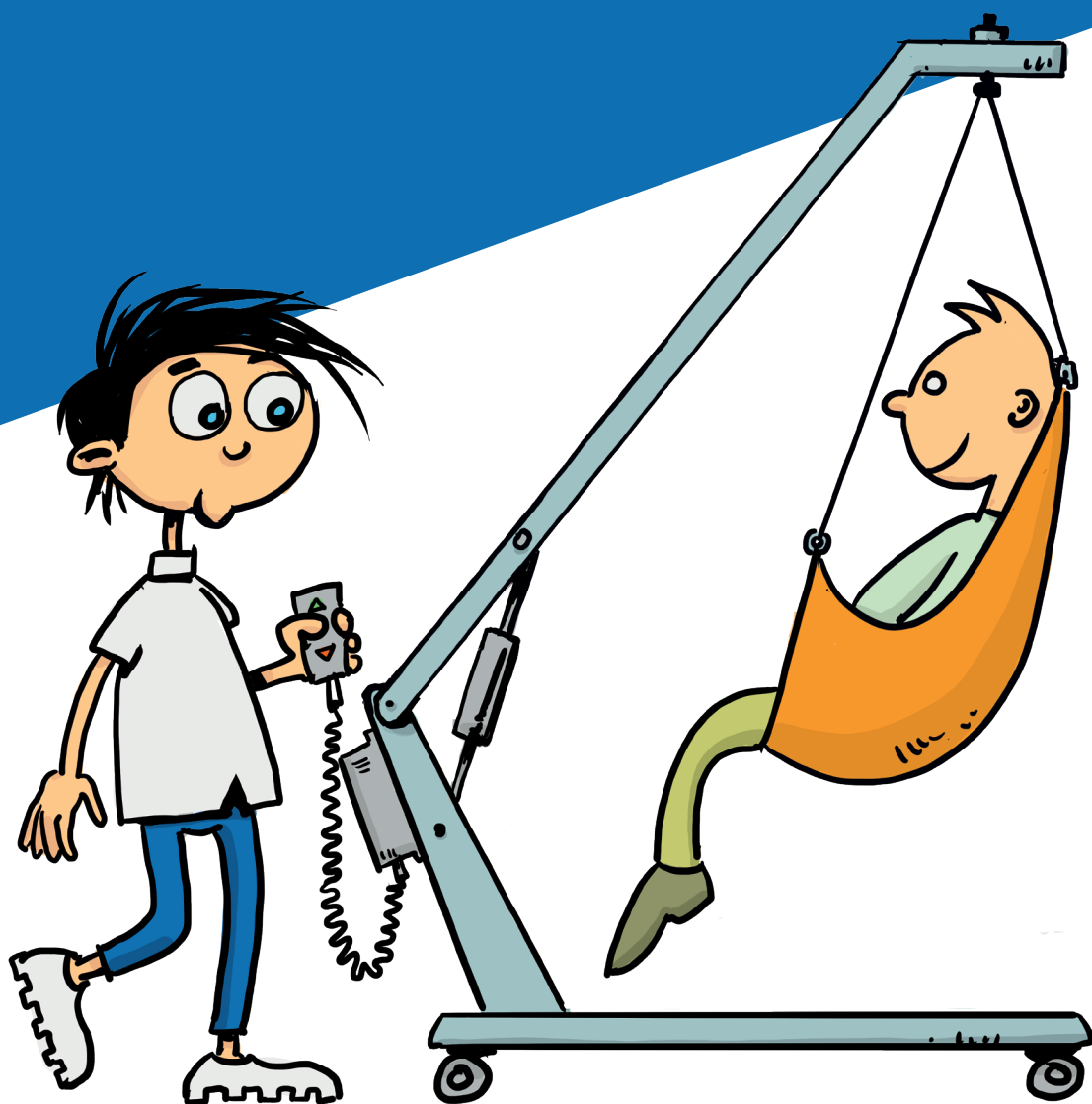


Practical guidelines on moving people



A publication of VerV - Ergonomics Belgium



**“Healthy caregiver,
quality healthcare”**

Inhoud

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1. Introduction

These practical guidelines contain practical recommendations on how to move people in an ergonomically responsible manner. They take into account both the physical strain on the caregiver and the comfort and self-reliance of the patient. The principles described here can be used in the various healthcare sectors: hospitals, residential and care centres, home care and the disabled sector.

At the heart of these practical guidelines lies the care recipient's class of autonomy, expressed by their mobility class. Patients should use their remaining capabilities as much as possible, this needs to be taken into account when selecting appropriate aids for the various transfers i.e. on or to the bed, from sitting to standing, from lying to sitting, during nursing and when donning and doffing compression stockings.

The background of the practical guidelines are biomechanical limits translated into typical movements or transfers used in health care. These are described in the Dutch practical guidelines, also widely accepted in Belgium. This way, the physical load for the caregiver remains manageable. After all, healthy health care implies healthy employees.

In practical terms, health care recipients are assigned a mobility class (MC). This determines the appropriate aids for performing a transfer. These are made available and their use checked against VerV's Lift-Thermometer. This gives a picture of the physical load and required aids in a care unit.

The practical guideline is a guide for healthcare facilities that want to invest in the health of caregivers and the comfort and self-reliance of patients.

- Health care recipients can be grouped into five mobility classes
- Transfers on the bed always require a slide sheet from MC C onwards
- Transfers out of bed are done with a mobilisation aid or hoist from MC C onwards
- Care tasks always require a height-adjustable
- Donning and doffing compression stockings always requires an aid
- VerV's Lift-Thermometer is used to evaluate the risk of moving people

2. Summary

The practical guideline is built around six simple propositions:

1 Health care recipients can be grouped into five mobility classes
When moving people, the care recipient's remaining capabilities should be used to the fullest. To this end, patients are placed in one of five mobility classes based on their autonomy. This MC determines the appropriate assistance for performing a transfer.

2 Transfers on the bed always require a slide sheet from MC C onwards
A slide sheet and a slow initiation are always required when offering assistance. In the case of a patient from MC C onwards, cooperation is often insufficient even after activation.

3 Transfers out of bed are done with a mobilisation aid or hoist from MC C onwards
Transfers from the bed to sitting and vice versa may require the use of a mobilisation aid or hoist. Patients in MC C can be assisted by a mobilisation aid and an active hoist to increase their cooperation. When this is no longer possible, a sling or overhead lift fully raises the passive carer (MC D and E).

4 Care tasks always require a height-adjustable
Health care often involves static postures. This is why an electric height-adjustable bed is a must in the care sector. Other adjustable elements i.e. toilet chairs, shower chairs, shower stretchers, bath lifts and seats, etc. also allow peripheral tasks to be performed using an optimal standing posture.

5 Donning and doffing compression stockings always requires an aid
Because compression stockings of pressure class 2 and up are difficult for a caregiver to put on a patient, an aid is always needed for donning and doffing them. A rubber glove can further improve grip.

6 VerV's Lift-Thermometer is used to evaluate the risk of moving people
Reducing physical strain in health care is a step by step process. VerV's Lift-Thermometer quickly shows whether the required aids are present and are being used in accordance with the mobility class of the care recipient.

3. Consensus

PROPOSITION 1:

**Health care recipients can be grouped
into five mobility classes**

Five mobility classes

When manually moving people, it is important to make optimal use of the remaining capacities of the patient. This not only reduces the stress on the caregiver, it also ensures that the patient remains mobile for as much and as long as possible. To estimate a person's remaining abilities, five mobility classes (MC) exist. These range from A to E or from the fully independent active care recipient (A) to the fully passive one (E).



Copyright Mobiliteitsklassen:
LOCOmotion (Knibbe &
Knibbe, 2018).

- A:** Fully active, can move without assistance.
- B:** Active, can move with an aid or after instruction.
- C:** Moderately active, needs help with transfers, has upper body control and can stand.
- D:** Semi-passive, needs help with transfers and has moderate upper body control, but can not stand. Some strength remaining in arms and/or legs.
- E:** Fully passive, no strength left in arms and legs, no upper body control, at most some head control remains.

The patient's functional mobility must be properly assessed at the time of the care activity, because mobility classes may change over time. In the case of acute care in a hospital, a patient may actively walk in for an intervention (MC A). After anaesthesia, however, they become fully passive (MC E). With chronic care in a care facility or at home, the changes are not as drastic. A mobility class may sometimes change to an adjacent class within the day. For example, in the morning, a patient may still be able to stand (MC C) but fatigue may cause them to experience difficulty standing later on in the day (MC D).

Mobility classes can help to proactively provide appropriate aids. Upon admission, the mobility class is entered into the electronic patient record. The nurse in the examination department can thus prepare the necessary aids for a smooth transfer to the examination table. After an intervention, the MC may change again. This interim assessment allows the department to know early on which aids will be needed in the room.

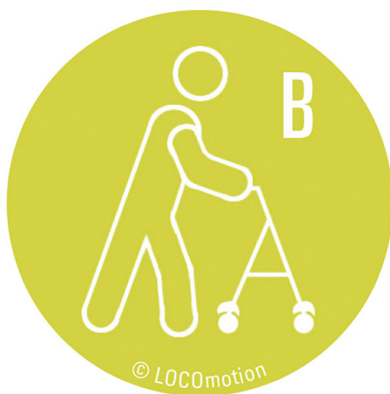
When a patient is transferred to a residential care centre or to their home environment, it is important to specify their mobility class beforehand. This way the care centre or family can already begin to prepare the room and provide the appropriate aids, instead of having to do this at the time of the patient's arrival, which is often very demanding on the caregivers.

MC5 can be used therapeutically in rehabilitation facilities. Patients with MC C or D at intake may meet the minimum required MC B at the end of their rehabilitation period in order to be discharged.

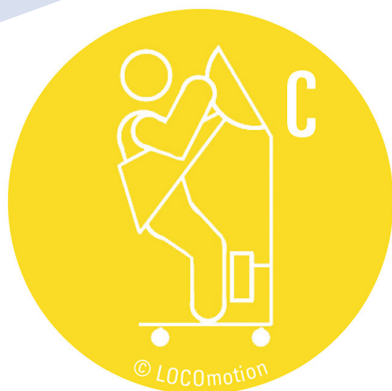
Mobility classes play a major role in this practical guideline because they determine the best suited aids for moving a person. For this reason, they must be described in simple and clear terms in order to ensure correct classification of the care recipient.



The care recipient can perform the care activity on their own. There is no physical strain on the caregiver because they do not have to provide any support.



The care recipient is able to perform the care activity independently if given some assistance in the form of instructions and guidance. The assistance required does not pose a risk of physical overload for the caregiver. The assistance may consist of verbal instructions or may involve helping the patient get up. Small aids and/or adaptations (such as a pull-up brace) may be used in addition.



The care recipient is unable to perform the care activity independently. The assistance required poses a risk of physical overload for the caregiver unless measures are taken. It is necessary to use an aid to make the caregiver's task physically acceptable. However, the care recipient can physically assist. They can stand and have upper body control as well as some strength in their arms. They are encouraged to make optimal use of their functional mobility. An active hoist, mobilisation aid or slide sheet are examples of aids that require patients to actively participate in order to be moved.



The care recipient is unable to perform the care activity independently. They have insufficient leg strength or are unable to stand. They do have some residual strength in the arms and legs, moderate upper body stability and head control. Without special measures, the assistance required brings risk of physical overload for the caregiver. It is necessary to use assistive devices, e.g. a sling lift, to partially or fully perform the transfer in order to make the caregiver's task physically acceptable.

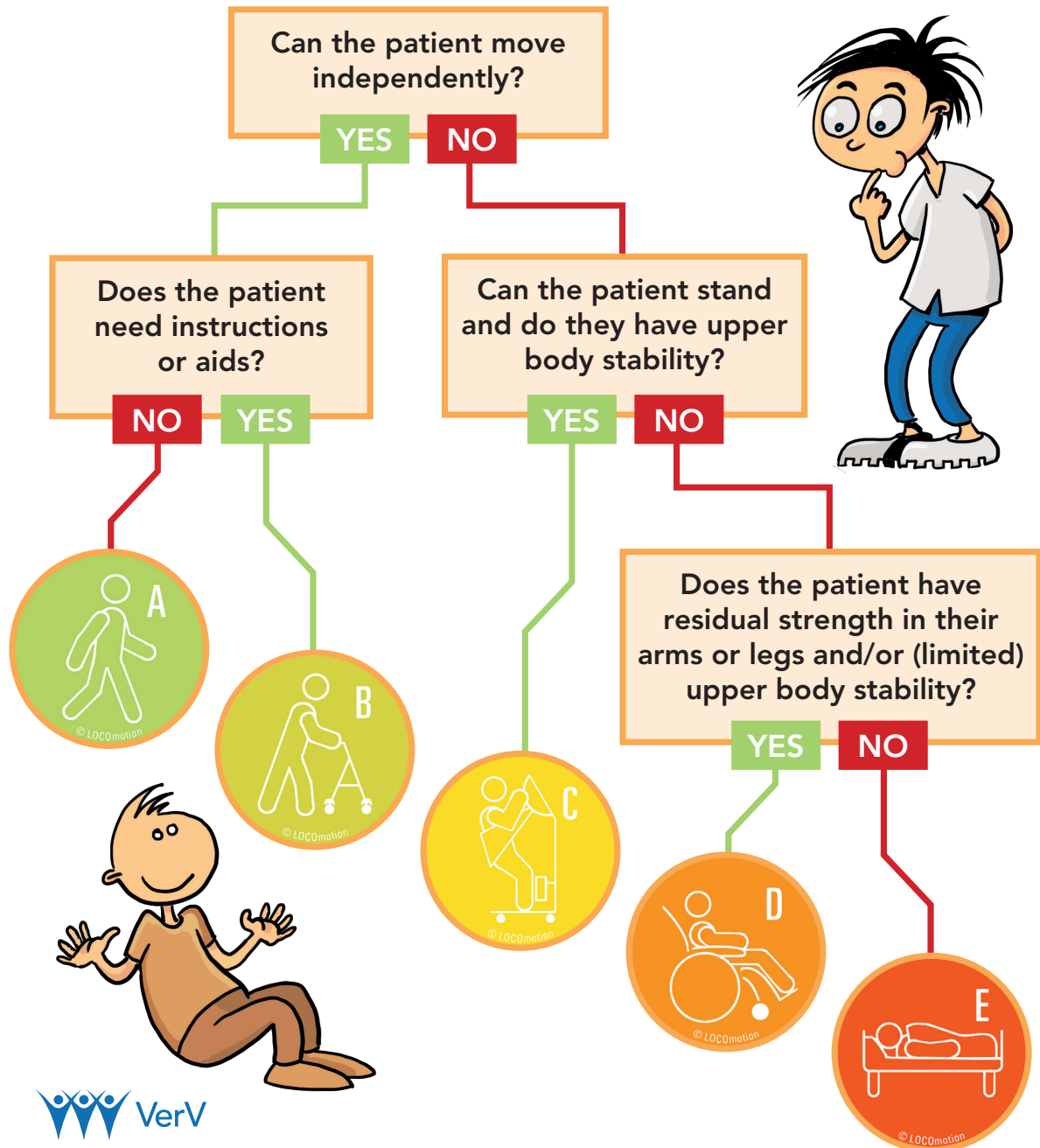


The care recipient is unable to perform the care activity independently. The assistance required carries a risk of physical overload for the caregiver. The patient has no more strength in their legs or arms and lacks upper body control. It is necessary to use assistive devices to perform the transfer in order to make the caregiver's task physically acceptable. Encouraging or maintaining mobility is not an objective. We may, for example, be talking about care recipients who are terminally ill, have no motor control or are so tired that it is important for them to conserve their energy to be able to receive visits or read, for example.

Patients in this MC are transferred using a sling lift, for example. In this process, the patient's cooperation is not encouraged. The focus is on providing optimal comfort and preventing or limiting the complications of immobility, such as pressure sores.

VerV decision matrix

The VerV decision matrix helps to unambiguously determine an appropriate mobility class in three steps. This is necessary for a consistent assessment and communication between different healthcare providers, facilities and manufacturers.



In the case of MC A and B, patients are able to move. In the case of MC B, however, instructions or an aid are needed. When a patient cannot move independently, their remaining capabilities are considered. Patients in MC C can still stand and have upper body stability. When only residual strength in their arms or legs and/or limited upper body stability remains, MC D applies. Patients in MC E are fully passive.

Being able to stand implies that the patient can independently stand on 1 or 2 legs for 30 seconds. Having upper body stability implies the patient can sit independently, without using their hands and on a firm surface for 30 seconds.

Relation of MC5 to other scales

Belgium is in the process of rolling out BelRAI, an instrument that can be used to make an assessment of each patient's physical, cognitive, psychological and social care needs. It is currently being rolled out mainly in residential care centres and home care organisations. Other sectors will follow at a later stage. By completing the questions on Activities of Daily Living (ADL) and, more specifically, on moving around, a link can be made to the MC5 scale and the aids required for each transfer can be determined.

Belgium's NIHDI on the other hand uses the KATZ index to determine the dependency level of patients. The KATZ index evaluates activities of daily living on a 4-point scale. Its assessment of the "transfer and movement" domain is very similar to the MC5 grading (albeit with no distinction between MC D and E).

Medical aid companies also often adopt the MC5 mobility class system. This ensures clear communication between the supplier and the institutions regarding the type of aids and their proper use. A common language makes things clearer.

Mobility classes can also form the basis for further screening using other care classification scales. For example, the risk of pressure ulcers will need to be determined faster for a patient in MC D and E compared to an MC B. An assessment of the risk of falling will need to be done faster for a patient in MC B and C compared to a patient in MC E.

PROPOSITION 2:

**Transfers on the bed always require a slide sheet
from MC C onwards**

Slide sheets

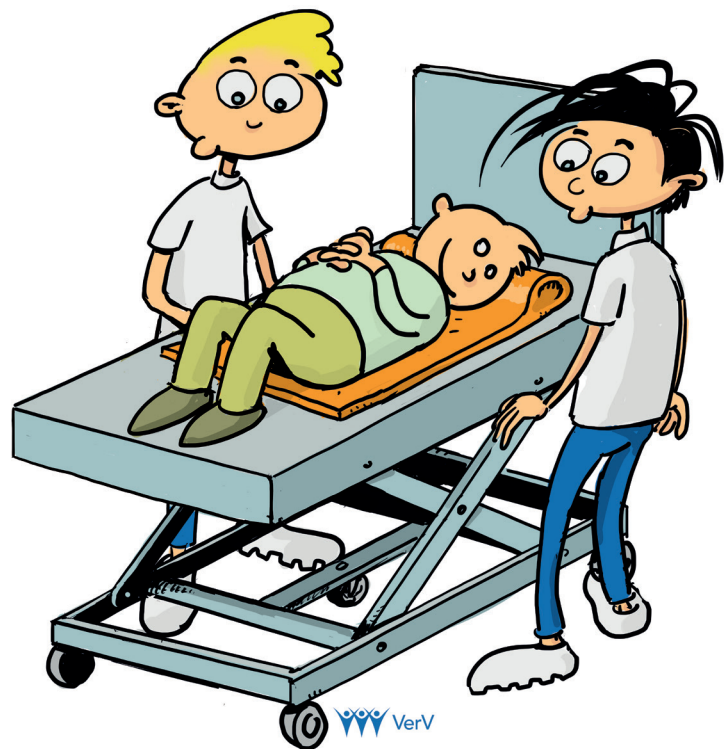
This proposition states that when a patient is no longer able to perform a transfer independently within the confines of the bed, i.e. from MC C onwards, a slide sheet is always required.

In addition to a slide sheet, equivalent slide aids exist nowadays, such as integrated flat sheets. These are undersheets with a sliding surface combined with a patient transfer sheet with a smooth underside. These aids have an equivalent smoothness as slide sheets. The integrated sheets are therefore an equally valid alternative.

Permanent sheets are gaining in popularity. However, a single-layer flat sheet that stays in bed is not suitable because it requires too much pulling force. A slide sheet overcomes this problem. The two smooth layers easily slide over one another. Still, a slide

sheet has to be applied and removed each time, an extra action that is time-consuming and sometimes struggles to find its way into the routine of care facilities. A slide sheet could be left in place for regular transfers, but this scenario should be evaluated individually. Leaving a slide sheet in place can even help prevent pressure sores by reducing the shearing forces exerted on the skin. Conversely, a permanent slide sheet may conflict with the internal guidelines of a least-restraint policy.

An integrated slide sheet features two sliding layers and can be left in bed at all times. It is an interesting aid for patients from MC D and E.



Slide sheet for transfer in bed

Effects of using slide sheets

A slide sheet in combination with a slow initiation helps to obtain an acceptable pull force while moving people. The biomechanical limit as set out in the Dutch code of practice is a pull force of 25 kg when using two hands and 15 kg when using one hand. Taking the frequency of movements into account and the mostly female workforce, 21 kg is a safe practical limit.

Pull forces can be measured with a dynamometer when sliding up and sideways in bed. The measured forces depend on various parameters such as the type of slide sheet, its size, the speed at which the transfer is started, the position of the slide sheet, the type of mattress, the weight of the patient, the position of the legs and the position of the bed (i.e. Trendelenburg). From these measurements, it is clear that a slide sheet is a necessary aid when moving people in bed.

Lifting techniques have given way to moving techniques. People are no longer lifted in bed, but shifted. This is already a significant improvement over the old techniques, which needed two people to lift the patient and always resulted in too much physical strain, up to more than 200% of the acceptable lifting limit. Shifting patients on the bed, however, can still require a lot of force. In this case, a slide sheet provides an efficient solution and on average reduces the required pulling force by 40% and even 60% when combined with slow movements.

The use of a slide sheet and slow movements is therefore always needed when the patient cannot move independently. The softer the mattress, the more pulling force is required. Therefore, the caregiver must always assume the care position when a

dynamic alternating mattress is used. For heavier patients, the forces can also be reduced by placing the bed in the semi-Fowler or Trendlenburg position.

The position of the slide sheet is also significant. There should be ample sliding fabric in the direction of the movement. Placing the slide sheet too low causes up to 33% more pull force during the transfer. The recommended position is for the top of the slide sheet to meet the top of the patient's head.

Measurements using different types of slide sheets show that there is a reduction in pull forces compared to not using them. However, a residual risk is still present with a single-layer slide sheet. A healthy class can only be achieved with two smooth layers. A large slide sheet and a double layer are therefore preferred. Similar sliding aids such as integrated flat sheets create the same degree of smoothness, allowing them to be used in the same way as a sliding sheet.

PROPOSITION 3:

Transfers out of bed are done with a mobilisation aid or hoist from MC C onwards

MC C – Mobilisation aid and active hoists

When extra assistance is needed for transfers from the bed to sitting and vice versa, the use of a mobilisation aid or hoist is needed. At MC C, a mobilisation aid and active hoist reinforce the patient's cooperation. When this is no longer possible, a sling or overhead lift completely lifts the passive patient.

Patients from MC C are still able to stand and have upper body stability. Nevertheless, some variation still exists within this category. A mobilisation aid is appropriate for people who can stand independently, but can no longer or hardly walk. Because the patient assumes an active sitting position, less strength is needed to stand up. The mobilisation aid encourages the patient to be more active and assist with transfers.

Active hoists and mobilisation aids are intended for short transfers such as from the bed to the toilet or chair. The patient stands with their feet on a plate and their knees rest against a knee support. Active hoists have a strap that can be placed behind the back of the patient to provide additional



Active hoist for transfer from bed to sitting.



Mobilisation aid for transfer from bed to sitting.

support when standing up. Patients can still stand up or have some leg strength, but not enough to stand up by themselves with a mobilisation aid.

MC D and E – sling and overhead lift

When a patient can no longer stand or has upper body stability, a sling or overhead lift is recommended. This is for mobility classes D and E.

The baseline is the biomechanical limit of 23 kg for lifting under optimal conditions. This is an acceptable load for 99% of men and 75% of women. If 90% of women are also to be able to work in a healthy way, 15 kg is the maximum lifting weight. Applied to healthcare, this means that passive care recipients are always considered “heavy”.

A sling lift lifts the patient using a lifting harness. The passive floor lift, with or without electric drive assistance, is mobile and can be braked. A passive overhead lift moves on



Passive floor lift for transfer from bed to sitting.

a rail system on the ceiling. They are a good solution for the comfort of both the patient and the caregiver. Compared to floor lifts, overhead lifts are faster, less stressful on the back and require less muscle work.

Effects of using overhead lifts

Overhead lifts are a good ergonomic aid, especially in care facilities with long-term stays. After all, in 2 to 3 years, the cost is recouped by a decrease in the number of physical complaints.

Overhead lifts reduce the physical strain during transfers in and out of bed. The number of physical complaints related to these transfers dropped by half. For transfers within the bed, there was no difference. Overhead lifts put the least amount of stress on the back and shoulder muscles when transferring between a bed and a wheelchair and vice versa. In addition, they also provide a clear advantage over passive floor lifts.

Overhead lifts have a positive effect on the comfort of both patients and caregivers. They make the job easier. After all, an overhead lift is instantly available. Caregivers report fewer back and shoulder complaints. Patients also prefer an overhead lift to be moved because it makes them feel safer and less stressed.

An overhead lift is faster to operate than a passive floor lift. The manual version is still the fastest though. Overhead lifts are also expensive. On the other hand, they offer a lot of benefits: more comfort and less illness with associated direct and indirect costs.

Overhead lifts are a must in long-term care facilities. They should be fitted as standard when new residential care homes are built. An overhead lift constitutes a triple-win: less stressful for the caregiver, more comfortable for the patient and cost-effective for the care facility.

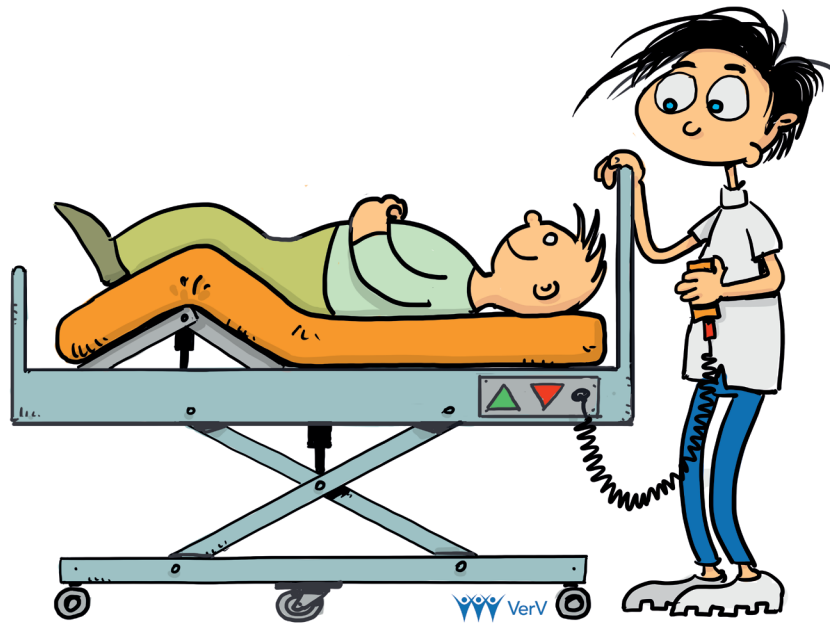
PROPOSITION 4:

Care tasks always require a height-adjustable aid

Electrically adjustable bed

Health care often involves static postures that can quickly become tiring. To allow for optimal working postures, a height-adjustable bed is always required. From an ergonomic point of view, this is standard equipment in care.

The baseline is the biomechanical limit, which dictates not to work with a twisted or bent ($>30^\circ$) back for more than one minute. A proper working height is a prerequisite for a neutral posture. As not all caregivers and patients are the same size, adjustable solutions are necessary.



Adjustable bed with knee support

When buying a bed, it is good practice to consider some basic ergonomic criteria:

- Electrically height-adjustable bed: sufficiently low for seated transfers
- Direction wheel: one or two swivel castors that can be locked or a fifth wheel
- Big wheels with brake mechanism
- Accessible underneath: open space of 15 cm high
- Semi-Fowler position: adjustable back and knee angle and adjustable tilt
- Trendelenburg and Reverse-Trendelenburg position
- Adjustable side rails, bed rails or guard rails
- Bed rails in two parts
- Easy for attachments: pull-up bar, perfusion stand
- Retractable foot ends
- All controls easily accessible
- 45 cm free space at head end

Can be added as an option:

- Electric slide sheets at the side of the bed
- Height-adjustable handles for pushing
- Tilting bed

Effects of using adjustable beds

A direction wheel makes it easier to drive straight ahead. The user has to change direction less often (28%). This effect is especially evident with heavy patients (120 kg). Subjectively, hospital beds with a fixed castor are perceived to be easier and less strenuous.

Height-adjustable handles allow the pushing height of the bed to be adjusted. After all, the load on the shoulders is 30% lower than when everyone has to push at the same height of 110 cm. A proper height for the handrail is at elbow height.

An adjustable back and knee angle allow the bed to be set in different positions. A contour mechanism means the knee angle moves with the angle of the backrest. The care recipient will slide less when the backrest is straightened regularly. The caregiver will also have to reposition the patient in bed less often.

Care tasks always require a height-adjustable aid

An adjustable environment i.e. adjustable toilet chairs, shower chairs, shower stretchers, bath lifts and seats, etc. also allow peripheral tasks to be performed using an optimal standing posture.

■ Height-adjustable toilet seat

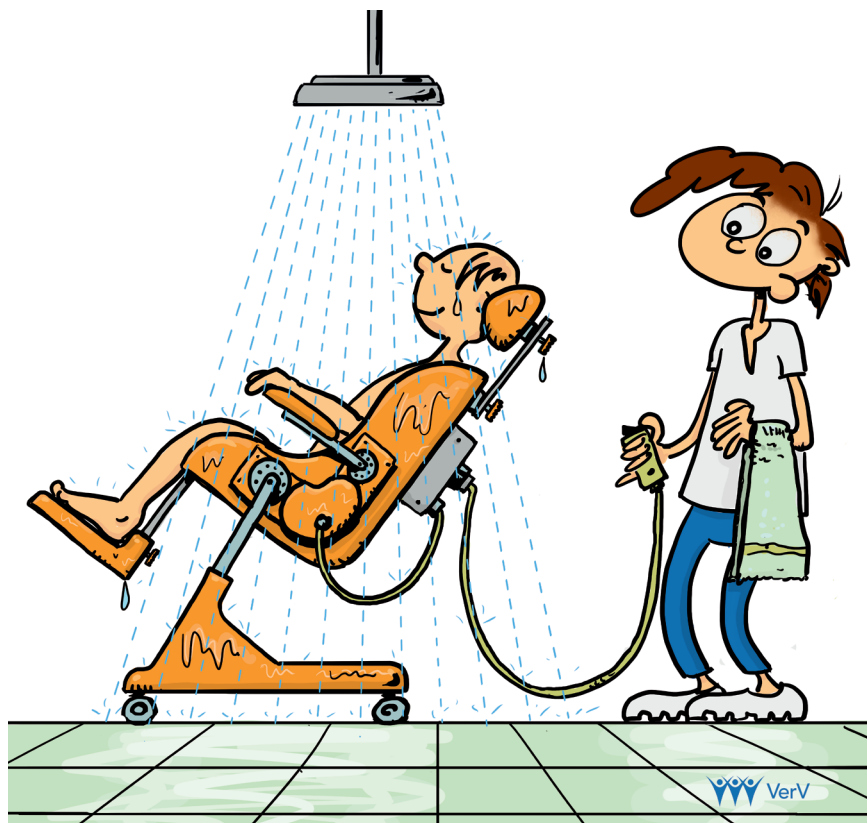
A height-adjustable toilet chair is an aid for patients who cannot walk to the toilet independently. This means that the toilet chair is used in combination with a hoist and should therefore be accessible underneath. A height-adjustable model makes sitting down and standing up easier for the patient.

■ Height-adjustable shower chair

A height-adjustable shower chair allows the caregiver to assist with showering while maintaining a healthy posture. Other peripheral tasks where the caregiver would benefit from an appropriate height include drying and dressing. Some shower chairs can also be moved over the toilet.

■ Height-adjustable shower stretcher

A height-adjustable shower stretcher benefits both the caregiver and the patient. The shower stretcher should be sufficiently high at its highest position to accommodate large caregivers. For the patient, the shower stretcher should be sufficiently low to allow transfers from the wheelchair. The shower stretcher can also be used as a care table.



Height-adjustable shower chair

■ Bath lift

A bath lift is a sitting aid used to raise or lower the patient into or out of the bath. In its highest position, a bath lift is class with the upper rim of the bath. This allows the patient to easily get in and out of the bathtub. The bath lift also provides a comfortable sitting position for the patient while bathing.

PROPOSITION 5:

**Donning and doffing compression stockings
always requires an aid**

Donning aid

An aid is always needed when donning and doffing compression stockings of pressure class 2 and up. Compression stockings must be tight, which makes donning and doffing them difficult. A donning aid reduces the strain on the caregiver and increases the comfort of the patient.

Different types of aids exist in function of open- or closed-toe compression stockings. A stocking slider is first put over the foot. The compression stocking is then pulled up until resistance is felt. The compression stocking is then put on by moving it upwards until the ankle and foot are well enclosed. After that, the stocking slider is removed.

For people who can no longer reach their feet a tool exists over which they can stretch the compression stocking, making it easier to slide their foot into it.

A stocking slider can also be used to remove compression stockings. First, it is put over the compression stocking and folded over. The compression stocking can then slip over the stocking slider. It is important that the slider always remains under the compression stocking. Once the stocking is off, the aid can be released again.

Practical

A caregiver's best position is on a chair or stool directly facing the person in need of care with the patient's foot in the middle of the caregiver's lap. This is the most symmetrical way to work. Rubber gloves improve grip on the stocking.

The best time to put on compression stockings is just before getting up, as this is when the legs are least swollen. Right after showering is not a good idea because the skin is not completely dry and the grip on the skin is reduced.

PROPOSITION 6:

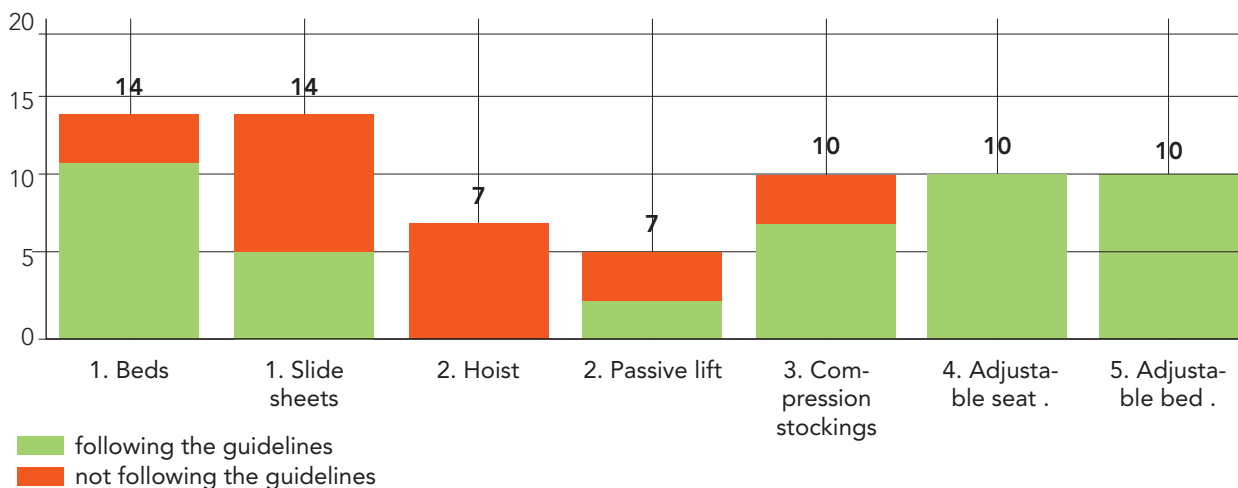
VerV's Lift-Thermometer is used to evaluate the risk of moving people

Lift-Thermometer

The risk of moving people is evaluated with VerV's Lift-Thermometer. For each transfer, depending on the mobility class, an assessment is made as to whether the required assistive device is present and used. The Lift-Thermometer was developed in the Netherlands. The Lift-Thermometer effectively tests the extent to which the above basic propositions are applied on a departmental level.

First, the patients of a department are grouped by their mobility class. This determines which aids should be used for each transfer. Next, through a survey and a score, we determine the percentage of patients from each mobility class for whom this is done correctly. This is repeated for each type of transfer.

The Lift-Thermometer is available online and guides the user through the different steps or transfers. The end result is a graph indicating for each transfer whether or not the appropriate assistive device is used. The red bars indicate where the required aids are not used. This may also be because they are not there. The Lift-Thermometer visualises a department's weaknesses at a glance. The chart is easy to read and encourages intervention. The tool can also be used to guide purchasing policies for assistive devices.



VerV's Lift-Thermometer

VerV's Lift-Thermometer is a derived variant of the Lift-Thermometer. Each individual patient is assessed for each transfer, and the terminology of the assistive devices has also been adapted.

VerV's Lift-Thermometer opens with an overview screen. This is where all care recipients in a department are first listed. Each patient's mobility class is then assessed. By selecting the mobility class, the aids required for the various transfers for that patient appear automatically. If the aids are actually used, the job is done. The assessor only has to mark off where the basic propositions are not followed. This makes it possible to see very specifically which patient does not have or is not using an appropriate assistive device.

Doing this for each care recipient separately provides an overview of

1. the care intensity
2. the number of resources needed for the whole department
3. the number of effectively used resources

The results are automatically converted into figures and in graph form. The weak points requiring intervention are clearly identifiable at a glance. The red bars indicate where the required tools are missing and/or not used.

When combining the results of these individual analyses, the risk of caregiver overload can be properly and objectively assessed. Based on this assessment, preventive measures to further reduce this risk can then be identified. VerV's Lift-Thermometer provides a good basis for an appropriate prevention policy.

The individual approach fits in with a future view where mobility classes are linked to the electronic patient record. Some key questions from the BelRAI then determine the mobility class in the background or the required aids in the foreground.

4. Legislation and standards

Code book VIII, part 3 Manual handling of loads

The Code describes the legislation on well-being. Book VIII Ergonomic Load, part 3 deals specifically with manually handling loads. The employer is responsible for preventing risks as much as possible. If there is no way to prevent a certain risk, it must be assessed with appropriate measures. Employees exposed to the risk must be made aware of it. Training on how to properly deal with the risk is mandatory in some situations.

Moving people is a form of manual handling of loads and is covered by this legislation. The intention is to eliminate manual transfers as much as possible for the caregiver, while at the same time maximising the patient's remaining capacities. Assistive devices can therefore be understood as appropriate measures. More concrete information regarding risk analysis can be found in the international standards.

ISO-TR 12296: Manual handling of people

Manual handling of loads is a major work-related cause of back pain. ISO-TR 12296 proposes a science-based approach to analyse and control its associated risks. This is done in four steps: risk identification, analysis, control and evaluation. To assess the risks associated with the manual handling of people, the literature lists several analysis methods. The four commonly used methods are: Dortmund Approach, Lift Thermometer, MAPO and PTAI.

■ Dortmund Approach

The Dortmund Approach from Germany is based on the biomechanical load on the low back. The compressive force on the low back during various transfers was calculated in the laboratory. Specific limit values are used as a function of gender and age to determine whether a manual transfer is acceptable or not.

■ Lift-Thermometer

The Dutch Lift-Thermometer evaluates the mobility of the patient to determine the assistive devices needed to perform a manual transfer under acceptable load.

■ MAPO index

The MAPO index from Italy maps the risk level of an entire department. All parameters contributing to the risk level of the department's employees are taken into account: patient mobility, number of caregivers, lifting aids (hoists), smaller aids (slide sheets), wheelchairs, environment and infrastructure, caregiver training.

■ PTAI

The Patient Transfer Assessment Instrument (PTAI) from Finland is a risk assessment on an individual and per-transfer level. A total of 15 factors are evaluated according to the traffic light model. The weighted average of positive criteria determines the overall load.

