

1. This document was created to support maximum accessibility for all learners. If you would like to print a hard copy of this document, please follow the general instructions below to print multiple slides on a single page or in black and white.
2. If you are viewing this course as a recorded course after the live webinar, you can use the scroll bar at the bottom of the player window to pause and navigate the course.
3. This handout is for reference only. Non-essential images have been removed for your convenience. Any links included in the handout are current at the time of the live webinar, but are subject to change and may not be current at a later date.
4. Copyright: Images used in this course are used in compliance with copyright laws and where required, permission has been secured to use the images in this course. All use of these images outside of this course may be in violation of copyright laws and is strictly prohibited.

How to print Handouts

- On a PC
 - Open PDF
 - Click Print
 - Choose # of pages per sheet from dropdown menu
 - Choose Black and White from “Color” dropdown
- On a Mac
 - Open PDF in Preview
 - Click File
 - Click Print
 - Click dropdown menu on the right “preview”
 - Click layout
- Choose # of pages per sheet from dropdown menu
- Checkmark Black & White if wanted.
- If more details needed please visit our FAQ page: <https://www.occupationaltherapy.com/help>

No part of the materials available through the continued.com site may be copied, photocopied, reproduced, translated or reduced to any electronic medium or machine-readable form, in whole or in part, without prior written consent of continued.com, LLC. Any other reproduction in any form without such written permission is prohibited. All materials contained on this site are protected by United States copyright law and may not be reproduced, distributed, transmitted, displayed, published or broadcast without the prior written permission of continued.com, LLC. Users must not access or use for any commercial purposes any part of the site or any services or materials available through the site.

Technical issues with the Recording?

- Clear browser cache using [these instructions](#)
- Switch to another browser
- Use a hardwired Internet connection
- Restart your computer/device

Still having issues?

- Call 866-782-9924 (M-F, 8 AM-8 PM ET)
- Email customerservice@OccupationalTherapy.com

Positioning for Function: The Trunk and Extremities

Michelle L. Lange, OTR/L, ABDA, ATP/SMS

- Presenter Disclosure: Financial: Presenter has received an honorarium for presenting this course. Presenter provides education for Stealth Products. Non-financial: Presenter has no relevant non-financial relationships to disclose.
- Content Disclosure: This learning event does not focus exclusively on any specific product or service.
- Sponsor Disclosure: This course is presented by OccupationalTherapy.com.

Learning Outcomes

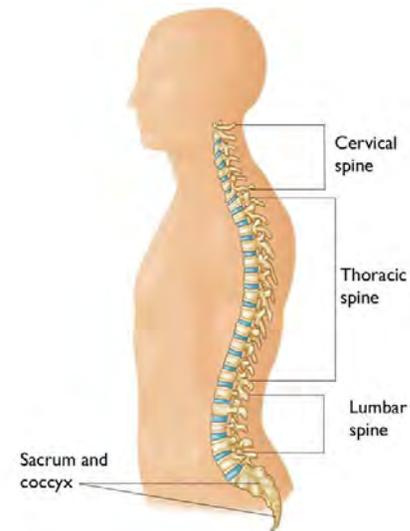
After this course, participants will be able to:

1. Identify kyphosis and seating interventions to address this concern.
2. Identify lateral scoliosis and trunk rotation and seating interventions to address these concerns.
3. Identify lordosis and seating interventions to address this concern.
4. Recognize hip, knee, ankle and foot positioning challenges and seating interventions to address these concerns.
5. Recognize upper extremity positioning challenges and seating interventions to address these concerns.

The Trunk

What we will be Covering Today

- Achieving and maintaining a neutral and upright trunk
- Kyphosis
- Lordosis
- Rotation
- Lateral Scoliosis
- Combined spinal asymmetries



<https://orthoinfo.aaos.org/en/diseases--conditions/fractures-of-the-thoracic-and-lumbar-spine/>

Why is this Important?

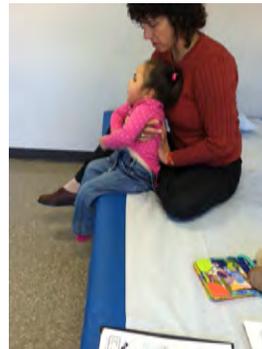
- The position of the trunk, and subsequently the head, is very dependent on the position of the pelvis
- Maintaining an upright trunk requires intrinsic muscle strength, balance, and stability
- If a client lacks the intrinsic control, extrinsic supports are required
- Gravity has a profound influence on the trunk

Positioning Strategies

- Not a cookbook approach
- Can't really look at challenges in isolation
- Always keep in mind the possible causes and your goals
- Goals can be used as justifications for funding
- Positioning Chart
 - www.atilange.com under Resources
 - See handouts

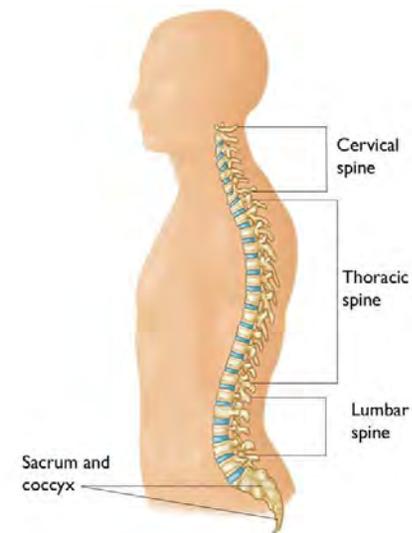
A word about Assessment...

- We are not going into Seating Assessment today
- We are jumping into common seating challenges and interventions
- But... don't forget that Mat Evaluation!



Anatomy Review

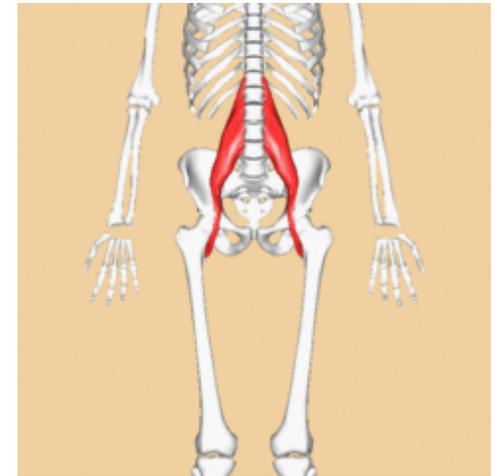
- Trunk
 - Spine
 - Cervical C1-C7
 - Thoracic T1-T12
 - Lumbar L1-L5
 - Rib cage
 - Muscles
 - Attached to the pelvis
 - Attached to the skull



<https://orthoinfo.aaos.org/en/diseases--conditions/fractures-of-the-thoracic-and-lumbar-spine/>

Anatomy Review

- Key multi-joint muscles that impact trunk position
- Hip Flexors – psoas (zo-is) major
 - This muscle attaches to the femur at one end and all the lumbar and lowest thoracic vertebrae at the other
 - Flexes and externally rotates the hip and stabilizes the lumbar spine with the abdominals
 - If range is limited, the psoas will pull the pelvis into an anterior tilt and the spine into lordosis. External rotation may also be present.
- Solution:
 - Allow slight external rotation
 - Stabilize pelvis
 - Determine optimal seat to back angle on mat exam



Physio-pedia.com

Positioning Strategies: Trunk

- Forward Trunk Flexion - Kyphosis
- Trunk Extension – Lordosis
- Trunk Rotation
- Lateral Trunk Flexion - Scoliosis

The Relationship Between the Pelvis and the Trunk

- Posterior Pelvic Tilt → Kyphosis



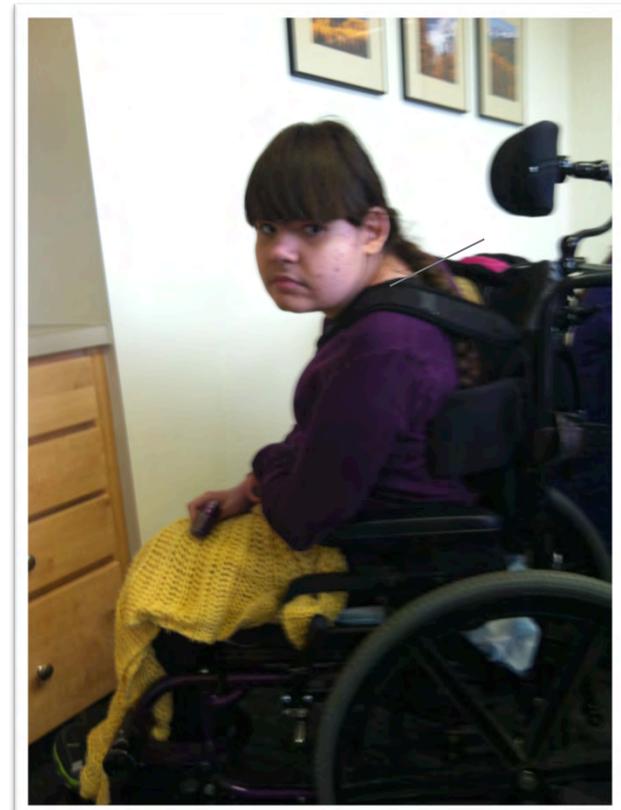
The Relationship Between the Pelvis and the Trunk

- Anterior Pelvic Tilt → Lordosis



The Relationship Between the Pelvis and the Trunk

- Pelvic Rotation → Spinal Rotation



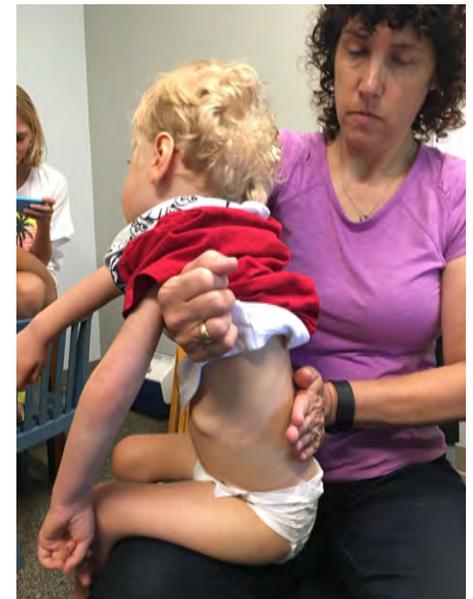
The Relationship Between the Pelvis and the Trunk

- Pelvic Obliquity → Lateral Scoliosis



Flexible vs. Fixed

- Spinal asymmetries may be flexible or reducible
 - Client has a certain postural tendency
 - This can be fully corrected to neutral by applying reasonable force and counter-force



Partially Flexible

- Many times an asymmetry can be partially corrected toward neutral
- The goal of seating is to correct as much as possible toward neutral without undue force/pressure to prevent or minimize this from worsening

Fixed or Non-Reducible

- A fixed or non-reducible asymmetry cannot be reduced toward neutral
- The goal of seating is to accommodate this asymmetry and maximize pressure distribution
- Non-reducible asymmetries can worsen but typically will not improve short of surgical intervention



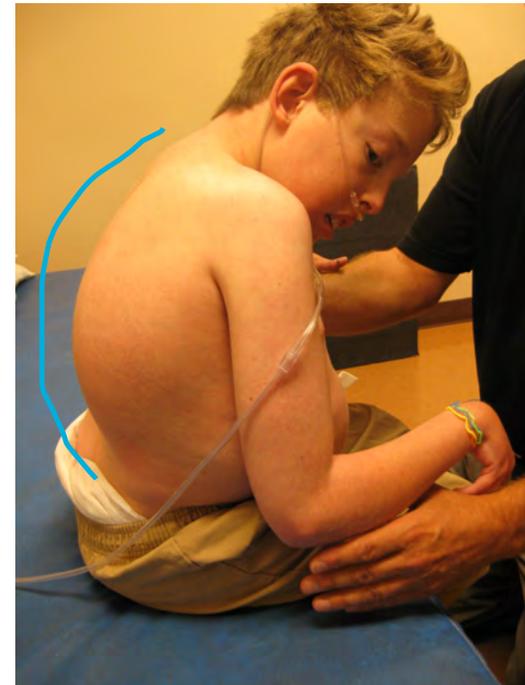
Combined Asymmetries

- These asymmetries can be seen at various levels of the spine
- These asymmetries can be seen in combination with one another
- i.e. lumbar lordosis, thoracic kyphosis, lateral scoliosis and rotation



Kyphosis

- Kyphosis can be at various levels of the spine
- Kyphosis may be flexible, partially flexible or fixed
- May be combined with neck hyperextension



Forward Trunk Flexion

- Possible Causes:
 - Flexion at hips
 - Flexion at thoracic area
 - Flexion at shoulder girdle with gravitational pull downward
 - May occur from increased or floppy tone, abdominal weakness, poor trunk control, weak back extensors
 - Increased tone (i.e. hamstrings) pulling pelvis back into posterior tilt
 - Posterior pelvic tilt
 - Habitual seating in an attempt to increase stability
 - Fixed kyphosis
 - Sling back

Forward Trunk Flexion

- Interventions:
 - If flexible:
 - Anterior trunk support
 - Posterior trunk support
 - Force and Counterforce

Forward Trunk Flexion

- Anterior Trunk Supports
 - Chest strap
 - Shoulder straps
 - Shoulder retractors
 - Butterfly style vests
 - Abdominal supports
 - TLSO



Stealth Products



Anterior Trunk Supports

- Facilitate an upright trunk
- Provide stability
- Maintain client contact with the back

Chest Straps

- Provides anterior thoracic support across the chest and does not cross the shoulders
- Prevents forward movement
- Does not prevent trunk flexion above strap
- Dynamic version allows movement forward and assist with return to upright
 - Extends functional reach



Chest Straps

- Clinical Applications
 - Minimal anterior support is required to prevent the client from leaning forward to the point that independent return to upright is not possible
 - May be needed for transportation or uneven terrain



Stealth Products

Shoulder Straps

- H-Harness style
- Backpack style
- Y straps

H-Harness Style

- More contact
- Less likely to fall off shoulders



Stealth Products



Bodypoint

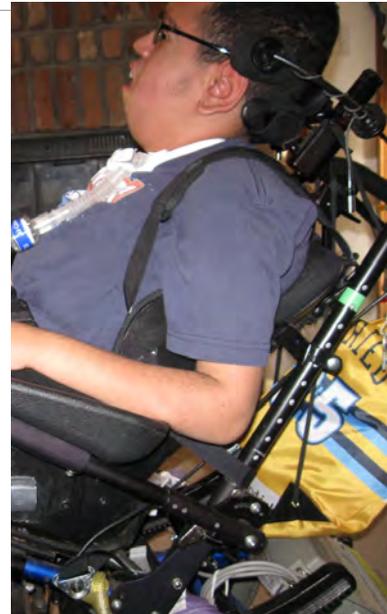
CONTINUED[®]

Backpack Style

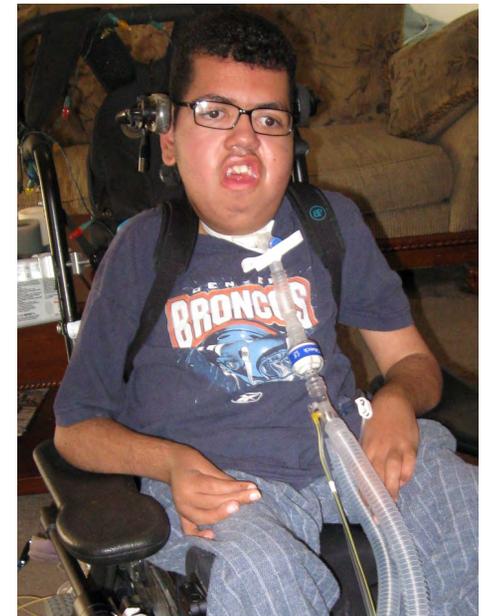
- Work well for a women's figure
- Less contact
- Better for shoulder retraction
- Can see clothes better



Stealth Products



Bodypoint



Shoulder Straps

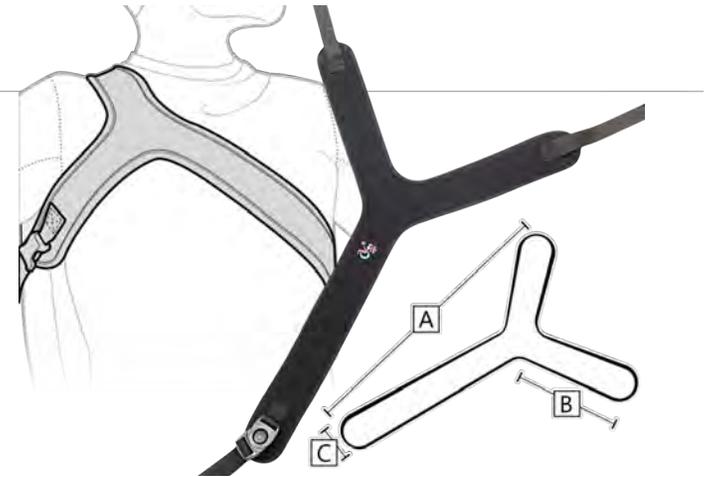
- Clinical Applications:
 - Targeted anterior thoracic support over the clavicles
 - Promotes trunk extension and scapular retraction
 - More upright trunk and improved head position



Bodypoint

Y Straps

- Y Straps provide some anterior thoracic support
 - Primarily designed to de-rotate the trunk
 - Available in a dynamic version
-
- Clinical Applications:
 - Shoulder straps can often limit trunk rotation
 - If shoulder straps are inadequate, a Y Strap can be used
 - Applies forces above and below the shoulder



Stealth Products

Shoulder Retractors

- Designed to encourage an upright trunk by “prompting” the client to extend when contacting the pad
- May be useful for clients who tend to “hang” on shoulder straps



Stealth Products

Anterior Vest

- More anterior contact than other options
- Less retraction than shoulder straps
- Dynamic version allows movement forward and assist with return to upright
 - Extends functional reach
- Various styles
 - Increased contact area or
 - Contoured style



Bodypoint



Stealth Products



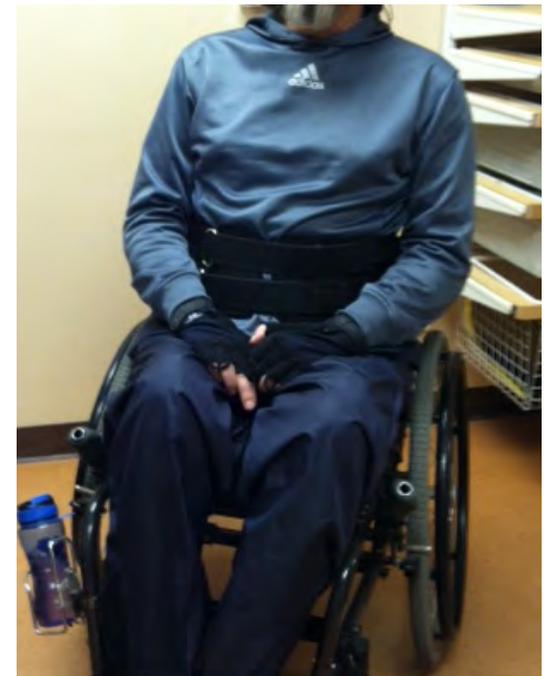
Anterior Vests

- Clinical Applications:
 - Facilitates upright trunk
 - Provides stability
 - Maintains client contact with the back
- Precautions:
 - Make sure this isn't positioned too high, as this can lead to choking
 - Use with pelvic positioning belt, or client could slide down and choke



Abdominal Panels

- Abdominal Panel or Belly Binder
- Circumferential support



Aspen Seating

Combination Anterior Trunk and Pelvic Supports

- Some combination supports are available
- Often in Adaptive Strollers
- Similar to 5 point harness in car seats
- Due to the attachment between the trunk and pelvic supports, neither can really do its job



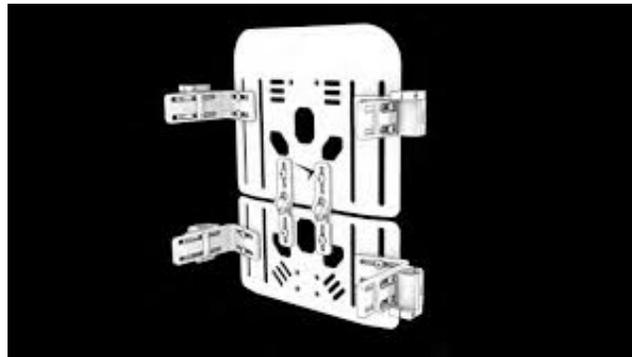
Trunk Flexion

- Alex is still hanging on his shoulder straps
- What to do?
 - Hint: is his head over the pelvis?
 - Find point of balance
 - Determines seat to back angle

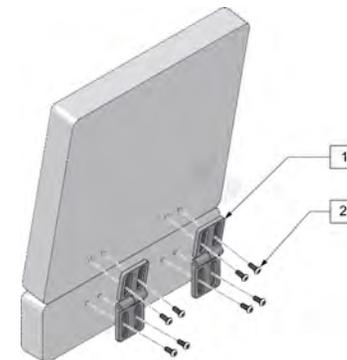


Forward Trunk Flexion

- Posterior Trunk Support
 - Correct posterior pelvic tilt
 - Increase trunk extension with biangular back



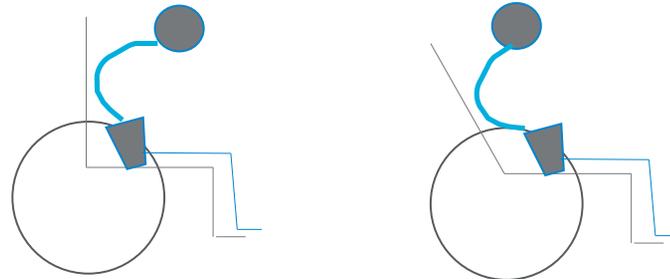
Stealth Products True
Forming Back



Jay Sure Fit

Forward Trunk Flexion

- Interventions:
 - If fixed:
 - *Open seat to back angle to match pelvis angle
 - Contoured back to accommodate trunk
 - Tilt seating system to allow upright head



Fixed Kyphosis

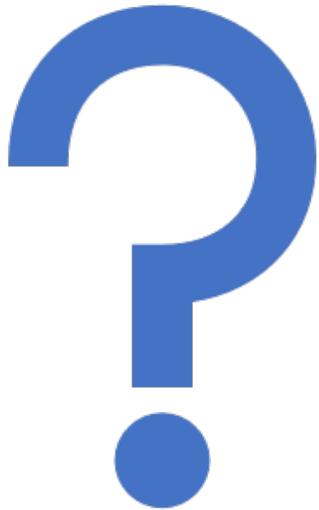
- Tilt to balance head over pelvis



Head behind pelvis to reach point of head balance

Forward Trunk Flexion

- Goals
 - Prevent spinal changes and subsequent pelvic changes
 - Neutral alignment of trunk over pelvis
 - If flexible, anatomical alignment
 - Increase head control
 - Trunk extension
 - Pressure distribution
 - Maintain good visual field



Questions?

Lordosis

- Hyperextension of the lumbar area
- Often combined with anterior pelvic tilt



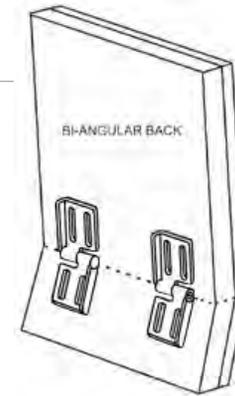
Lordosis

- Possible Causes:
 - Tight hip flexors or over correction of tight hip flexors
 - Increased tone pulling pelvis forward into an anterior tilt
 - Habitual posturing in an attempt to lean forward for functional activities
 - “Fixing” pattern to extend trunk against gravity (e.g. in conjunction with shoulder retraction)

Lordosis

- Interventions

- If flexible:
 - Provide lower back support as needed
 - Biangular back
 - May need to change seat to back angle
 - Do not over correct limited hip flexion
 - Pulls the pelvis into anterior tilt
 - May require anterior trunk support



Therafin



Stealth Products



Aspen Seating

Lordosis

- Interventions
 - If fixed:
 - Molded seating system to accommodate asymmetry and distribute pressure



Aspen Seating mold

Lordosis

- Goals:
 - Neutral alignment of trunk over pelvis
 - Pressure distribution
 - Reduce subsequent shoulder retraction and fixing to allow function
 - Reduce subsequent anterior pelvic tilt



Questions?

Trunk Rotation



- Often seen in combination with lateral flexion
- Often seen in combination with pelvic rotation
- Possible Causes:
 - Pelvic rotation
 - Lateral trunk flexion causes

Trunk Rotation

- Interventions:
 - See pelvic rotation interventions
 - If flexible:
 - Use anterior supports on forward side, if rotation is primarily from upper trunk
 - Y-strap, if entire trunk is involved



Stealth Products

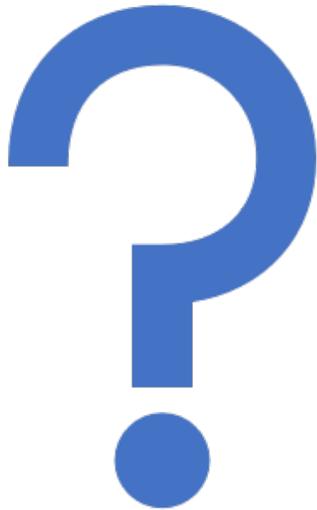
Trunk Rotation

- Interventions:
 - If fixed:
 - If the trunk is fixed in rotation, the primary goal is to allow the client to face forward
 - This may require placing pelvis asymmetrically in seating system
 - A molded back may be required to distribute pressure behind pelvis and trunk



Trunk Rotation

- Goals:
 - If flexible:
 - Neutral alignment of trunk over pelvis
 - Correct pelvic rotation
 - If fixed:
 - Pressure distribution
 - Forward facing posture



Questions?

Lateral Trunk Flexion



- Scoliosis may be C curve, S curve and/or rotational
- Scoliosis may be flexible, partially flexible or fixed

Lateral Trunk Flexion

- Possible Causes:
 - Increased tone on one side
 - Musculature imbalance, may have pelvic involvement
 - Decreased trunk strength or decreased tone, causing asymmetrical posture
 - Habitual posturing for functional activity or stability
 - Fixed scoliosis

Lateral Flexion

- Often worse with effort...



Lateral Trunk Flexion

- Interventions:
 - If flexible:
 - Generic contoured back
 - More targeted contoured backs often add more lateral support

Stealth Products
Ultra
Lightweight
Pediatric Back



Stealth Products
ADI Backs



With added
laterals



Stealth Products
TrueForming/Nucleus
Backs

Backs

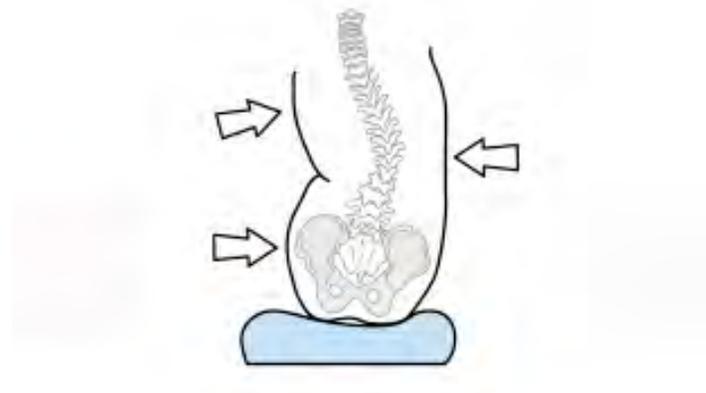
- There are many “off the shelf” backs which incorporate various levels of support



Stealth ADI Backs

Lateral Trunk Flexion

- Interventions:
 - If flexible:
 - Lateral trunk supports (may need to be asymmetrically placed, one lower at the apex of lateral convexity for that force and counterforce)
 - Anterior trunk supports to correct any rotation (see forward trunk flexion interventions)



Lateral trunk supports



AEL



Stealth – variety of angles



All Season Mount

Lateral Trunk Flexion

- Interventions, continued:
 - If fixed:
 - Refer to physician to explore medical or surgical procedures, x-rays
 - TLSO
 - Aggressively contoured or molded back to allow for fixed curvature of spine and/or rib cage
 - Horizontal tilt under seat to right head, if pressure distribution is good



Motion Concepts

Lateral Trunk Flexion

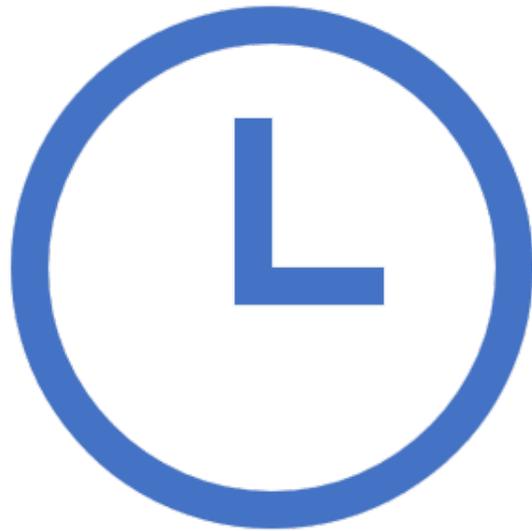
- Goals:
 - Neutral alignment of trunk over pelvis, if flexible
 - Minimize subsequent changes in pelvic and lower extremity posture
 - Level head over trunk for increased vision, social interaction
 - Pressure distribution



Questions?

References

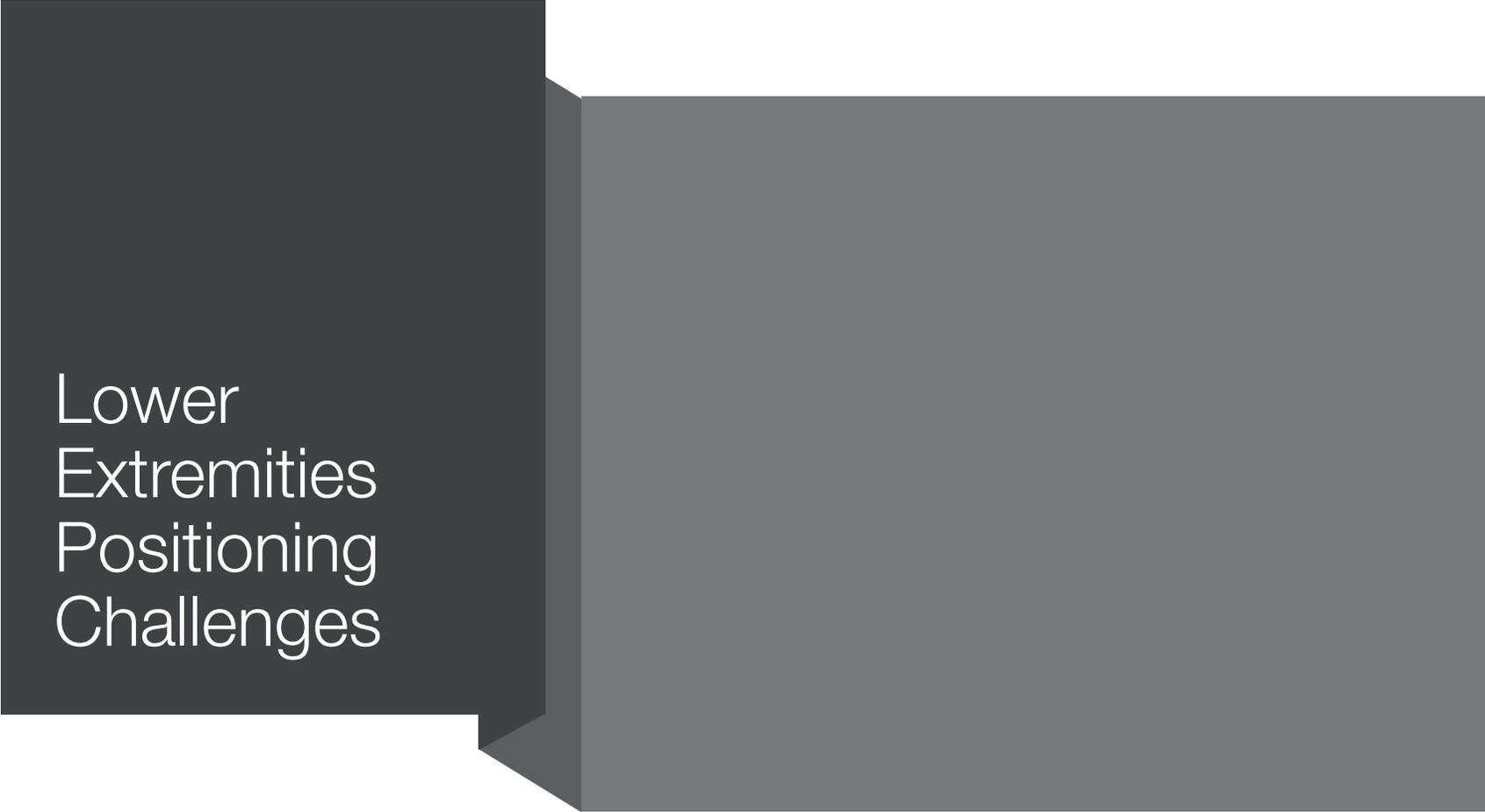
1. Jones, D. A., & Rader, J. (2015). Seating and Wheeled Mobility for Older Adults Living in Nursing Homes: What Has Changed Clinically in the Past 20 Years?. *Topics in Geriatric Rehabilitation*, 31(1), 10-18.
2. Babinec, M., Cole, E., Crane, B., Dahling, S., Freney, D., Jungbluth-Jermyn, B., ... & Potter, C. (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: Official RESNA Position Papers articulate issues in assistive technology and rehabilitation engineering important to researchers, practitioners, policy makers, and funding sources. These positions are based on a strong evidential foundation, supplemented by the authors' extensive expertise and *Assistive Technology*, 27(4), 263-271.
3. Lange, M. & Minkel, J. (Eds). (2018). *Seating and Wheeled Mobility: a clinical resource guide*. Slack, Inc., Thorofare, NJ.
4. Letcher, R. (2016). *Biomechanical Modeling of the Human Body for Application to Wheelchair Seating Systems* (Doctoral dissertation, The Ohio State University).
5. Nace, S., Tiernan, J., & Ní Annaidh, A. (2019). Manufacturing custom-contoured wheelchair seating: A state-of-the-art review. *Prosthetics and orthotics international*, 43(4), 382-395.
6. Occupational Therapy Practice Framework: Domain and Process (3rd Edition). *Am J Occup Ther* 2017;68(Supplement_1):S1-S48.
<https://doi.org/10.5014/ajot.2014.682006>



Break Time!

We will start again in 5
minutes!

The Extremities



Lower
Extremities
Positioning
Challenges

Lower Extremities: Hips

Hip flexion

Hip extension

Hip adduction

Hip abduction

Windswept tendency

Hip Flexion

- What is it?
- The client has a tendency to flex the hips, sometimes past a neutral position of 90 degrees of hip flexion
- May be flexible (reducible) or fixed (non-reducible)



Hip Flexion

- Possible Causes:
 - Decreased range of motion of hip flexors
 - Fixing with hip flexors due to lack of hip extension or stability
 - Poor positioning
 - i.e. sleeping on side with hips and knees very flexed
 - Poor range of motion management
 - Alternative positions are also needed, i.e. stander

Hip Flexion

- Interventions:
 - If flexible:
 - Superior thigh pads or strapping thighs or feet superiorly
 - Padded lap tray (underside)



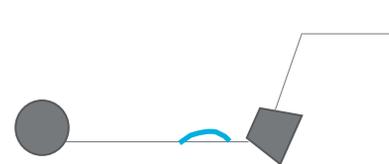
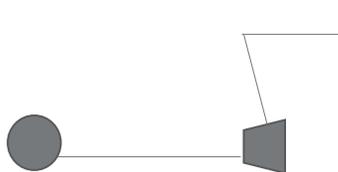
Bodypoint Ankle Huggers



Therafin shoe holder with straps

Hip Flexion

- Interventions
 - If fixed:
 - Do not overcorrect and cause anterior pelvic tilt
 - Prevent lordosis



Hip Extension

- What is it?
- The client has a tendency to extend the hips, sometimes past a neutral position of 90 degrees of hip flexion
- May be flexible (reducible) or fixed (non-reducible)



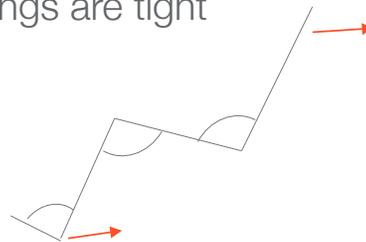
Hip Extension

- Possible causes:
 - Decreased range of motion of hip extensors
 - Increased extensor tone —————>
 - Poor positioning
 - This young man did not sit for several years
 - Poor range of motion management
 - Alternative positioning needs to include some prolonged sitting time
 - Discomfort



Hip Extension

- Interventions:
 - If flexible:
 - Opening seat to back angle may reduce active extension or set it off
 - If fixed:
 - Open seat to back angle to accommodate range limitation
 - Increase knee flexion, if hamstrings are tight
 - Contoured seating system



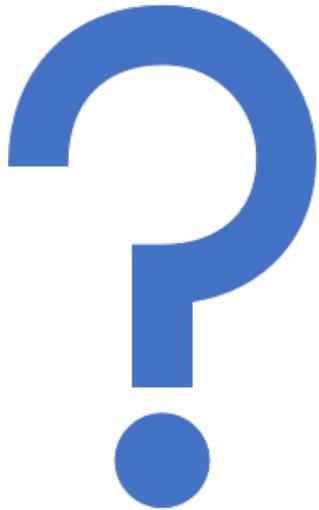
Hip flexion and extension asymmetries

If one hip needs to be flexed and one extended, this can be accommodated

Remember, in a “split seat”, make sure to wedge under the high leg



Invacare Matrix InTouch Stabilite OM Cushion with right leg wedge



Questions?

Hip Adduction



- Possible Causes:
 - Extensor tone
 - Decreased range of motion of hip adductors
 - Sling seat
 - Internal rotation

Hip Adduction

- Interventions:
 - Contoured seat
 - Leg troughs
 - Medial knee support
 - Anterior knee support
 - Strapping



Stealth Products
cushion



Bodypoint leg harness

Medial Knee Block

- The groin is not a weight bearing surface!
- We have other strategies to keep the pelvis back
- Medial Knee blocks are designed to limit hip adduction



Too big and too far back



Stealth Products, flip down



Stealth Products, adjustable to accommodate leg length discrepancy

Hip Abduction

- Possible Causes:
 - Decreased range of motion of hip abductors
 - Initial low tone
 - Surgeries
 - Poor positioning



Hip Abduction

- Interventions:
 - Contoured seat
 - Leg troughs
 - Lateral knee blocks
 - Lateral pelvic/thigh supports



Stealth Products lateral knee support



Stealth Products lateral pelvic supports

Hips: Windswept Posture

- One leg is abducted and externally rotated
- One leg is adducted and internally rotated
- Possible Cause:
 - Pelvic rotation
 - Range limitations
 - Sleep positioning



Windswept Posture

- Typically a result of sleep positioning



Hips: Windswept Posture

- Interventions:
 - Pelvic rotation interventions
 - Hip adduction and abduction interventions
 - i.e. for Left Windswept, left lateral knee block and right medial knee block



Lower Extremities: Knees

- Knee flexion
- Knee extension



Questions?

Knee Flexion

- Possible Cause:
 - Decreased range of motion of hamstrings
 - Flexor tone
 - Structural knee issues



Knee Flexion

- Interventions:
 - If flexible:
 - Refer to physician to explore medical or surgical procedures
 - Posterior strapping →
 - If fixed:
 - Open seat to back angle
 - Anteriorly sloped seat
 - Place footrests posterior to front edge of seat
 - Bevel front edge of seat



Bodypoint



Placing Footrests Rearward

- Various footplate options are available to bring feet back to accommodate limited knee extension
- Can lead to interference with footplates

Seating Dynamics
Super contracture footrest



Knee extension

- Possible causes:
 - Decreased range in quadriceps
 - Over lengthening of the hamstrings
 - Structural knee changes
 - Extensor tone



Knee extension

- Interventions
 - If flexible:
 - Refer to physician to explore medical or surgical procedures
 - Provide alternative positioning to stretch the quadriceps (outside of the chair)
 - Strapping
 - In front of lower legs
 - At feet
 - Dynamic options



Dynamic Options

- Seating Dynamics
 - Dynamic footrest
 - Elevates 30 degrees
 - Telescopes 1 ½”
 - Dynamic dorsi/plantar flexion



Knee extension

- Interventions
 - If fixed:
 - Different footrest angle
 - Elevating legrests
 - Custom foot support



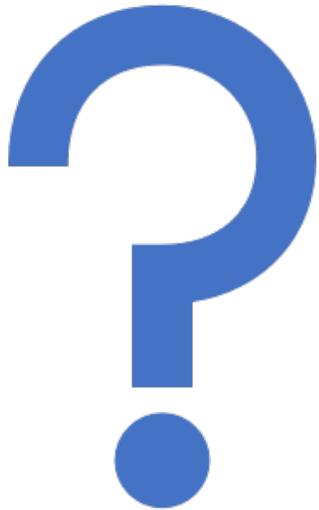
90 degree footrest hanger, too closed for this client



Elevating legrests, Quickie

Lower Extremities: Feet

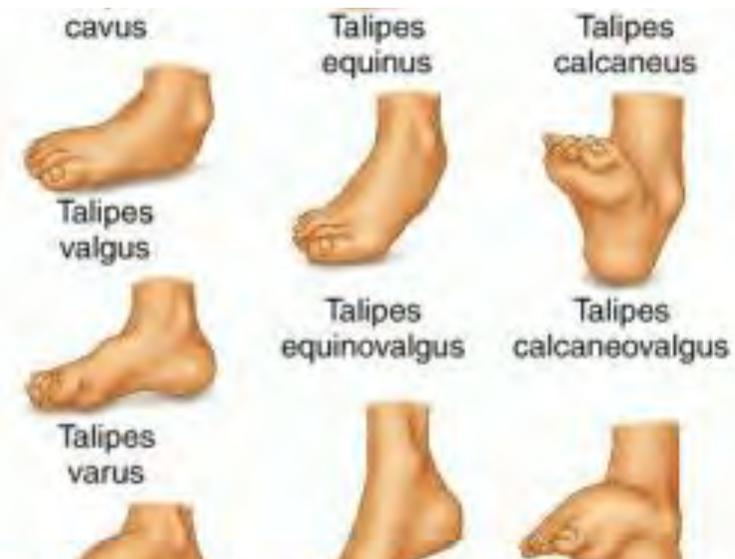
- Ankle and foot range limitations in various planes
- Foot distortions



Questions?

Ankle and Foot Limitations

- Possible Causes:
 - Tonal patterns
 - Lack of weight bearing
 - Surgery



Ankle and Foot Limitations

- Interventions:
 - Angle adjustable footplates (sagittal and frontal planes)
 - Padded foot boxes
 - Molded foot support
 - Specialized shoes



Slippers to pad feet

Angle Adjustable Footplates

- Match the angle of the footplate to the foot as closely as possible
- In all planes
- Distributes pressure
- Accommodate fixed distortions of the foot or ankle
- Some are capable of inversion/eversion, plantar/dorsiflexion & depth adjustments



Feet angled outward to accommodate tibial torsion

CONTINUED[®]



Padded Foot Box

Stealth Products



Aspen Seating

Positioning the Feet

- Even if the foot can be readily positioned on the footplate, sometimes the foot is secured to the footplate
 - To prevent injury to the feet
 - To limit hip flexion
 - To increase stability

Foot Support

- Toe and Ankle straps
- Circumferential supports
- Shoe Holders with straps

- Clinical Applications:
 - Postural support and stability
 - Maintains foot on footplate
 - Pressure distribution
 - Limits knee extension
 - Protects the foot from injury



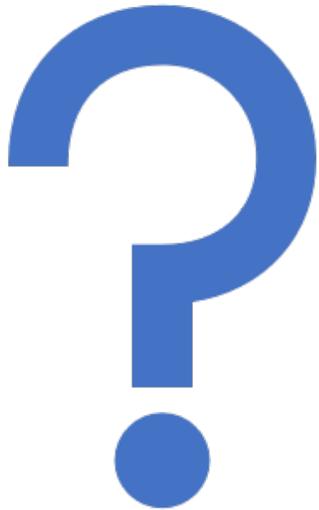
Stealth Products
Circumferential
support



Padded toe straps



Shoe holders



Questions?

Positioning Strategies: Upper Extremities

- Shoulder Retraction
- Elbow Extension
- Uncontrolled Movements
- Self-Abusive Behavior
- Shoulder Subluxation or Dislocation



Shoulder Retraction

- Often in conjunction with elbow flexion
- Possible Causes:
 - increased tone in scapular adductors or retractors
 - weakness of muscles in shoulder girdle with decreased ability to protract shoulder
 - “fixing” pattern to extend trunk against gravity, stabilize, or as a righting response
 - anxiety, startle

Shoulder Retraction

- Interventions:
 - posterior elbow or upper arm support
 - adjust tilt in space if due to reflexes
 - restrain forearms (trunk must be anteriorly supported)
 - provide stability elsewhere to break-up fixing pattern

Elbow Blocks



Stealth elbow block

Forearm Strapping

- To maintain alignment with switch in combination with elbow block



AEL





Elbow Extension

- Often in conjunction with shoulder horizontal abduction
- Possible Causes:
 - muscle imbalance
 - habitual pattern to laterally stabilize trunk
 - habitual pattern to extend trunk
 - ATNR
 - anxiety, startle
 - effort or stress

Elbow Extension

- Interventions:
 - restrain forearms
 - splinting or orthotics



AEL

Uncontrolled Movement



- Flailing, uncontrolled movements
- Possible Causes:
 - increased tone due to effort
 - athetosis
 - an attempt to stabilize
 - may worsen with anxiety

Uncontrolled Movement of Upper Extremities

- Interventions:
 - block or strapping to decrease movement
 - forearm/wrist weights
 - splinting or orthotics (i.e. to keep elbows extended)

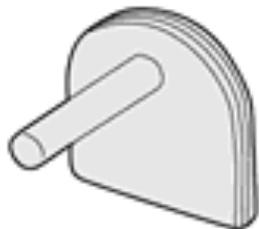


Uncontrolled Movement of Upper Extremities

- Interventions, cont.:
 - distal stabilizer for independent grasp
 - Towel rack
 - Posts
 - Cuffs - Mark



Vertical post



Horizontal post



Uncontrolled Movement of Upper Extremities

- Interventions, cont.:
 - custom tray to allow arms to be placed under tray surface (padded)
 - Juan



Self-Abusive Behavior

- Possible Causes:
 - self-stimulation
 - anxiety
 - Lesch-Nyhan syndrome
 - Cornelia deLange syndrome

Self-Abusive Behavior

- Interventions:
 - Same as for uncontrolled movement
 - look at providing alternative sensory input, if needed

Subluxed or Dislocated Shoulders



[Commons.wikimedia.org](https://commons.wikimedia.org)

- Possible Causes:
 - decreased shoulder or upper extremity strength
 - paralysis
 - decreased muscle control
 - decreased tone
 - increased tone
 - postures that continually pull humerus

Subluxed or Dislocated Shoulders

- Interventions:
 - Upper Extremity Support System (tray)
 - widened armrests
 - arm trough
 - posterior or lateral elbow blocks
 - forearm straps
 - dual shoulder straps crossing clavicle and acromian processes
 - slings and mobile arm supports





Questions?

continued^{ed}

Thank You!

References

1. Dolan, M. J., & Henderson, G. I. (2014). Patient and equipment profile for wheelchair seating clinic provision. *Disability and Rehabilitation: Assistive Technology*, 9(2), 136-143.
2. Jones, D. A., & Rader, J. (2015). Seating and Wheeled Mobility for Older Adults Living in Nursing Homes: What Has Changed Clinically in the Past 20 Years?. *Topics in Geriatric Rehabilitation*, 31(1), 10-18.
3. Babinec, M., Cole, E., Crane, B., Dahling, S., Freney, D., Jungbluth-Jermyn, B., ... & Potter, C. (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: Official RESNA Position Papers articulate issues in assistive technology and rehabilitation engineering important to researchers, practitioners, policy makers, and funding sources. These positions are based on a strong evidential foundation, supplemented by the authors' extensive expertise and *Assistive Technology*, 27(4), 263-271.
4. Lange, M. & Minkel, J. (Eds). (2018). *Seating and Wheeled Mobility: a clinical resource guide*. Slack, Inc., Thorofare, NJ.
5. Kenny, S., & Gowran, R. J. (2014). Outcome measures for wheelchair and seating provision: a critical appraisal. *British Journal of Occupational Therapy*, 77(2), 67-77.
6. Occupational Therapy Practice Framework: Domain and Process (3rd Edition). *Am J Occup Ther* 2017;68(Supplement_1):S1-S48.
<https://doi.org/10.5014/ajot.2014.682006>

Contact Information:

Michelle Lange
MichelleLange1@outlook.com
www.atilange.com