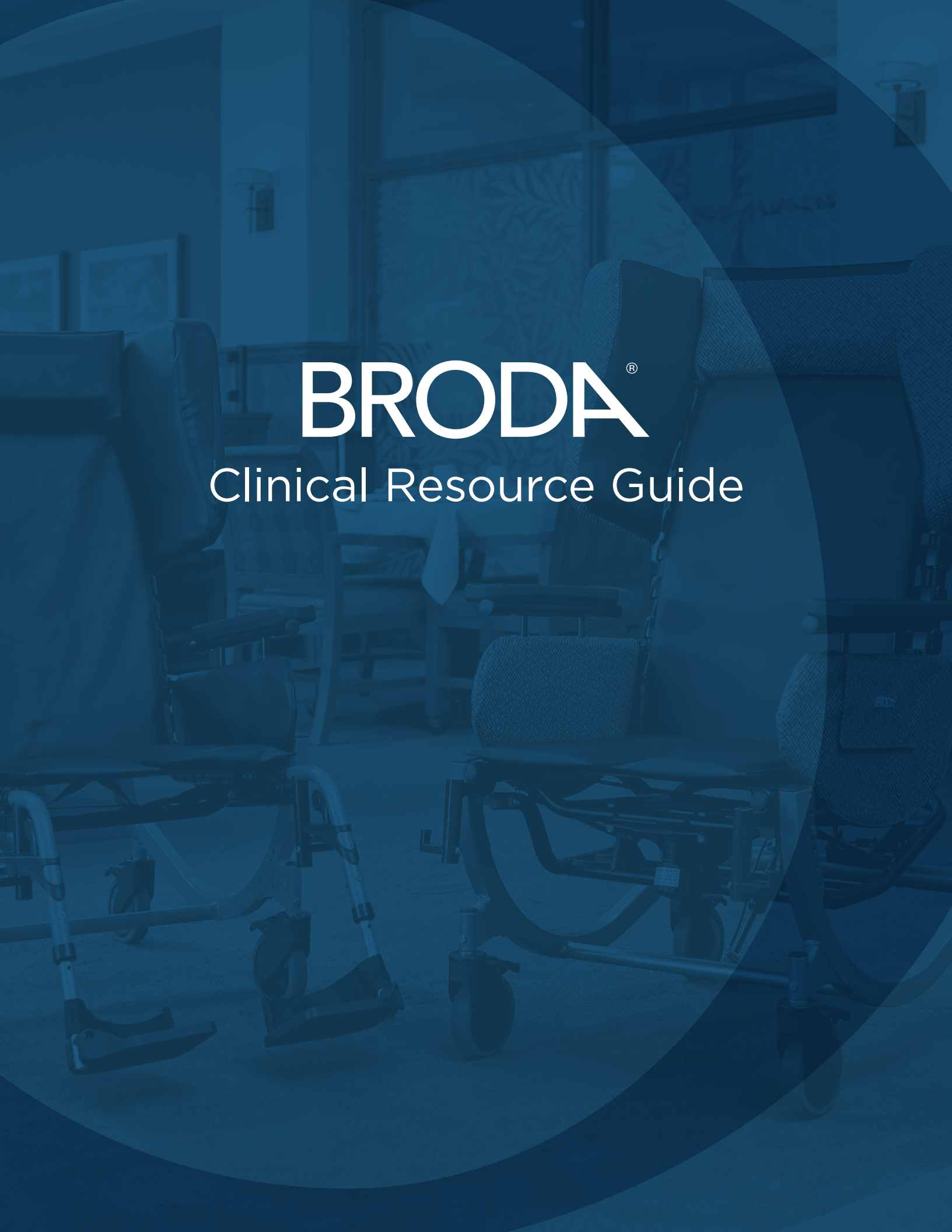


BRODA®

Clinical Resource Guide


BRODA

Table of Contents


ARMY SNAPSHOTS
BRODIX

Purpose of this Guide

This Clinical Resource Guide is meant to assist healthcare professionals with seating and positioning guidelines to promote proper postural alignment and achieve excellent patient outcomes.

This guide will help readers:

- Understand the clinical justifications for manual positioning wheelchairs.
- Review the importance of achieving the best fit between the client and the wheelchair to prevent abnormal posture, decrease the risk of pressure injuries, and maximize comfort to promote improved quality of life.
- Understand the seating evaluation process, from start to finish.

Reaching Your Seating & Positioning Goals

In order to have success with seating and positioning equipment, it's important to start with your clinical goals.

Successful seating & positioning goals must:

- Align with the client's goals
- Provide good postural support
- Support independence in activities of daily living (ADLs)
- Facilitate user comfort
- Accommodate any postural abnormalities and/or prevent further progression of existing abnormalities
- Provide excellent pressure redistribution to maintain skin integrity
- Reduce caregiver burden

Why Should Seating and Positioning Be an Important Part of Your Quality Improvement Program?

Providing the appropriate seating system can:

- Maintain skin integrity and reduce the incidence and cost of seating related pressure
- Maintain/maximize independence and cost of seating-related pressure injuries
- Increase socialization
- Improve survey results
- Improve star ratings
- Maximize comfort
- Reduce falls/fall risk at the wheelchair level

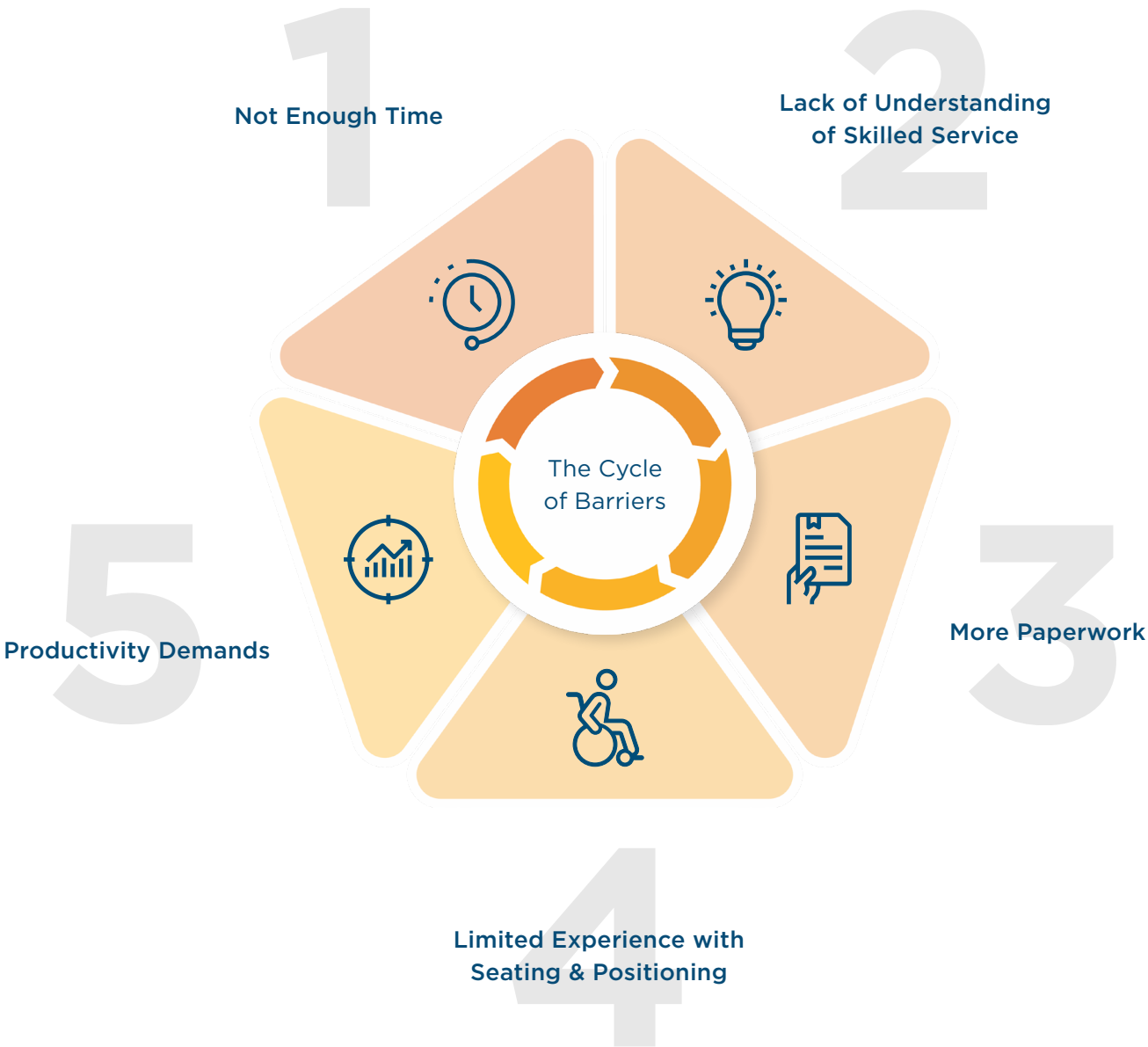
Common Barriers to Providing Optimal Seating & Positioning

Why do we see so many residents exhibiting poor posture? Families, nursing professionals, and even physical and occupational therapists often get stuck in a cycle of barriers that prevent the patient from receiving optimal seating and positioning care.

First, it takes time to implement a seating program. Executing a thorough seating and positioning plan requires constant vigilance. There is also a lack of education about seating and positioning. This is a learned skill in nursing and therapy and is not adequately covered by most universities and training programs. Paperwork, limited experience, and high patient loads can also diminish the chances of residents receiving effective seating and positioning care. Facility administrators and clinical directors must take an active role in preparing and equipping their staff for success.

This guide contains useful tools, assessments, statistics, and tips to create a successful seating and positioning plan for any resident.

The Cycle of Barriers to Optimal Seating & Positioning



Who Makes Up the Care Team?

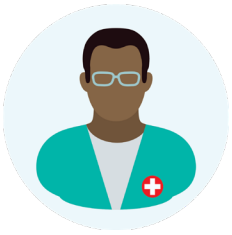
As you prepare your seating and positioning plans, it's important to recognize who is on your care team. Don't forget to include the end user's input in the care decisions; they are the most important person on the team and ultimately reap the benefits of a successful seating program.

END USER

Identifies their goals and needs and is the most important person on the team!

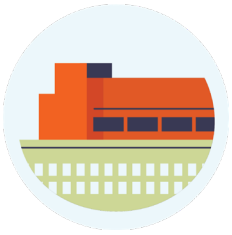
DOCTOR

Determines the medical necessity for seating and positioning equipment.



NURSE

Can identify risk or need for seating evaluation.



MANUFACTURER

Has in-depth knowledge and experience of all of the products that they offer.

DME/CRT DEALER

Has earned certification as an assistive technology professional with specialized knowledge of complex rehab products and equipment.

THERAPIST

Applies clinical expertise and partners with the client to understand their goals. Assesses the client's functional abilities, postural support needs, medical history, and environment to determine the best mobility device to meet the client's unique needs.

Procuring Seating and Positioning Equipment

Before procuring new seating and positioning equipment, it's important to understand the multi-step process. By considering the full process before you begin, you will save time (and potentially money) for your facility and your end user.

Nurse/Therapist identifies need for a seating evaluation & requests order from the medical provider. They complete a face-to-face assessment.

OT/PT evaluate and assess functional ablilites and limitations related to the clients' ability to particpate in their mobility-related activities of daily living (MRADLs).

OT/PT contacts with ATP/Dealer to determine what equipment the client qualifies for in order to determine the best options

OT/PT completes Letter of Medical Necessity and sends to the medical provider for approval and signature.

The OT/PT and the ATP/Dealer conduct an equipment fitting in an appropriate setting. Follow-up in 4-6 weeks to determine outcomes and client satisfaction.

Most Canadian provinces do not require a physician referral.

Durable Medical Equipment (DME) vs. Complex Rehab Technologies (CRT)

When evaluating seating and positioning equipment, it's important to understand the distinction between durable medical equipment (DME) and complex rehab technologies (CRT).

Durable Medical Equipment (DME)

- Basic seating and mobility equipment

Who May Be Eligible for DME?

A client may be eligible for DME, if they:

- Can propel short distances indoors.
- Do not require positioning beyond the seat cushion or basic back support.
- Are free from postural deformities.
- Have an adequate sitting balance.
- Have normal muscle tone.
- Do not complain of pain when seated.
- Have a non-progressive condition.

Medicare Requirements*

- A physician's order and exam with documentation supporting the need.
- OT/PT or ATP evaluation is not required.

*Although not required, an on-site evaluation is always recommended.

Complex Rehab Technology (CRT)

- Medically necessary, configured for an individual client.
- Requires evaluation, fitting, adjustment, and configuration.
- Meets the client's unique medical, physical, and mobility needs of the client's primary diagnosis resulting from a progressive, degenerative neuromuscular disease, congenital disorder, or certain types of injury or trauma.

Who May Be Eligible for CRT?

A client may be eligible for CRT, if they:

- Need a wheelchair for daily mobility.
- Utilize a wheelchair for many hours a day.
- Have limitations in balance.
- Require custom dimensions to maintain good postural alignment to maximize function.
- Experience pain when seated.
- Require specialized configuration or adjustments to maintain posture and skin integrity.
- Propel their wheelchair indoors and outdoors.
- Have a progressive condition.

Prescription Requirements

- Requires skilled, experienced professionals.
- Requires evaluation, measurements, trials, fittings, training, and modifications.

Medical Criteria & Clinical Justifications

As part of the medical equipment procurement process, clinicians must provide sufficient clinical justification for each piece of the equipment, along with certain accessories or components. Below are some helpful guidelines for writing clinical justifications. Before getting started, make sure that you understand your local requirements for evidence of medical necessity.

Wheelchair selection always requires evidence of medical necessity.

The first step is a physician's visit with notes that include the following:

- Mobility-related diagnosis
- Symptoms that affect mobility
- Activities of daily living that are affected by mobility limitations
- Current ambulation status

Manual Tilt Wheelchair Justification

A client may require a manual tilt wheelchair, if they:

- Are unable to perform independent wheelchair mobility
- Are unable to perform independent pressure relief and re-positioning
- Require postural support, head and trunk control, and accommodation of postural asymmetries
- Would benefit from trunk support and open thoracic posture for increased respiratory function
- Require supportive positioning to allow for safe swallowing and digestion

A basic wheelchair may be recommended for short-term use, only (i.e., for a person who needs to be non-weight-bearing for a certain amount of time).

BENEFIT	CRITERIA	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS
Pressure Relief	Skin Breakdown Decreased Skin Integrity	• Tilting the seating surface allows for repositioning, which shifts the weight and pressure away from the boney prominences for individuals unable to perform independent weight shifts.[1] • Proper repositioning improves blood flow, oxygenation, and retention of the skin tissue, which is vital for maintaining skin integrity.[1] • Tilt and recline functions should always be combined with at least 15° of recline, or preferably 30° of recline, to benefit from enhanced blood flow to the ischial tissues.[2]
Positioning	Decreased Postural Control Decreased Head/Neck Control	• Posterior tilt can reduce the effects of gravity on the trunk and upper body, which provides a more functional postural alignment.[1] • Proper positioning facilitates more functional use of the upper extremities. • Positioning wheelchairs facilitate safe, effective positioning of the patient following transfer, allowing adjustment of posture from the tilted position. • Tilt eliminates shear displacement (sliding out of position) during position changes.[3] • Posterior tilt effectively opens the diaphragm allowing for greater expansion of the lungs resulting in improved oxygenation, blood flow, and organ function.[1] • Positioning wheelchairs facilitate positioning for comfort and pain management.[3]

BENEFIT (Cont'd)	CRITERIA (Cont'd)	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS (Cont'd)
Activity Tolerance	Impaired Function in Mobility-Related Activities of Daily Living	• Proper positioning and weight distribution improve sitting tolerance throughout the day. • Proper positioning improves engagement and socialization. • Postural support through tilt and recline facilities activities of daily living (ADLs).[1] • Tilt provides proper seating alignment, decreases fatigue, and decreases the risk of postural deviation.[3] • Posterior tilt enhances visual orientation, speech, alertness, and arousal.[3]
Medical Functions	Respiratory Function Digestive Function Physiological Function	• Good postural alignment using tilt allows for improved function of the respiratory system.[3] • Posterior tilt facilitates proper digestion and decreases the risk of aspiration and other complications of the GI Tract. • Proper positioning improves physiological processes such as orthostatic hypotension, respiration, and bowel and bladder function.[3] • Positioning wheelchairs can help manage symptoms related to edema (swelling) of the extremities.
Caregiver Benefits	Caregiver Burden	• Decreases caregiver burden during activities of daily living; feeding, bathing, and toileting needs. • Allows for gravity-assisted repositioning of individuals throughout the day. • Improved seating comfort allows for fewer transfers during the day.

BENEFIT (Cont'd)	CRITERIA (Cont'd)	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS (Cont'd)
Transportation Safety	Reduced Transportation Risk	• Using a WC19 designated wheelchair (which can withstand 20g impact forces during crash testing) improves safety and comfort during transportation.

Are Positioning Wheelchairs Considered Restraints?

No, positioning wheelchairs, such as Broda wheelchairs, are not considered restraints as long as there is proper use and documentation of tilt and recline. Broda positioning seating systems are classified as Supportive Positioning Devices.

The Electronic Code of Federal Regulations defines a restraint as "any manual method, physical or mechanical device, material, or equipment that immobilizes or reduces the ability of a patient to move his or her arms, legs, body, or head freely" (CFR 482.13(e)(1)).

This definition describes intentionally immobilizing a patient or reducing their movement by the use of a medical device. It does not apply to wheelchairs, seating systems, and secondary supports when they are used to provide postural support, stability, pressure redistribution, and pressure relief.

Are Positioning Belts Always Considered Restraints?

According to the RESNA Restraint Position Paper, positioning belts are considered postural support devices (PSDs). PSDs are pads or straps that "limit or control a specific movement in the body." Because of this, the belts may be considered restraints. To determine whether the belt or pad is a restraint, consider its main purpose: is the device intended to restrict movement or to increase function?

For example, if a patient would like to self-propel with her feet but is unable to keep her pelvis in place while achieving heel strike, a pelvic positioning belt would allow her to move independently while reducing her risk for falls and pressure injuries.

Clinicians will typically classify a positioning belt as a "support" rather than a "restraint" for two reasons, according to RESNA.

1. "'Supports' are used to achieve a very specific position or posture of a body part in addition to minimizing migration in a specific direction."
2. "'Restraints' typically refer to devices that are used to limit harmful motion during vehicular transportation, or a device that is carefully controlled in many settings." [1]

The information above is intended for clinicians practicing within the United States of America. Please consult your state and local regulations before prescribing any medical device.

Broda Comfort Tension Seating® (CTS) System

Broda Comfort Tension Seating® is ideal for individuals with one or more of the following conditions:

CRITERIA	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS
At Risk for Skin Breakdown, Decreased Skin Integrity, OR History of Pressure Injury	The Comfort Tension Seating® system prevents the hammocking effect, which occurs with standard wheelchair seating surfaces. Each strap conforms individually to the person's body, thus suspending the person's weight across multiple points; this distributes the individual's weight more evenly and dramatically reduces pressure on any area. The even distribution of the patient's weight allows for decreased pressure and improved blood flow, allowing for greater retention of tissue health, which is vital for maintaining skin integrity. The Broda Comfort Tension Seating® system also allows for enhanced airflow, which decreases the buildup of heat and moisture. It also decreases the development of yeast and bacteria while improving seating comfort.
Outstanding Bony Prominence and Musculoskeletal Deformities or Conditions	Each strap conforms individually to the amount of pressure being applied. Therefore, if a user presents with a bony prominence or condition such as having kyphosis or lordosis, the strap will conform to the pressure point instead of creating high-pressure areas which occurs with standard wheelchair seats. Select straps may be removed or repositioned for an even greater pressure reduction.

CRITERIA (Cont'd)	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS (Cont'd)
Severe Agitation or Discomfort due to Typical Wheelchair Seating Surfaces	The Comfort Tension Seating® system is more comfortable han standard wheelchair seating surfaces. The strapping system disperses weight evenly, providing a more comfortable seating surface. The straps are firm enough to provide the necessary support to encourage proper pelvic positioning, helping to prevent pelvis tilting and postural deviations.
Decreased Postural Stability and Control, OR Decreased Mobility or Misalignment of the Pelvis	Collectively, the Comfort Tension Seating® straps conform to and support a user's pelvis, which assists with achieving and maintaining a midline posture. The straps are firm enough to provide the necessary support to encourage proper pelvic positioning, helping to prevent postural deviations. The strapping system's ability to give way and mold to the body dramatically decreases the pressure on the pelvic region. Comfort Tension Seating® offers superior immersion and pressure redistribution properties and comfort.[4]
Involuntary, Uncontrolled, and Potentially Harmful Movements	The Comfort Tension Seating® system is designed with smooth straps to cradle the patient while absorbing the energy produced by the patient's movement. The straps' ability to give way during episodic movements dramatically decreases the potential for injuries generally associated with standard seating surfaces.

Adjustable, Removable, and Swing-Away Arm Supports

For the following criteria, it is helpful to have arm supports that are adjustable and can be quickly and easily removed, such as Broda swing-away arm supports.

CRITERIA	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS
Decreased Muscle Tone in Upper Extremity, Shoulder Subluxation, OR At Risk for Shoulder Subluxation	Adjustable arm supports assist with proper height positioning for upper extremities. Proper support and positioning of the upper extremities decrease the risk of postural deviations. Height-adjustable arm supports assist in managing current or potential shoulder subluxation by allowing for frequent adjustment and proper arm positioning.
Decreased postural stability/or control	Supporting the upper extremities assists with proper postural trunk support by promoting midline position. Proper support and positioning decrease postural deviations and facilitate functional use of the upper extremities. Improved posture aids in improving blood flow, obtaining greater expansion of the thoracic diaphragm, and improving organ function and capacity.
Unable to or Unsafe to Perform Stand Pivot Transfers OR Uses a Slide Board for Transfers	Swing-away and removable arm supports accommodate the use of patient lifts and facilitate safer transfers by providing better access to the patient. A supine transfer can be completed with the wheelchair reclined to a flat position (for wheelchairs with 90° of back recline) and the arm support removed on the side nearest the bed. Swing-away and removable arm supports can also aid in completing bowel and bladder protocols, changing incontinence products, and completing activities of daily living.

CRITERIA (Cont'd)	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS (Cont'd)
Decreased Ability to Reposition Upper Extremity and Severe Discomfort OR Agitation with Standard Arm Supports	Height-adjustable arm supports allow caretakers to adjust an individual's arm throughout various heights, which is necessary for pressure reduction, edema control, and comfort. Proper positioning of the upper extremities also aids in maintaining a midline posture and improves postural stability. Improved postural stability can aid in decreasing postural deviations including, but not limited to, slumping, sliding, falling forward, and lateral lean.
An Upper Extremity with a Cast, Sling, or Brace	Swing-away and removable arm supports accommodate casts, slings, braces, and other devices. Height-adjustable arm supports provide proper support and allow for frequent repositioning of the upper extremities, aiding in pain management and relief as well as the management of edema and postural support. Adjust the arm support height to accommodate and support the weight of the cast, sling, or brace, thus improving patient comfort, endurance, and ability to engage in their surroundings.

Height-Adjustable Foot Support with the Broda Comfort Tension Seating (CTS®) System

Individuals with one or more of the following conditions may benefit from a height-adjustable foot support featuring the pressure-relieving qualities of the Broda Comfort Tension Seating® system.

CRITERIA	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS
At risk for skin breakdown or decreased skin integrity on the lower extremities	Each strap conforms individually to the person's lower extremity, thus suspending the weight of the person's legs across multiple points. This distributes the individual's leg weight more evenly and dramatically reduces the amount of pressure. The Comfort Tension Seating® system prevents localized pressure, which occurs with standard wheelchair foot supports. Comfort Tension Seating® also allows for superior air circulation that helps reduce or disperse heat and moisture, which is beneficial for aiding in the treatment of and/or prevention of wounds. The solid, oversized design of the height-adjustable foot support allows for the entire lower extremity to be supported, decreasing the risk of injuries sustained when the leg falls through the opening of standard lower leg supports.
Outstanding bony prominence and musculoskeletal deformities/ conditions where the lower extremities make contact with the foot support	Each strap conforms individually to the amount of pressure being applied. Therefore, if a user presents with a bony prominence, the straps on the foot support will give way or conform to the pressure point instead of creating a higher-pressure point which occurs with standard wheelchair lower leg supports. Also, select straps may be removed or repositioned to reduce pressure and accommodate individualized needs.
Involuntary, uncontrolled, or forceful movements in one or both lower extremities	The Comfort Tension Seating® system is designed with smooth straps to cradle the patient while absorbing the energy produced by the patient's movement. The strap's ability to give way during episodic movements dramatically decreases the potential for injuries generally associated with standard lower leg supports.

CRITERIA (Cont'd)	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS (Cont'd)
Abnormal muscle tone in one or both lower extremities and synergistic movement/pattern with the lower extremity	Individuals with increased muscle tone in the lower extremity are at higher risks for increased pressure, especially peak pressures (i.e., a flexor withdrawal movement can cause the knee to flex, which could cause the heel to draw up into lower leg support or even calf support). The overall foot support design is ergonomically correct to facilitate proper positioning of lower extremities with low or flaccid tone. The strapping system is a safe solution as it absorbs energy, reduces pressure, and is soft and smooth.
Discomfort with standard leg/foot supports	The Comfort Tension Seating® system provides superior comfort compared to standard wheelchair lower leg supports. With a solid, oversized design, our foot support accommodates individuals with flaccid extremities by providing a large, solid, and supportive surface. The straps are firm enough to support the lower extremities without causing discomfort. The strapping system disperses weight evenly, providing a comfortable, supportive surface.
Foot drop or at risk for foot drop	The Broda foot support design places ankles in a neutral position (90°) to support the feet and prevent foot drop. The foot support's neutral position and oversized design best accommodate individuals with flaccid extremities, as it provides a solid supportive surface that aids in decreasing the risk of injury.
Impaired lower extremity sensation	Decreased or absent lower extremity sensation may interfere with the individual's ability to feel excessive pressure caused by typical foot supports or the need to reposition the lower extremity. This may contribute to skin breakdown, extreme discomfort, and agitation. The Comfort Tension Seating® system will disperse the weight of the patient's lower extremities evenly across the leg/foot support for proper support. The leg/foot support can be adjusted easily, allowing the caregiver to properly position and reposition the patient's lower extremities to aid in treating conditions such as edema.

Adjustable Tilt

A wheelchair user may benefit from a wheelchair with tilt functionality if they meet one or more of the following criteria.

CRITERIA	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS
Decreased postural control	The posterior tilt of a seating surface can reduce the effects of gravity on the trunk/upper body, facilitating a more functional and proper upright posture. Good postural alignment assists with greater and more functional use of the upper extremities. Posterior tilt effectively opens the diaphragm allowing for greater thoracic expansion resulting in improved oxygenation, blood flow, and organ function.[3] The tilt feature facilitates optimal positioning for comfort, pain management, and relief.[3]
At risk for pressure injury and decreased skin integrity	Tilt systems maintain a constant seat-to-back angle, allowing patients to be repositioned throughout the day without the risk of shear displacement. Tilting the seating surface provides repositioning for those who cannot independently shift their weight. The posterior tilt shifts the weight and pressure away from critical areas under the pelvis. Proper repositioning improves blood flow, oxygenation, and retention of the skin tissue, which is vital for maintaining skin integrity. Posterior tilt facilitates position changes associated with pressure relief for individuals with a limited range of motion.
Musculoskeletal deformities/ conditions and other medical conditions which prevent proper positioning when seated in a non-tilting wheelchair (i.e., kyphosis or lordosis)	Tilt wheelchairs are helpful for individuals with musculoskeletal deformities or conditions. The posterior tilt reduces the effects of gravity on the trunk and upper body, helping to eliminate postural deviations. Tilt best accommodates conditions such as but not limited to hypertonicity, hypotonicity, kyphosis, and lordosis. The posterior tilt helps decrease fatigue associated with hypertonicity and improves postural support and stability for individuals with hypotonicity.

CRITERIA (Cont'd)	CLINICAL JUSTIFICATION & FUNCTIONAL BENEFITS (Cont'd)
Decreased head/neck control and inability to feed self or be fed safely from a non-tilting wheelchair	Clinicians use customized positioning to maximize breathing and speaking ability by maintaining vital organ capacity and reducing aspiration risk. The posterior tilt provides stability and improves postural support for those who cannot maintain an upright seated posture. Tilt can be used to realign posture and enhance functions such as feeding, communication, and completion of activities of daily living. Postural deviations including, but not limited to, slumping, sliding, falling forward, lateral lean, and head drop can be decreased with the use of posterior tilt.
Individuals who are at risk for falls or injuries from using a non-tilting wheelchair	Tilt provides postural stability and support for those unable to maintain an upright seated posture. Tilting the seating surface in a posterior direction maximizes the body's weight and gravity, allowing the patient to remain seated, upright, and engaged in functional activities. Tilting the patient posteriorly provides proper seating alignment, decreasing fatigue and postural deviations. Falls can be significantly reduced with decreased postural deviations and improved postural support and stability.

Adjustable Back Recline

A wheelchair user may benefit from a wheelchair with recline functionality if they meet one or more of the following criteria.

CRITERIA	CLINICAL JUSTIFICATION & BENEFITS
Individuals with orthostatic hypotension and decreased cardiopulmonary function	Reclining assists with the effects of orthostatic hypotension. The recline function can be used as a therapeutic method for gradually increasing an individual's tolerance to sitting in a more upright position. This also assists with improving a person's overall cardiopulmonary status.
Individuals at risk for pressure injury OR decreased skin integrity	Reclining a seating surface decreases gravity's effects, significantly reducing seating pressures. Also, varying the amount of recline throughout the day allows for repositioning. Repositioning shifts the weight/pressure from a particular area while improving blood flow and oxygenation of the tissue. This repositioning is essential for maintaining skin integrity. Proper repositioning improves blood flow, oxygenation, and retention of the skin tissue, which is vital for maintaining skin integrity.
Individuals with decreased postural stability OR control	Reclining a seating surface in a posterior direction can reduce the effects of gravity on the trunk/upper body, facilitating a more functional and proper upright posture. Good postural control also assists with greater and more functional use of the upper extremities. Proper postural control can increase oxygenation, blood flow, and organ function.
Individuals who require the recline function to assist with toileting hygiene needs	The recline function allows the caregiver to better accommodate and assist with toileting needs. A wheelchair that reclines to 90° will also allow the caregiver to complete many of the patient's activities of daily living from the chair without the need for an extra transfer, reducing awkward postures and decreasing caregiver burden.

Low Seat Surface Height & Dynamic Rocking

Broda pedal wheelchairs feature a low seat surface height and a soothing, caregiver-activated rocking feature, which lead to many functional benefits for patients with the following criteria:

CRITERIA	CLINICAL JUSTIFICATION & BENEFITS
Individuals who self-propel and are at risk for falls or injuries when using a non-tilting wheelchair	Pedal wheelchairs (also known as mobility wheelchairs) are designed to accommodate patients who self-propel. Some Broda pedal wheelchairs also offer the benefit of infinitely adjustable tilt. With a short seat surface height and a front pivot point, Broda mobility wheelchairs enable proper foot-to-floor placement. This creates an ergonomically correct position for self-propulsion. Posterior seat tilt maximizes the body's weight and gravity, allowing the user to remain seated, upright, and engaged so they may participate in functional activities. Posterior tilt provides proper seating alignment, decreasing fatigue and postural deviations. Falls can be significantly reduced by decreasing postural deviations and improving postural support and stability.
Mild agitation, anxiety, and tendency to rock	A pedal wheelchair with rocking capabilities provides a gentle, caregiver-activated rocking motion that helps to calm agitation and create a soothing effect for the user. Rocking has been linked to decreased anxiety and pain for individuals with a diagnosis of dementia.[5, 6] The low, adjustable seat surface height allows for a proper heel strike enabling the resident to maintain independence with mobility.
Mild Rigidity	A wheelchair with rocking motion capabilities helps absorb rigid movements to enhance the comfort and safety of the wheelchair user. Additionally, the caregiver can adjust the rocking tension to accommodate the resident's movement, weight, etc.

PLEASE NOTE: MOBILITY CHAIRS DO NOT OFFER THE RECLINE FEATURE.

Postural Abnormalities & Clinical Recommendations

Non-Reducible vs. Reducible Postural Abnormalities

How do you know if you should accommodate or correct a postural abnormality? Each abnormality is either Fixed/Non-Reducible or Flexible/Reducible.

Non-Reducible Postural Abnormality

GOAL

Accommodate the abnormality to prevent further progression.

During the mat evaluation, if you cannot move the client out of the posture, then the abnormality is non-reducible, or fixed. These abnormalities must be accommodated, rather than fixed. In this case, the client needs equipment to accommodate abnormal posture, providing the best support and pressure redistribution.

Reducible Postural Abnormality

GOAL

Correct the abnormality to prevent it from becoming a non-reducible posture

During the mat evaluation, if you can move the client out of the posture, then the abnormality is reducible, or flexible. However, correcting to a neutral position may or may not be possible.

Abnormal Postures

What came first, the abnormal posture or the improperly fitted wheelchair?

It is not uncommon for an improperly fitted wheelchair to lead to abnormal postures that can contribute to pain, pressure injury, and falls.

Common Causes of Postural Abnormalities

CAUSE	POSTURAL ABNORMALITY	CAN LEAD TO...	SUGGESTED SOLUTIONS
Hammocking effect of basic vinyl sling seat wheelchair	• Posterior pelvic tilt • Pelvic obliquity • Pelvic rotation	• Pressure injuries to the sacrum, ischial tuberosities, and/or coccyx • Non-reducible abnormal posture • Pain • Falls	Use a firm seating surface to prevent hammocking. This could include: Broda Comfort Tension Seating®, solid seat pan, rigid insert
Hammocking effect of basic vinyl wheelchair back support	• Fixed: Kyphosis of the thoracic spine • Flexible: Scoliosis of the spine	• Pressure injuries • Non-reducible abnormal posture • Pain	Open the seat to back angle OR use a contoured back support
Seat surface height is too short	• The knees are higher than the hips	• Pressure injuries to the sacrum, ischial tuberosities, and/or coccyx • Non-reducible abnormal posture • Pain • Falls	• Measure lower leg length • Choose a contoured cushion with lateral adduction and medial abductors • Consider a higher-profile cushion with immersion properties
Seat surface height too low	• The client slides forward to achieve heel strike or foot support	• Posterior pelvic tilt with kyphosis • Pressure injuries to the sacrum, ischial tuberosities, coccyx, and scapula • Pain • Falls	• Adjust the seat to floor height • Consider low-profile cushion

Neutral Pelvic Position

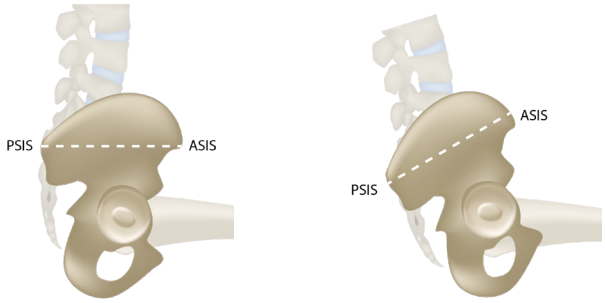
A main goal of any seating and positioning program should be to help the user attain a neutral pelvic position. A neutral pelvic position is ideal for functional movement, participation in activities of daily living (ADLs), and preventing pressure injuries and other abnormalities.

FIGURE 1:
Characteristics of a Neutral Pelvic Position

Pelvis	Midline
Spine	Normal lordosis is seen in the cervical and lumbar spine.
Head	Upright posture. No evidence of abnormal posture.

Posterior Pelvic Tilt

FIGURE 2: Characteristics of Posterior Pelvic Tilt with Kyphosis with or without Forward Neck Flexion



Neutral Pelvic Position

Posterior Pelvic Tilt

Pelvis	The ASIS is higher than the PSIS, demonstrating a “slumped” or sacral sitting posture.
Spine	Thoracic kyphosis.
Head	Forward flexed posture, resulting in a downward gaze.

Clinical Recommendations

Non-Reducible Posterior Pelvic Tilt

- Choose an immersive cushion with contours to provide good pressure redistribution and decrease peak pressure on the ischial tuberosities, sacrum, and coccyx
- Open seat-to-back angle in combination with a tilt to prevent the pelvis from sliding forward

Reducible Posterior Pelvic Tilt

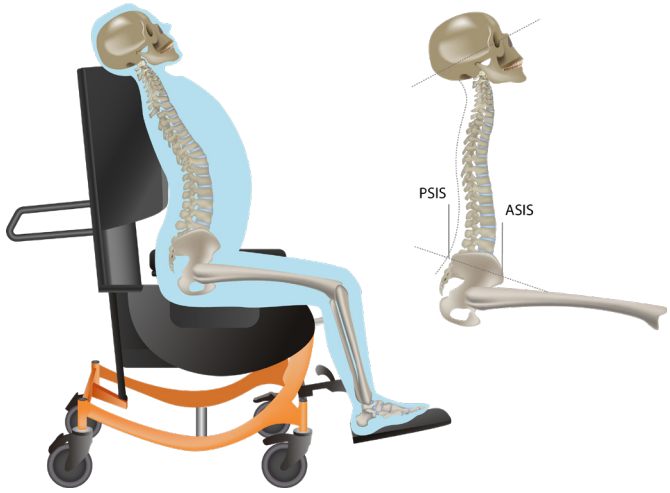
- Choose a cushion with medial and lateral contours to promote alignment
- Utilize a firm surface to support the cushion versus a vinyl sling seat to prevent hammocking and abnormal postures

---

Anterior Pelvic Tilt

FIGURE 3: Anterior Pelvic Tilt with Lumbar Lordosis, with or without Neck Hyperextension

Pelvis	The pelvis sits with the PSIS higher than the ASIS.
Spine	Excessive lordosis of the lumbar and cervical spine, which places the wheelchair user at risk of tipping the wheelchair backward.
Head	Excessive lordosis of the cervical spine causes hyperextension of the neck and an upward eye gaze.



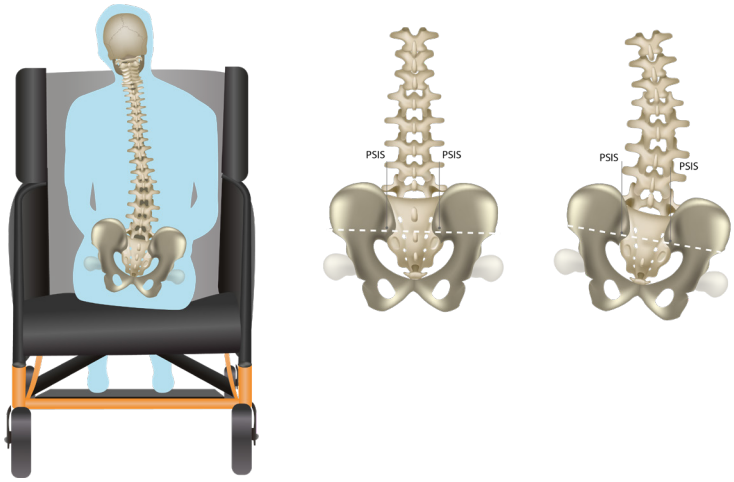
Clinical Recommendations

- Choose a cushion that maximizes contact between the wheelchair user and the seat.
- Ensure that the back support is tall enough to provide adequate support.
- Consider a moldable back support to match the curvature of the spine.

Pelvic Obliquity

FIGURE 4: Characteristics of Pelvic Obliquity with Scoliosis, with or without Lateral Neck Flexion

Pelvis	The ASIS is higher on one side of the pelvis, causing one hip to rise.
Spine	When one side of the pelvis is higher, the thoracic spine curves away from the higher side. May lead to scoliosis over time.
Head	Lateral flexion usually occurs on the side where the hip is higher.



Clinical Recommendations

To accommodate a pelvic obliquity, pressure redistribution is the main goal.

Non-Reducible Pelvic Obliquities

- Accommodate for the deformity; raise the *higher* side*

Reducible Pelvic Obliquities

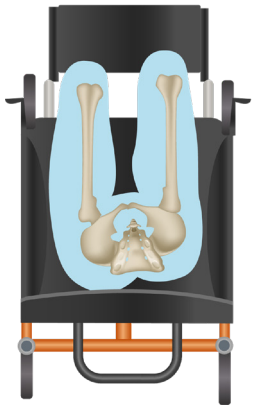
- Level the pelvis by building up cushion *under* the lower side.

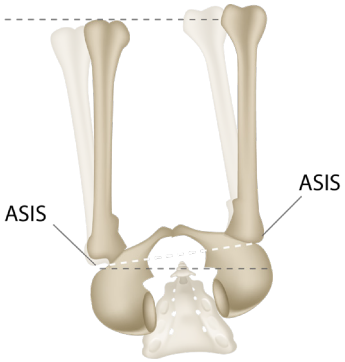
*Must be done with an obliquity kit or custom cushion to prevent a deformity or pressure injury from forming.

Pelvic Rotation

FIGURE 5: Characteristics of Pelvic Rotation with or without Lateral Neck Flexion

Pelvis	One side of the pelvis is more forward than the other side, producing rotation in the hips.
Spine	The thoracic spine follows and rotates in the same direction as the Pelvis.
Head	Lateral flexion





Clinical Recommendations

Non-Reducible Pelvic Rotation

- Choose an immersive cushion with minimal contours.

Reducible Pelvic Rotation

- Consider an anti-thrust cushion
- Choose a cushion with tapered adductors and medial abductors to promote a neutral pelvis.

Windswept Posture

FIGURE 6: Windswept Posture

Pelvis	Usually present with a rotation or obliquity, it causes one leg to adduct and the other to abduct.
Spine	Rotation or scoliosis is dependent upon the position of the pelvis.
Head	Lateral flexion, possible forward flexion.

Clinical Recommendations

- Choose a cushion that is adjustable to accommodate the windswept posture.
- Avoid elevating the wheelchair leg supports as this may exacerbate the deformity.
- Follow the suggestions for pelvic rotation or pelvic obliquity, as appropriate.

The Seating Evaluation

A wheelchair seating evaluation is a multifaceted process, requiring subjective and objective information about all aspects relating to the person's mobility needs.

This includes the client's:

- Environments
- Functional abilities
- Postural support needs
- Risk factors for pressure injury

All seating evaluations should include the following areas to ensure the best possible outcome.

Measurement of Environment

Thoroughly measure the client's residence (house, assisted living facility, independent living facility, or skilled nursing facility) and any other environment in which the client intends to use their wheelchair.

- Be sure to include measurements of doorways, table height, bed height, stairs, etc.
- Take flooring into consideration (hardwood, carpet, thresholds, etc.).
- Consider whether the client regularly needs a wheelchair to travel outside of their residence (doctor's appointments, dialysis, family visits, etc.). If so, make sure the recommended wheelchair is WC19 certified, which means that it is crash tested for safety in an accessible vehicle.

Equipment Trial

Justify why the selected equipment increases independence and why a less expensive piece of equipment will not suffice

Anatomical Assessment

In order to select the right equipment, accurate client measurements are key. After transferring the individual to a mat or a firm chair, complete the following measurements:

Shoulder Width	Measure the patient at the widest point of the shoulders.
Back Height	Measure from the seating surface to the top of the head.
Back Length	Measure from the seating surface to the base of the neck.

Seat Width	While sitting on a firm surface, measure the width of the hips/thighs at the widest point. Add 1”-2” to this measurement for a comfortable seat width.
Width at Knee	Measure across the widest point of the knees.
Seat Depth	Measure from the posterior (back) of the buttocks to the popliteal (underside of the knee).
Seat Height	If the patient utilizes a cushion when in the chair, complete measurements with the cushion in the chair to obtain proper measurements. With feet flat on the floor & knees bent at 90°, measure from the floor to the underside of the knee and add 1”- 2” inches to allow for clearance of the footrest.
Armrest Length	With the shoulder in a neutral position, measure from the 90-degree angle at the elbow to the fingertips

For more details, download our anatomical assessment tools. Common mobility assessments can be found in the Appendix.

Click to access our **Anatomical Assessment** tool

Click to access our **Bariatric Anatomical Assessment** tool

Current Seating & Mobility Equipment

Evaluate and describe ALL the client’s current equipment, including any pertinent information regarding the condition of the equipment.

Essential Considerations During the Fitting Process:

All seating system recommendations should...

- Optimize the client’s functional ability to perform activities of daily living (ADLs)
- Protect the skin to prevent and heal existing pressure injuries
- Maximize comfort for the client
- Minimize unwanted movement
- Have normal muscle tone
- Correct or accommodate for postural abnormalities
- Prevent postural abnormalities

In order to find the best equipment option for the client, schedule a visit with an ATP and a durable medical equipment dealer to begin a trial of the recommended equipment.

Adapted from: Semancik, Bethany, et al. “Face Validity of Standardized Assessments for Wheeled Mobility & Seating Evaluations.” Assistive Technology, Sept. 2021, pp. 1-9. https://doi.org/10.1080/10400435.2021.1974980.

Considerations for Seating & Positioning Wheelchair Users of Size (Bariatric Users)

There are several things to consider when performing a seating evaluation for a person of size. It is essential to gather a weight history and accurate weight to determine the most appropriate seating system. There are five main body types. Each type will present a different weight distribution and will likely have different equipment needs.

Apple-Shaped Body Types

Apple-shaped bodies are characterized by excessive weight distribution in the abdominal area. As weight distribution is more anterior, this can lead to the instability of a wheelchair and increase the risk of tipping forward.[12]

There are two different distribution types attributed to apple body types:

- **Apple Ascites** — Ascites is an accumulation of fluid in the peritoneal cavity. Someone who presents with an apple ascites distribution may have a rigid abdomen due to fluid accumulation.[12]
- **Apple Pannus** — Apple pannus distribution is associated with a mobile abdomen, which may hang over the waist.[12]

Pear-Shaped Body Types

Pear-shaped bodies are characterized by excessive redundant tissue below the waist and above the knees.

There are three different distribution types attributed to pear-shaped body types:

- **Pear Abducted** — Redundant tissue is carried on the inside of the thighs, which will prevent the femurs from attaining a neutral alignment and result in lower extremity abduction.[9]
- **Pear Adducted** — Redundant tissue is carried on the outside of the thighs, which will prevent the femurs from attaining a neutral alignment and result in lower extremity adduction.[9]
- **Pear Gluteal Shelf** — Excess buttock tissue can create a posterior shelf. [1]

IMPORTANT CONSIDERATIONS FOR PEAR-SHAPED BODY TYPES

- Excessive medial femoral tissue distribution of redundant tissue in the inner thighs can prevent the femurs from achieving a neutral alignment and lead to abduction.
- Excessive lateral femoral tissue distribution can require greater seat widths to accommodate the feet in a more neutral alignment.

FIGURE 7: Visual charateristics of the five main weight distributions

Apple Ascites | Apple Pannus | Pear Abducted | Pear Adducted | Pear Gluteal Shelf

Additional Factors for Wheelchair Users of Size

FACTOR	CONSIDERATIONS	CLINICAL RECOMMENDATIONS
Weight	• The seating assessment should include weight history. Weight history is essential to determining the best equipment to meet the current and foreseeable future needs. • Record any recent weight loss or gain and an accurate, current weight.	Ensure that your recommended seating system accommodates current weight and/or frequent weight fluctuations.
Tissue Distribution	• The lateral view of the client's seated posture will reveal weight distribution and how the tissue distribution affects the client's posture. • An apple-shaped body type can prevent a client from sitting with 90° of hip flexion, which may cause the client to sit with their pelvis forward. • Clients with a pear-shaped body can present with redundant tissue on lateral aspects of their femurs (adducted) or more tissue distribution on the medial aspects (abducted).	• Often, attempts to position the hip in a more neutral position result in the belly tissue being forced against the thighs, causing abduction of the lower extremities. • Both presentations require wider seats and narrower back supports. A seat back that accommodates a gluteal shelf can be an effective solution.

FACTOR (Cont'd)	CONSIDERATIONS (Cont'd)	CLINICAL RECOMMENDATIONS (Cont'd)
Supplemental Measurements Redundant posterior pelvic tissue distribution (see Bariatric Measurement Guide)	With the client seated, take the following measurements: 1. Posterior aspect of the tissue at the calf to the posterior aspect of gluteal tissue on the pelvis 2. Posterior aspect of the tissue at the calf to the posterior aspect of the client's trunk 3. From the seat surface (mat table) to the top of the gluteal tissue on the posterior aspect of the pelvis	• Ensure that equipment allows for better midline presentation and avoids possible interference with the wider back and the upper extremities. • For a client with an apple-shaped body, a wheelchair with a narrower seat width and wider back support may be recommended (mesomorph back). • Bariatric clients with large amounts of redundant tissue on the posterior trunk or flanks type of tissue distribution will increase the distance from the back support surface to the occiput. More expansive seat surfaces with narrower trunk supports can address the tissue distribution of clients with pear-shaped bodies and endomorph backs
Transfers/ Repositioning	• Bariatric clients may have difficulty repositioning themselves after transferring into a wheelchair. • For safety, determine the range of possible finished seat-to-floor height.	• Utilizing a mat table, begin at the same height as the client's existing wheelchair and lower the mat in small increments to establish a safe range for seat-to-floor height. • For clients that utilize a mechanical lift, ensure that the transfer device will be accessible around the dimensions of the new wheelchair.

FACTOR (Cont'd)	CONSIDERATIONS (Cont'd)	CLINICAL RECOMMENDATIONS (Cont'd)
Gluteal Depth and Height	If the client has excessive redundant tissue at the gluteal region, the client may not have adequate spinal support.	The measurement from the evaluation support surface to the top of the gluteal tissue can determine the back support height and allow redundant tissue to stay below the back support. **Seat cushion thickness must be considered.**
Panniculus and Seat Depth	The redundant tissue that forms a panniculus can limit seat depth. The panniculus may prevent the client from moving farther back in the seat. Accurate measurement is vital.	A higher-grade panniculus will require modifications to the seat cushion surface and the seat pan. Supporting the femurs will improve weight distribution and increase anterior sitting balance. **Be mindful of pinch points.**
Lower Extremity Issues	Bariatric clients with an apple-type tissue distribution or panniculus may experience increased pressure on the femur due to excess abdominal tissue.	May present with upper legs abducted or externally rotated. Traditional foot supports that attach to the lateral aspect of the wheelchair frame are most appropriate.
	Bariatric clients with excess redundant tissue of the medial thigh (commonly seen with clients with pear-shaped bodies) will typically have the lateral aspect of the knees as the widest tissue distribution. This will often exceed the width of the hip measurement.	A wider seat than back support may be indicated. Flared or offset lower extremity supports may be needed to prevent direct contact of the lower extremities with the leg supports.
Back Support	Consider excessive posterior pelvic tissue distribution (also known as gluteal shelf). When the posterior gluteal tissue contacts the back support surface, this can create a lordotic posture and may cause pain.	The back support can be mounted above the gluteal tissue to contact the client's posterior thoracic region to accommodate the gluteal shelf.

FACTOR (Cont'd)	CONSIDERATIONS (Cont'd)	CLINICAL RECOMMENDATIONS (Cont'd)
Seat Surface Height	Many clients of size do not utilize cushions or lower leg supports to achieve heel strike for mobility. This may result in high-pressure areas, especially at the front edge of the seat surface. High pressure can lead to impeding circulation. Sling seat materials will likely stretch and tear over time.	Wheelchairs that offer lower seat-to-floor heights are recommended to accommodate a cushion.
	• Bariatric cushions are thicker to compensate for compression. Thicker cushions will increase seat-to-floor height. • Increased seat-to-floor height can inhibit heel strike and limit the propulsion method.	Consider the seat-to-floor height and cushion height to achieve the optimal fit.
Seat Surfaces	• A seat cushion's integrity may deteriorate along the anterior aspect, especially for clients that utilize their lower extremities for propulsion. • An ideal cushion will include immersion, envelopment, and pressure redistribution properties related to the client's needs.	Clients of size, especially those with excessive redundant tissue of the medial thigh, may require cushion modification to allow the femurs to rest in a lateral, abducted orientation.
	Sling seat-type surfaces do not offer good pelvic or postural support. Sling seat-type wheelchairs are prone to stretching and ripping, which can lead to abnormal postures, pain, falls, and pressure injuries.	Firm options offer better support and performance.

Adapted from Tanguay, S. (2018). Chapter 19: Considerations when working with the bariatric population. In M. L. Lange & J. L. Minkel, Seating and Wheeled Mobility: A clinical resource guide (pp. 317-332). Slack Incorporated.

Pressure Injuries & Obesity

It is important to be aware that people who are diagnosed with morbid obesity are at increased risk of pressure ulcers and deep tissue injury due to factors such as immobility and poor vascularization of adipose tissue. Damage can occur before it is seen on the skin level. People who are obese are prone to sweating, which can contribute to skin integrity issues. Care should be taken during all mobility and transfers to decrease the risk of pressure injury from shear.[1]

Damage from pressure wounds can occur before it becomes visible on the skin level.

Secondary Conditions

CONDITION	EXPLANATION	IMPORTANT CONSIDERATIONS
Lymphedema	Lymphedema's asymmetrical nature can lead to abnormal seated postures.	This condition may affect seat depth and cushion shape, and length.
Lymphorrhea	Weeping of lymph fluid[7]	Porous fabric covers should be removable or easily cleaned to prevent fungal infection or cellulitis.
Cellulitis	Common complication bacterial infection of subcutaneous tissue	This may lead to anterior instability of the wheelchair.
Lipoma	A benign tumor composed of adipose tissue	It may be painful when in contact with a surface.
Panniculus	Excess abdominal tissue can be large and is graded on a scale from 1-5	A large panniculus may cause anterior pelvic rotation and spinal lordosis. *It's important to pad any potentially sharp edges of the wheelchair. When utilizing a tilt system, anticipate where gravity may displace tissue during the shift to the front of the seat.

Adapted from Tanguay, S. (2018). Chapter 19: Considerations when working with the bariatric population. In M. L. Lange & J. L. Minkel, Seating and Wheeled Mobility: A clinical resource guide (pp. 317-332). Slack Incorporated.

Choosing Appropriate Wheelchair Components

Back Supports

A standard sling-back style wheelchair will not provide adequate support or comfort. A sling-back wheelchair will not assist with alignment, stability, or pressure redistribution, and it will contribute to or exacerbate postural abnormalities.

In addition to providing postural support, the backrest protects and supports the spine and pelvis. It is important to note that the upper body's weight is sustained through the spine; therefore, the protection of the spine is essential.

Considerations for Choosing a Back Support

- **Adjustability** — an essential consideration in meeting current and future needs.
- **Shape** — How much support does the client need?
- **Material** — Which material will work best for your client? Options include air, gel, foam, or a combination.

Goals for Back Supports

- Provide stability and comfort to maximize functional abilities.
- Allow for maximum pressure redistribution to minimize pressure injury risk.

Hong, E.-K., Dicianno, B. E., Pearlman, J., Cooper, R., & Cooper, R. A. (2016). Comfort and stability of wheelchair backrests according to the TAWC (tool for assessing wheelchair discomfort). Disability and Rehabilitation: Assistive Technology, 11(3), 223-227.

Head Supports

Providing proper back support, however, is only one part of the seating system equation. We must look at the whole seating system to achieve good postural alignment, supporting mobility, function, and comfort.

Considerations for Choosing a Head Support

- **Visual Field Improvement** — Allows for increased engagement and communication.
- **Proper Head/Neck Support & Alignment** — Facilitates safe swallowing during meals.
- **Improved Respiration**
- **Improved Mobility**

Goals for a Head Support

- Provide support and comfort.
- Decrease excessive extension, rotation, or lateral flexion of the neck.

A head support should be height- and angle-adjustable.

Head Support Tips

- Ensure the client's body is in the best postural alignment before assessing head support fit.
- Keep in mind that the head position changes with body movement

---

Foot Supports and Elevating Lower Leg Supports

Foot supports are a vital component of seating and positioning. They assist with postural alignment and pressure redistribution. It is crucial to consider whether the lower leg support will impede transfer ability; they should be easy to move out of the way (swing away, flip up, etc.).

The foot support setting needs to be "just right." If the foot support is set too short, the pressure will be greatest at the bony prominences at the pelvis and the ischial tuberosities. It can increase the risk of developing a pressure injury. If the foot support is too long, the load shifts to the thighs. This can potentially cause the user to slide forward, pulling the pelvis into a posterior pelvic tilt, and increasing the risk for pressure injuries at the coccyx or tailbone.

Foot supports have a fixed or adjustable angle relative to the seat of the wheelchair and are removable.

- Foot supports range between 60° and 90° angles.
- Foregoing foot supports for wheelchair users who do not propel a wheelchair with their feet may lead to:
    - Increased pressure on the lower back, buttocks, and thighs.
    - Discomfort due to lack of support and pressure redistribution.
    - The development of abnormal postures
- Foot supports with 60–70° angles are the most common to provide ground clearance and avoid caster interference during propulsion.
- Angle-adjustable foot supports allow for anterior and posterior tilt.
    - Anterior tilt supports users with limited ankle range of motion or clonus
    - Posterior tilt can assist with keeping the foot on the footplates during uneven terrain.
    - Medial and lateral tilting of the footplate can accommodate deformities at the foot and ankle.

*For safety reasons, foot supports are recommended for all wheelchair users when a caregiver propels the wheelchair. Proper foot and/or leg support assist in stabilizing the pelvis and improve the distal function of the upper extremities.

Elevating lower leg supports can be at any angle. A calf pad is included with these kinds of lower leg supports. This is ideal for users who may be unable to bend their knees due to an injury or other medical issue without assistance from the user or a caregiver. The leg can be kept straight. Users who require their legs to constantly be rested at the same angle benefit from elevated lower leg supports since they always have the same elevation.

Myths about Elevating Lower Leg Supports

- **Myth #1: Elevating Lower Leg Supports Decrease Edema**
  FALSE. To decrease edema, the lower extremities must be raised 30 cm above heart level (the user would need to be tilted to achieve this in a wheelchair).
- **Myth #2: Elevating Lower Leg Supports Decrease Pressure on the Pelvis**
  FALSE. Elevating lower leg supports can cause posterior pelvic tilt, increasing pressure on the ischial tuberosities, sacrum, and coccyx.

Pros & Cons of Elevating Lower Leg Supports

PROS

- Maintains lower extremity extension for users with limited knee flexion or for post-up precautions.
- For some people, it can be comfortable.

CONS

- Promote flexion of the knees, hips, and ankles, increasing the risk of contracture.
- Adds weight to the chair.
- Break easily due to moving parts; hanger attachments become warped or worn from the supporting Les (especially edematous lower extremities). They can migrate away from each other over time, leading to poor positioning at the Les and hips.
- Requires strength and coordination to manage them independently.
- Adds to the chair's overall length, so it requires more space to turn (difficult for many people to navigate).
- Calf pads may contribute to sacral sitting when the calf panels push against the user's calves, pulling the person into a posterior pelvic tilt.

Cushion Considerations

There are several types of wheelchair cushions, each serving a different purpose for clients with a variety of needs. Regardless of which cushion you use, the basic goals are as follows:

Cushion Goals

- Reduce the risk of pressure injuries
- Support proper posture
- Increase user comfort

Basic Cushion Characteristics

Basic cushions are flat or minimally contoured, and provide minimal-to-no support, and are 1 to 2 inches thick.

Materials: foam, air, gel, or a combination.

Skin Protection/Pressure Redistribution Cushion Characteristics

Skin protection/pressure redistribution cushions redistribute pressure away from the bony prominences and are typically 3 inches thick.

Materials: air, viscous fluid, thermoplastics, foam, or a combination.

Insurance Coverage Criteria for Skin Protection/Pressure Redistribution Cushions:

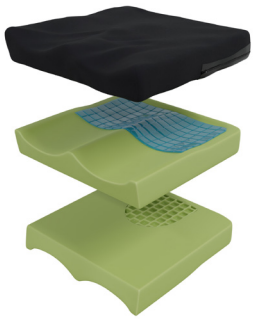
- Current pressure injury or history of a pressure injury
- Qualifying diagnosis code
- Inability to perform a weight shift secondary to diagnosis

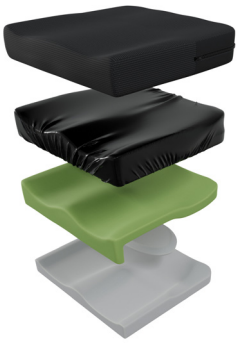
Skin Protection/Pressure Redistribution Positioning Cushion Characteristics

These cushions offer the characteristics of both skin protection and a positioning cushion.

Positioning seat cushion is generally countered and can include components to address postural needs such as pre-ischial shelf, anti-thrust, hip guides, lateral thigh supports, and medial thigh supports.

Positioning cushions are covered by some insurances if the client meets the criteria for a manual or power wheelchair and has significant postural asymmetries due to diagnosis.





In order to find the right wheelchair cushion for your client, consider the following:

CUSHION TYPES		
BASIC CUSHIONS	**SKIN PROTECTION/PRESSURE REDISTRIBUTION CUSHIONS**	**SKIN PROTECTION/ PRESSURE REDISTRIBUTION & POSITIONING CUSHIONS**
Can perform a weight shift independently and transfer independently or with minimal assistance.	May need assistance or may be unable to perform a weight shift or transfers. Has a diagnosis that increases the risk of pressure injury	May need assistance or may be unable to perform a weight shift or transfers. Has a diagnosis that increases the risk of pressure injury.
No postural abnormality is present. No history of or current pressure injury.	May have a postural abnormality. At risk for pressure injury/history of a pressure injury. May have limited mobility.	May have a postural abnormality. At risk for pressure injury/history of pressure injury. May have limited or minimal mobility.
Intact sensation	Impaired or absent sensation	Impaired or absent sensation
Ambulatory	Contracture risk	Contracture risk
	Frail/impaired skin integrity	Frail/impaired skin integrity
	Fall risk	Fall risk
	Diagnosis of dementia	Diagnosis of dementia
	Neurological impairment	Neurological impairment
	Progressive disease	Progressive disease

Preventing Pressure Injuries

According to best practice guidelines, frequent pressure injury risk assessment should be conducted at admission, quarterly, or upon a change in medical condition. Full-time wheelchair users should be referred for a seating evaluation by a seating specialist.

Risk Factors for Pressure Injury

There are a variety of conditions that increase a person's risk of developing a pressure injury.

- Impaired mobility
- Impaired sensation
- Impaired nutrition
- Anemia
- Diabetes
- Altered hormones
- Congestive Heart Failure
- Incontinence
- Any source of edema
- Obesity
- Being underweight
- Older age
- Decreased alertness
- Postural deformities
- History of a previous pressure injury

Seating Surface Properties

When forming a pressure injury prevention plan, consider the material of the cushion or seating surface and how the surface redistributes pressure.

Offloading

The principle of offloading is removing pressure from a small surface area and loading it onto a greater surface area that is better able to withstand the pressure.

Immersion/Envelopment

Immersion is when the cushion or support surface material allows the body to sink into the seat or cushion. Envelopment is when the cushion or support surface allows the body to sink into the surface and conforms to the body's contours, reducing the peak pressure from the bony prominences.

Cushion Mediums

TYPE		BENEFITS	CONSIDERATIONS
Foam	High Resilience Foam	High resilience foam can **provide structure for the base of the cushion.**	It may be heavy. Incontinence can be a concern.
	Visco Elastic Foam	Memory foam **allows for immersion and envelopment.**	The higher the density, the better the immersion and envelopment will be. It can be heavy. Incontinence can be a concern.
Air		Air cushions are adjustable and **offer immersion and envelopment.**	Some types require maintenance. Some types may be less stable than others.
Gel Fluid		Gel allows for envelopment and immersion of bony prominences for **increased pressure redistribution**.	The effectiveness may depend on the cushion's stability. Gel migration can be a concern. Certain cushions require kneading for periodic maintenance.
Honeycomb		A honeycomb cushion **allows movement with minimal maintenance**.	Lack of adjustability can be a concern as the honeycomb surface may be too firm for some people.
Combination (Foam/Air or Foam/Gel)		Foam **provides a stable base**. Users also receive the benefits of air or gel.	It can be heavy and may need maintenance.

Practical Tips for Cushion Use

1. Remember to use the cover that came with the cushion. It is good practice to order two cushion covers for every cushion so that you always have a spare.
2. Do not place anything on top of the cushion. There should not be anything between the cushion and the patient to ensure the best skin protection and pressure redistribution (no pillows, pillowcases, incontinence pads or dycem.)
3. Use of mechanical lift slings should be based on clinical judgement. Always take into consideration if there is a higher risk of shear or injury.

Transportation & WC19 Certified Wheelchairs

People seated in wheelchairs during travel are 45 times more likely to be injured in an accident than a typical passenger.[13] Of great concern, adults over the age of 65 are at higher risk for severe injury in motor vehicle collisions (MVA) due to age. Their risk of fatality during MVA is doubled compared to younger people.[14] People with several comorbidities are at the highest risk of injury.[14] To reduce the risks of vehicle travel, facilities can use special transport wheelchairs that are crash tested to ensure the occupant's safety. The highest standards in crash testing are the WC19 standards.

What Are the WC19 Standards?

The WC19 transport wheelchair certification distinguishes whether a wheelchair is safe to use as a seat in a motor vehicle, such as a van or a bus. **Not all wheelchairs marketed as "transport wheelchairs" are WC19 certified.** Always check to make sure that the equipment is WC19 certified before purchasing if your client intends to use it outside of the client's place of residence (doctor's appointments, outings, etc.).

The Wheelchair Transportation Standards for North America are voluntary standards that add extra protection for wheelchair users. Although not currently a legal requirement for wheelchair vehicle transport, these standards are the guiding principles that encourage mobility device manufacturers to include crash protection when manufacturing their wheelchairs.

In 2000, the American National Standards Institute (ANSI) approved Standard No. WC19: "Wheelchairs Used as Seats in Motor Vehicles," making the guidelines the voluntary national standard in the United States. Furthermore, there are similar international wheelchair transportation safety voluntary standards from the International Organization for Standardization (ISO). The University of Michigan Transportation Research Institute (UMTRI) monitors compliance with these standards and issues the WC19 certification.

What Makes a Wheelchair WC19 Certified?

A WC19 compliant wheelchair must meet the following criteria:

1. Four easily accessible securement points on the wheelchair frame
2. A wheelchair-anchored pelvic belt restraint.
3. WC19 labeling on the wheelchair frame and belts.
4. Successful completion of a 30-mph, 2-g frontal impact crash test without any components failing; an occupied crash test with a test dummy is a plus
5. Securement geometry that accepts a securement strap end-fitting hook
6. A clear path of travel that allows proper placement of vehicle-mounted occupant safety belts next to the skeletal parts of the passenger's body
7. No sharp edges

WC19 Transport Package

Did you know Broda offers a WC19 Transport Package for select wheelchairs?

This package adds the convenience of keeping the individual in the same wheelchair for everyday care and transportation. This reduces the number of transfers and improves the overall comfort and safety for both the user and the caregiver.

For more information about the WC19 Transport Package and to browse all compatible wheelchairs, visit us online at brodaseating.com

Synthesis Positioning Wheelchair

Encore Rehab Wheelchair

Encore Pedal Wheelchair

Elite Positioning Wheelchair

Glossary of Terms

ADLs — Activies of daily living

ALF — Assisted living facility

ANSI — American Naitonal Standards Institute

ASIS — Anterior superior iliac spine

ATP — Assistive technology professional

CHF — Congestive heart failure

CRT — Complex rehab technology

CTS — Comfort Tension Seating

DME — Durable medical equipment

ILF — Independent living center

ISO — International Organization for Standardization

ITs — Ischial tuberosities

LMN — Letter of medical necessity

MD — Medical doctor

MRADLS — Mobility related activity of daily living

MVA — Motor vehicle accident/collision

NP — Nurse practitioner

OT — Occupational therapist

PA — Physicians assistant

PSD — Postural support device

PSIS — posterior superior iliac spine

PT — Physical therapist

RESNA — Rehabilitiation Engineering & Assistive Technology Society of North America

UMTRI — University of Michigan Transportation Research Institute

WC19 — A voluntary industry standard for designing, testing, and labeling a wheelchair that is ready to be used as a seat in a motor vehicle

References

1. Ding, D., Leister, E., Cooper, R. A., Cooper, R., Kelleher, A., Fitzgerald, S. G., & Boninger, M. L. (2008). Usage of tilt-in-space, recline, and elevation seating functions in natural environment of wheelchair users. Journal of Rehabilitation Research & Development, 45(7), 973-984. https://doi.org/10.1682/JRRD.2007.11.0178

2. Zemp, R., Rhiner, J., Plüss, S., Togni, R., Plock, J. A., & Taylor, W. R. (2019). Wheelchair tilt-in-space and recline functions: Influence on sitting interface pressure and ischial blood flow in an elderly population. BioMed Research International, 2019, 10 pages. https://doi.org/10.1155/2019/4027976

3. Dicianno, B. E., Lieberman, J., Schmeler, M. R., Souza, A. E. S. P., Cooper, R., Lange, M., Liu, H., & Jan, Y. K. (2015). Rehabilitation Engineering and Assistive Technology Society of North America's position on the application of tilt, recline, and elevating legrests for wheelchairs literature update. Assistive Technology, 27(3), 193–198. https://doi.org/10.1080/10400435.2015.1066657

4. Damiao, J., Blair, A., Martinez, N., Reyes, R., & Mahon, B. (2023). Pressure distribution comparison among standard seating surfaces and strap seating system. Global Journal of Health Science, 15(7), 35. https://doi.org/10.5539/gjhs.v15n7p35

5. Pieper, M. J. C., Van Dalen-Kok, A. H., Francke, A. L., Van Der Steen, J. T., Scherder, E. J. A., Husebø, B. S., & Achterberg, W. P. (2013). Interventions targeting pain or behaviour in dementia: A systematic review. Ageing Research Reviews, 12(4), 1042–1055. https://doi.org/10.1016/j.arr.2013.05.002

6. Watson, N. M., Wells, T. J., & Cox, C. (1998). Rocking chair therapy for dementia patients: Its effect on psychosocial well-being and balance. American Journal of Alzheimer's Disease, 13(6), 296–308. https://doi.org/10.1177/153331759801300605

7. Tanguay, S. (2018). Chapter 19. Considerations when working with the bariatric population. In M. L. Lange & J. L. Minkel (Eds.), Seating and Wheeled Mobility: A clinical resource guide (pp. 317–332). Slack Incorporated.

8. Semancik, B., Schmeler, M. R., Schein, R. M., & Hibbs, R. (2021). Face validity of standardized assessments for wheeled mobility & seating evaluations. Assistive Technology, September, 1–9. https://doi.org/10.1080/10400435.2021.1974980

9. Sunrise Medical. (2015). Seating and mobility considerations for individuals who are bariatric, part 1 – body shape. Sunrise Medical website, March 2015. https://www.sunrisemedical.ca/education-in-motion/clinical-corner/march-2015/seating-and-mobility-considerations-for-individuals-who-are-bariatric,-part-1-body-shape

10. Hong, E. K., Dicianno, B. E., Pearlman, J., Cooper, R., & Cooper, R. A. (2014). Comfort and stability of wheelchair backrests according to the TAWC (tool for assessing wheelchair discomfort). Disability and Rehabilitation: Assistive Technology, 11(3), 223–227. https://doi.org/10.3109/17483107.2014.938365

11. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, Pacific, P., & Pressure Injury Alliance. (2019). Prevention and treatment of pressure ulcers/injuries: Quick reference guide. In E. Haesler (Ed.), EPUAP/NPIAP/PPPIA, published by Cambridge Media. https://www.epuap.org/wp-content/uploads/2016/10/quick-reference-guide-digital-npuap-epuap-pppia-jan2016.pdf

12. National Center for Statistics and Analysis. (2009). Traffic safety annual assessment – Highlights. Washington, DC: (NHTSA) National Highway Transit Safety Administration, 2008. https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/811172

13. Buning, M. E., Bertocci, G., Schneider, L. W., Manary, M., Karg, P., Brown, D., & Johnson, S. (2012). RESNA's position on wheelchairs used as seats in motor vehicles. Assistive Technology: The Official Journal of RESNA, 24(2), 132–141. https://doi.org/10.1080/10400435.2012.659328

14. Yee, W. Y., Cameron, P. A., & Bailey, M. J. (2006). Road traffic injuries in the elderly. Emergency Medicine Journal, 23(1, January), 42–46. https://doi.org/10.1136/emj.2005.023754

15. Centers for Medicare & Medicaid Services. (2011). https://www.gpo.gov/fdsys/pkg/CFR-2011-title42-vol5/pdf/CFR-2011-title42-vol5-sec482-13.pdf, 5, § 482.13(e)(1).

16. Babinec, M., Cole, E., Crane, B., Dahling, S., Freney, D., Jungbluth-Jermyn, B., Lange, M. L., Pau-Lee, Y. Y., Olson, D. N., Pedersen, J., Potter, C., Savage, D., & Shea, M. (2015). The Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) position on the application of wheelchairs, seating systems, and secondary supports for positioning versus restraint. Assistive Technology, 27(4, October), 263–271. https://doi.org/10.1080/10400435.2015.1113802

17. Rehabilitation Engineering Research Center on Wheelchair Transportation Safety (RERC WTS). (2010). The WC19 information resource: crash-tested wheelchairs and seating systems. WC19 your ticket to ride safely. August 18, 2010. https://www.rercwts.org/WC19.html

18. Owens, J., & Davis, D. D. (updated 2022, May 8). Seating and wheelchair evaluation. In StatPearls [Internet]. StatPearls Publishing, 2023 January. https://www.ncbi.nlm.nih.gov/books/NBK559231/

19. Minkle, J. (2018). Chapter 1. Seating and mobility evaluations for persons with long-term disabilities focusing on the client assessment. In M. L. Lange & J. L. Minkel (Eds.), Seating and Wheeled Mobility: A clinical resource guide (pp. 3-26). Slack Incorporated.

Appendix: Common Mobility Assessments

9-Hole peg test – Dexterity
https://www.sralab.org/rehabilitation-measures/nine-hole-peg-test

10-mWPT – Wheelchair propulsion technique
https://wheelchairskillsprogram.ca/wp-content/uploads/2018/04/WPT_form_v1.0.pdf

Borg Scale – Perceived Exertion
https://dhhs.ne.gov/ConcussionManage/Documents/BorgScaleExertion.pdf

Braden Scale – Pressure injury risk (Braden scale II is now available subject to copyright)
https://www.bradenscale.com/

Dynamometer – Grip strength
https://www.sralab.org/rehabilitation-measures/hand-held-dynamometer-grip-strength

Functional Independence Measure (FIM) – Ability to complete ADLs & IADLs
https://www.sralab.org/rehabilitation-measures/functional-independence-measure

Functional Mobility Assessment (FMA) – Ability to complete mobility-related ADLs
https://www.sralab.org/rehabilitation-measures/functional-mobility-assessment

Four Functional Tests for Persons Who Self-Propel A Manual Wheelchair
https://www.sralab.org/rehabilitation-measures/4-functional-tests-persons-who-self-propel-manual-wheelchair#wheelchair-usage

Manual Muscle Test (MMT) – Strength and range of motion
https://www.sralab.org/rehabilitation-measures/manual-muscle-test

Pain Disability Index (PDI) – Effect of Pain on activity
https://osteopathy.org.au/publicassets/d679702f-3219-ed11-945e-005056be13b5/Pain-Disability-Index--PDI-.pdf

Posture and Postural Ability Scale (PPAS) – Posture and ability to change posture
https://www.applyebp.com/wp-content/uploads/2020/08/Balance-PPAS.pdf

Timed Up & Go Test (TUG) – Walking speed, gait, balance, fall risk
https://www.cdc.gov/steadi/pdf/TUG_test-print.pdf

Wheelchair User's Shoulder Pain Index (WUSPI) – Shoulder pain
https://www.sralab.org/rehabilitation-measures/wheelchair-users-shoulder-pain-index#wheelchair-usage


BRODA
BRODA

BRODA®