

# Hoisting

## for children & adults with muscular dystrophy & allied neuromuscular conditions

To be used in conjunction with:

- Chapter 8a     *Equipment for Adaptations;*
- Chapter 10    *Disability Needs Assessment Form/Architectural Brief;*
- Chapter 17    *Multi-use Facilities;*
- Chapter 18    *Addresses: Manufacturers/Suppliers/Sources of Advice.*

Hoisting is a straightforward procedure, but a number of issues need to be considered:

- ⇒ Why use a hoist? The EEC Directive    2
- ⇒ Mobile hoist vs fixed ceiling track (or gantry) hoist    6
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## Why use a hoist? The EEC Directive

The legislation is considered under the following headings:

- ⇒ lifting: new rules protecting carers;
- ⇒ the employer's obligations;
- ⇒ risk assessment;
- ⇒ individual risk factors;
- ⇒ implications for people with neuromuscular conditions and their helpers;
- ⇒ the professional assessment.

### Lifting: new rules protecting carers

On 29 May 1990, the EEC brought out a Directive (90/269/EEC) "*on the minimum health and safety requirements for the manual handling of loads where there is a risk particularly of back injury to workers... Member States shall bring into force the law, regulations and administrative provisions needed to comply with this Directive not later than 31 December 1992*".

This was followed by:

- Manual Handling Operations Regulations of 1992, introduced on 1 January 1993. "*The effect of this legislation is to prevent accidents and may be relevant to compensation for the injured lifter*";<sup>1</sup>
- Royal College of Nursing *Code of Practice for the Handling of Patients, 1993*. This stated: "*No nurse should take the full weight of any patient, under ideal conditions, weighing more than 30 kilos (approx. 5 stones)*". For two nurses the weight is "*50 kilos (8 stones) with the weight shared between them. Note: Two nurses cannot necessarily lift twice the weight lifted by one nurse*".<sup>1</sup>
- RCN revised *Code of Practice for the Handling of Patients* in April 1996. The RCN at the same time launched a safer patient-handling policy with the aim of eliminating hazardous manual handling in all but exceptional life-threatening situations. The revised code says: "*Manual handling may continue provided that it does not involve lifting most or all of a patient's weight*".<sup>1</sup>

As a result, the importance of hoists and the availability of manual handling equipment have escalated. The latter, however, is not discussed here as such equipment does not influence the adaptations.

The details of the EEC Directive are presented as published so that the implications can be seen in context. To highlight the relevance to people with neuromuscular conditions and their helpers, *comments are placed in brackets and marked with an asterisk*.\*

These comments are related to:

- the specific physical problems of many people with neuromuscular conditions which make handling difficult;
- the importance of avoiding hazardous lifting situations;
- the need for the supply of specialised equipment such as a hoist, and a bed with a height-adjustable mechanism.

## The employer's obligations

These can be summarised under three headings:

- ⇒ general provision;
- ⇒ organisation of the workstation;
- ⇒ information and training of workers.

### General provision

*"... to avoid the need for manual handling of loads by workers. Where this cannot be avoided the employer shall take the appropriate organisational measures ... or provide workers with such means in order to reduce the risk involved in the manual handling of such loads having regard to the Risk Assessment".*<sup>1</sup> \*(This strengthens the need for the supply of a fixed ceiling track hoist.)

### Organisation of the workstation

*"Where the need for manual lifting cannot be avoided, to organise workstations in such a way as to make handling as safe as possible"*<sup>1</sup> \*(by supplying a bed with a height-adjustable mechanism, to make it easier for the disabled person to get in and out of bed and/or to place the bed at the optimum height for the carers when attending to the disabled person in the bed) *"and to assess"* \*(with a comprehensive OT assessment) *"in advance if possible, the health and safety conditions of the work involved"*.<sup>1</sup>

### Information and training of workers

*"Workers must receive information on the weight of loads and proper training on how to handle loads correctly"*.<sup>1</sup> \*(Definition of loads includes people.)

## Risk assessment

From 1 January 1993, UK Regulations state that a Risk Assessment must be undertaken and it is the employer's responsibility to see that this happens. The EC Directive and the UK Regulations acknowledge that there are many factors, divided under four headings, to be taken into account when assessing the risks involved, as follows:

- ⇒ characteristics of the load;
- ⇒ physical effort required;
- ⇒ characteristics of the working environment;
- ⇒ requirements of the activity.

## Characteristics of the load

The manual handling of a load may present a risk, particularly of back injury if it is:

- *"too heavy or too large"* \*(guidelines on weights are contained in the Regulations and the weights are lighter than those of the College of Nursing mentioned on page 2);
- *"unwieldy or difficult to grasp"*, \*(people with neuromuscular conditions are often very floppy);
- *"unstable"* \* (lack trunk control) *"or has contents likely to shift"*;
- *"positioned in manner requiring to be held or manipulated at a distance from the trunk, or with a bending or twisting of the trunk"* \*(lifting out of a bath or transferring manually from one chair to another – or bed to chair);
- *"likely, because of its contours and/or consistency, to result in injury to workers, particularly in the event of a collision"*.<sup>1</sup>

## Physical effort required

A physical effort may present a risk, particularly of back injury if it is:

- *"too strenuous"*;
- *only achieved by twisting movement of the trunk"* \*(leaning over a bath to position a ceiling hoist sling);
- *"likely to result in a sudden movement of the load"*;
- *made with body in an unstable posture"*<sup>1</sup> \*(carrying a child upstairs).

## Characteristics of the working environment

These are unacceptable where:

- *"there is not enough room"* \*(substantiates the need for space in the bedroom and bathroom – see Chapter 15 *Adaptation Specifications* and Chapter 11 *Space Requirements*) *"in particular vertically, to carry out the activity"*;
- *the floor is uneven, thus presenting tripping hazards, or is slippery"* \*(the need for suitable floor covering in the bathroom) *"in relation to the worker's footwear"*;
- *the place of work or the working environment prevents the handling of loads at a safe height or with good posture by the worker"* \*(the need for a height-adjustable bed – see Chapter 8c);
- *"there are variations in the level of the floor or the working surface, requiring the load to be manipulated on different levels"* \*(carrying upstairs);
- *"the floor or foot rest is unstable"*;
- *the temperature, humidity or ventilation is unsuitable"*.<sup>1</sup>

## Requirements of the activity

The activity may present a risk particularly of back injury if it entails one or more of the following requirements:

- *"over-frequent or over-prolonged physical effort involving, in particular, the spine"*;
- *an insufficient bodily rest or recovery period"*;
- *excessive lifting, lowering or carrying distances"* \*(carrying a child upstairs – which substantiates the need for a lift or ground-floor extension);
- *"a rate of work imposed by a process which cannot be altered by the worker"*.<sup>1</sup>

## Individual risk factors

The worker may be at risk if he/she:

- *“is physically unsuited to carry out the task in question;*
- *is wearing unsuitable clothing, footwear or other personal effects;*
- *does not have adequate or appropriate knowledge or training”.<sup>1</sup> \*(Highlights the importance of being taught risk-free transfers instead of manual lifts, e.g. use of hoists, transfer sliding boards, etc.)*

## Implications for people with neuromuscular conditions and their helpers

It must be noted that responsibility lies with the employer and the carer working in the home, school, hospital, etc. In the last few years there has been greater involvement of disabled people in the use of paid carers, as disabled people have received financial grants from the Independent Living Fund. This has increased with the *Community Care (Direct Payments) Act 1997* which allows Local Authorities to make direct cash payments to individuals instead of providing Community Care services that they are assessed as needing. Therefore, it is important to understand the employer/employee relationship. Where the employer is the disabled person or their family, they will have the same responsibilities for the health and safety of the carer as any other employer. A disabled person should ask their Social Services for advice and consider employing carers through an agency. The employee has a duty to make full and proper use of any equipment or system provided by the employer in compliance with the regulations.

If a family or individual does not have the appropriate equipment for use at home they should contact Social Services and ask for a moving and handling assessment. At school, the responsibility would lie with the Education Authority to supply any equipment necessary. The arrangements must focus on the individual needs and a care plan should indicate the chosen method for handling/transferring the person. The professional assessment carried out by a physiotherapist, occupational therapist or nurse who is likely to be employed as a manual handling advisor, must be written down and used as a basis for action and the supply of equipment.

## The professional assessment

The format could be as follows:

- ⇒ purpose of handling task;
- ⇒ disabled person’s data;
- ⇒ environment;
- ⇒ selection of technique(s)/equipment;
- ⇒ needs of paid or family carers;
- ⇒ action.

## Purpose of handling task

- Provide details of the situations in which lifting is necessary and the need to avoid manual lifting.

## Disabled person's data

- Weight, height, shape;
- physical disability and diagnosis, if appropriate;
- ability to assist;
- onset of fatigue;
- clothing \*(*slippery surface of a spinal brace*).

## Environment

- Furniture;
- equipment;
- space.

## Selection of technique(s)/equipment

- Mechanical;
- electrical;
- assistance needed.

## Needs of paid or family carers

### Action

- Care plan;
- re-assessment date.

Once it has been decided that a hoist is essential, two decisions have to be made:

- Is a mobile or a fixed ceiling track hoist a more appropriate method of hoisting?
- Which particular model is the most suitable?

These options are considered below, in turn.

## Mobile hoist vs fixed ceiling track (or gantry) hoist

Essentially, this choice is usually very straightforward, as follows:

- Ceiling hoists run on a ceiling track and transfers can be made under the track only. If all the necessary transfers can be made within the bedroom and bathroom (if an extended track is provided), then a ceiling hoist is likely to be the best option.
- Unless an extended track is feasible, mobile hoists are essential if transfers need to be made in other rooms on the same floor. If transfers are needed on two floors, a ceiling hoist and a mobile hoist are likely to be the best solution.
- A ceiling hoist on a gantry (floor-standing metal frame) may be the best solution when a disabled person requires an overhead hoist temporarily, such as when a house move is pending or another address is visited regularly.
- If a hoist is needed for use out of the house and in the bedroom and/or bathroom, the best solution may be to have two hoists (i.e. a ceiling hoist in the house and a mobile hoist stored in the van or car).

However, there are a number of additional factors that may influence the choice between a mobile or ceiling hoist and these are discussed in relation to the advantages and disadvantages of each type.

## Mobile hoist

The following will be considered:

- ⇒ advantages;
- ⇒ features to be considered and possible disadvantages;
- ⇒ recommended models.

### Advantages

There are three main advantages.

#### ■ The hoist can be used in different rooms

Typically, this would be in a bedroom, to lift in/out of bed, and a sitting room, to lift in/out of an easy chair, or in a school, for use in different classrooms, gym, etc. The main advantage of a mobile hoist is the ability to use the hoist in different rooms that are not adjacent.

#### ■ The hoist is suitable for lifting up from the floor anywhere in the house or garden

For a person who falls regularly and depends on a carer to lift them, a mobile hoist may be invaluable. Assessment of this manoeuvre is essential, as some models are easier to use and more suitable than others in this situation. Alternative equipment for getting up from the floor should also be assessed, (see Chapter 8b ‘*Seat to Standing*’). However, for an adult who falls frequently over a period of several years and needs to be lifted in/out of a bath etc., there may be justification for the supply of both a mobile and ceiling hoist, until safety is ensured by the continuous use of a wheelchair.

#### ■ The hoist can be transported for use away from home

The ability to transport a mobile hoist in a car or van makes it ideal for lifting in other situations and suitable for holiday use. Ensure that the model chosen either breaks down into component parts, or folds and can be wheeled into a suitable vehicle.

### Features to be considered and possible disadvantages

#### ■ Does the boom of the mobile hoist travel through an arc when raised?

Unfortunately, this drags the disabled person forwards and increases the tendency to swing.

#### ■ When moving in the hoist, is there a tendency to swing?

Although it is not recommended that a mobile hoist is used to transport a disabled person from one room to another, sometimes it needs to be pushed/pulled within a room. On these occasions, with the exception of the two recommended models that do not use sling straps, the disabled person tends to swing. This will be difficult for anyone who lacks trunk control and they will feel vulnerable, particularly if unable to hold on to the spreader bar to steady themselves.

#### ■ Does the base of the hoist fit under or around the furniture (e.g. bed or chair), from which the disabled person needs to be hoisted?

If the furniture is too low, can it be raised satisfactorily. If it is too wide to be straddled, is it possible to position one leg of the hoist base under the furniture? If the base of a mobile hoist does not fit under the bed or around the chair, it may be difficult to lower the disabled person into the precise position required.



### ■ **Is the hoist compact enough to be manoeuvred easily in the areas in which it needs to be used?**

A mobile hoist may be difficult to manoeuvre and this may be impossible in a small room, through narrow doorways or tight turns. It can also be difficult to push a hoist on carpet.

### ■ **Does the hoist have the required lifting range?**

A mobile hoist may have an extensive lifting range (e.g. from floor to bed), but a limited maximum height to which it can lift. As a result, if the person is to be transferred on to a high surface, the length of the sling straps has to be restricted and the disabled person may feel that their head is likely to bump on the spreader bar.

### ■ **Where will the hoist be stored when not in use?**

A mobile hoist has to be stored and is yet another piece of equipment cluttering up a house and reducing the vital circulation space required by a wheelchair user.

### ■ **In a mobile hoist, a disabled person is totally dependent.**

A carer is needed not only to put on the sling but also to push the hoist.

### ■ **Does the sling provide adequate head support if required?**

Because of the limited distance between the average seat height and the spreader bar of a mobile hoist, disabled people may feel that their head is vulnerable in a sling that is large enough to provide head support, because it is too near the spreader bar.

### ■ **Is a manual model adequate, or would an electrical model be more satisfactory?**

Operating a manual hoist at the same time as lowering a severely disabled person into a chair may be difficult if the helper has to lift the back of the sling, (because pushing on their knees causes pain) to position the person correctly into the back of the chair. The effort involved, and the height of the operating handle in relation to the height of the main carer, must be assessed. Electric hoists are strongly recommended and are usually considered essential for regular/daily use.

## **Recommended models**

Many different models of mobile hoists are available, but the models that satisfy all the possible criteria are as follows:

- ⇒ *Arjo Trixie and Arjo Lisa;*
- ⇒ *Liko Golvo 7000ES/7007ES.*

### **Arjo Trixie and Arjo Lisa**

These hoists have several very important features:

- a 'wishbone' spreader that enables fine tuning of the sitting position and therefore of the head control of the disabled person in the sling – and allows this position to be altered instantly. This is an important feature for anybody with a neuromuscular condition. In addition to providing a comfortable sitting position, it also enables the person to be tipped forwards to ensure that their bottom is positioned at the back of the seat before being lowered;
- the sling is attached directly to the spreader bar without the use of straps, thereby reducing the tendency for the disabled person to swing in the sling when the hoist is moved;



- the hoists are suitable for lifting children working on the floor in physiotherapy sessions or adults who have fallen;
- the hoists are powered and therefore are easier and quicker to use, although diligence is needed to keep the battery charged and ready for use;
- the *Arjo Trixie* is easy to fold, push on its wheels and transport;
- the *Arjo Lisa* can be taken apart to transport;
- there is an excellent range of slings in polyester nylon or mesh, in seven sizes. The four-point standard body sling, with additional padding, is recommended for people with a neuromuscular condition. The Arjo representative can be consulted where necessary, if there is no suitable sling in the standard range.

As a result, these hoists are highly recommended for school use for boys with Duchenne muscular dystrophy and children with other neuromuscular conditions, and are equally suitable for adults with all types of MD. It is important to ensure that these models are always assessed when choosing the most suitable mobile hoist.

*Arjo Ltd*

### **Liko Golvo 7000ES/7007ES**

The model numbers relate to the domestic/multi-use hoists respectively. The latter model is slightly larger and will lift higher.

The particular advantages of these hoists are as follows:

- they have a belt-driven column that lifts in the same way as a ceiling hoist, but on a portable frame;
- the legs of the base are powered to move out parallel to each other (all other hoists move out in a 'V' shape) which makes them more stable when being pushed and creates a wider safer working area on the floor. This is particularly useful for:
  - lifting from the floor;
  - straddling furniture;
- it allows the hoists to be used as an aid for standing to transfer or for walking practice.
 

*N.B. In this situation the equipment must be carefully assessed by a physiotherapist experienced in the treatment of people with a neuromuscular condition, with additional advice from the hospital clinic team, and is likely to be contraindicated and unsuitable following spinal surgery.*
- there is an extensive range of slings in three fabrics and five sizes. The range includes a standing/walking vest with leg harness and walking pants, which can be used also with the *Liko 240/242* ceiling hoist.

*Liko (UK) Ltd*

## Fixed ceiling track hoist

The following will be considered:

- ⇒ advantages;
- ⇒ disadvantages;
- ⇒ essential features;
- ⇒ short track vs extended track;
- ⇒ achieving the correct position of the track over the equipment and transfer spaces;
- ⇒ use of a swing kit/room-to-room system;
- ⇒ correct position of the track over the bed;
- ⇒ correct position of the track over the toilet;
- ⇒ recommended position of 13amp fused spur;
- ⇒ the timing of the installation of the hoist;
- ⇒ recommended models.

### Advantages

- The spreader bar rises vertically and the disabled person is not dragged forwards.
- The tendency to swing is limited.
- Use of the hoist does not depend upon the width or height of the furniture or equipment from which the disabled person needs to be hoisted.
- A ceiling hoist, correctly installed, can lift from any equipment under the track, but the spreader bar must have a **360°** swivel.
- Use of a ceiling hoist is not dependent upon manoeuvring through narrow doorways or tight turns.
- It would be unusual for a ceiling hoist to have an inadequate lifting range. The height that a ceiling hoist can lift is limited only by the height of the ceiling and the size of the track and motor.
- A ceiling hoist does not need to be stored.
- A ceiling hoist is unobtrusive (particularly if the track is fitted wall to wall) and takes up no space.
- The hoist can be used independently or with minimal help from a carer. Although help may be needed to position the sling, if a ceiling hoist has suitable touch-sensitive switches, it can be operated by a severely disabled person, and this independence, in a heavily dependent life, is important to most people.
- A ceiling hoist is very safe for a carer to use, without the risk of a back injury.
- The sling will provide adequate head support (if this is required).
- In a ceiling hoist there will be adequate distance between the spreader bar and the floor or the seat and bed height, to ensure that any length of sling can be used without the user's head being vulnerable because it is too near the spreader bar.
- In purpose-built accommodation, the layout can be designed to allow access to all the necessary areas in the house.
- If a disabled person tends to fall in a particular room, a room-covering system will be suitable to pick up from any position.

### Disadvantages

- Unless it is a portable model that can be lifted off the track, a fixed ceiling track hoist cannot be used in two rooms unless they are linked with a track.
- With the exception of en-suite rooms, it may be cumbersome to install a ceiling track to include every room in which a hoist is needed.
- The hoist cannot be used for lifting up from the floor anywhere in the house or garden.
- Unless a disabled person is able to crawl to a position under a ceiling hoist (either a single track or room-covering system) a mobile hoist will be more suitable.

## Essential features

The essential features of ceiling hoists for people with muscular dystrophy and other allied neuromuscular conditions (see also page 18) relate to the following:

- ⇒ sensitive switches;
- ⇒ length of switch cord;
- ⇒ type of switch cord;
- ⇒ swivel spreader bar;
- ⇒ twin or triple sling hooks at each end of the spreader bar;
- ⇒ suitable slings;
- ⇒ emergency lowering device;
- ⇒ rechargeable battery.

### Sensitive switches

As someone with muscular dystrophy becomes increasingly disabled, their dependence on others becomes more acute. Therefore, it is essential to increase independence as much as possible. A ceiling hoist with touch-sensitive switches can be controlled by everyone with any neuromuscular condition. When assessing the suitability of a switch, however, it is important to consider the long-term hand function. Pull cords are never suitable, as it is necessary to be able to raise the arm to pull down the cord; in addition, rocker-switches, although often considered easy to operate, are never as sensitive as push-buttons and, therefore, are not suitable.

### Length of switch cord

This must extend so that the centre of the switch panel is **500mm** from the floor. This enables those users who are unable to lift up their arms, to position the control in their lap, with their arms resting on their thighs.

### Type of switch cord

A switch panel on a straight cord is recommended for anyone with limited strength in their hands and arms, as restraining a curly cord will be impossible. It is then essential to ensure that the cord is not damaged by being trapped or excessively pulled – and that it is the recommended length (see above) to allow the control to be held on the user's lap - eliminating the need to reach upwards.

### Swivel spreader bar

If the spreader bar swivels through **360°** it is not as important to position the wheelchair so that the front and back are parallel with the length of track and, if necessary, they can be at an angle to the track. The swivel feature is vital where a track extends from the bedroom into the bathroom (over the toilet and bath) to assist lowering the disabled person into the correct position.

### Twin or triple sling hooks at each end of the spreader bar

Twin hooks enable the back and leg sections of the sling to be hung on to separate hooks to provide front-to-back depth in the sling and prevent the user from feeling 'bunched up'. Also, if a strap is twisted, it can be repositioned without affecting the other straps. Triple hooks, if available, provide an additional hook on which to hang the strap attached to the head support, but some slings are designed and tailored to support themselves with stiffeners, and/or foam padding.

## Suitable slings

(These are discussed on pages 20-23.)

## Emergency lowering device

It is important that the hoist incorporates a method of being lowered in the event of a power cut. This may be manually or battery operated, or both.

## Rechargeable battery

If the track is to be extended into the bathroom, (either at the time of installation or possibly in the future), it will be necessary to supply a model with a rechargeable battery, rather than a hoist with an extending cord.

## Short track vs extended track

The following will need to be considered:

- ⇒ for use in en-suite facilities;
- ⇒ the choice for initial installation;
- ⇒ factors affecting the choice.

## For use in en-suite facilities

It is essential that people with neuromuscular conditions should have en-suite facilities so that, if necessary, they can be dressed/undressed on their bed and transferred to and from the bathroom within the warmth and privacy of the two rooms, and so that a ceiling hoist track over the bed can extend into the bathroom.

In designing for a person with a deteriorating neuromuscular condition, it is not always possible to anticipate the long-term needs or (particularly in the case of an adult) to reconcile these with the short-term needs. Therefore, if the option of an extended track is not adopted initially, the plans should still be drawn with the fittings sited in the optimum position for an extended track, in case this proves to be the most suitable method of transfer in the future.

## The choice for initial installation

There are two options, as follows:

### **Over the bed and across the bedroom (preferably wall to wall) for use with a mobile bath or shower chair (with the possibility of installing a ceiling turntable with an extended track in the future).**

The track should extend from the wall beside the bed and be long enough to cover the bed width plus adjacent floor area needed for two wheelchairs i.e. plus **1800mm** in order to use the hoist for lifting in and out of bed and from one chair to another. Unless the room is very wide, the track is more unobtrusive if it extends wall to wall and provides the opportunity to charge the hoist in the bedroom, but not over the bed (see pages 16-17);

### **Over the bed (preferably wall to wall) plus an extended track into the bathroom.**

## Factors affecting the choice

- Is a shower or a bath the most appropriate facility? See Chapter 7 *Bath vs Shower*.
- If a shower is chosen, is it used with a shower chair that will transfer the user between the bedroom and bathroom?
- If a bath is chosen, how much support is needed, now or in the future, as this will influence the choice of equipment?
- What is the most appropriate method of lifting in/out of the bath, in view of the equipment chosen to support the disabled person in the bath.
- Is a shower toilet recommended? This is significant, because the washing and (particularly) the drying action is more effective if the disabled person sits directly on the seat and not on a superimposed mobile bath or shower chair. This means that, ideally, a ceiling hoist will be installed (front to back) over the shower toilet.
- The decisions above will dictate whether a mobile hoist chassis or an extended track is used to transfer between the bedroom and bathroom (except where a ASM Multi-System In-Bath Cradle is used, as the cradle can be transferred between the rooms, on either a mobile chassis or a ceiling hoist).

The issues involved in the choice of equipment are discussed in greater detail in Chapter 8a *Equipment for Adaptations*.

## Achieving the correct position of the track over the equipment and transfer spaces

There are four options: curved tracking; ceiling turntables, switched track or a room-covering system, to ensure that the ceiling hoist is able to pick up from the essential positions in a room. The choice would normally be made in two stages, as follows:

- ⇒ curved tracking vs electrically-operated ceiling turntable or switched track;
- ⇒ electrically-operated ceiling turntable or switched track vs room-covering system.

### Curved tracking vs electrically-operated ceiling turntable or switched track

In the past, the position of the bed and the fittings in the bathroom were dictated by the limitations of the track, which could change direction only via a curved section. The advent of powered ceiling turntables allows the track to change direction at any pre-set angle. This is likely to be important in order to install the fittings in the most satisfactory position in the bathroom and to allow those who initially had a ceiling hoist over the bed only (to be used with a Mermaid Ranger or shower chair), at a later date to extend the tracking to the bathroom. Turntables can be operated manually with a pull-cord, or electrically. Anyone with a neuromuscular condition is unlikely to have sufficient arm strength to operate a manual turntable and the cords hanging down are irritating. An electrically-operated turntable will therefore be essential.

Curved tracking is an additional cost and it would be unusual to need less than two or three curved sections in any installation covering the bed, toilet and bath. Therefore, although it is more expensive to install one or two ceiling turntables, the cost can be off-set against the cost of two or three curved sections; however, if the positions of the bed and the bathroom fittings are compromised by trying to accommodate curved tracking, the difference in cost is fully justified.

The architectural designer is advised to send the drawings to the hoist supplier, who will recommend the most satisfactory route for the track from over the bed to the fittings in the bathroom that will/may be used with the ceiling hoist. It will then be possible to ensure the ceiling is prepared for the fitting of the track when/if needed.

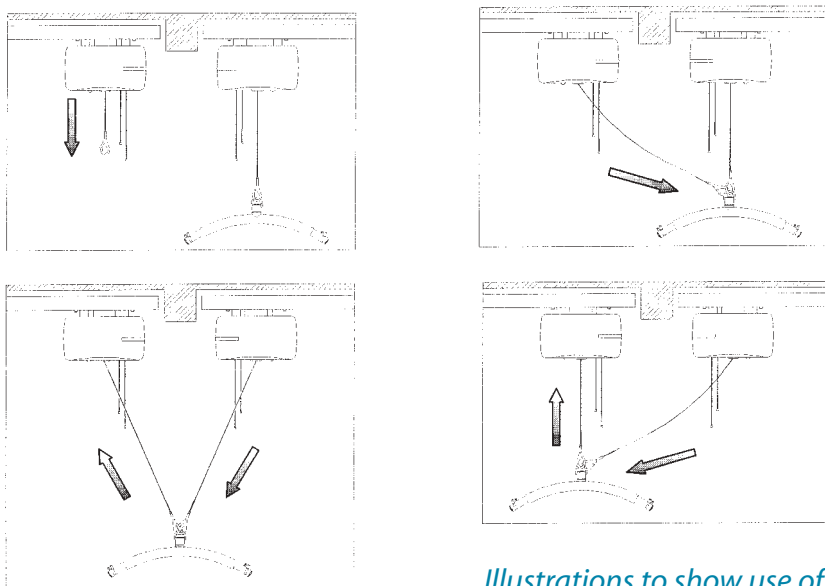
## Ceiling turntable or switched track vs room-covering system

A room-covering system (sometimes called an H or X-Y system), consists of two primary rails installed on two opposite walls in the room, with a traverse rail which straddles the primary rails and runs at right-angles between them. The advantage of this system over a ceiling turntable is that it allows the user to be lifted by the hoist from *any* point in the room, instead of under the fixed track only, which may be particularly essential where a room is being used by several disabled people, such as a hospital ward. In a situation where a hoist is needed in an adjacent room, the hoist can be linked either to a single track or to another room-covering system. The traversing action can be either manual or powered; however, as with a fixed ceiling hoist track, a powered model is recommended to increase the independence of the user.

For multiple occupancy of a bedroom and the shared use of a bathroom, it is recommended that a room-covering system is installed in both the bedroom and bathroom. Where the rooms are adjacent, the track should be extended between both rooms.

## Use of 'Swing Kit'/track-to-track/door-transfer system

Sometimes a supporting lintel is above the door. To avoid the expense and structural difficulty of removing a supporting beam to enable a track to be installed between the two rooms, a 'Swing Kit' can be used to allow the hoist to be extended between the rooms without having to lower the user down into a wheelchair in the adjoining doorway. The hoists in both rooms are taken on their tracks to each side of the wall over the door opening and, by sharing a spreader bar, the person is transferred smoothly between the two hoists as shown below. For the availability of this feature with the recommended models, see the chart on page 19.



*Illustrations to show use of 'Swing Kit'*

*Drawings reproduced with kind permission of Guldman*

## Correct position of the track over the bed

The track should be positioned at right-angles to the length of the bed, parallel to the wall behind the bed headboard, so that the centre of this track to the wall is **1020mm**. This measurement is well tried and tested in relation to an electric bed, so that the disabled person is subsequently lowered on to the small horizontal platform in the bed and will not need to be lifted either up or down the bed, which are difficult manoeuvres for a carer. If the track is parallel to the length of the bed, the disabled person's toes are liable to catch on the bedding, causing great pain. For people with a neuromuscular condition, their feet are particularly vulnerable, as they may be plantar flexed (pointed) in a fixed position.

## Correct position of the track over the toilet

When a disabled person is sitting on the toilet seat it is important that they are positioned correctly in relation to the back support of the cistern; the position is particularly critical for the optimum washing and drying action of a shower toilet. In the case of a child who is growing, or if the disabled person's posture is likely to change in the future, a certain amount of adjustability will be essential – and this can be maintained if the track passes front to back over the toilet. The only contraindication to the track being installed front to back over the pan is if it will be essential to use the hoist to transfer from a wheelchair positioned at the side of the pan. Although a space at the side of the toilet is always recommended (see Chapter 15 *Adaptation Specifications*) if an extended track is used, the wheelchair can be positioned elsewhere in the bathroom under the track, in order to transfer using the hoist.

## Correct position of the track over the Arjo Sovereign bath

It is easier to position the disabled person symmetrically if the track passes front to back over the seat when swung **out** of the bath. This centre line must be **1330mm** from the tap end of the bath and **370mm** from the end of the bath, with **700mm** between the edge of the seat (opposite the tap end of the bath) and the adjacent wall. **N.B** This allows a carer to move around the seat.

## Recommended position of 13amp fused spur

This will depend on the length of track and the option not to charge the hoist over the bed, as follows:

- ⇒ a straight track where an extended track will not be needed in the future;
- ⇒ an extended track;
- ⇒ charging the hoist in the en-suite bedroom, but not over the bed.

### **A straight track where an extended track will not be needed in the future**

The spur power point should be installed at the end over the bed, if it is to be used totally independently by the disabled person (which is unlikely if they have a neuromuscular condition) - or ideally - on the wall opposite the bed.

### **An extended track**

The spur can be installed in one of three positions, as follows:

- **(as above) at the end over the bed**, if it is to be used totally independently by the disabled person (which is unlikely if they have a neuromuscular condition);

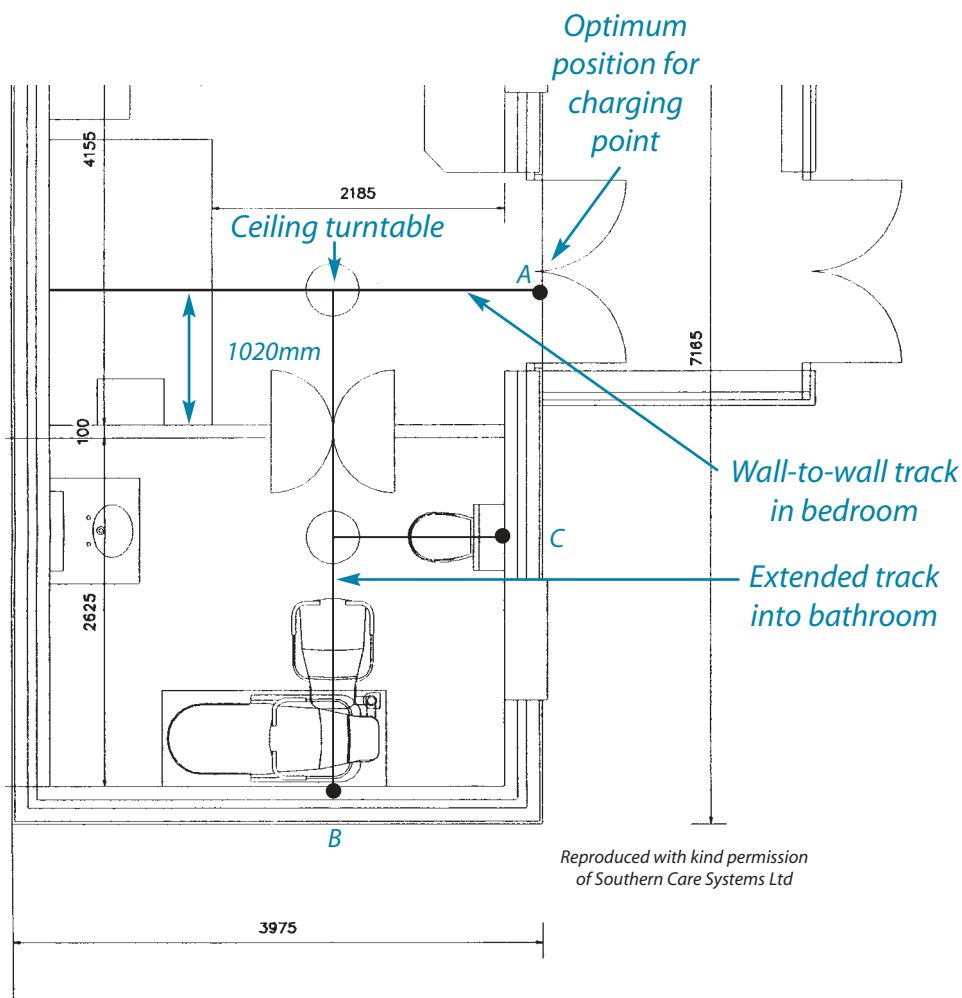


- **at the other end, in the bathroom,** if a carer will be available to 'fetch' the hoist, when needed; or ideally
- **on the wall opposite the bed.** The hoist will be used at the end of the day to lift the disabled person *into* bed, and then charged overnight. The first use in the morning will be to lift *out* of bed when, in many cases, the toilet may be needed urgently. To avoid the need for the carer to have to fetch the hoist first thing in the morning (and to have to take it into the bathroom last thing at night) it will be more convenient to charge the hoist in the bedroom (and more satisfactory to charge it away from the bed, particularly as the hoist may emit a low-frequency hum when charging).

### Charging the hoist in the en-suite facilities, but not over the bed

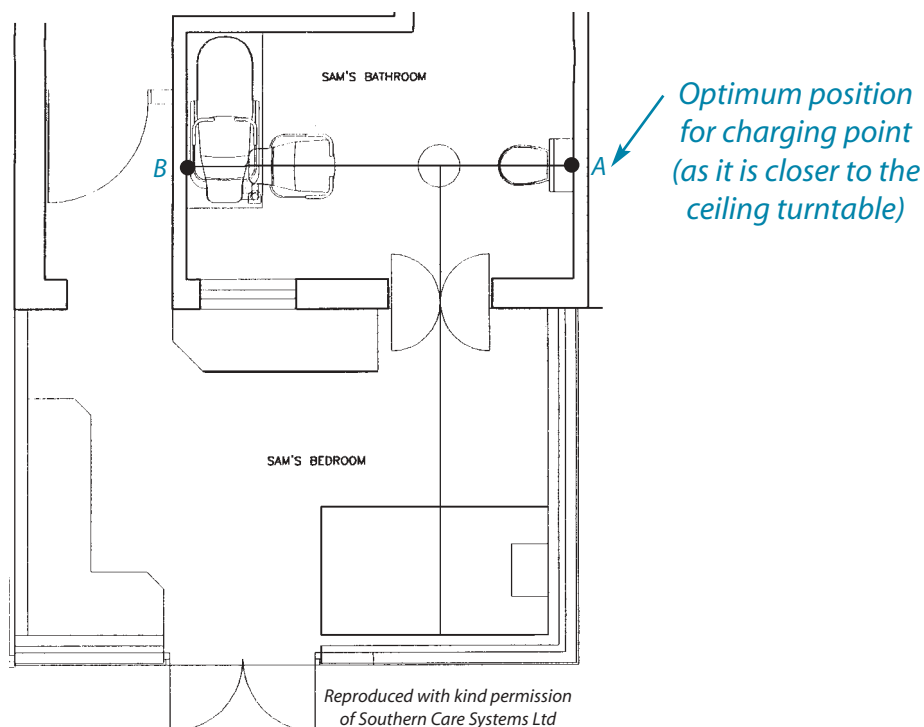
If the bed is positioned at a right-angle to the bathroom door, this can be achieved with a straight track installed from the wall beside the bed to the opposite wall where the charging point is positioned. Therefore, instead of a curved track at the side of the bed, a ceiling turntable is installed to line up with the centre of the bathroom door.

The advantage of a straight track over a curve is that it makes it easier to align chairs correctly when preparing for transfers; furthermore, positioning a bed in this way allows the recommended space for transfers at the side of the bed (i.e. **1800mm**) to double up as the circulation space around the bathroom door.



*Ideal layout for a single bed where circulation space is a greater priority than access to both sides of the bed, showing alternative positions ● A, B or C for the charging points*

## Charging the hoist in the en-suite facilities, but not over the bed



To show alternative charging point positions ● A or B, when the length of the bed is parallel to the face of the bathroom door

Access to both sides of the bed is essential for a double bed, but usually, is not recommended for a single bed, unless the room is very large – for the following reasons:

- to allow as much wheelchair circulation space as possible in the bedroom;
- because of the need to reach a wall light switch when in bed – see Chapter 15 *Adaptation Specifications (electrics)* for positioning of a wall-mounted switch (and the alternative remote-control switch);
- an adjacent wall provides a feeling of security to the person when in bed.

However, because it may be necessary for a carer to have access to both sides of the bed, it is recommended that there is sufficient space (approximately **1000mm**) on the exposed side of the bed, to allow the bed to be pulled away from the wall. It is important to ensure that the bed will not then obstruct the door to the bathroom.

## The timing of the installation of the hoist

If the hoist is not needed at the time when the adaptations are carried out, it is wise to ensure that the ceiling joists are suitable and to install the electrical supply, so that the decorations do not have to be spoilt in the future.

## Recommended models

Provided that the hoist model incorporates all the essential features, (see page 11 and the comparative chart below) the choice will depend on the following:

- whether a room-covering track is the best solution (see page 14);
- the need for a turntable (which should be electric) switched track or room-covering system;
- if Local Authorities prefer to deal with one particular company (often in their own area);
- competitive pricing and reliability.

There are a number of hoist models which have been well tried and tested with people with neuromuscular conditions and are included in the chart below. All ceiling hoists have an electric motor, to raise and lower the disabled person in the sling, and it is a mandatory requirement under lifting regulations that there is an emergency lowering device. However, these are the only features that are common to all models, irrespective of whether they use a single track or a room-covering system. It is important to note that not all the recommended features for people with neuromuscular conditions are available with every model - and it will be essential to consider the options carefully.

If other models not included in the chart are being considered, the format provides the opportunity for the firm to clarify the availability of the recommended features. A spare column has been included so that the chart can be photocopied for this purpose – and when completed – this will enable readers to make an informed choice.

Comparative chart of ceiling hoist features of recommended models							
Hoist model See also pages 11-17	<b>Bravo:</b> <i>Arjo Ltd</i>	<b>Wispa 200/300 Series:</b> <i>Chiltern Invadex Ltd</i>	<b>240/242:</b> <i>Liko Ltd</i>	<b>Guldmann Dan-Hoist:</b> <i>Moderna Contracts Ltd</i>	<b>Spectra:</b> <i>Southern Care Systems Ltd</i>	<b>Transactive:</b> <i>Westholme Ltd</i>	
Slow start (gradual acceleration from rest) is standard for lifting & traversing actions	✓	✓	✓	✓	✓	✓	
Powered movement along single track (with use of curved sections, if necessary)	✓	✓	✓	✓	✓	✓	
Electric ceiling turntable	✓	✓	x manual only	✓	✓	x manual only	
90° turns standard, but can be built to any angle	✓	✓	N/A	✓	✓	14 outlets on turntable	
Switched track	✓	x	✓ manual & electric	✓ manual, electric or infrared	x turntable performs same function	x	

Comparative chart of ceiling hoist features of recommended models (cont.)							
Hoist model See also pages 11-17	<b>Bravo:</b> <i>Arjo Ltd</i>	<b>Wispa 200/300</b> <b>Series:</b> <i>Chiltern Invadex Ltd</i>	<b>240/242:</b> <i>Liko Ltd</i>	<b>Guldmann</b> <b>Dan-Hoist:</b> <i>Moderna Contracts Ltd</i>	<b>Spectra:</b> <i>Southern Care Systems Ltd</i>	<b>Transactive:</b> <i>Westholme Ltd</i>	
Powered by curly cord direct from mains transformer	Most firms have discontinued this feature, which is only included here to highlight that it is not recommended for people with neuromuscular conditions						
Continuous powered contact within track	✓	✗	✗	✓	✗	✗	
Battery charged at end of track	✓	✓	✓	✓	✓	✓	
Infrared system available	✓	✓	✓	✓	✓	✓	
Option of emergency raising of disabled person in event of power failure (lowering is mandatory)	✓	✓ until battery runs down	✓ 242 model	✗ will not lift if insufficient charge to complete transfers	✓ until battery runs down	✓ Transactive Plus - up to <b>252Kg (42 stone)</b>	
Swing Kit/Track-to-Track/Door-Transfer system through doorway where adjustment to door header is impossible	✓ called Swing Kit	✗	✓ called 242R2R	✓ called Swing Kit	✓ called Door Transfer	✓ called Transpoint Track-to-Track	
Sensitive push-button (not rocker) switches	✓	✓	✓	✓	✓	✓	
Centre of switch handset to floor can be specified at <b>500mm</b>	✓	✓	✓	✓	✓	✓	
Spreader bar swivels through <b>360°</b>	✓	✓	✓	✓	✓	✓	
How many sling hooks are standard at each end of spreader bar?	Choice of 2, 3 or 4	2	1	2	2	3	
If not supplied as standard, can 3 sling hooks be supplied to order?	✓	✓	✓ with sling side bars	✓ with alternative spreader bar	✓	Standard	

Comparative chart of ceiling hoist features of recommended models (cont.)							
Hoist model See also pages 11-17	<b>Bravo:</b> <i>Arjo Ltd</i>	<b>Wispa 200/300 Series:</b> <i>Chiltern Invadex Ltd</i>	<b>240/242:</b> <i>Liko Ltd</i>	<b>Guldmann Dan-Hoist:</b> <i>Moderna Contracts Ltd</i>	<b>Spectra:</b> <i>Southern Care Systems Ltd</i>	<b>Transactive:</b> <i>Westholme Ltd</i>	
Room-covering system (able to link to single track in adjacent room)	✓ called Bravo room-covering hoist	✓ called X-Y system	✓ called H system	✓ called room-covering system	✓ called X-Y system	✓ called H system	
Is the movement along the track powered or dependent upon a helper i.e. manual?	Manual or powered	Manual or powered	Manual or powered	Manual or powered	Manual or powered	Manual or powered	
Name of sling most suitable for users with MD See next page	MAA 4000 Range	Full support sling	Original high back	Basic high	Spectra MD sling	Westholme MD sling W205	

## Hoist assessment and slings

A number of issues need to be considered:

- ⇒ factors influencing the success of hoisting;
- ⇒ type of sling;
- ⇒ modified or special, 'one-off' slings;
- ⇒ compatibility of slings and hoists;
- ⇒ sling material;
- ⇒ positioning the sling.

### Factors influencing the success of hoisting

In addition to the quality of the initial hoist demonstration, the assessment of the correct type and size of sling, and the most satisfactory method of positioning the sling, are likely to influence both the disabled person's and the carer's acceptance that hoisting is a feasible and practical alternative to manual lifting. The support that the sling provides (particularly if head support is needed) and its comfort in use, will be crucial, particularly in providing confidence to the disabled person.

The timing of the introduction of hoisting is important in the case of children. A hoist should be introduced at an early age while it is a fun experience, so that they become familiar with the process of hoisting at a time when they are less disabled.

## Type of sling

The issues to be covered are as follows:

- ⇒ MD sling;
- ⇒ toileting sling;
- ⇒ toileting sling used to help stand up.

### MD sling

Although most firms have designed a one-piece hammock sling specifically for people with muscular dystrophy, individual assessment is essential and continuous feedback is appreciated and comments welcomed. The sling (see page 20) will have the following features:

- support extending from the base of the spine to the shoulder (or crown of the head, if head support is needed);
- tailoring to reduce the excess material and provide the correct support;
- padding, or stiffeners positioned in slots (so that they can be removed to ease laundering) to hold the sling erect;
- padded leg pieces;
- a method of holding the leg pieces flat against each other vertically, so that the straps – and not the leg pieces themselves – are crossed over.

The difficulty of a supportive sling of this type is that although the sling is satisfactory when used on the toilet, it is not easy to lower the person's clothing. For this reason many people are anxious to use a toileting sling.

### Toileting sling

Toileting slings are available from hoist suppliers and, although the exact design will vary, essentially they are slings with:

- one band behind the back, passing under the armpits and joined to two additional flaps which are fastened at the front of the chest;
- a second band under the thighs;
- the two bands joined together at the side by a piece of the sling material.

The use of this type of sling depends on the back support remaining in the correct position, either because it is held down by the user's arms or because it fastens tightly at the front of the chest. For most people with a neuromuscular condition, the pressure under the arms is too great for the shoulder girdle and they cannot tolerate the compression of the chest with a tight sling. As a result, the sling fastening has to be loosened and the person then jackknives out of the back of the sling. However, there are a minority of people who can tolerate this type of sling; when there is uncertainty, the sling should be assessed.

## Toileting sling used to help stand up

There is the additional option of using the *Liko* vest-like support which has multi-adjustable and flexible cross-straps, in conjunction with the Golvo 7000ES/7007ES models (discussed on page 9) or the Sabina/Sabina Comfort hoist (increased choice of sling options), which have height-adjustable knee blocks to provide front support to help the user to stand.

**N.B.** *This equipment must be carefully assessed by a physiotherapist experienced in the treatment of people with a neuromuscular condition, with additional advice from the hospital clinic team, and is likely to be contraindicated and unsuitable following spinal surgery.*

*Liko (UK) Ltd*

## Modified or special, 'one-off' slings

There will be occasions when a standard sling will need to be modified or a specialist sling designed; usually, the firm supplying the hoist will arrange for this to be carried out. However, if this is not possible, most other hoist manufacturers or suppliers provide a specialist sling design and manufacturing service, which is also available from *Silvalea*. This firm supply a comprehensive catalogue providing details of their service and a measurement chart. A total of 800 designs are available and any replacement sling can be made; this would be an invaluable service to a disabled person using a 'much-loved', but discontinued sling.

*Silvalea Ltd*

## Compatibility of slings and hoists

In the past, the recommendation was that slings should not be used with hoists from different manufacturers. However, it is now generally accepted that slings are interchangeable if the hoist and sling are correctly assessed, inspected and maintained separately, and the hoist hardware is identical, i.e. there is a compatible fitting method (rings, hooks etc.) on both the sling and hoist. Nevertheless, the position regarding compatibility must be checked with each firm – both the hoist and the sling suppliers. To ensure complete peace of mind to the disabled user, the therapist and the carers, *Silvalea* and most other firms have taken out public/products liability insurance cover.

## Sling material

Slings are made in a wide range of materials, but for people with a neuromuscular condition, who will require additional firm padding, the choice is usually polyester nylon for general use and a net sling for bathing; however, in both cases the sling assessment should establish which material the users (the disabled person and the helper) find the most suitable. It is usual for at least two slings to be provided (particularly where a sling is used both in the bedroom and bathroom) to allow a wet or damp sling to dry, and so that slings can be washed one at a time.

## Positioning the sling

Slings are designed so that they are positioned symmetrically behind the disabled person's back; by pulling on the inner curve of the sling they are eased an inch or so under the bottom. The leg pieces are brought forward on each side, ensuring that they are not twisted, and are then taken under the legs in one of two ways:



**Under both thighs to form a bucket seat**

This method is likely to be suitable for smaller disabled people only, as most users in this position will feel too restricted in the sling.

**Under each thigh separately and then brought up between the legs**

This is the recommended method for most disabled people with a neuromuscular condition, but because their selective muscle wasting results in an outward rotation of the thighs, it is important to bring the legs together and support the thighs in a comfortable position. It may be essential to provide an MD sling and that the *straps of the leg pieces of the sling are crossed between the legs* and hooked on to the *opposite* end of the spreader bar to prevent the sling from 'rucking up', moving towards the groin and causing discomfort.

**Reference**

1. Fletcher, B., Holmes, D., Tarling C., Tracy M., *The Guide to the Handling of Patients*. National Back Pain Association, 1997.