

TRANSFER DEVICES

INTRODUCTION

For individuals with spinal cord injuries, a primary goal of rehabilitation is learning the ability to successfully transfer between different surfaces or pieces of equipment. Transfers can include, but are not limited to, moving from the bed to the wheelchair, from the wheelchair to the commode, and from the commode to bathing equipment.

Some individuals will be able to perform transfers without any medical devices, but many will require the use of an assistive device, with or without a caregiver assisting. In addition, the difficulty of the transfer (such as the distance between two surfaces) may change the level of assistance or the assistive device an individual may require in that instance.

Table 1 illustrates expected transfer equipment by level of injury for individuals with motor complete spinal cord injuries.

Motor Level	Expected Transfer Equipment
C1-C4	Power or mechanical lift with sling.
C5	Maximum assistance with transfer board or with power/mechanical lift
C6	Possibly independently with or without transfer board, may require some assistance, especially for varying surface heights.
C7-T1	Likely independent with transfer board over uneven surfaces, potentially able to transfer without equipment.
T2-T12	Likely independent with transfers with or without transfer board.
L1-S5	Likely independent with transfers without transfer board.

Table 1: Expected Transfer Equipment by Level for Individuals with Motor Complete Spinal Cord Injuries

This chapter will give a comprehensive overview of potential transfer equipment that may prove useful for individuals with spinal cord injuries. One important caveat when evaluating the different equipment in this

chapter is that availability and reimbursement by insurers is variable and often depends on strict criteria. If possible, it is important to trial equipment before purchase because obtaining incorrect transfer equipment could limit the independence of an individual and insurance may deny coverage for a second device.

AMBULATORY ASSISTIVE DEVICES

Although most commonly thought of to help with mobility, these devices are critical for many individuals to successfully transfer.

Typical Users: These devices are most commonly used by individuals with incomplete spinal cord injuries or lower level spinal cord injuries, often in conjunction with bracing.



Gait Belt



Lifting Belt



Transfer Sling

Contraindications and Cautions: Using ambulatory assistive devices, particularly without caregivers present, often requires significant upper extremity strength to help lift the body. This can lead to degenerative changes of the shoulders and upper extremities. Individuals are also at risk of falls when using these devices.

Caregiver Manual Gait Assistive Devices:

Although relatively simple in design, a gait belt can effectively be used to prevent falls in appropriate individuals. The person who is assisting with the transfer should stand with hands spread and securely holding the gait belt. They should have a wide base of support and while assisting the individual should bend at the knees and not at the back.

Gait Belt/Lifting Belt/Transfer Slings: These devices are generally a few inches thick and come in many materials such as canvas, nylon or leather. They can be secured with a buckle or a loop with teeth. There are variations of the gait belt that also include leg loops, handles or a full chest harness. Others types do not fully lock around the waist and just provide support with standing.

FLOOR STAND-TRANSFER SYSTEMS

Infrequently used in those with spinal cord injury, the goal of these devices is to help individuals with adequate strength to stand but difficulty with transferring. The person assisting with the transfer can place their foot on the device to add stability.

Turntable: Made of two discs that rotate over one another, these devices should be used with caution in those with spinal cord injury as they can lead to falls if the individual is not closely monitored.

Pivot Transfer Mat: Non-stick mats, these provide a stable surface for individuals to stand on while performing a transfer.



Turntable



Pivot Transfer Mat

WALKERS

Walkers are devices of variable designs that provide a wide and stable base of support for individuals to lean/push against in order to stand, transfer and walk. Essentially, the user is transferring weight from their legs to their arms. They can be used with both sit to stand transfers and stand pivot transfers. When standing with a relaxed arm, the handgrips of the walkers should be at the crease of the user's wrist. Walkers can generally be adjusted to the user but may require a junior, tall or bariatric walker in select cases.

Standard/Basic Walkers: These walkers have no wheels. Users need to lift the walker in order to advance forward. Standard walkers tend to be the most stable but can be difficult to advance.

Two-Wheeled Rolling Walkers: These walkers have two casters on the front legs of the walker. They provide for an easier and more natural gait pattern than a standard walker but are less stable.

Three-Wheeled Rolling Walkers: These walkers have one swiveling wheel in front and two fixed wheels in the back. These are more maneuverable, lighter and easier to transport compared to a four wheeled walker.

Four-Wheeled Rolling Walkers: Often known as a rollator, these walkers are also maneuverable. They often have a seat as well.

Platform Walker/Attachment: These walkers have a platform (or attachments) that allows individuals to use a walker without having to use their hands or forearms, which may be options for those with weight bearing restrictions.

CANES

Canes can be used to help with transfers for those with good lower extremity function but difficulty with

balance or standing from sitting. They effectively assist with balance by increasing the user's base of support. It should be used in the hand opposite the weaker side as it allows the user's weight to shift off the more involved leg. Canes can also be used bilaterally to provide even greater support. When standing with a relaxed arm, the cane handle should be at the

WALKERS



Standard/Basic Walkers



Two Wheeled Rolling Walkers



Four Wheeled Rolling Walkers



Platform Walker



Platform Walker Single Arm Attachment

CANES



Single Point Cane



Tripod/ Quad Canes



Hurry Cane™

height of the crease of the user's wrist. There are a variety of shapes, materials, and modifications to the handgrip of the cane for comfort or to accommodate grip preferences.

Single-Point Cane: These canes come to a single tip (or point of contact with the ground).

Hurry Cane™: Similar to single point canes, but they have a 360 degree pivoting head with 3-point rubber tip, which is non-skid and all-terrain.

Tripod/Quad Canes: These canes come to three or four tips and have greater contact with the ground which provides greater stability.

CRUTCHES

Crutches are similar to canes and walkers, and can be used to help those with lower body weakness transfer. They also take weight off the legs by providing weight bearing through the arms. They generally require greater coordination and balance than a walker.

Axillary Crutches: Traditionally used to offload a limb, axillary crutches can also be used for lower extremity support and balance. These axillary pad (top part of the crutch) should rest 1-2 inches below the armpit and pressed against the ribcage to stabilize the crutch. Weight is placed through the handgrips.



Axillary Crutches



Forearm/Lofstrand Crutches

The height of the handgrips should be adjusted to the user's hip, leaving a slight bend in the elbow. Axillary are often used for more short term use compared to Forearm/loftstrand crutches (see below).

Forearm/Lofstrand Crutches: Forearm crutches have a cuff that fits around the user's forearm and a handgrip. They are more portable than axillary crutches but require the most coordination and balance. Compared to axillary crutches, they are often for longer-term use and allow for a more reciprocal gait pattern.

Hands Free Crutches: These crutches are designed to provide maximum comfort and mobility support. Unlike axillary/forearm crutches, they eliminate the pressure placed on the armpits, hands, and wrists. Instead, pressure is distributed through the elbows and forearms.

TRANSFER BOARDS

One of the most commonly used transfer devices for individuals with spinal cord injuries, a transfer board aids individuals in completing lateral transfers from one surface to another. They work to bridge the gap between the two surfaces. Individuals should anteriorly weight shift to avoid sheering across the board. It can be helpful to go down a slope, if possible, to allow the assistance of gravity. Slip-resistant pads, or friction tape, can be adhered to the bottom, to increase stability during transfers

Typical Users: Individuals with low tetraplegia (C7-T1) or paraplegia. They are used when individuals do not have sufficient upper body strength to fully clear their buttocks between the two surfaces, as it allows them to break the transfer down into multiple small movements. They also may be helpful to those experiencing fatigue, chronic pain, or joint deterioration due to previous transfer methods.

Contraindications and Cautions: Individuals are at risk of sheer injuries if they slide their buttocks across the transfer board. Boards should be inspected to ensure they are smooth, undamaged and splinter free. Shear-free boards also have the risk of skin getting pinched and torn.

Transfer Board: Transfer boards come in many shapes, sizes and materials (such as wood or plastic) to accommodate varying transfer conditions and individual sizes.

TRANSFER BOARDS



Contoured Transfer Boards



Beasy Transfer Board™



Standard Transfer Board



Scooter Transfer Board



Notched Transfer Board

Standard Transfer Board: Average 8-12" wide x 24-25" long. Shorter boards are easier to get under buttocks and reach to the secondary surface. Longer boards are for wider gap transfers, such as wheelchair to car. These can come with or without slots, which allow individuals with poor hand strength/dexterity to hold them. Weight capacities listed for commercially available standard board models range from 300-400 lbs. If the individual weighs more than 400lbs, they will require a bariatric model. The bariatric models are thicker to accommodate the increased load.

Notched Transfer Boards: Notches to help stabilize on transfer surfaces (for example, the wheelchair).

Contoured Transfer Boards: Contoured to fit around a commode seat, they allow placement and use while on the commode/toilet.

Shear-Free Boards: Designed for those that are unable to adequately lift during transfers, shear-free (or anti-shear) boards consist of a movable surface that does not require the individual to lift during transfers.

- **Beasy Transfer Board™:** The most common type of shear-free board is the Beasy Transfer Board™. It is constructed with a sliding round disc in the middle of a curved board that moves from one end of the board to the other while the person sits on it. An individual will require enough trunk control to maintain upright posture throughout the transfer or it can lead to increased risk for falls.
- **Scooter Transfer Board:** These boards are made of a series of wheels that allow the user to slide on the board. These boards are generally contraindicated in spinal cord injury given the risk of pinching skin leading to the development of wounds.

LIFTS AND LIFT SLINGS

Another commonly used transfer modality are individual lifts. Individual lifts physically go underneath the individual and lift them from one surface to another. They come in a variety of types based on individual needs and their environment. Another consideration is the need for an appropriate lift sling.

Typical User: Typically used in people with C1-C6 tetraplegia who do not have the strength to independently transfer, bariatric individuals, individuals with weak upper extremities, and for individuals whose caregivers cannot provide the amount of assistance required for a safe manually assisted transfer. Furthermore, lifts can help protect caregivers as frequently lifting the individual they are caring for can put them at risk of injury. They are also helpful in those who have a history of, or currently have, skin breakdown on their buttock.

Contraindications/Cautions: The biggest risk of using a lift is that the individual falls out of the lift during a transfer which can lead to a serious injury. Caregivers are also at risk of repetitive stress injuries by using a manual lift.

Floor Lifts: These lifts are placed on the ground. They come in a variety of styles and sizes based on the needs of the user. Manual lifts are usually covered by insurance if necessary for daily transfers within the home while other lift types are generally not covered.

- **Manual Hydraulic Mechanical Lifts:** These lifts are composed of a floor base, hand pump mechanism, push handles to steer the lift, and overhead cradle for attaching the sling. The base legs have locks and are able to open laterally and close inward to allow access under various surfaces, such as a bed, wheelchair, toilet/commode, or standard chair. The bases take up floor space and are unable to be moved under surfaces with less than 4" of clearance from the floor. The overhead cradle may have two or four hooks for sling attachment, which varies depending on brand/model. To raise the individual into the air, the caregiver must crank a lever.

Specialty models are available that take up less space/fold, are portable or accommodate lower arm systems, allowing difficult transfers in tight spaces, such as in and out of a car. Standard floor models have weight capacities ranging from

400-500 lbs. Bariatric models have capacities between 600-1000 lbs.

- **Electronic Mechanical Lifts:** These are composed of the same parts as a manual lift, but are operated using a hand push button control. These lifts are battery powered and recharged using a standard AC outlets or a battery charger. All devices should have an emergency stop and a manual emergency release lowering capability in case of loss of battery power. These also come in standard or bariatric models. They also can have various features (such as folding). These are often not covered by insurance, but are available to be purchased by the individual/caregiver for ease of use in the home.

Overhead Lift Systems: These systems are similar to floor lifts although they are mounted from a fixed point overhead. These systems are generally expensive and often limited to institutional settings. They also generally do not allow the freedom of transfer locations, unlike floor lifts, although custom units can be made to encompass an entire room or even multiple rooms.

Ceiling Lift: These systems may be mounted directly to a reinforced ceiling or joists, or through posts placed strategically in corners of the room (or sometimes mounted to the walls). Ceiling lifts are power operated. Weight capacities range from standard models 300-500 lbs. and bariatric models up to 1000 lbs. These systems are advantageous as they leave open floor space without a floor base unit to maneuver and can be used with beds/chairs that manual lift frames would not fit around. A structural engineer and permits are generally needed for home installation to ensure safety.

Slings: All lift systems require a sling to harness the transferring individual. There are a variety of slings that can be used for multiple different purposes. Slings are available in both solid and polyester mesh (usually used for bathing). Slings come in different sizes. There are also padded varieties of the below slings.

Split Leg or "U" Slings: These are suitable for a wide variety of users and lifting operations including from a seated or lying position. Split leg slings support the entire body. Some models offer additional head support. The sling is ideal for lifting, moving and positioning users who have reduced control of their upper and lower body. These may be contraindicated in the setting of thigh and sacral wounds.

LIFTS AND LIFT SLINGS



Ceiling Lift



Split Leg or "U" Slings



Full Body (Hammock) Slings



Standing Slings



Manual Hydraulic Mechanical Lifts



Electronic Mechanical Lifts



Electronic Stand-Assist Lift

Full Body (Hammock) Slings: These slings are designed for lifting and moving people with diminished motor function as they support the entire body and provide extra support around the hips and thighs. Unlike the split leg slings, this sling allows the hips to remain in a neutral position. Hammock slings can be solid (above) or can have a hole at the buttocks area to allow for use on the commode/toilet.

Standing Slings: These slings attach to an overhead lift system and are designed for individuals with sufficient leg strength to stand upright, but who have difficulty balancing. These slings reduce the chance of falls during early mobilization for transfers and walking.

Trapeze: These are generally a triangular shaped metal bar that can be used to facilitate bed positioning or transfers in and out of the bed to either a wheelchair or shower/commode chair. These can be stabilized to a metal overhead bed frame, to a ceiling/wall, or to a portable frame base. If attached to the bed or wall/ceiling, they are more secure, but can only be used in that location. Despite being less secure, the portable frame base can be used in multiple locations. There are also concerns about the biomechanics of overhead lifting when using a trapeze, related to repetitive stress shoulder injuries in people with spinal cord injuries.

Stand-Assist Lifts are designed to assist an individual to a semi-standing position for transfer. These devices include handles for the individual to hold, at the same time their trunk and hips are secured. These devices can be:

Manual: The individual uses the leverage of the device to help stand and then the caregiver uses the wheeled frame to help with the pivot portion of the transfer. An individual must have enough leg strength to come to and maintain at least a partial stand to use these devices. Common name brands of these devices include: Molift Raiser™ and Sara Stedy™.

Electric: A sling is positioned under the arms and around the individual’s thoracic region to provide support. The sling system and hydraulic lift helps raise the individual to a semi-standing position with feet secured on a footboard. An individual must be able to tolerate weight through their legs and exhibit some trunk control to be used safely. It is not recommended for those post thoracic or lumbar spinal surgery due to the distraction it provides to the spine.

TRANSFER DEVICES SPONSORED BY:

SPONSOR
LOGO

SPONSOR
LOGO

SPONSOR
LOGO