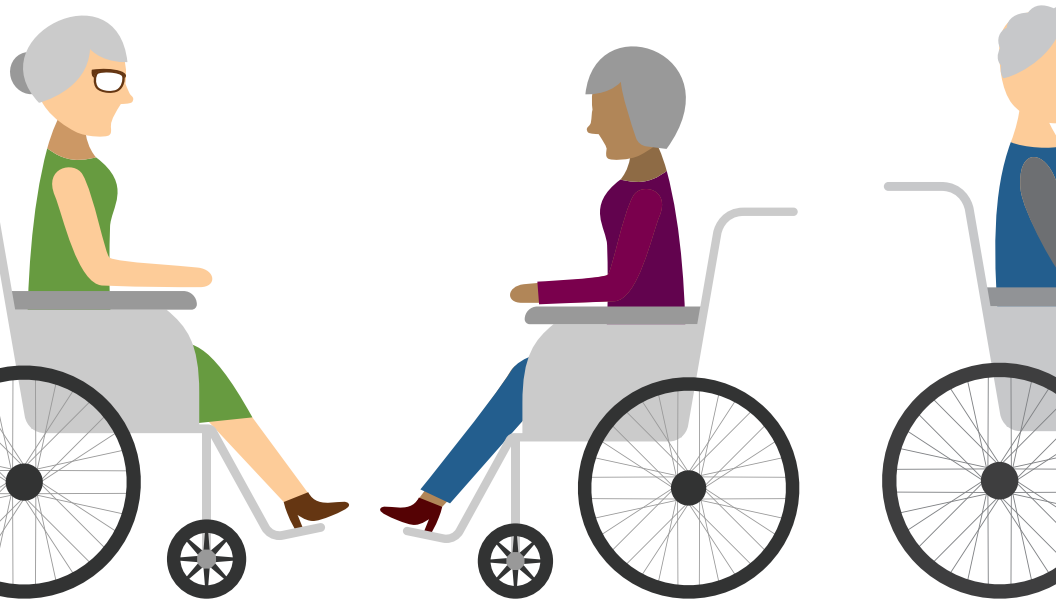
WHEELCHAIR SEATING & POSITIONING GUIDE

FOR LONG TERM CARE



permobil

HELLO! I'M ANA ENDSJO

ABOUT ANA

Ana Endsjo has worked as an occupational therapist since 2001 in a variety of treatment settings. She has mainly worked with the geriatric population, dedicated to the betterment of the treatment of the elderly in LTC centers. Her focus has been on seating and positioning and contracture management of the nursing home resident. With this experience, her hope is to guide other therapists, rehab directors, nurses, and administrators through educational guides, blogs, webinars, and live courses in her role as Comfort Company's Clinical Education Manager for the long term care division.

Master of Occupational Therapy
Nova Southeastern University

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PURPOSE OF THIS GUIDE

This guide is intended to shed some light on the mystery of seating and positioning in the LTC setting. The aim is to assist the LTC therapist obtain customized, optimal posture for each resident by:

- Understanding universal wheelchair terminology
- Identifying the abnormal postures created by poor wheelchair positioning
- Understanding how ill-fitting components lead to abnormal postures
- Identifying keys to a successful wheelchair evaluation in the LTC setting

✱ **Look for these blue boxes in the rest of the guide. They're Ana's quick tips or takeaways for that specific section.**

* **Despite knowing what is BEST for the resident, the above factors may prevent us from doing it!**

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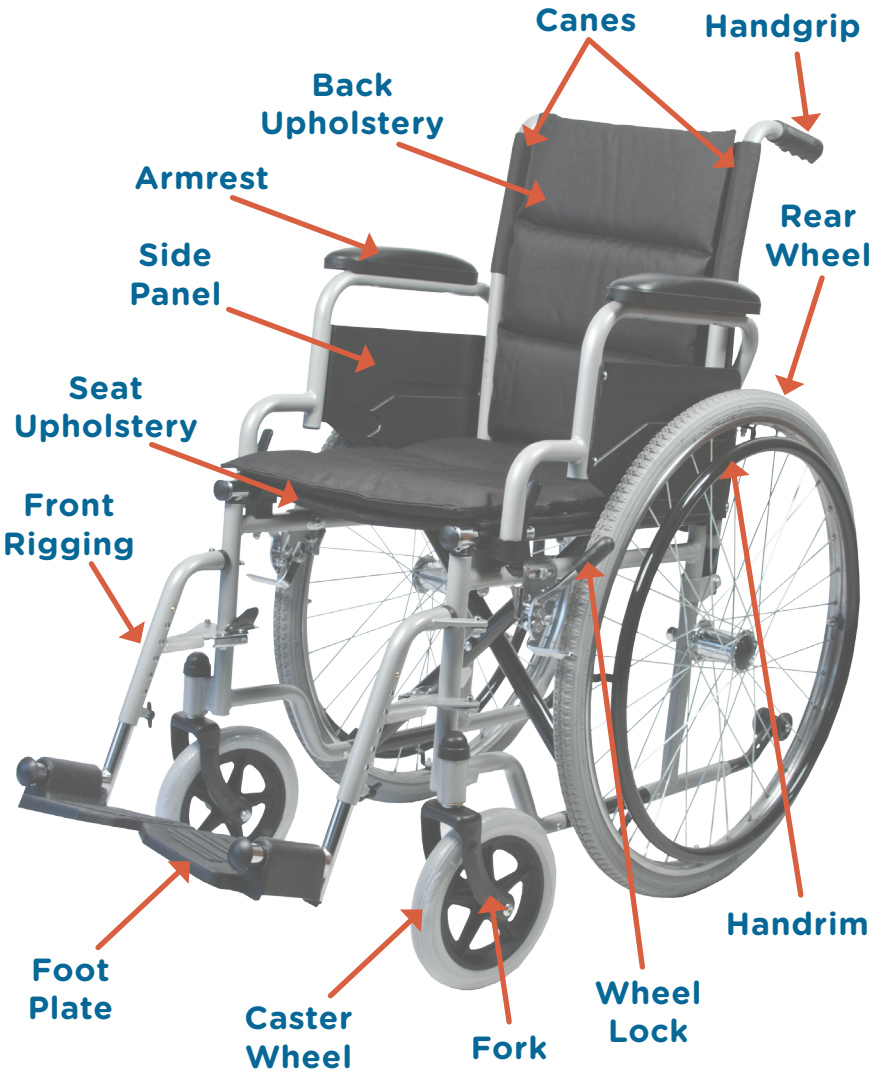
WHEELCHAIR PARTS: KNOWING THE UNIVERSAL TERMINOLOGY



WHEELCHAIR OPTIONS: FEATURES & LIMITATIONS

WHAT CHAIR SHOULD I BUY FOR AN LTC RESIDENT?

The cheapest option is often NOT the best option.

Look for that **ONE** chair with **MAXIMUM ADJUSTABILITY** to fit multiple body types.

STANDARD WHEELCHAIR OPTIONS		
Very Minimal Adjustability	Minimal Adjustability	Most Adjustability
K0001/K0002	K0003	K0004

NON-STANDARD WHEELCHAIR OPTIONS		
Minimal Adjustability	Minimal Adjustability	Most Adjustability
Gerichair	Recline/High Back Chair	Tilt-in-Space

WHEELCHAIR KEY

K0001: Standard Wheelchair

K0002: Standard Hemi Wheelchair

K0003: Lightweight Wheelchair

K0004: High Strength, Lightweight Wheelchair

STANDARD WHEELCHAIR COMPARISON CHART

	K0001: Standard
Chair Weight without Legrests	>35 lbs
Seat Width: Standard	16″, 18″, 20″
Seat Depth: Standard	16″
Weight Capacity	300 lbs
Back Height	18″
Lowest Achievable Seat-to-Floor Height	21″
Adjustability to accommodate for postural abnormality:	
Armrest Height	No
Back Height	No
Seat-to-Back Angle	No
Ability to create a Fixed Tilt	No
Seat-to-Floor Height (STFH)	No
Armrest Options	
Desk Length	Yes
Full Length	Yes
Legrest Options	
Standard	Yes
Elevated (ELR)	Yes
Swing-Away	Yes
Meant for Long Term Sitting	No

**Features vary according to model.*

	K0002: Standard Hemi Height	K0003: Lightweight	K0004: High Strength, Lightweight
	>35 lbs	33 - 35 lbs	30 - 34 lbs
	16″, 18″, 20″	16″, 18″, 20″	16″, 18″, 20″, 22″
	16″	16″, 18″	16″, 18″, 20″
	300 lbs	300 lbs	300 lbs
	18″	18″	16″ to 20″
	19″	17″	14.5″
	No	No	Yes
	No	No	Yes
	No	No	Yes
	No	No	Yes
	Hemi Height Only	Yes	Yes
	Yes	Yes	Yes
	Yes	Yes	Yes
	Yes	Yes	Yes
	Yes	Yes	Yes
	Yes	Yes	Yes
	No	No	Yes

SPECIALIZED WHEELCHAIR COMPARISON CHART

**Features vary according to model.*

Chair Weight without Legrests
Seat Width: Standard
Seat Depth: Standard
Weight Capacity
Back Height
Lowest Achievable Seat-to-Floor Height (STFH)
Adjustability to accommodate for postural abnormality:
Armrest Height
Back Height
Seat Depth
Seat-to-Back Angle
Ability to create a Fixed Tilt
Angle Adjustable Foot Plates
Seat-to-Floor Height (STFH)
Armrest Options
Desk Length
Full Length
Legrest Options
Standard
Elevated (ELR)
Swing-Away
Meant for Long Term Sitting
Able to replace sling back with a specialty back support
Frame has built-in growth capability
Able to add a head support
Tilt Angle
Recline Range

A NOTE ON GERICHAIRS

Gerichairs have evolved over the years. Older models, found in a number of facilities, have little to no adjustability while newer models have more built-in adjustability. Keep in mind that seat width and the back support still cannot be changed to fit the resident's individual shape, limiting the therapist's ability to contour the seating system to the resident's curvature.

Recline/High Back Chair	Tilt-in-Space
35 - 50 lbs	>45 lbs
16", 18", 20"	16", 18", 20"
16", 18", 20"	16", 18", 20"
300 lbs	300 lbs
22" - 53"	24"
21"	17"
No	Yes
No	Yes
No	Yes
Yes	Yes
No	Yes
No	Yes
Standard or Hemi Height	17" - 21"
Yes	Yes
Yes	Yes
Yes	Yes
Yes	Yes
Yes	Yes
Yes	Yes
No	Yes
No	Yes
No	Yes
Unable to Tilt	45°
90° - 180°	Fixed recline using chair canes: 80° - 120°

ABNORMAL POSTURE

WHAT AM I LOOKING AT? WHAT IS THE BODY DOING THAT IT SHOULDN'T BE DOING?

With prolonged sitting, residents begin to shift their bodies into what is known as abnormal postures to seek stability and/or alleviate pain and pressure.

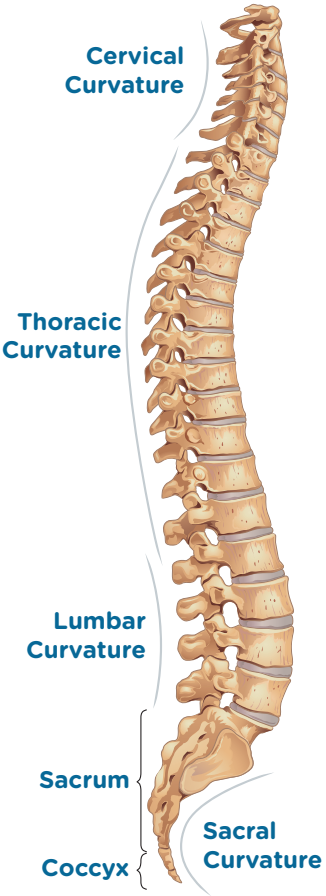
Abnormal Postures are grouped into 5 categories and are as follows:

- **Anterior Pelvic Tilt (page 12)** with lumbar lordosis; with or without neck hyperextension.
- **Posterior Pelvic Tilt (page 13)** with thoracic kyphosis; with or without forward neck flexion. Referred to as SACRAL SITTING.
- **Pelvic Obliquity (page 15)** with scoliosis; with or without lateral neck flexion.
- **Pelvic Rotation (page 16)** with rotation of the spine; with or without lateral neck flexion.
- **Windswept Posture (page 17)**

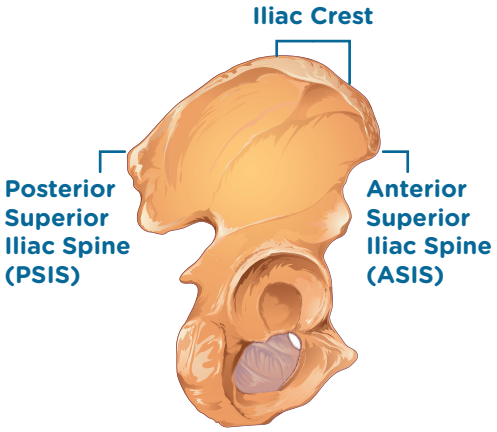
✱ **Understand what you are looking at and decide whether your goal is to *correct* or *accommodate for* the abnormal posture. (pg 18)**

ANATOMY REFRESHER

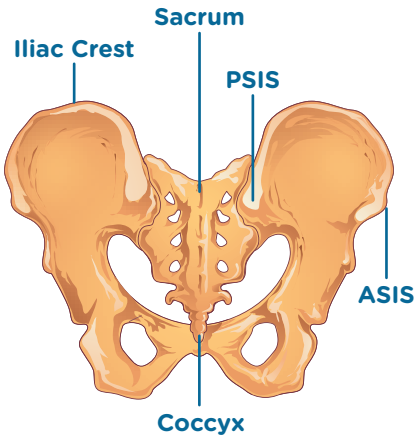
RIGHT LATERAL VIEW OF SPINE



RIGHT LATERAL VIEW OF PELVIC BONE



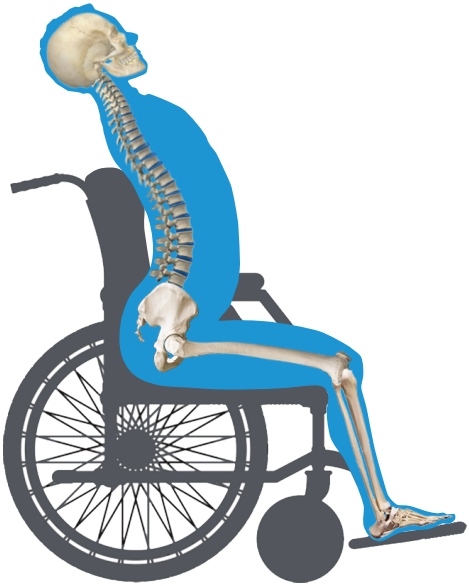
POSTERIOR VIEW OF PELVIS



OPTIMAL POSTURE

OPTIMAL POSTURE	
What is the pelvis doing?	Pelvis in midline. ASIS & PSIS at equal height: no pelvic tilt L ASIS & R ASIS at equal height: no obliquity L ASIS & R ASIS at equal depth: no rotation
What is the spine doing?	Balanced and upright, no rotation, no lateral curvature. Normal lordosis in cervical and lumbar spine and normal kyphosis in thoracic spine creating the desired “S” shape.
What is the head doing?	Head is functionally upright with only mild forward/lateral flexion or rotation.
Goals	Maintain proper alignment with a *STANDARD* cushion (pg 45) and back support.

ANTERIOR PELVIC TILT



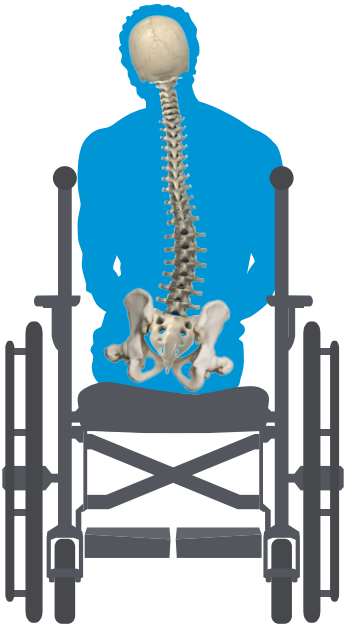
ANTERIOR PELVIC TILT	
What is the pelvis doing?	Pelvis sits with PSIS higher than the ASIS resulting in the anterior pelvic tilt.
What is the spine doing?	Excessive lordosis of the lumbar and cervical spine: the resident hyperextends his or her back over the sling back of the chair, placing him or her at risk to tip the chair backwards.
What is the head doing?	Excessive lordosis of cervical spine causes hyperextension of the neck and upward eye gaze.
Goals	Utilize a cushion and back support that maximizes contact with the seat surface for optimal pelvic and spinal stability and pressure redistribution.
	Stability is the goal so provide a back support that is tall enough for the resident. Measure from seat surface to the top of shoulder.
	Look for a moldable back support to conform to the curvature of the spine.

POSTERIOR PELVIC TILT

POSTERIOR PELVIC TILT	
What is the pelvis doing?	Pelvis sits with ASIS higher than the PSIS resulting in the posterior pelvic tilt which produces the sacral sitting posture.
What is the spine doing?	Excessive thoracic kyphosis, producing “C” shape spine
	“Flattening out” of the lordosis of the cervical spine
	“Flattening out” of the lordosis of the lumbar spine
What is the head doing?	Decreased lordosis in cervical spine, causing forward neck flexion & downward eye gaze to floor/lap
Goals	Use a cushion with medial and lateral contour to promote LE alignment and pelvic stability.
	Ensure appropriate cushion depth to prevent resident from sliding forward seeking reduced pressure behind the knees.
	Add a rigid insert to prevent hammocking of the seat and cushion and keep the pelvis from collapsing into a posterior pelvic tilt.
	If FLEXIBLE: Try a cushion with tapered adductors to load the trochanters, stabilizing the pelvis in the resident's most neutral alignment.
	If FLEXIBLE: Use a cushion with an anti-thrust component to reduce forward sliding of the pelvis into posterior pelvic tilt.
	If FIXED: Use an immersion style cushion that contours to the shape of the resident to promote maximum pressure redistribution, minimizing peak pressures.
	If FIXED: Consider opening seat-to-back angle in conjunction with a fixed tilt in the wheelchair, to match the resident's ROM limitations and minimize forward sliding.

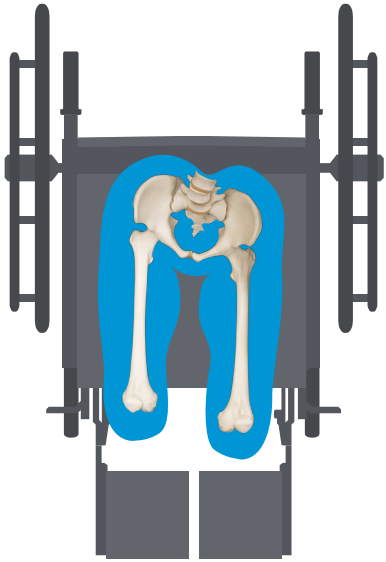
Refer to Page 18 for more information on Fixed and Flexible postures

PELVIC OBLIQUITY



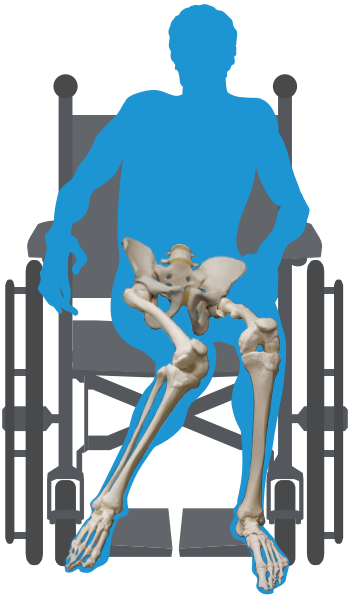
PELVIC OBLIQUITY	
What is the pelvis doing?	Pelvis sits with the L or R ASIS higher than the other, causing the raising up of one hip.
What is the spine doing?	When one side of the pelvis is raised higher than the other, the thoracic spine curves away from the higher side creating a scoliosis over time.
What is the head doing?	The neck will go into lateral flexion as if the person is dropping the ear to his or her shoulder. The lateral flexion will usually be towards the side where the hip is higher.
Goals	Pressure redistribution is the goal whether the deformity is FIXED or FLEXIBLE.
	If FLEXIBLE: level the pelvis by building up the lower side.
	If FIXED: accommodate for the deformity. Protect the bony prominences from pressure by "filling in" the higher side and immersing the lower side IT.

PELVIC ROTATION



PELVIC ROTATION	
What is the pelvis doing?	Pelvis sits with L or R ASIS more forward than the other producing the rotation in the hips.
What is the spine doing?	The thoracic spine follows and rotates in the same direction as the pelvis. Therefore, if the right side of the pelvis is rotated more forward, the right side of the spine is rotated more forward as well.
What is the head doing?	The neck will go into lateral flexion as if the person is dropping the ear to his or her shoulder.
Goals	Stabilize the pelvis in the resident's most neutral position—adjusting for flexible or fixed postures—to prevent further pelvic rotation.
	Consider an anti-thrust to reduce forward migration of the pelvis.
	If FLEXIBLE: use tapered adductors and a medial abductor to create leg troughs for midline LE alignment and to maintain a pelvic neutral position.
	If FIXED: look for a cushion with less aggressive contouring. Protect the bony prominences with an immersion-style cushion.

WINDSWEPT POSTURE



WINDSWEPT POSTURE	
What are the pelvis and LEs doing?	Usually goes hand in hand with a rotation or an obliquity and causes one leg to adduct and the other leg to abduct, presenting as if the legs were "swept" away together to one side of the chair.
What is the spine doing?	Will present usually with a rotation or scoliosis depending on the position of the pelvis.
What is the head doing?	The neck will go into lateral flexion and may be accompanied by forward flexion.
Goals	Look for a cushion that can be adjusted (built-up or minimized) to accommodate for internal rotation and adduction of one LE and external rotation and abduction of the opposite LE.
	Avoid use of ELRs that decrease femoral contact with seat surface and promote windswept posture.
	Windswept posture often accompanies either a rotation or an obliquity, so follow the goals for those underlying causes of this posture.

FIXED VS FLEXIBLE POSTURAL ABNORMALITIES

HOW DO I KNOW WHEN TO CORRECT THE POSTURAL ABNORMALITY AND WHEN TO ACCOMMODATE FOR IT?

Each abnormality is either **FIXED** or **FLEXIBLE**. Understanding whether the postural abnormality is fixed or flexible helps decide if we need to **ACCOMMODATE** for or to **CORRECT** the postural abnormality.

FIXED = ACCOMMODATE

When a posture is **FIXED**, the skeleton does not move out of that posture. The resident needs equipment that will **ACCOMMODATE** for the fixed posture, providing optimal support and pressure redistribution.

GOAL = Prevention of further progression

FLEXIBLE = CORRECT

When a posture is **FLEXIBLE**, the skeleton still moves and equipment should be chosen with the goal to **CORRECT** the abnormal posture.

GOAL = Prevention from becoming a fixed posture

ISSUES WITH THE CURRENT WHEELCHAIR SYSTEM CAN CAUSE ABNORMAL POSTURE

HOW DOES AN IMPROPERLY FITTING WHEELCHAIR IMPACT MY RESIDENT'S POSTURE?

The wheelchair can definitely be at fault when the resident is sitting in one of the five abnormal postures. Here is a closer look into seating dimensions and how an ill-fitting wheelchair component can be the culprit behind the body moving into unwanted, harmful postures.

What is going on?	What can you do?
Use this column as your problem list in your evals.	This column gives you ways to address the issues present. Letters referenced correspond to measuring guide pages 35 - 43. Use those measurements to find the appropriate wheelchair dimension to fit your resident's body size.

SEAT DIMENSION

Wheelchair seat width and depth are crucial to proper pelvic and LE alignment

HAMMOCKING SEAT SLING

What is going on?	Negative Result	What can you do?
Pelvis collapses	Posterior pelvic tilt aka sacral sitting	Add Rigid Insert
Resident seeks out one side of wheelchair for stability	Pelvic obliquity	Add Rigid Insert
Resident compensates by rotating pelvis for stability	Pelvic rotation	Add Rigid Insert
LEs “sweep” to one side	Windswept posture of LEs	Add Rigid Insert

WIDTH: TOO NARROW

What is going on?	Negative Result	What can you do?
Excess pressure at trochanter from contact with the chair	Wound risk at the trochanter	Measure hip width (C) Look for a skin protection cushion that immerses the trochanters
Resident rotates hips to “fit” into the chair	Pelvic rotation	Measure hip width (C)
Resident ”sweeps” LEs to one side trying to avoid a buildup of pressure on the trochanters	Windswept posture of LEs	Measure hip width (C) Find a cushion with medial abduction and lateral adduction contours to maintain LE alignment

SEAT DIMENSION

WIDTH: TOO WIDE

What is going on?	Negative Result	What can you do?
Resident leans to one side to increase stability. Pelvis will be lower on that side	Pelvic obliquity	Measure hip width (C)
Pelvis collapses	Posterior pelvic tilt aka sacral sitting	Measure hip width (C)
Pelvic collapse causes hips to internally rotate and LEs to excessively adduct	Strain & contracture risk at hip joints Wound risk at medial knees where knees rub together	Find a cushion with medial abduction and lateral adduction contours to maintain LE alignment
LEs "sweep" to one side when LE weakness is present	Windswept positioning of LEs	Measure hip width (C) Find a cushion with medial abduction and lateral adduction contours to maintain LE alignment

DEPTH: TOO DEEP

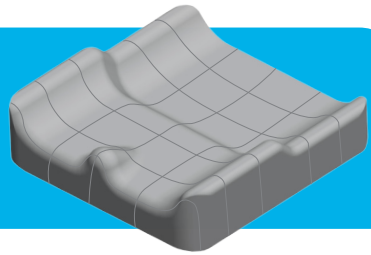
What is going on?	Negative Result	What can you do?
Seat sling digs into the back of legs causing pain Resident will slide forward to alleviate the pain	Posterior pelvic tilt aka sacral sitting	Measure upper leg length (K) minus 2"
Seat sling digs into the back of legs decreasing circulation, increasing LE edema Resident slides forward to alleviate numbness	Posterior pelvic tilt aka sacral sitting	Measure upper leg length (K) minus 2"
Foot propulsion more difficult, resident slides forward for better heel strike	Posterior pelvic tilt aka sacral sitting	Measure upper leg length (K) minus 2"
Resident will slide forward immediately after repositioning	Posterior pelvic tilt aka sacral sitting	Measure upper leg length (K) minus 2"

*** Use a MWC that has seat depth adjustability: K0004**

DEPTH: TOO SHALLOW

What is going on?	Negative Result	What can you do?
Decreased femoral contact and LE support	Windswept posture, abduction, or adduction of LEs	Measure upper leg length (K) minus 2” Find a cushion with medial abduction and lateral adduction contours to maintain LE alignment
Reduced area for pressure redistribution results in increased pressure at the ITs, sacrum and coccyx	Wound risk at ITs, sacrum, and coccyx	Measure upper leg length (K) minus 2” Look for a skin protection cushion that immerses and/or offloads the bony prominences
Pelvis collapses inward due to lack of LE support to ensure pelvic alignment Hips internally rotate and LEs excessively adduct	Strain & contracture risk at hip joints Wound risk at medial knees where knees rub together	Measure upper leg length (K) minus 2” Find a cushion with medial abduction and lateral adduction contours to maintain LE alignment

* **When LE alignment is an issue: think CONTOURS when choosing a cushion!**



* **When any given seat dimension is incorrect, the ideal solution is to change out the wheelchair for one that's dimensions meet your resident's specific measurements. It may seem too easy but it really is true!**

SEAT-TO-FLOOR HEIGHT (STFH)

STFH is crucial for proper pelvic alignment, LE alignment, and heel strike for self-propulsion

The below is a quick reference to match lower leg length to wheelchair model for proper STFH

Wheelchair Model	Achievable STFH	Lower Leg Length Required to Fit MWC
K0001	21”	**23” or longer**
K0002	19”	**21” or longer**
K0003	17” - 19”	**19” or longer**
K0004	As low as 14.5”	**16.5” or longer**

*** Use a MWC with STFH adjustability: K0004**

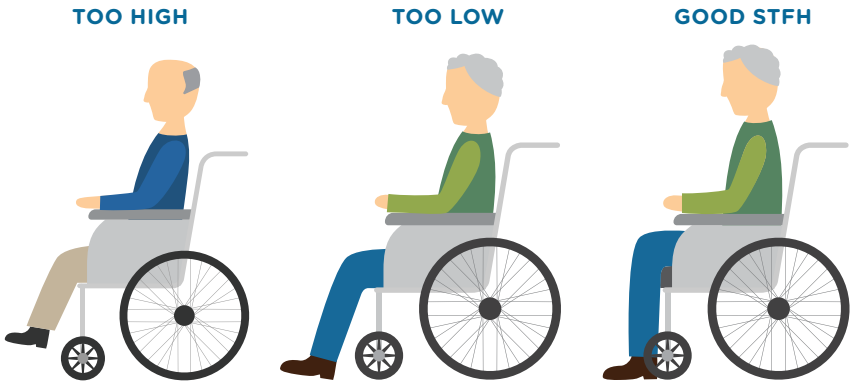
STFH: TOO LOW

What is going on?	Negative Result	What can you do?
Legrests are shortened to compensate for lack of threshold clearance Knees are then higher than the hips causing decreased femoral contact with the seat surface and LEs “sweep” to one side	Windswept positioning of LEs	Measure lower leg length (L) Use a higher profile cushion Find a cushion with medial abduction and lateral adduction contours to maintain LE alignment
Knees higher than hips increase peak pressure at ITs, sacrum, and coccyx	Wound risk at ITs, sacrum, and coccyx	Measure lower leg length (L) Use a higher profile cushion Look for a skin protection cushion that immerses and/or offloads the bony prominences
On a chair without legrests, feet can drag and get caught under chair during propulsion or transport	Resident can be thrown out of chair or injury to LEs can occur	Measure lower leg length (L) Use a higher profile cushion

STFH: TOO HIGH

What is going on?	Negative Result	What can you do?
Foot propulsion is more difficult so resident slides forward for better heel strike	Posterior pelvic tilt aka sacral sitting	Measure lower leg length (L) Use a lower profile cushion
Increased pressure at distal thigh, increasing risk of LE edema, resident slides forward to reduce numbness and pain	Posterior pelvic tilt aka sacral sitting	Measure lower leg length (L) Use a lower profile cushion
Resident rotates forward on one side for better heel strike of one foot	Pelvic rotation	Measure lower leg length (L) Use a lower profile cushion
Feet "dangle"	Increased internal rotation and adduction of hip	Measure lower leg length (L) Use a lower profile cushion Find a cushion with medial abduction and lateral adduction contours to maintain LE alignment
Resident slides forward to alleviate strain on pelvis and knees	Posterior pelvic tilt aka sacral sitting	Measure lower leg length (L) Use a lower profile cushion

*** Choose a higher or lower profile cushion to compensate for incorrect STFH when switching out the MWC just isn't an option!**



Refer to Page 39 for more information on measuring for proper STFH

BACK SUPPORT

An appropriate back support can: align the spine, provide pelvic stability, decrease risk of wound development and pain, and improve function

When choosing appropriate back support height, define your GOAL for the resident:

- IF *positioning* is the objective, then measure seat to top of shoulder height (G) to choose a back support that can provide optimal trunk stabilization.
- IF *self-propulsion* for a resident with good trunk strength is the goal, measure seat to inferior angle of scapula (H) for increased freedom of movement and access to the wheels.

Refer to the back support measuring guide on page 40 to address the following issues.

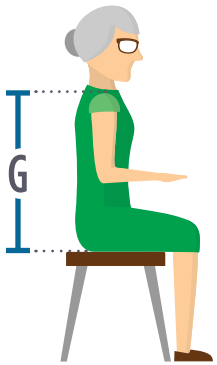
HEIGHT: TOO LOW
This causes insufficient stability for a resident with poor trunk strength and balance

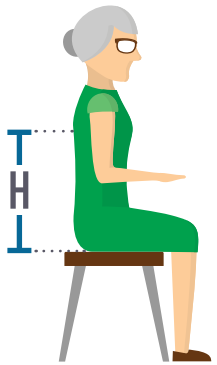
What is going on?	Negative Result	What can you do?
Resident slides down in the chair seeking more surface area for increased stability	Posterior pelvic tilt with kyphosis of the thoracic spine	Measure seat to top of shoulder (G) or Seat to inferior angle of scapula (H) Provide an appropriately sized contoured back support for added stability that allows for immersion and envelopment of resident's curvature
Resident seeks out one armrest to gain more stability	Pelvic obliquity with scoliosis of the spine	Measure seat to top of shoulder (G) or Seat to inferior angle of scapula (H) Provide an appropriately sized contoured back support for added stability that allows for immersion and envelopment of resident's curvature
Resident rotates spine and pelvis to seek out more stability on one side of the body	Pelvic rotation with rotation of the spine	Measure seat to top of shoulder (G) or Seat to inferior angle of scapula (H) Provide an appropriately sized contoured back support for added stability that allows for immersion and envelopment of resident's curvature

HEIGHT: TOO HIGH/TOO UPRIGHT

What is going on?	Negative Result	What can you do?
Resident with poor core strength will slide down to alleviate fatigue	Posterior pelvic tilt with kyphosis of the thoracic spine	Measure seat to top of shoulder (G) or Seat to inferior angle of scapula (H) Open seat-to-back angle either through back support hardware or by adjusting the back canes in a MWC with that option Provide an appropriately sized contoured back support for added stability that allows for immersion and envelopment of resident's curvature
Sitting too upright pushes the trunk forward resulting in instability	Anterior pelvic tilt with lumbar lordosis	Measure seat to top of shoulder (G) or Seat to inferior angle of scapula (H) Open seat-to-back angle either through back support hardware or by adjusting the back canes in a MWC with that option Provide an appropriately sized contoured back support for added stability that allows for immersion and envelopment of resident's curvature

*** Another reason to choose a K0004 MWC is the ability to adjust seat-to-back angle. This helps to alleviate fatigue of the trunk muscles and reduce the sensation of being pushed out of the chair.**





Refer to Page 40 for more on measuring for proper back support height

LEGREST

Properly fitting legrests not only provide a place to rest the feet, they:

- Stabilize the LEs for optimal pelvic and spine alignment
- Promote femoral contact for pressure redistribution away from the bony prominences to reduce risk of wounds

USE OF ONLY ONE LEGREST

What is going on?	Negative Result	What can you do?
Pelvis on the side with the legrest is higher	Pelvic obliquity	Add second legrest if positioning is your goal
One-legged heel strike for propulsion	Pelvic rotation	Add second legrest if positioning is your goal
LEs "sweep" toward the side with the legrest	Windswept positioning of LEs	Add second legrest if positioning is your goal

✱ **Sometimes only one legrest is necessary but having only one can cause the above issues. We can't have our cake and eat it too. When considering the addition of a second legrest, decide what is more important: one-legged propulsion OR the prevention of a postural abnormality.**

UNEQUAL FOOT PLATE HEIGHTS

What is going on?	Negative Result	What can you do?
Unequal foot plate heights cause one side of the pelvis to be higher	Pelvic obliquity	Adjust foot plate heights to be even

LEGREST TOO SHORT/FOOT PLATE TOO HIGH

What is going on?	Negative Result	What can you do?
Decreased femoral contact, which increases peak pressure at the ITs, sacrum, and coccyx	Wound risk at ITs, sacrum, and coccyx	Measure lower leg length (L) Lengthen legrest/lower foot plate Look for a skin protection cushion that immerses and/or offloads the bony prominences
Decreased femoral contact cause LEs to "sweep" to one side	Windswept positioning of LEs	Measure lower leg length (L) Lengthen legrest/lower foot plate Find a cushion with medial abduction and lateral adduction contours to maintain LE alignment
Decreased femoral contact increases hip flexion pulling downward on the pelvis	Posterior pelvic tilt aka sacral sitting Shortened hamstrings	Measure lower leg length Lengthen legrest/lower foot plate

LEGREST TOO LONG/FOOT PLATE TOO LOW

What is going on?	Negative Result	What can you do?
Resident slides forward and stretches legs to reach foot plates	Posterior pelvic tilt aka sacral sitting	Measure lower leg length (L) Shorten legrest/raise foot plate
Promotes sacral sitting that adds pressure directly onto the ITs, sacrum, and coccyx	Wound risk at ITs, sacrum, and coccyx	Measure lower leg length (L) Shorten legrest/raise foot plate Look for a skin protection cushion that immerses and/or offloads the bony prominences
Resident stretches foot & ankle downward to reach a foot plate that is too low promotes ankle plantar flexion & inversion	Contracture risk of ankle joint	Measure lower leg length (L) Shorten legrest/raise foot plate Use of a single or double foot support
Resident stretches to reach the foot plate, only the ball of the foot makes contact with the foot plate	Risk of eliciting abnormal reflexes and tone	Measure lower leg length (L) Shorten legrest/raise foot plate Use of a single or double foot support

ARMREST

Properly adjusted armrests serve many functions:

- A place to rest UEs
- Contribute to overall trunk stability and upright posture when muscle weakness is present
- Facilitates ease of transfers

HEIGHT: TOO LOW

What is going on?	Negative Result	What can you do?
Resident slides down in chair to make contact with armrests	Posterior pelvic tilt with kyphosis of the thoracic spine	Measure seat to elbow (I) and adjust armrest height accordingly
Resident leans to one side seeking more support Pelvis on that side will be lower	Pelvic obliquity with scoliosis of the spine	Measure seat to elbow (I) and adjust armrest height accordingly
Excessive shoulder depression to make contact with armrest allows gravity to pull at shoulder joint	Shoulder subluxation and dislocation in a resident with weak shoulder musculature	Measure seat to elbow (I) and adjust armrest height accordingly

HEIGHT: TOO HIGH

What is going on?	Negative Result	What can you do?
Excessive elevation of shoulder to place arms on armrests	Constant contraction of musculature causes fatigue, pain, numbness, and contracture risk	Measure seat to elbow (I) and adjust armrest height accordingly
Resident leans against armrest versus placing arm on armrest seeking stability	Lateral leaning of trunk	Measure seat to elbow (I) and adjust armrest height accordingly
Resident leans to one side causing the pelvis on that side to be lower	Pelvic obliquity with scoliosis of the spine	Measure seat to elbow (I) and adjust armrest height accordingly

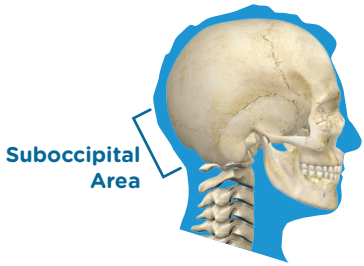
✱ **Use a MWC with armrest adjustability: K0004**

HEAD SUPPORT

Proper head support is important for:

- Socialization and Communication
- Safe Swallowing
- Respiration
- Attention to Task
- Mobility

A standard posterior head support pad should be positioned in the suboccipital area with the goal to prevent excessive extension, rotation, or lateral flexion.



TOO HIGH

What is going on?	Negative Result	What can you do?
The pad will rest on the occipital area or above, causing strain on the neck	Resident will try to adjust by moving the head away from the pad	Place pad in suboccipital area

TOO LOW

What is going on?	Negative Result	What can you do?
The pad will rest on the cervical spine, resulting in poor posterior support	Head extension	Place pad in suboccipital area

✱ **Look for a head support that has maximum adjustability to support the head posteriorly and laterally simultaneously and is angle adjustable.**

SEATING EVALUATION GOALS

WHAT SHOULD MY GOALS BE IN A SEATING EVALUATION?

Goals of a therapist when fitting a resident for a wheelchair

- Provide pelvic and trunk stability
- Maximum function for ADLs
- Protect skin and prevent wounds or heal existing wounds
- Maximum comfort for resident
- Minimize unwanted movement
- Correct or accommodate for postural abnormalities
- Prevent progression of postural abnormalities

BE A 5 STAR Facility through achieving your seating and positioning goals

- Pass state inspections
- Reduce the incidence and cost of wound care
- Reduce the incident of injury due to falls from wheelchair level
- Maintain skin, skeletal, and muscular integrity and function
- Reduce the number of residents with a “decline in function” on quarterly screens
- Eliminate the temptation of using restraints
- Maximize the ability to participate in ADLs from wheelchair level
- Reduce the percentage of residents that report pain while sitting at wheelchair level
- Maximize quality of life

HOW TO MEASURE FOR PROPERLY FITTING WHEELCHAIR COMPONENTS:

HOW IS A SEATING EVALUATION DIFFERENT THAN A TYPICAL OT/PT EVAL?

Don't let the term "Seating Evaluation" scare you!!

- Conduct your evaluation as you would any other OT/PT eval in the nursing home to determine functional needs of the resident.
- Assess limitations in ROM, strength, balance and endurance and how they negatively affect posture in the wheelchair.
- Is there a postural abnormality? Decide if that postural abnormality is flexible or fixed: should your goal be to correct or accommodate for it?
- Choose an appropriate wheelchair model that allows for adjustability, seat cushion, back support, head support, and accessories to address the resident's physical limitations.
- Use the measurement form provided to take key measurements.
- Match the wheelchair to the resident's dimensions to ensure a proper fit.

*** Don't forget to look for hip contractures and tight hamstrings during the evaluation. They are often the culprits of poor pelvic positioning!**

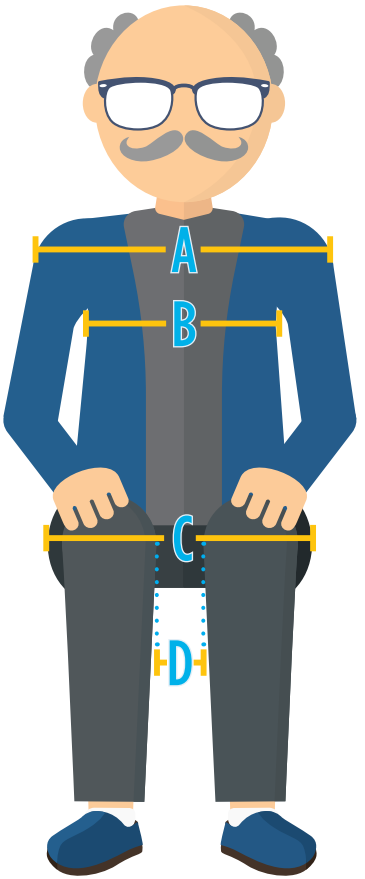
Measuring Tips

- All measurements should be taken while sitting on a firm, flat surface in the posture the therapist is trying to accomplish for the resident.
- Measure using a hard measuring tape not one that can bend and wrap around the patient's body. That will lead to measurement errors, adding circumference or length.
- All measurements should be taken straight across the body.
- Use a measurement form to remind you of the measurements needed to be taken and to record them properly.

WHAT ARE THE MEASUREMENTS THAT I NEED TO TAKE?

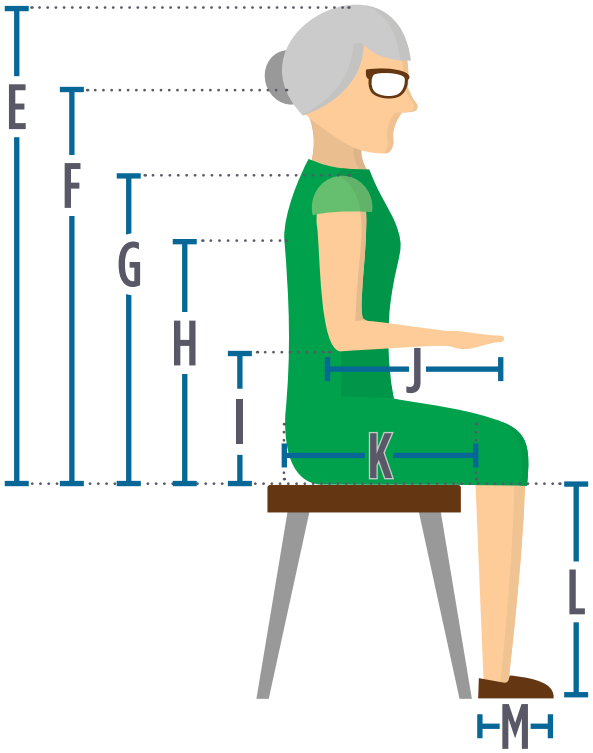
Here is an easy to use measurement form with the measurements included in an LTC seating and positioning evaluation.

Measuring Guide



- A - Shoulder Width
- B - Chest Width
- **C - Hip Width**
- D - Between Knees

*** Don't forget to include excess tissue in all measurements and measure the resident in their ideal posture**



E - Top of Head

F - Occiput

G - Seat to Top of Shoulder

H - Inferior Angle of Scapula

I - Seat to Elbow

J - Lower Arm Length

K - Upper Leg Length

L - Lower Leg Length

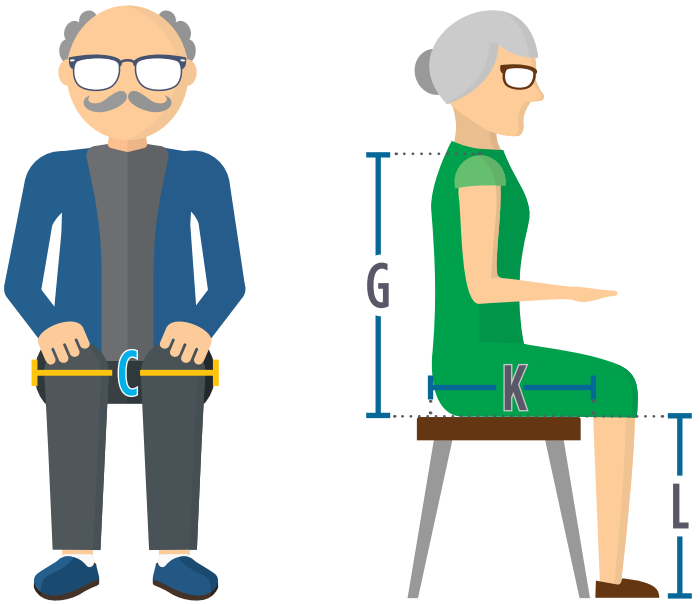
M - Foot Length

WHAT IF I DON'T HAVE ENOUGH TIME TO TAKE ALL THE MEASUREMENTS?

Since time is a constraint, the top 4 measurements you MUST do are:

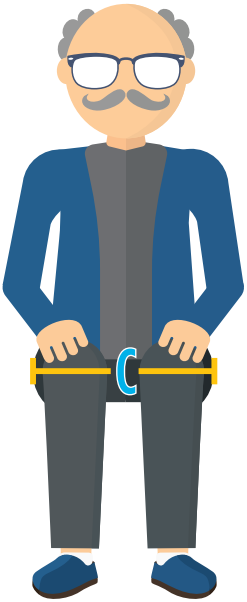
- **Hip Width (C)**
- **Seat to Top of Shoulder (G)**
- **Upper Leg Length (K)**
- **Lower Leg Length (L)**

These will allow you to match a wheelchair, including a cushion and back support, to your resident.

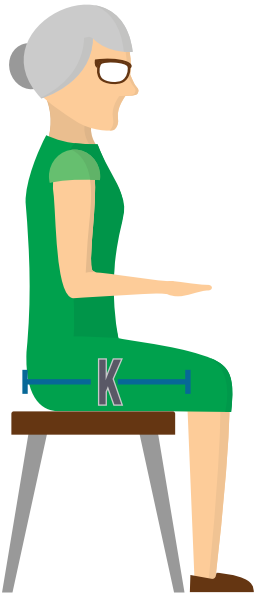


REMEMBER TO HAVE RESIDENT SITTING ON A FLAT, FIRM SURFACE FOR ACCURATE MEASUREMENTS

SEAT DIMENSION



WIDTH



DEPTH: K - 2"

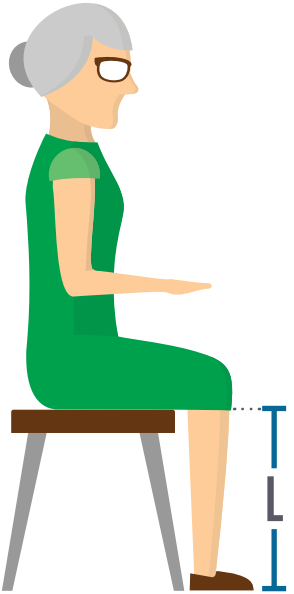
HOW TO MEASURE WIDTH:

- Measure from widest point to widest point of hips including all residual tissue

HOW TO MEASURE DEPTH:

- Measure from the buttocks, including any excess tissue, across the femur to the popliteal fossa
- Then subtract 2”

SEAT-TO-FLOOR HEIGHT
(STFH, AKA LOWER LEG LENGTH)

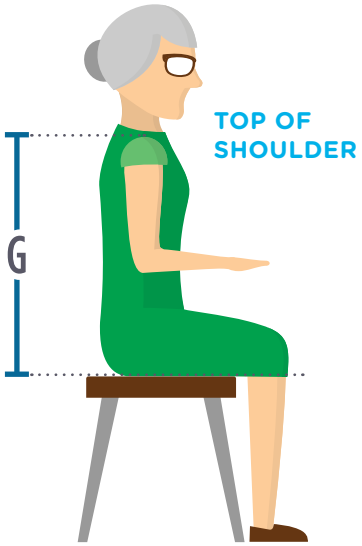


HOW TO MEASURE:

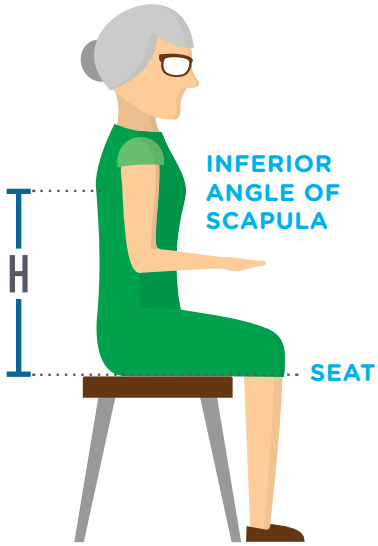
- Measure from the top of the resident's seat to the floor (top of cushion if applicable)
- Measure with feet on floor with shoes that they normally wear or barefoot if they do not normally wear shoes, and measure bottom of foot/shoe to popliteal fossa

*** If providing the resident with a new cushion, remember to consider the thickness of the desired cushion and adjust STFH accordingly**

BACK SUPPORT



RESIDENT NEEDS A POSITIONING BACK DUE TO POOR TRUNK STRENGTH



RESIDENT IS A SELF PROPELLER WITH GOOD TRUNK STRENGTH

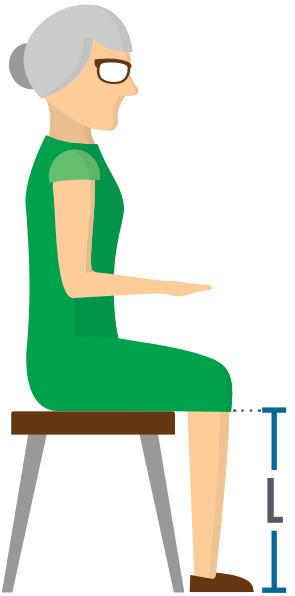
HOW TO MEASURE HEIGHT:

- Measure the person in the position you are striving to achieve

* Measure both sides L & R in case of scoliosis and/or a pelvic obliquity

* An average back height for a self propeller is 16” tall while 18”-20” is the average for a person who is dependent in propulsion

LEGREST



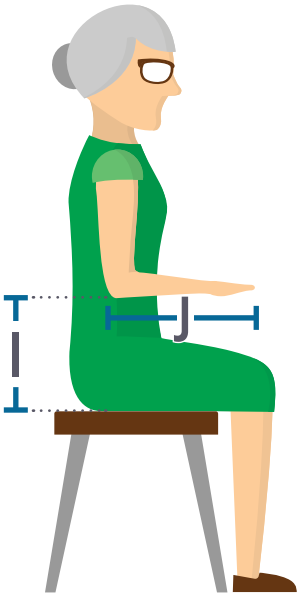
LENGTH: L - 2"

HOW TO MEASURE LENGTH:

- Measure from bottom of foot/shoe to popliteal fossa, including shoes that resident normally wears
- Then subtract 2”

*** There must be a 2” clearance from foot plate and floor to clear thresholds**

ARMREST



HEIGHT

HOW TO MEASURE HEIGHT (I):

- Seat your resident with shoulder in neutral and elbow bent at his or her side to 90°
- Measure from top of seat to under forearm/ elbow

*** K0001, K0002, K0003 chairs DO NOT come with height adjustable armrests. This is just one more reason they are not the most cost-effective option when thinking long term.**

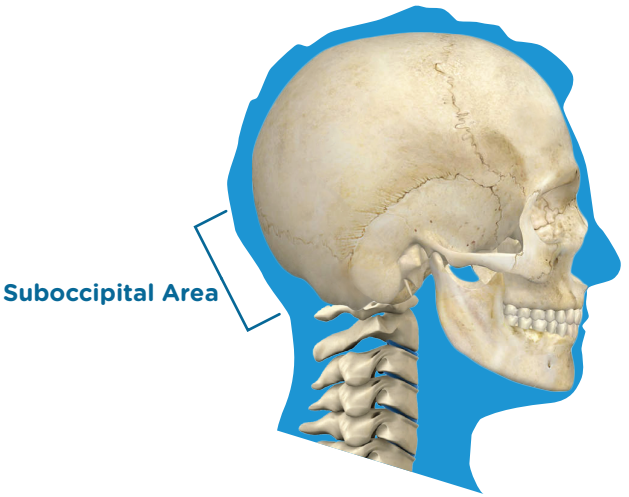
- If resident is needing a specialized arm length (J): measure from end of elbow to where the therapist wants the desired replacement arm support to end

HEAD SUPPORT

HOW TO MEASURE HEIGHT:

There is no miracle formula for fitting a resident for a proper head support

- The rest of the body must be in the best alignment possible before trying to fit for a head support.
- Remember that head position changes constantly with the slightest movement of the body.
- Aim to position the pad in the suboccipital area.
- Choose a head support with lateral, anterior/posterior, and angle adjustability.



✱ Never use a tall backrest as a head support.

WHAT TYPE OF CUSHION SHOULD I CHOOSE?

HOW DO I KNOW WHAT CUSHION TO CHOOSE OUT OF THE HUNDREDS OUT THERE?

There are two key questions to ask yourself:

- Does the resident sit in an abnormal posture that places them at risk to fall from the chair and/or develop a contracture?
- Is the resident at risk for, have an existing, or have a history of wound development?

The answers to these questions will guide you to the correct cushion category. Cushions are broken up into three categories depending on the resident's particular needs.

- Standard
- Skin Protection
- Skin Protection & Positioning

* **Typically there is a fourth category for positioning only cushions. We believe that all residents that sit with a postural abnormality are at risk for wound development due to peak pressures on the bony prominences. Therefore, all positioning cushions SHOULD have skin protection properties.**

Here are some things to consider when choosing the type of cushion:

STANDARD	SKIN PROTECTION
Resident has sufficient balance and strength to maintain good posture for long periods of time	Resident has comorbidities that place their skin at risk for breakdown (Diabetes, vascular insufficiency, nutritional deficiency, etc.)
Can independently reposition self	Difficulty repositioning self
Ability to perform independent pressure relief	Difficulty with performing independent pressure relief
No skin breakdown or has a *Stage 1* diagnosis	At significant risk for a wound or has a wound at any stage
No significant postural abnormality	May or may not be mobile
Resident has good sensation	Impaired sensation
May or may not be incontinent	Incontinent
For short-term residents working on ambulation	Skin at risk due to prolonged sitting in wheelchair >4 Hrs/Day
Long-term resident that uses their chair minimally	

✱ **Understand your resident's abilities and risk areas in order to choose the cushion that best matches your resident's needs.**

Want help finding a cushion that meets your resident's needs? Refer to the decision tree and cushion comparison chart in our *LTC Wheelchair Seating and Positioning Product Selection Guide* for our top picks in each category.

SKIN PROTECTION & POSITIONING

Resident has comorbidities that place their skin at risk for breakdown (Diabetes, vascular insufficiency, nutritional deficiency, etc.)
Poor balance and weak core, pelvic, and LE musculature
Minimal to no ability to reposition self
Minimal to no ability to perform independent pressure relief
Sits in one of the 5 postural abnormalities (Pages 12 - 17)
At significant risk for a wound or has a wound at any stage
Limited mobility or immobile
Impaired sensation
Incontinent
CONTRACTURE RISK from prolonged sitting in a postural abnormality
FALL RISK from chair
Progressive disorders
Dementia
Neurological impairment

WHEN DO I CHOOSE A SPECIALIZED BACK SUPPORT?

HOW DO I KNOW IF MY RESIDENT NEEDS IT?

There are key questions to ask yourself when deciding if the sling back should be replaced with a specialized back support:

- Is your resident immobile?
- Does your resident have a postural abnormality that affects pelvic and trunk stability and alignment?
- Does your resident require assistance to sit unsupported?
- Does your resident complain of pain while sitting in the wheelchair?

If you answered yes to any of these questions, then without a doubt, replace the sling back with a specialized back support.

Back supports are broken into the following categories:

- Standard
- Moderate Support
- Maximum Support

Much like cushion categories, there are certain criteria that assist a therapist in choosing the appropriate back support category that will meet the

resident's needs. This criteria includes the amount of assistance needed for repositioning, ability to maintain an optimal midline posture, and the amount of pressure the back support must withstand. Please refer to pages 49-50 for a more detailed algorithm to help you choose what back support category fits your resident's needs.

No matter what category you choose, the right back support is an essential part of an optimal seating system. Here are some of the important advantages of a specialized back support:

- Increases seat depth
- Captures curvature whether normal or abnormal and increases contact with both the back support and seat surface for maximum stabilization
- Envelops the spine to maximize pressure redistribution and minimize peak pressure on the spinous process
- Decreases pain
- Works hand in hand with the cushion to lock in the pelvis for maximum stabilization
- Helps reduce the progression of an abnormal spinal posture

*** The typical sling back that comes on all models of chairs easily hammock and lose their shape, no longer stabilizing the trunk. Be familiar with back supports on the market and how they can help to achieve your resident's goals.**

Here are some things to consider when choosing a type of back support:

STANDARD	MODERATE
Independently maintains trunk in midline while sitting unsupported	Min to mod assist to maintain trunk in midline while sitting unsupported
Active resident; with or without a fixed or flexible abnormal curvature of the spine	Resident with activity limitations; with or without a fixed or flexible abnormal curvature of the spine
Can independently reposition and perform pressure relief	Requires min to mod assist to reposition and perform pressure relief
Intact skin and/or occasional redness along the spinous process	Persistent redness or an open area along the spinous process
Light leaner that may use a foam lateral trunk support to promote upright, midline posture	Moderate leaner that would benefit from a mounted lateral trunk support to promote upright, midline posture
Complaint of back pain while sitting in the wheelchair	Complaint of back pain while sitting in the wheelchair
Awake and alert	Decreased alertness, sleeps occasionally in chair
Good head control, head position does not affect trunk posture or vice versa	May or may not require a head support to maintain optimal head, neck, and trunk alignment
Captures some abnormal curvatures of the spine with a less aggressive system to increase stability and pressure redistribution	More stable and durable back support that allows for better surface contact through adjustability of seat-to-back angle and contours to most postural abnormalities, leading to stability and pressure redistribution

Want help finding a product that meets your resident's needs? Refer to the back support decision tree and comparison chart in our *LTC Wheelchair Seating and Positioning Product Selection Guide*.

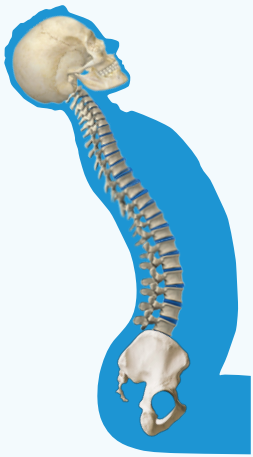
MAXIMUM
Max to dep assist to maintain trunk in midline while sitting unsupported
Inactive resident; with or without a fixed or flexible abnormal curvature of the spine
Requires max to dep assist to reposition and perform pressure relief
Persistent redness or an open area along the spinous process
Heavy leaner that requires a mounted lateral trunk support to promote upright, midline posture
Complaint of back pain while sitting in the wheelchair
Decreased alertness, sleeps often in chair
Requires a head support to maintain optimal head, neck, and trunk alignment
Neurological disorders
Progressive disorders
Most stable and durable back support that allows for the most aggressive envelopment to capture any abnormal curvature, leading to optimal stability and pressure redistribution

Specialized back supports can be molded to an abnormal curvature of the spine seen with all pelvic deformities. Here is a closer look at the abnormal curvatures of the spine that you will be able to envelop for increased stability and alignment, pressure distribution, and comfort:

Kyphosis

Scoliosis

Lumbar Lordosis



Spinal Rotation

THE GREAT ELEVATING LEGREST MYTH!

ELEVATING LEGRESTS (ELRs) ARE A GOOD OPTION RIGHT?

NO!

Here are some common myths about ELRs that you NEED ABSOLUTE CLARIFICATION on to help you understand why standard legrests are usually the better option:

See page 54 for visual

1 ELRs keep hips back in chair: Wrong!

- ELRs do just the opposite!
- When we elevate the legs, we pull on the already tightened hamstrings of the resident.
- The shortened hamstrings cause a greater pull on the pelvis, bringing the pelvis into a posterior pelvic tilt.
- The posterior pelvic tilt makes the pelvis slide forward, resulting in sacral sitting.
- The resident begins to slide forward out of the chair, the exact opposite of keeping the hips back in the chair!

2 ELRs decrease edema: Wrong!

- Contrary to popular belief ELRs on K0001-K0004 MWCs—the type typically seen in a nursing home—unfortunately CANNOT reduce edema.
- In order to decrease edema, the legs must be 30 cm above heart level. The only way to achieve that degree of elevation with an ELR is when used in combination with tilt and recline, often seen in power chairs.
- ELRs on a manual chair can actually decrease optimal circulation by cutting off blood flow at the groin area and inhibiting flow to the lower extremities.

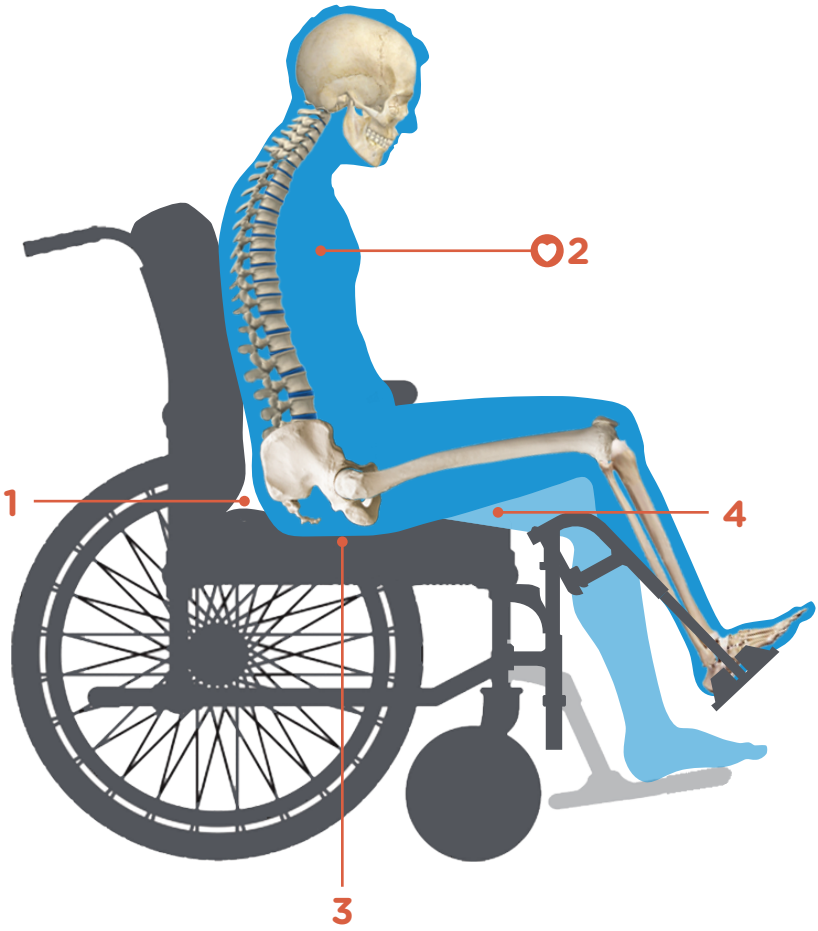
3 ELRs decrease pressure on the pelvis: Wrong!

- ELRs actually position the pelvis in a posterior pelvic tilt.
- The forced posterior pelvic tilt increases pressure on the bony prominences of the ITs, sacrum, and coccyx.
- Wound development risk is increased in those areas.
- Elevating the legrest promotes knee flexion, leading to decreased femoral contact, shifting the pressure back onto the ITs and sacrum/coccyx.

4 ELRs help with LE alignment: Wrong!

- ELRs prevent full femoral contact with the seat surface.
- Since less of the leg is making contact with the seat surface, it is easier for the leg to internally/externally rotate or abduct/adduct.
- Legs then fall off legrests more easily.
- Windswept posture is more prevalent.
- ELRs promote flexion of knees, hips, and ankles, increasing risk of contractures at those joints.

RIGHT LATERAL VIEW - WHAT IS REALLY HAPPENING WHEN USING AN ELR



* **AVOID the use of ELRs as much as possible for optimal positioning in a wheelchair.**

ACCESSORIES

WHEN WOULD I NEED TO ADD ACCESSORIES?

As in most things, LESS is MORE and this is certainly true in wheelchair positioning. If you take your time in selecting the right model and size wheelchair and then select an appropriate cushion and back support, accessories may not be needed. Too often accessories are used as "band-aids" to a less than optimal wheelchair and seating system. When used the proper way, they can be the finishing touch to achieve the best posture possible for your resident!

UPPER EXTREMITY SUPPORTS CAN BE ADDED ONTO THE EXISTING ARMREST TO:

- Add length
- Add additional postural support
- Decrease contracture risk
- Decrease dependent edema in UE
- Increase comfort while sitting in wheelchair

*** Most of us don't sit with our elbows bent to 90˚ with the forearm straight out. So why do we position our residents this way, especially when dealing with abnormal tone or decreased range of motion? Choose an upper extremity support that has angle adjustability!!**

TYPES OF UPPER EXTREMITY SUPPORTS:

You can choose a basic non-adjustable support or you can choose a pad style and hardware style to suit the needs of your resident.

HARDWARE TYPES

- Slide On: Pad will be aligned with existing armrest
- Bolt On: Pad will be aligned with existing armrest
- Swing-Away: Pad can move towards or away from body as needed
- Articulating: Pad can be positioned in any plane, most adjustable option

PAD TYPES

- Standard trough that keeps arm from sliding off the pad in any direction
- Minimal contour for low profile support
- Moldable option at the wrist for extension of wrist and finger abduction

LOWER EXTREMITY SUPPORTS

Added to a chair:

- Support the lower leg, foot, and ankle in optimal position
- Decrease risk of contracture
- Accommodate for contractures and protect from injury
- Manage abnormal tone and reflexes
- Support an amputated limb
- Support a limb post surgery on legrest

TYPES OF LE SUPPORTS:

- Single Foot Support
- Double Foot Support
- Double Foot Support with Separator
- Calf Pads
- External Fixator Support
- Amputee Support

✱ **Don't forget that quality leg supports have a range of sizes or can be customized. Consider where you want the support and measure to ensure you get the right fit.**

✱ **An external fixator support provides great stability and support for a LE post hip/knee surgery, or when a LE immobilizer is in use!**

LATERAL TRUNK SUPPORTS

- Prevent lateral leaning due to decreased trunk strength and balance
- Correct or accommodate for a scoliosis or trunk rotation and prevent further progression of the postural abnormality
- Decrease pressure points on the apex of the curvature that could possibly lead to skin breakdown and cause pain to the resident

TYPES OF LATERAL SUPPORTS:

- Mounted swing-away or fixed lateral supports
- Traditional foam lateral supports

*** If your resident has tone and/or is a heavy leaner, choose mounted lateral trunk supports. Traditional foam supports cannot withstand the sustained pressure and the foam will collapse.**

CONCLUSION

*** Remember there is NO cookbook solution to wheelchair seating and positioning. Use your clinical reasoning skills to figure out what's best within the parameters you are given.**

Keep the following goals in mind and do the best you can!

- **Maximize resident comfort**
- **Minimize pain**
- **Correct deformity when possible**
- **Prevent further deformity**
- **Prevent Wounds**

Please refer to *Comfort Company's LTC Product Selection Guide* to see our top picks for seating and positioning products!

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GLOSSARY

ELR: Elevating Legrest

STFH: Seat-to-Floor Height

MWC: Manual Wheelchair

IT: Ischial Tuberosity

PSIS: Posterior Superior Iliac Spine

ASIS: Anterior Superior Iliac Spine

LE: Lower Extremity

UE: Upper Extremity

ROM: Range of Motion

ADLs: Activities of Daily Living

PPT: Posterior Pelvic Tilt

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