-chair, chair-to-chair and chair-to-car transfers, repositioning clients in chairs, and supporting clients while walking.

There are multiple types of belt. Most belts are made of fabric or cushioned material and have multiple loops or handholds.

FIGURE 7.3

Transfer belt

The belts are secured around clients' waists and adjusted until they are firm, not tight. Transfer belts should only be worn by clients, never by carers.

Points to note about transfer belts

There are some risks for carers associated with using transfer belts. For this reason, some moving and handling coordinators recommend that transfer belts not be used for client transfers. If used, the carer should hold on to the handles from the outside, and never put their thumbs inside or through the loops (in case the client falls and the carer cannot disengage their hands). Transfer belts should never be used to lift clients.

Transfer boards

There are multiple types of transfer board and related assistive devices. Full-body-length transfer boards (sometimes labelled as PAT slides or Transglides in New Zealand) are used to bridge gaps for clients who are lying down when sliding between two adjacent surfaces at similar levels, such as from a bed to a stretcher. They are usually made of plastic and should be used in conjunction with slide sheets. Smaller transfer boards can be used for seat-to-seat transfers, such as between a car seat and a wheelchair.

FIGURE 7.4

Full-length transfer board

In the past, roller boards have been used as lying-to-lying transfer devices. These boards have a loose vinyl covering that is difficult to clean and potentially an infection

control risk. These boards create risks for carers when reaching and risks for clients with skin shear. It is recommended that roller boards be replaced with full-length transfer boards.

Sitting-to-sitting transfers

For sitting-to-sitting lateral transfers, a smaller transfer board or slide board can be used to bridge gaps between adjacent seats. These boards can be straight or curved like a boomerang (an example is the yellow 'banana board'). Small transfer or slide boards can be used for lateral transfers such as those between a:

- Chair and wheelchair
- Bed and wheelchair
- Wheelchair and toilet
- Wheelchair and car.

FIGURE 7.5

Sitting transfer board

Curved transfer boards make it easier to transfer around fixed armrests. The boards are usually prescribed by therapists. Note that clients should have sitting balance to use these boards and both carers and clients require training in their use. If feasible, arrange to have the surface to which the client is being transferred slightly lower than the surface from which they are being transferred. This makes it easier for the client to move.

Air-assisted transfer devices

There are a number of air-assisted transfer devices available. There are two general types: inflatable mattresses for lateral (e.g. bed to bed) transfers and air-assisted lifting devices, or 'jacks'. These devices are generally versatile and cost effective, especially for small facilities.

FIGURE 7.6

Air-assisted mattress

Inflatable mattresses

For lateral transfers while lying down: the client lies on the mattress while the client and mattress are transferred between two adjacent surfaces, and air-assisted lifting devices. A lateral transfer air mattress can be used as an alternative to a transfer board and slide sheets. The mattresses are effective for reducing friction, and thus the load on carers during lateral transfers.

Air jacks

Air-assisted lifting devices, or 'jacks', can be used to raise clients from the floor to bed or stretcher level by pumping air into an air mattress with multiple layers, which expand vertically as more air is pumped in. The jacks can be very useful for lifting fallen clients from the floor. Figure 7.7 shows an example of an air jack that lifts clients in a sitting position. Figure 7.8 shows a 'Hoverjack' that lifts clients in a lying position from the floor to bed height. All types of air-assisted device require carers to steady the client, and an air pump.

FIGURE 7.7

Air-assisted jack

FIGURE 7.8

Air-assisted 'Hoverjack'

Electric profiling beds

An electric profiling bed has a mattress platform comprising two, three or four separate sections, each of which can be adjusted using a control handset or panel. Height adjustment allows the bed to be raised or lowered quickly for client movements and clinical services.

Some electric beds have one movable section in which only the head or backrest section can be raised, allowing a client to sit up in bed. With these beds, clients are more likely to slide down the beds and may need frequent help from carers.

FIGURE 7.9

Example of an electric bed

FIGURE 7.10

Electric bed showing profile positions

The general benefits of electric beds are:

- Promotion of client mobility and independence
- Reduced workload for staff
- Reduction in manual handling risks and injuries to staff
- Reduced incidence of pressure sores in clients.

With electric beds, staff can adjust the height more accurately to suit individual client and carer needs. Being able to stand back and observe a client while operating a bed allows staff to observe the client moving into different positions. Improved client comfort is more likely as adjustments of the beds are usually smoother than with beds requiring a hydraulic pumping action.

All clinical areas and clients benefit from the bed height adjustment that allows low bed heights. Electric beds also facilitate clients getting out of bed by raising them closer to a standing position. Staff time can be saved by the reduced need for manual handling of clients and the removal of hydraulic pumping on non-electric beds.

Points to note about electric beds

- **Mattress compatibility**: Some electric beds may require special sectioned mattresses. Beds requiring special mattresses may mean replacing beds as a combined bed and mattress procurement
- **Size**: Electric beds can be large. Beds with a longer-than-average length may lead to reduced space in areas such as multi-bed units. They can be difficult

BOX 7.1

Compatibility of electric beds and mobile hoists

A common problem I have come across is the incompatibility of some cheaper electric beds with mobile hoists. The beds do not allow clear access underneath for the hoist legs to go under. Staff have to push and pull resulting in jerky movements for the resident. There was an incident where electric bed wires under the bed caused an accident when the hoist was pulled over the wires and the patient fell out of the sling. Manufacturers need to provide a way of hooking up the wires out of the way.

Source: Manual handling trainer

to manoeuvre in tight corners and narrow corridors and through doorways and hospital lifts

- **Compatibility with other equipment**: Mobile hoists usually need positioning under beds. Can the supplied mobile hoists fit under the bed at its lowest setting?
- **Weight and portability**: The portability of electric beds is a consideration for community use owing to the need to transport the beds and assemble them in clients' homes and other residential settings. In hospitals, beds may need to be moved from ward to ward. Being able to move and steer beds may be a consideration. The heavy weight of many electric beds may be an issue when beds are used to transport clients through carpeted areas or up sloping corridors. A mechanical bed pusher can be used to assist with mobility of the beds
- **Installing new beds:** Whenever new equipment is purchased, plan for all relevant carers to be trained in its use. Beds are becoming more complex and all practicable steps should be taken to ensure their safe use.

Specific features

Electric beds come in many shapes and sizes. They can include many features that are not apparent on a brief inspection. Some potentially useful features are described below.[1] When purchasing electric beds, the assessment and procurement procedures need to take into account the types of client that will be using the beds and the bed features that will most often be used by carers.

- **Minimum height**: Some models of bed are quite high when in their lowest positions for small clients. Short clients can find it difficult to place their feet on the floor when transferring off and onto the bed edge, reducing their independence. A similar problem can occur with the use of pressure-reducing overlay mattresses, as the height increase can cause transfer difficulties for some clients. Some electric beds are designed to go down close to floor level (sometimes referred to as 'floorline' beds) and can be used in falls management

FIGURE 7.11

Example of an electric bed that can lower close to floor level

- **Number of sections**: Beds with four sections are most versatile for positioning clients. However, beds with two or three sections are available

1. Some of the points in this section are from the report by MHRA, 2003.

- **Bed-to-seat or bed-to-stand profiling**: Some models of electric bed allow the profile of the bed to convert to a seat or to a standing position while the client is in the bed. This avoids the need for carers to fit slings on clients who are lying down, or manually repositioning clients from lying to sitting and sitting to standing
- **Side rails**: Rails at the side of the bed that can be raised or lowered prevent clients rolling out of bed. The minimum height to which beds can be lowered may be compromised by the use of side rails, particularly drop-down rails and those that fold underneath the bed. Side rails need to be adjustable to allow transfers between bed and stretcher. Side rails are a recognised form of restraint, and if being used for restraint need to be noted in the restraint register, consistent with organisation policy. Split rails are preferable and seen less as a restraint

FIGURE 7.12

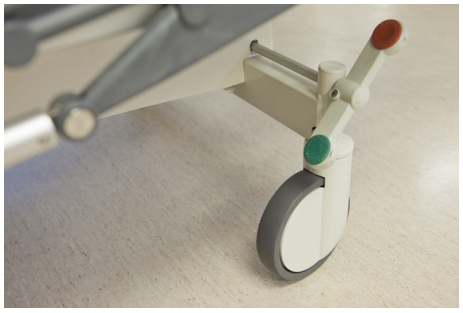
Side rails on a bed

- **Turning function**: Some beds have turning functions that allow clients to be turned on their sides. Depending on the type of bed, turning can be activated by the client in bed or by a carer, or the bed can be programmed to turn at set intervals. Caution must be used with turning functions as there is the potential for limbs to be trapped, particularly with clients who have decreased sensation or communication difficulties. Mechanical turning does not replace the other functions of carer-provided turning of a client, such as checking breathing and skin and providing human contact
- **Battery backup**: Being able to operate beds on backup batteries may be needed where clients are moved between locations in bed, or where access to electrical sockets is limited
- **Manual operation**: Is there provision for manual operation in case of battery or electrical failure? The manual levers need to be identified easily by staff
- **Cleaning and infection control**: The component area of the electric bed frame and any attachments should be accessible for cleaning. Ease of cleaning is best assessed when trialling a bed
- **Preventing client moving down the bed**: Clients often move down their beds when moved from lying to sitting positions. On electric beds, this may occur as the beds are profiled to lift up clients' heads. This can be avoided if the beds include a feature called 'auto-regression' of the backrests in the bed specification

- **Lockout facility**: A facility to lock the adjustments to prevent beds being profiled or tilted may be important in clinical areas where it is necessary to prevent knee flexion or other movements in clients who need to be nursed flat. The lock-out feature may also be useful during visiting times to avoid mishaps associated with visitors
- **Wheel locks**: Locks on bed wheels are used to prevent beds being moved. These are important for some types of transfer, such as bed-to-bed transfers using transfer boards
- **Handsets**: Two features of the control handsets to assess are the robustness of the handsets and control panels, and their ease of operation

FIGURE 7.13

Wheel locks on a bed



- **Other features**: There are a number of other specialist operations and functions available on some electric beds. These include weighing scales built into the beds, motorised beds that assist movement along corridors, and anti-fall alarms.

Bed accessories

There are multiple accessories, or add-ons, for beds that can be useful for some types of client and setting, especially in community settings where electric beds are not available. These include:

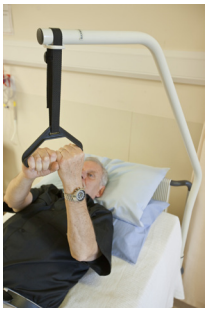
- **Bed ladders**: Small ladders or steps placed at the sides or ends of beds that allow partially mobile clients to get in and out of bed
- **Bed or hand blocks**: Hand blocks have wide bases and handholds. They are used in pairs by clients who are sitting in bed
- **Bed levers**: A bed lever is a grab rail that a client can use to help them sit up or turn over in bed. There are various types and they can be fixed to the wall, bed or floor. Some may obstruct part of the bedside, making it difficult for the client to get in and out of bed, while others are adjustable and can be moved away from the bed. Bed-fixed levers must be securely positioned and fitted to be safe for use. Some bed-fixed levers have platforms or rails that go under the mattresses, so they are secured in position by the clients' body weight
- **Rope ladders**: A rope ladder helps the client to pull themselves up in bed from a lying position to a sitting position. It has plastic or wooden rungs linked together with rope to form a ladder. The ladder attaches to the foot or base of the bed. Rope ladders are unstable to pull up on and often need practice to master. Clients need to have strong upper limbs and abdominal muscles. It is

essential that the rope ladder is securely fixed to the bed and the client can reach the first rung when they are lying on the bed. Rope ladders with plastic rungs may be slippery to hold

- **Overhead poles**: Overhead or lifting poles (sometimes called 'monkey poles') are used by clients to move in bed, such as up and down the bed and in and out of the bed. They can also be used by clients to lift themselves so that bedpans can be placed under them. Most overhead poles use floor- or bed-mounted cantilever gantries, with handles hanging from them on height-adjustable straps. The gantry frames must be secured to stop them tipping. All poles should have safe working loads (SWLs) clearly marked on them

FIGURE 7.14

Overhead pole



- **Bed lifters**: These are used to lift beds to suitable working heights so that carers do not have to stoop. They are suitable for non-electric beds, such as in homes where they allow clients to continue using their own beds. They do not provide profiling actions, and they require sufficient space to get under the beds

- **Bed movers**: These battery-operated devices (see Figure 7.15) attach under the foot ends of beds and allow operators to transport beds and clients to other locations. They have controls that allow manoeuvring in confined spaces and steering along corridors. Their positioning allows the operators to see the clients during use. Bed movers reduce strain on staff who regularly move beds during their work shifts. However, they increase the overall length of the beds and may not fit in lifts. Bed movers require additional storage and it may be difficult to have movers kept where needed.

FIGURE 7.15

Bed mover

Hoists

There are three general categories of hoist: mobile floor hoists, standing hoists and ceiling hoists (sometimes called overhead hoists). In some countries hoists are called lifts or mechanical lifts. All hoists use slings to hold clients, and some hoists can lift clients in specially designed stretchers. All hoists should be compliant with the Standards New Zealand requirements in AS/NZS 3551:2004 Technical management programs for medical devices. This standard covers procurement, acceptance process, safety and performance testing and disposal.

The types of sling used with hoists are described later in this section. All hoists, slings and ceiling tracking should be clearly labelled with their SWLs.

All carers using hoists should be trained in fitting slings and in the proper use of hoists prior to using them. Carers also need to be familiar with the specific functions of particular types or models of hoist. Like other moving and handling equipment, hoist designs and features are continually evolving.

Mobile hoists

Mobile hoists (sometimes called mobile floor hoists) are used to transfer clients who are not mobile between locations, such as from a bed to a chair or a bathroom. They can also assist with ambulation, gait training and other specialised functions. The client is supported in a hoist sling, which should be single-client assigned for infection control.

Mobile hoists can be very cost effective, as they can be moved to different locations in a facility. One hoist can be used for a variety of tasks. Normally two carers are required when hoisting a client with a mobile hoist.[2]

2. Procedures for using mobile hoists for specific moving and handling tasks are described in Section 4 'Techniques for moving and handling people'.

BOX 7.2

Parts of a mobile hoist

- **Boom** (goes up and down)
- **Sling bar**, spreader bar or yoke
- **Legs** (move in and out)
- **Mast** – upright part of hoist
- **Handles** – for manoeuvring the hoist
- **Brakes** – only to be used for storage. Do not use brakes when hoist is in use as the hoist needs to find its own centre of gravity, otherwise it may tip over
- **Emergency stop button** (if hoist is not working, check it is not pushed in)
- **Emergency lower buttons** (you may need extra pressure to come down on older hoists)
- **Weight limit** (SWL)
- **Maintenance alert** – do not use if out of date.

FIGURE 7.16

Example of a mobile hoist

Mobile hoists come in multiple designs. All have central lifting frames with booms and sling bars (also known as spreader bars or yokes) to which the slings are attached using the hooks or clips on the bars. The bases or legs have wheels that allow the hoists to move along the floor. Some have bases that can expand or contract in width to fit around or under commodes, shower chairs, recliners, wheelchairs and beds. Some hoists are foldable or collapsible. Some mobile hoists have vertical lift movements and some have arc movements. Vertical lift movements generally provide a higher lift and can usually be used for assisted walking with walking slings. Nearly all mobile hoists are battery powered, so a routine battery-charging system is required.

BOX 7.3

Using a mobile hoist without training

I was a nurse aide in this rest home. One day the manager wheeled in a hoist and told me to use it to lift the patient who was sitting on a commode and left me to it. So I hoisted a patient complete with commode and all. I didn't have any training on how to use the hoist.

Source: Patient handling trainer

Mobile hoists can have some disadvantages. Carers may need a lot of strength to move mobile hoists, in areas with carpet (especially if the hoists have small wheels), through doorways and in sloping corridors. There needs to be enough space in the room to use a mobile hoist and sometimes furniture can restrict movement. When using mobile hoists over beds, some cannot lift high enough to allow the clients to clear the beds, especially beds with pressure-care mattresses. Some beds may not have enough space beneath to allow the hoist base to get underneath.

Points to note about mobile hoists

While mobile hoists can be versatile, users should note the following specific features and potential limitations.

- Mobile hoists need adequate storage space close to locations where they are used. They require more storage space than ceiling hoists
- Most mobile hoists are powered by batteries that need regular charging. They need a system for routine charging of batteries. If batteries are detachable, it is desirable to have two batteries for each hoist so that one battery is always being charged
- All mobile hoists should have a sticker or certificate with dates for routine checking and servicing. A hoist should not be used if the expiry date on the sticker has passed
- All hoists should be labelled with a SWL. As part of risk assessment, a client's weight should be checked to ensure it is less than the SWL of the hoist, prior to lifting
- Wheel brakes are fitted on most models of mobile hoist. The brakes should not be applied while hoisting a client. Mobile hoists are designed to move while hoisting clients so that the sling bar is over the centre of gravity of the load
- It can be unsafe to use a mobile hoist on a sloping floor or surface where there is a risk that the hoist can tip over
- Not all mobile hoists can lift clients safely from the floor. To do this, the feet or base of the mobile hoist must be designed to allow a floor lift. If this feature is needed, check that the model being considered can do this safely

BOX 7.4

Lifting equipment reduces assaults on carers

Assaults by residents on caregivers in a residential care facility reduced after equipment to lift and transfer residents was introduced and carers were trained how to use the equipment. Residents felt caregivers could be trusted to move them comfortably and safely. Also, the physical separation between the caregiver and the resident through use of the lift, particularly patients with a known history of violence, is likely to have reduced assaults on caregivers when using lifts.

Source: Collins et al, 2004

- Lifting height – not all mobile hoists can lift clients high enough to clear beds, especially if the beds have pressure mattresses
- Some hoists allow for interchangeable spreader bars; others require that only the manufacturers' spreader bars can be used
- Some hoists allow different types of sling to be used, while others require that only the manufacturer's sling for each model of hoist can be used. If several models of mobile hoist are used in a facility, the interchangeably of spreader bars and slings should be considered.

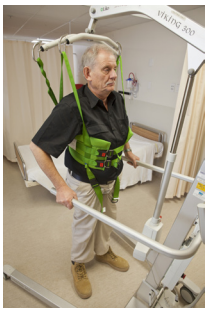
Mobile hoist features and accessories

The following accessories and features are available on some hoists, or can be purchased as optional accessories.

- A hand-held control panel to operate the hoist – it needs to be able to clip on to the upright frame of the hoist
- A walking sling allows a mobile hoist to be used for mobility and rehabilitation (see Figure 7.17)
- Scales to weigh clients are available on some hoists. When fitted as an additional attachment above the sling bar, scales may reduce the lifting height

FIGURE 7.17

Example of a mobile hoist with walking sling and gait training bars



- All electric hoists must have emergency stop buttons and manual release mechanisms to allow clients held by the hoists to be lowered without battery power
- A low-battery-level indicator or warning light is desirable
- The length of the boom to which the spreader bar is attached needs to be considered when hoisting a tall or large client. A longer boom provides more leg room between the sling and the upright frame. However, with a shorter boom the client can sit with both knees on one side of the frame, which reduces the risk of their knees knocking against the frame
- Gait training bars assist with mobility (Figure 7.17) and are useful for turning hoists
- Stretcher attachments (Figure 7.18) enable the immobilisation of potential spinal cord injury clients and are useful in any trauma or suspected injuries after falls. They can also enable the weighing of these clients if they have weigh scale accessories.

FIGURE 7.18

Example of a mobile hoist with a stretcher attachment

Standing hoists

A mobile standing hoist (also called a sit to stand hoist and standing lifter) is a specific type of mobile hoist used to move a client from one seated surface to another, such as from a chair to a toilet. The hoist has a platform or footrest on which the client stands. The client is supported by a sling fitted around their trunk (a special sling known as a 'standaid sling') and by a leg brace or knee block that has strapping to hold the client's legs in place. Standing hoists are suitable for clients who are partially weight bearing and can support most of their own weight while standing.

FIGURE 7.19

Example of standing hoist

FIGURE 7.20

Example of standaid sling

Standing hoists are useful as they allow more access to clients' clothing than sling hoists. For this reason, they are useful for moving clients from one seated position to another and can assist with toileting partially mobile clients. They also have a therapeutic benefit for clients in providing an opportunity to increase weight-bearing tolerance. They should only be used for transporting clients for short distances, such as within a room or to an adjacent bathroom, not for longer distances such as corridors.

Points to note about standing hoists

- It may be easier to use a standing hoist rather than a mobile or overhead hoist for toileting as long as the client has sufficient weight-bearing capacity
- Extra care needs to be taken with clients with specific clinical conditions, such as low muscle tone, osteoporosis, spinal metastasis and difficulty standing with their feet flat
- Standing hoists should have adjustable legs to go under and around chairs and toilets.

Ceiling hoists

Ceiling hoists or ceiling lifts have tracking fastened along the ceiling and are generally a permanent feature built into either a single room or multiple locations in a unit or facility. Some versions of ceiling tracking are designed to be relatively portable; the tracking can be removed when no longer needed. Gantry hoists have the tracking mounted on a mobile frame and can provide a hoist for a single room where, for example, the main use is for transfers to and from a bed.

FIGURE 7.21

Example of a ceiling hoist with a fixed unit

Ceiling hoists have four major advantages over other types of hoist:

- They require less force to move
- Because of their immediate availability, there is a higher likelihood of use when needed
- Floor coverings and uneven surfaces do not affect use
- They have minimal storage space requirements.

However, there are some disadvantages: the use of ceiling hoists is limited to areas with tracking installed; and hoists with fixed ceiling tracking may initially be more expensive to install than providing gantry hoists or mobile hoists.

Ceiling track (and gantry hoist) systems can usually lift over a greater height range from ceiling to floor than mobile hoists. Ceiling track and gantry hoist systems require less space to operate than mobile hoists and should be considered if space is restricted.

The hoist may have a portable hoist unit or motor that can be lifted off the track, or a fixed hoist unit that is permanently attached to the track. Table 7.3 outlines some of the advantages and disadvantages of fixed and portable ceiling hoist units. Electricity to run the hoist unit can be supplied through the track, or by a battery fitted into the hoist unit. Some units are only motorised for lifting clients in slings and not for moving clients along the track. These units require carers to push clients along the track. Other units have motor functions for both lifting clients and moving clients along the track, operated by a remote control.

TABLE 7.3 PORTABLE AND FIXED HOISTS FOR CEILING HOIST SYSTEMS

Portable hoist unit	Fixed hoist unit
Charging facility for hoist unit is usually off the track; may be less accessible	Option of wall-mounted docking unit or on-track charging
Manual handling required to attach unit to track	No manual handling of hoist unit required
Can be moved to other tracks when needed or stored when not needed	Can only be used on track where fitted
Requires additional time and effort to attach the hoist to tracking. This is likely to be a disincentive for staff using the hoist	Staff more likely to use the hoist if it is permanently attached to tracking

Ceiling track systems

For ceiling hoists, there are multiple track systems available. The type of ceiling track system selected will depend on the types of use intended. For single rooms, straight tracking may be the easiest to install. However, its major limitation is that it only allows the lifting and moving of clients in a straight line. Adding curved sections of tracking allows increased coverage, especially in bathrooms (see Figure 7.22).

FIGURE 7.22

Examples of ceiling tracking into a toilet

The most versatile tracking system is a parallel tracking pattern called the 'XY' system, which provides full room coverage. With this system a client can be moved anywhere in the room. The XY system has two straight sections of track on each side of the room, parallel to each other, with another track joining the two. The joining track can slide along the two parallel tracks.

More complex track systems are available for healthcare facilities where transfers between rooms, such as bedroom to toilet, are required. For example, 'gates' (for transit between two adjacent track systems) and 'turntables' (which allow movement from one track to another at track junctions) can also be fitted to increase the versatility of ceiling tracking systems. More information about the installation of ceiling track systems is provided in Section 9 Facility design and upgrading.

Points to note about ceiling hoists

- Ceiling hoists are usually permanent fixtures, so the building structure must be suitable. Some structural considerations could be whether ceiling joists need to be reinforced, and whether doorways need to be altered to accommodate tracking
- Retrofitting is possible for most types of structure and ceiling
- Ceiling tracking can be most cost effective when incorporated into a new building or installed during planned renovations
- All electric hoists must have an emergency stop button and manual release mechanism to allow clients on the hoists to be lowered without battery power/electricity supply
- All ceiling hoist units should have a sticker or certificate with dates for routine checking and servicing. Hoists should not be used after the expiry dates on the stickers
- All hoists and ceiling tracking should be labelled with the SWL. As part of risk assessment prior to lifting, a client's weight must be checked to ensure it is less than the SWL of the hoist and track.

Ceiling hoist features and accessories

The following accessories and features are available on some ceiling hoists or can be purchased as optional accessories:

- Scales to measure a client's weight are available on some hoists
- A low-battery-level indicator or warning light is desirable
- A walking sling allows a ceiling hoist to be used for mobility and rehabilitation.

Gantry hoists

A gantry hoist may be a preferred option where fitting ceiling tracking is too expensive or where a large-capacity hoist is only required for a limited time. The transfer range of gantry hoist systems is limited by the length of the track. Some versions of gantry hoist are semi-portable and can be disassembled and transported by vehicle.

FIGURE 7.23

Gantry hoist

Fixed wall hoists

A fixed wall hoist is a permanent fixture beside a client's bed or in a bathroom (it is sometimes called a bathing hoist), and swings to allow the client to be moved from wheelchair to bath. It can only be used for short transfers, for instance from a bed to a bedside commode chair. The brackets for the swinging hoist frame can be fixed in various locations in a hospital or facility so that the portable hoist can be attached when needed. Fixed wall hoists can be located in small rooms where there is not enough room to use mobile hoists. They also provide an alternative if the building structure does not allow overhead tracks to be installed.

Fixed wall hoists can be useful in nursing and residential homes where hoist use is variable. Brackets can be installed in multiple rooms and the hoists moved around as needed. However, fixed hoists do have some disadvantages. They are usually more expensive than mobile hoists. As the brackets are permanently mounted, positioning must be carefully planned to suit the room layout and transfer needs. Once the hoist brackets have been fitted, the client's bed and other nearby furniture usually need to stay in the same location in order to use the hoist.

Slings

Slings are used to support clients being moved with hoists. The sling is attached to hooks or clips on the hoist spreader bar or yoke to provide support for the client while they are being moved. There are several types of sling available that are made from various materials. Becoming familiar with the multiple types of sling is an essential part of using hoists. Training programmes typically spend some time on teaching the correct use of slings. Accidents that occur during the use of hoists often involve incorrect sling use. Table 7.4 summarises some of the key features of slings.

Choosing the right sling and fitting it correctly improve comfort, dignity and safety for the client. Having a comfortable and secure experience can help to overcome a reluctance to use a hoist, which some clients have. Generally, the more material a sling has the greater the comfort and support it provides.

TABLE 7.4 SLING FEATURES AND FUNCTIONS

Sling feature	Sling type	Functions
Fabric or material	Synthetic	Most common type of sling for general purpose use
	Mesh	Used for bathing
	Sheepskin or quilt lined	For clients with fragile skin or increased pain when being hoisted
Single or multiple client use	Disposable	For use with one client only. Usually has a 'Do not use' tag that becomes visible when washed
	Washable	Can be used and laundered multiple times
Shapes and functions	Divided leg sling	Most common type for general lifting
	Hammock sling	Used for lifting clients who require additional support
	Toileting or access sling	Designed for toilet use or to allow access to clothing; has less fabric for support
	Walking sling	Supports a client when walking

Points to note about slings

- **Compatibility of slings with hoists**: Some hoists are designed to be used with only a specific type of sling. Other hoists can use multiple types of sling. This point should be checked in the hoist instruction manual or with the supplier. When ordering new slings or hoists it is important to know whether the new versions will be compatible or interchangeable with any existing slings or hoists. If they are not compatible, more work will be required to maintain and service different sling and hoist systems. It is possible to use multiple brands of sling on some hoists, but this requires a suitably qualified person to document compatibility, preferably with agreement from the suppliers.
- **Reusable and disposable slings**: Most facilities have reusable slings that are washed before use with another client. However, if heavy soiling is likely or infection risk is high, disposable slings may be preferred. Disposable slings are for one-client use only and should be disposed of when soiled or no longer needed for the client. They must not be washed or cleaned then reused.

FIGURE 7.24

Example of labels

- **Laundry services**: There are several ways to launder slings and each facility needs to have a system in place. These systems include: the facility owns the slings and they are cleaned by its own laundry; the facility owns the slings and its laundry contractor cleans them as an added service; and the contract laundry service provides the slings in agreement (e.g. types, numbers) with the

facility and cleans them. Note that some external laundering services provide specific brands of sling only.

- **Standard labelling**: Each sling should be labelled with the following details:
  - The name of the sling or its model number
  - The names or types of hoist for which the sling is designed
  - The size of the sling
  - The SWL of the sling
  - Any special washing, drying and sterilisation instructions
  - The manufacturer's name or logo, or registered trade name.
- **Checking slings**: All slings should be checked before they are used:
  - Check all loops at connection points for signs of fraying and loose stitching
  - Check entire sling body for loose stitching, rips, holes and bleach staining
  - Check for signs of fabric weakening, such as heat damage, distorted fabric and staining
  - Check all buckles
  - Size, shape and fitting of slings.

FIGURE 7.25

Standard slings

FIGURE 7.26

Fitting of sling so lower loops cross between client's legs

Slings are available in multiple sizes to suit the weights and body sizes of clients. Sling sizes can range from very small to extra large. The sling size will be shown on a label attached to the sling. Most slings are now colour coded; the size indicated by each colour should be shown on a sticker attached to the hoist that will be used with the sling. Not all manufacturers use the same colours to indicate sling sizes, so this should be noted if using slings with different hoists. Sling sizes may vary between manufacturers, so carers need to measure the sling for each client to ensure the correct size is used. When ordering slings, ensure each sling is labelled with its size and SWL, which should be in kilograms for use in New Zealand. If the sling is too large, there is a risk of the client slipping out of the sling. A sling that is too small can

result in the spreader bar coming too close to the client's face, can be tight in the crotch and cause discomfort, or may not provide enough support for the back.

Slings have loops or straps that are attached to spreader bars on hoists. Sometimes these straps are adjustable and can be set for a specific client by being marked with a piece of wool or a pen to identify the setting for the client. This means they can be hoisted in the same position with different carers.

Table 7.5 summarises the more common types of sling and these are described in more detail below. There are other types of sling, such as amputee slings, that require specialist knowledge for use. Clients with hip replacements, morbid obesity, bilateral amputations or other complications may require specialised transfer assessments and specialty slings.

TABLE 7.5 TYPES OF SLING AND PURPOSES

Type of sling	Purpose	Limitations and comments
Standard or divided leg sling (universal sling)	A U-shaped sling for general lifting	Not suitable for toileting or clients who can only be transferred in a lying position
Access or toilet sling (hygiene sling)	Allows more access to clothing for toileting	Client needs some upper limb and truck control
Hammock sling	A rectangular sling that supports the body over a large area	More difficult to put on and take off the client than a standard sling – no access to client's body for washing
Repositioning sling	A full-body sling used for turning or positioning in bed	A specialised sling for clients who need turning regularly
Stretcher	Allows movement of a client in a lying position	The hoist must be designed to be used with a stretcher
Walking harness sling	Allows support for a client while walking	Mainly used with ceiling hoists or mobile hoists where the boom can be raised high enough

Standard or divided leg sling

FIGURE 7.27

Standard sling

This is a U-shaped sling and may or may not have upper back and head support. Its advantages are that:

- It is easy to put on when the client is sitting or lying
- It covers a large surface area of the client's body and is more comfortable than a toilet sling
- When the leg bands are positioned correctly, there is less likelihood of the client slipping or falling out of the sling
- The standard sling can be used to pick up a client off the floor.

Some disadvantages are that standard slings may not be as suitable for bathing and toileting as the access or toilet sling. The leg bands or straps can be uncomfortable for the client if they are not positioned correctly or if the client is left in the sling for too long.

Access or toilet sling (hygiene sling)

Toilet slings provide split leg support and upper-mid-back support. Some slings come with waist support instead of upper-mid-back support. The advantages of this sling are that it is useful for toileting if the client has some upper limb and trunk control, and it can be put on a client in most positions. It provides good access for washing as well as toileting. Some clients may be able to put this sling on independently.

Toilet slings have disadvantages. They do not provide as much support as standard slings, so they should only be used for a short time. A client with reduced muscle tone has an increased risk of slipping through the sling. The client must be able to cooperate fully and not raise their arms over their head.

Hammock sling

This is a rectangular sling. Some have commode openings. It is comfortable to use as the client's body is supported over a larger area than in a standard sling. There is less likelihood of discomfort or damage to the client's skin. It is suitable for lifting the client off the floor. Some disadvantages are that it can be difficult to put on and take off when the client is seated or lying in bed, and there is no access to the client's body for washing, even if the sling has a commode opening.

Repositioning sling

This is a specialised full-body-length sling used for turning or positioning in bed clients who need to be turned several times a day. Repositioning slings are usually left under the client in their bed. If leaving a sling under a client, care should be taken to remove wrinkles from the material and tuck the straps under the mattress. Flat bed sheets, soaker pads and other items can be placed on top of a repositioning sling to absorb moisture and improve comfort.

FIGURE 7.28

Repositioning sling

Stretcher attachment

A stretcher or 'flatlifter' enables the movement of a client in a lying position. The stretcher is a body-length rigid scoop frame, or a series of flexible batons that are positioned under the client and attached to a frame that is assembled around the client.

Some stretcher attachments are made of special material designed for X-rays. Stretcher attachments are useful for spinal and post-operative orthopaedic care as the clients can be immobilised during transfers. Some hoists offer three-way client angle adjustments for the stretcher sling: flat, head down (Trendelenburg) and feet down. Not all hoists can accommodate stretcher attachments.

FIGURE 7.29

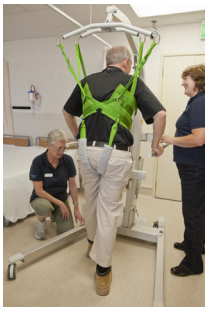
Example of a stretcher sling

Walking harness sling

Walking harness slings are designed to provide complete or partial support for clients who can walk. These slings can be used with ceiling hoists, but are also available with some mobile hoists where the booms can be raised high enough for clients to stand directly underneath the sling bars.

FIGURE 7.30

Mobile hoist with a walking harness sling



Stretchers

Stretchers are used to transport clients in lying position between locations within a facility. They come in many shapes and sizes. All hospital stretchers have wheels or castors and they may be height adjustable. Some stretchers are battery operated with similar functions to profiling

beds. Stretchers are a standard item of equipment in all hospitals and healthcare facilities and services. Specialist stretchers include those designed specifically for ambulance use and bariatric stretchers for morbidly obese clients.

Wheelchairs

FIGURE 7.31

Wheelchair

Wheelchairs are another standard item for equipment in hospitals and healthcare facilities. Different versions are available. Some are designed to provide clients with independent mobility and have features such as being foldable for transport in cars. Others are designed only for assisted mobility where carers are required. A point to note is that design features that are important for individual use in the community, such as collapsible footrests and protruding parts, may increase the likelihood of injury, especially if used regularly by clients. For such clients, purpose-built transfer and transport chairs may present fewer contact hazards than wheelchairs designed for independent mobility. Bariatric chairs should have electric motors.

Standing and pivoting aids (non-electric)

There are several non-electric standing transfer aids and trolleys for clients who can stand but have difficulty walking. These aids or pivoting devices can be used with clients who can stand but who are unable to walk without assistance.

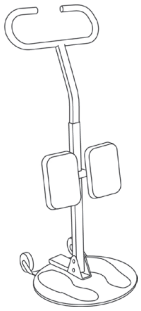
Standing transfer trolley

A standing transfer trolley enables a carer to transfer a client from a chair or a wheelchair to a toilet. It is intended for people who can stand but have difficulty walking. The client stands on the footrest and holds the handlebar for support. Some standing transfer trolleys have seats that can drop down for clients to sit on during transfers. The trolleys are then moved by carers to the locations required.

The standing trolley is useful for rehabilitation. It is easy to use and encourages some mobility. It provides an option between mobilising with some assistance and a sit to stand hoist.

FIGURE 7.32

Framed turning platform



Framed turning platform

A framed turning platform enables a client to stand during a move from seat to seat. The framed turning platform may have cushioned knee pads for the client to brace against during the move. The client puts their feet on the turntable and pulls themselves up to standing using the

handholds. The carer then turns the platform and the client sits down in the new position. The client's feet must be placed centrally on the turntable or framed turning platform so that the rotation through the transfer is smooth. Care is needed as these items can rotate unpredictably if not controlled. The turning platform should have a foot-operated brake that is engaged when the carer steps down on the outer edge of the turntable.

Shower and bath equipment

There are multiple types of equipment to assist clients to move in showers and baths. Two types of shower equipment are described here.

Wheeled shower chairs

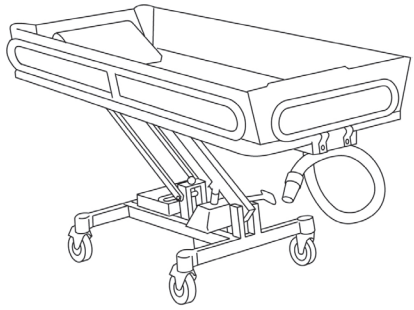
A wheeled shower chair can be used to transport a client to and from a shower and can be used in the shower while the client remains seated. Wheeled shower chairs may have backrests, armrests and footrests that can be removed or shifted. Some also have tilting functions to allow easier showering. Wheeled shower chairs are usually made from perforated plastic to allow water to drain from the seat. Powered or battery-operated shower chairs are preferred, as they reduce the risk in positioning clients during the process.

Mobile shower trolleys

Mobile shower trolleys are full-body length so that a client can be showered in a lying position. This type of trolley can also be used as a changing table.

FIGURE 7.33

Mobile shower trolley



Shower trolleys tend to be used in open shower areas rather than in shower cubicles, as they are usually too long to fit in cubicles. Sliding equipment can be used to transfer a client onto a shower trolley, or the client can be hoisted. Many trolleys are height adjustable so that they can be positioned at the correct working heights for carers.

Emergency equipment

There is a range of equipment available for emergencies. Within facilities, emergency equipment may be used for the rapid evacuation of immobile clients to an outside location, such as during a fire or earthquake. Ambulances and other emergency service vehicles generally carry multiple types of specialist emergency equipment for moving people.

Most emergency services have standard 'pick up and carry' types of stretcher. These can be used in emergencies to move people quickly to other locations. These stretchers usually fold into small packages for compact storage. Other examples of emergency equipment are described below.

Slide pads and sheets

FIGURE 7.34

Slide pad

Slide pads and sheets are an option for emergency evacuation equipment for immobile clients. Slide pads are similar to small mattresses; they have straps to secure clients and slippery surfaces underneath so they can be dragged along floors and down stairs with clients lying down. Emergency slide sheets are fitted underneath mattresses. They have straps that can be fastened over mattresses to secure clients to the mattresses, and slippery surfaces so the sheets with clients and mattresses can be dragged along the floor.

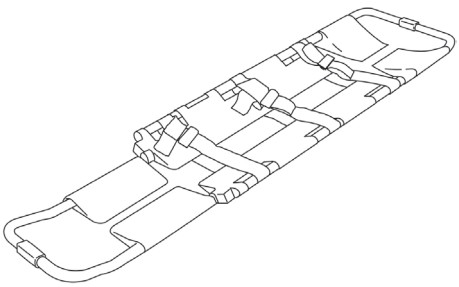
Backboards or spine boards

A backboard or spine board is used to immobilise and transport a client with a suspected spinal injury in an emergency. It is a rigid, full-body-length board to which the client is strapped. These boards may be made from sheet aluminium with a tubular aluminium frame, wood with a special waterproof coating, or coated plywood board.

Scoop stretchers

FIGURE 7.35

Scoop stretcher



A scoop stretcher is a lightweight, concave stretcher that separates into two sections along its length (Figure 7.35). It can be placed under a client from each side without the need to roll or lift them. The concave surface supports the client, minimising lateral movement and reducing the risk of further injury. The client can then be carried to a location where further medical treatment can be administered.

The scoop stretcher may have a narrow foot-end frame for handling in confined areas. It folds up for storage and has locking length-adjustment latches that snap into place. Some companies are now producing combined boards ('combi boards') that include the features of both spine boards and scoop stretchers.

Combination stretchers/chairs and evacuation chairs

A combination stretcher and carry chair is an option for transporting clients in an emergency (Figure 7.36). It can be configured for use as a wheeled chair, a stair chair or a flat stretcher.

Another option is an emergency evacuation chair, which can be used for transporting clients down stairs (Figure 7.37).

FIGURE 7.36

Combination stretcher/chair

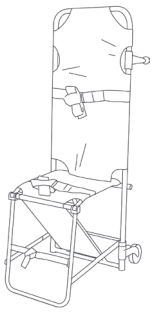


FIGURE 7.37

Emergency evacuation chair

OTHER TYPES OF EQUIPMENT AND AIDS

There are numerous types of equipment and mobility aid other than the ones described in earlier sections. If a client is able to bear some of their own weight for a short period of time, there are various devices available to assist in transfers between bed, chair and toilet. Some of these aids can be used to help clients move short distances, or to stand in a supported manner. They range from simple to more technical, such as walkers, transfer belts and stand to sit lifts. The Ministry of Health and the Accident Compensation Corporation (ACC) both publish lists of approved equipment for people with disabilities and limited mobility (see www.accessable.co.nz). Note that these lists cover a very limited range of the moving and handling equipment that is available.

References and resources

Collins, J. W., Wolf, L., Bell, J., & Evanoff, B. (2004). An evaluation of a 'best practices' musculoskeletal injury prevention program in nursing homes. *Injury Prevention*, 10(4), 206-211.

MHRA (Medicines and Healthcare Products Regulatory Agency). (2003). *Evaluation: Electrically powered profiling beds Part 1: Hospital beds* (MHRA 03038). London: MHRA. Retrieved 9 September 2010 from www.mhra.gov.uk.

Nelson, A. (2003). *Patient Care Ergonomics Resource Guide: Safe patient handling and movement*. Retrieved 11 August 2010 from www.anasafepatienthandling.org/Main-Menu/SPH-Background/SPH-Solutions.aspx.

Nelson, A., Collins, J., Knibbe, H., Cookson, K., Castro, A., & Whipple, K. (2007). Safer patient handling. *Nursing Management*, 38(3), 26-33.

Standards New Zealand, AS/NZS 3551:2004. *Technical management programs for medical devices*

See www.standards.co.nz/touchstone/Issue+16/Electrical/Electricity+Safety+Regulations+2010+Standards+for+hazardous+areas+and+electromedical+equipment.htm.

VISN 8 Patient Safety Center of Inquiry. (2010). *Technology Resource Guide*. Retrieved 29 October 2010 from www.visn8.va.gov/patientsafetycenter.

WorkSafeBC. (2006). *Transfer Assist Devices for Safer Handling of Patients: A guide for selection and safe use*. Retrieved 9 September 2010 from

www.worksafebc.com/publications/health_and_safety/by_topic/health_care/default.asp.

Web resources: equipment[3]

Biomedical Services NZ Ltd

www.biomed.co.nz/medical-device-legislations.html

Safe Lifting Portal

www.safeliftingportal.com/patientlifts/index.html

WorkSafeBC: Workers' Compensation Board of British Columbia, Canada

www.worksafebc.com/publications/health_and_safety/by_topic/health_care/default.asp

3. Note: If the URLs shown do not work, do a search on the organisation title. Equipment manufacturers often sponsor or provide equipment websites. ACC and the Guidelines' authors do not specifically endorse any manufacturer.