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Wheelchair Seating: Considerations For The Prop Sitter

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Learning Outcomes

The participant will be able to:

1. Define a prop sitter
2. List 3 goals when positioning a prop sitter
3. List 3 clinical guidelines when positioning a prop sitter

What we will be covering:

- What is a “prop sitter”?
- Clinical Guidelines
- Case Study

SMS Series

- This is part of a series of webinars designed to prepare the participant for the Seating and Mobility Specialist examination
- And… develop more advanced seating and wheeled mobility skills

Seating and Wheeled Mobility

- Every mobility base includes some form of seating
- Primary supports include seat, back, armrests, and footrests
- Seating interventions vary tremendously depending on the client age, diagnosis, prognosis, postural needs, pressure risks, etc.

Postural Needs

- One way of looking at Wheelchair Seating is by postural support needs:
  - Hands-free sitter
  - Hands-dependent sitter
  - Prop sitter

Hands-free Sitter

- The person is able to lift their hands off of the surface without changing the position of the trunk
  - Can also shift weight to the side and return to a midline position
  - Good trunk control

Hands-Dependent Sitter

- This person uses one or both hands on a surface to maintain sitting balance
  - If hands are lifted, the trunk will collapse

Prop Sitter

- This person cannot maintain sitting, even with the support of both arms
  - External support is required

The Prop Sitter

- Goals
  - Provide adequate proximal support for improved function
  - Optimize function
    - Function may be more basic, such as improved breathing and swallowing, rather than increased participation in MRADLs (mobility related ADLs)
  - Prevent development of or accommodate asymmetrical postures
  - Mitigate pressure issues

The Prop Sitter

- Typical Diagnoses and Presentation
  - Little or no postural asymmetry
    - Often very low tone in trunk
    - New diagnosis or acquired injury
  - Significant, non-reducible asymmetries
    - Supporting head in midline even if pelvis and trunk are asymmetrical

The Prop Sitter

- Orthopedic and Neurological impairments
  - Asymmetrical alignment of pelvis and spine
  - i.e. Muscular dystrophy, cerebral palsy
- Neurological impairments
  - Little or no trunk control
  - i.e. SCI, ALS
- Other diagnoses, dependent on postural support needs
  - MS, DVA, TBI, DD

The Prop Sitter

- Typically, multiple issues including mobility, sensation and alignment
- Progressive conditions may start as hands-free or hands-dependent

Assessment

- Fixed or non-reducible
  - Cannot be corrected or even moved without surgery, but can worsen
- Flexible or reducible
  - Can be reduced, but not necessarily to neutral
  - Even if reducible to neutral, still important to check if more flexible in one direction

The Mat Exam

- An important measurement in supine is hip flexion which determines seat to back angle
- This is addressed in more detail in the Mat Assessment course

The Pelvis

- Posterior pelvic tilt leads to
  - Trunk flexion
  - Forward head position
  - Hip internal rotation and adduction
    - or
  - Hip external rotation and abduction

The Pelvis

- Anterior pelvic tilt leads to
  - Trunk extension, exaggerated lumbar curve, scapular retraction
  - Neck extension
  - Hip internal rotation and adduction

The Pelvis

- Obliquity
  - One side of the pelvis is lower
    - Named for low side (Left obliquity = left low)
  - Opposite side of trunk collapses

The Pelvis

- Rotation
  - One side of the pelvis is forward
    - Named for facing side (Left rotation = right side of pelvis forward, entire pelvis facing left)
  - Legs windswept to facing side
    - One leg abducted and externally rotated
    - One leg adducted and internally rotated
      - At risk of subluxation
- See Positioning the Pelvis course for more information

The Spine

- Position of the spine is dependent on position of the pelvis
- Support is needed at the pelvis and the spine to promote upright and allow the head to be upright
- Alignment is key as spinal asymmetries are likely to develop, more so in children who are still growing

The Spine

- When spinal asymmetries do develop, these can be seen in conjunction with each other and influence the shape of the rib cage
- Portions may be reducible or not
- See Positioning the Trunk course for more information

Head Control

- Prop sitters typically have decreased head control and need additional support to hold the head upright against gravity
- The position of the pelvis and spine are critical
- Opening the seat to back angle and tilt reduce influence of gravity
- See Positioning the Head course for more information

Accommodation vs. Correction

- Prop sitters often have asymmetries
- Correction seeks to reduce an asymmetry towards neutral
- Accommodation supports an asymmetry in place
  - Pressure distribution
  - Comfort
  - Function

Accommodation vs. Correction

- Compromise
  - More asymmetry of the pelvis or spine may be required for an upright head, vision, comfort, or function
  - Adequate pressure distribution must be provided if these surfaces (particularly the pelvis) must be supported in a asymmetrical posture

Simulation

- With Prop Sitters, it is critical to simulate where support is needed and at what angles before final recommendations
  - Mat assessment – using the evaluator's body
  - Simulators – planar and molded

Key Points of Control vs. Total Contact

- Key points of contact provide targeted contact in specific areas to control posture
- Total contact is provided with a molded seating system

Force\Counterforce

- Much of seating is force and counterforce to maintain alignment
  - Example: posterior head and anterior trunk
- Sometimes 3 point control is required to achieve alignment
  - Example: lateral to rib cage and lateral to at least one side of the pelvis to achieve and maintain alignment

Force/Counterforce

- Posterior head support
- Anterior trunk support

Key Points of Control vs. Total Contact

- Key points of contact
  - Allows more movement
  - Less pressure distribution
  - Often easier transfers
- Total Contact
  - Maximum pressure distribution
    - Decreases pressure injury risk
    - Increases comfort
    - Increases postural support and stability
  - May be more difficult to modify

Proximal Support

- The seating system provides proximal support that the client does not have intrinsically
- Proximal support is required to optimize function, but is also required for life sustaining functions
  - Breathing
  - Gastrointestinal

Muscle Tone

- Many prop sitters have increased muscle tone
- The seating system can inhibit muscle tone and extensor patterns
  - Significant contact
  - Angles – increase hip flexion and hip abduction
  - Dynamic Seating
    - See webinar

Muscle Tone

- Many prop sitters have very low muscle tone, particularly in the trunk
- The seating system can provide the necessary support
  - Significant contact with firm materials
  - Increased proprioceptive input



Interventions

- Shape Capture
- Angles and Orientation
- Orientation in Space
- Types of Seating

Interventions

- Shape Capture
  - The mat exam and simulation determine optimal angles and where support is required
  - If total contact is required, the shape capture is the process of recording the exact body shape of the client in the desired position
  - Molding simulator is used
    - Various styles

Shape Capture Process

- Client is placed in molding simulator
- Shaping bags are pushed and pulled around the client to support the desired position
  - Often takes 2-3 people
- Air is removed from the bags to hold the shape
- Shape is assessed, check for any redness
- Air can be slowly let back in to soften the bags for further adjustment
- Final bag shape is 'captured', often digitally

Interventions

- Angles and Orientation
  - Angles are typically determined at the mat exam, but may need to be reassessed at specific recommendations
  - Seat to back support angle
    - Dependent on hip range
  - Seat to lower leg support angle
    - Dependent on hamstring tightness
  - Lower leg support to foot support angle
    - Dependent on ankle and foot range limitations or distortions
  - Ancillary supports may not be symmetrical
    - Lateral trunk pads angle, offset head support, etc.

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Interventions

- Orientation in Space
  - Posterior Tilt
    - Common
    - Postural management
      - Gravity assist for trunk and head control
    - Weight shifts
    - Fatigue management

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Interventions

- Orientation in Space
  - Anterior Tilt
    - Sometimes used as a 'task performance position'
    - Can also be used to compensate for a very open seat to back angle

Permobil

Interventions

Motion Concepts

- Orientation in Space
  - Lateral Tilt
    - Can be used to provide weight shifts in clients who cannot tolerate a posterior tilt
    - Can be used to balance the head over the trunk in a significant lateral scoliosis
    - Sometimes a fixed wedge is used instead

Interventions

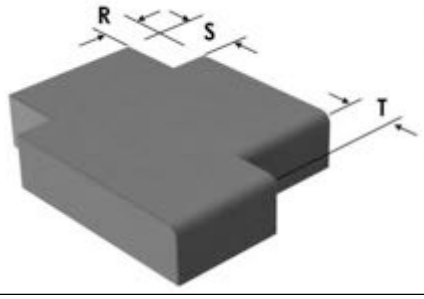
- Types of Seating
  - Clientized seating
  - Customized seating
  - Custom-made seating
  - Custom-molded seating

Types of Seating

- Clientized seating
  - Off-the-shelf seating
    - Key points of control

Types of Seating

- Customized seating
  - Modification of off-the-shelf seating
    - Asymmetrical seat length for leg length discrepancy
    - Wedging a pelvic obliquity



Spex seating

Types of Seating

- Custom made seating
  - Based off of specific client measurements
    - Desired materials and upholstery, as well as general shape can be selected
    - Some systems allow more modification/accommodation
      - i.e. Grid back

Stealth Products

Types of Seating

- Custom molded seating
  - Direct molding
    - Foam in place
  - Indirect molding
    - Simulation and shape capture

Dynamic Systems

Shape Capture

- Video of shape capture for Ride Designs cushion

Case Study

- Anderson
- Age 12
- Diagnosis: cerebral palsy
- Prop Sitter

Case Study

- Identified issues:
  - Lordosis
  - Scoliosis
    - Shortens left
  - Kyphosis
  - Pelvic obliquity
    - Low right
  - Pelvis anterior tilt
  - Pelvic rotation
    - Facing right (left ASIS forward)
- Right windswept tendency
- Upper extremity flexion in elbows, wrists and sometimes shoulders
- Poor head control
- Discomfort / decreased sitting tolerance
- Pressure injury risk

Case Study

- Spine
  - Lordosis
    - Note impact on rib cage
  - Kyphosis
  - Scoliosis

lordosis

Worse with increased hip extension, leading to more anterior tilt

Case Study

kyphosis

- Spine
  - Lordosis
  - Kyphosis
    - Note impact on rib cage
  - Scoliosis

Case Study

- Spine
  - Lordosis
  - Kyphosis
  - Scoliosis
    - Note skin fold

Case Study

- The scoliosis could be reduced by eliminating gravity
- He needed significant support to do so in the seating system

Case Study

- Lower Extremities
  - Lack of hip and knee extension
    - Increasing lordosis
  - Windswept tendency

Case Study

- Solution – molded seating
- Anderson required molded seating to accommodate and support his spinal curvatures and ribcage distortions

Case Study

- With the appropriate "shape capture" and seat to back angle, Anderson was able to align and balance his head with minimal support

Case Study

- Anderson's shape capture

Case Study

- Anderson
  - Molded seating supported Anderson's seating tolerance, function, respiration, swallowing, and reduced pressure injury risk

Take Home Message

- Prop sitters require comprehensive evaluation with a team to determine where support is required and at what angles.
- Prop sitters often require a more complex seating solution, partially due to asymmetries which may not be fully reducible.

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Questions?

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Thanks!

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