CUSTOM SEATING: WHO, WHEN AND HOW?

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This session will review the decision-making process utilized in determining whether to provide your client with "off-the-shelf" seating or customized seating products. This will include a look at the clinical presentation of the client, assessment/simulation data required, measurement taking, and trial fittings required. Utilization of contoured foam, gel, and air products to enhance a customized fit will also be considered, as well as critical techniques in achieving a desired fit.

Learning Objectives

1. Recognize how to determine who requires custom seating.
2. Describe custom seating products available.
3. Recognize when to utilize foam, air or gel in customizing seating.
4. Explain the techniques and measurements required to complete custom seating.

Custom Contoured Seating

Determining if your client requires a custom contoured surface is often seen as a challenge, but does not need to be. Customized seating can minimize the risk of peak pressures and shear on weight bearing surfaces, especially over bony prominences. It can also provide the best postural support and control where modular does not match the client's shape. By customizing the shape, it often decreases the need for additional lateral and anterior supports. Custom seating is good for prolonged sitting where postural support and pressure relief is required, or for clients with inadequate sensation. Specific shape contours can also prevent friction/shearing from occurring from downward migration often seen with modular systems. As a result, the client no longer needs to "hold on" and therefore this frees their hands for functional activity. Custom seating may often be one piece construction and therefore there are less pieces to lose. Accommodation and correction can be achieved as well as aggressive support where necessary. Due to the close contouring, there is also more proprioceptive input to the body which may assist in decreasing agitated movements.

There can be disadvantages to custom seating and therefore your assessment data may provide you with justification not to complete a full custom contoured system based on the following factors. It may be limited for growth or shape changes. If the fit is too close, it may interfere with compensatory movements or proprioceptive input may be too great creating reliance on the support surfaces. There may be limitations for transfers depending on the shape. Unfortunately, there is also a potential for pressure points resulting from improper positioning on highly contoured surfaces. Custom seating may also be labour intensive and therefore costly. As well there is limited trial time or ability to set up the system for active mobility prior to finished production.

Prescribing custom seating

* be aware of basic posture and seating principles
* understand ergonomic and biomechanical principles for mobility
* complete a mat assessment
* test out and simulate posture and the support required to maintain that posture
* record wheelchair measurements after custom seating is complete to ensure fit into mobility base
* consider environmental factors and system functionality for the client and caregivers

The following critical pathway will help identify the steps to follow when prescribing custom seating. When assessing a client for custom seating it is important to look for potential areas that may be affected by alterations in their seated position. This may include at risk skin areas, tonal changes or contractures from long term tonal changes, reflexes (normal/abnormal) and the client's use of reflexes

in postural support, bony protrusions, respiratory and circulatory changes or changes in body position and orientation in space, incontinence, swallowing, eating, drooling problems, the client's ability to sit unsupported, and finally the client's ability to reposition or weight shift.

Custom seating may begin at the basic level of adding carved foam support to an already pre fabricated back shell. This is good for the client who requires minimal accommodation to back curvatures, but the overall shape of the back shell provides adequate support. This may also be seen as customizing an off the shelf cushion by adding additional adductor, abductor or obliquity pieces, or carving back one leg trough for discrepancies. Again this is good for the client who is more actively mobile or needs minimal adjustments in shape to match their contour or maximize their surface contact. If more aggressive accommodation is required, then foam in place molding may take place. Again a regular back shell may be used, but by pouring the foam around the client, a closer contact to the exact shape is achieved. Foam in place is not recommended for aggressive correction as it is difficult to maintain client alignment during the foaming process. The next step may be to complete a fully scripted custom seat/back by taking measurements of the client and transferring this data to a prescription form, from which a fully customized seat/back will be manufactured. This type of seating is seen with the Precision Fit seating through PRM. Finally, full custom contoured shaping may be required for very asymmetrical postural seating and can be done through a variety of mediums but often includes a molding frame (PRM). This type of system has the advantage of allowing for full accommodation as well as differing degrees of correction where required.

When considering whether or not off the shelf seating will work, or if you need to look at customizing the seating the following factors will assist in determining what seating is required.

Pressure

Does the client have a pressure ulcer history and on observation are there areas of redness or scarring.
Does the client have asymmetry in weight bearing surfaces? Are there bony deformities that protrude? Is there any rib/pelvic creasing, or a rib hump that contacts one side of the back surface first? Consider tightness at the back of the knee (tight hamstrings), high pressure at the back of the head from extensor tone, high pressure on the feet (toes, lateral edges, ankles) from high tone or lack of movement, or shearing pressure on the ears from head rotation. It is also important to consider pressure that may occur from custom contoured seating that may interfere with ostomy sites, G-tube sites, bowel and bladder catheters, shunts, or baclofen pump below skin surface. Considerations for nutrition/weight fluctuations from surgery, illness or G-tube insertion will be important and there affect on the contact of the support surfaces. When completing custom seating, it may be useful to utilize pressure mapping on completion of the custom seating in order to fully discern pressure relief during molding of the contours and surfaces.

Dysphagia

It is important to consider the impact of positioning on swallowing and eating for your client. Therefore during simulation of the final position required, one must consider the position of head and neck as well as trunk elongation, abdominal pressure and alternate positions for feeding.

Respiration

A client's breathing capacity may be affected by changes in seated position and therefore the degree of chest expansion and thoracic mobility must be assessed. If the client has a tracheostomy, the head and neck position is important to maintain for air flow. Often "straightening" the client may experience a tracheal shift resulting in impingement due to spinal changes. It is therefore recommended that pulse oximetry be utilized in order to see changes in oxygen levels with alterations in head/trunk positioning, and alternate activities.

Orthopedic changes

Past or future surgeries can change the client's ability to tolerate fixed positioning. Therefore it is important to determine if the client has or will have tendon releases, osteotomies, spinal fusions, rod placements, or pins/plates insertion or removal. Fractures that may be a result of osteoporosis or stress factures can be determine by available bone scans, bone densities or x-rays. X-rays will also assist in demonstrating ongoing dislocations. Clients must also be assessed for possible arthritis and resulting pain which may occur from immobile joints.

Caregivers

When completing a custom seating system, transfers and use of mechanical lifts and slings can become more difficult for care givers due to the close contact of the curvatures. It is important to consider how the transfer is completed prior to finishing a system in order to ensure that the transfer will be able to be completed and all slings can be removed after the client is in the chair. Custom seating can also impinge on catheter and condom drainage or urinal use if it is too contoured or these factors are not taken into consideration. Dressing a client can be more difficult if done in the seating system as the client cannot be shifted as easily. Custom seating systems are generally a little more difficulty to move and place in/out of a mobility base, and therefore the transport of system must be addressed prior to determining the type of seating to be completed. Lastly, it is important that the ease of cleanliness and durability be addressed as the integrity of the system will be affected by the ability to maintain the general hygiene of the product.

Seating Solutions

When completing any seating it is important to consider the prevention of abnormal postures, orthopedic deformities and/ or pressure problems. We also need to provide the ability to correct abnormal postures and functional orthopedic deformities that are flexible and will enhance function and heal/ correct the causes of pressure problems. Seating may also provide accommodation of abnormal postures and orthopedic deformities which are structural (fixed) in nature. Overall seating should provide comfort, enhance or preserve functional ability and ease of management.

The following solutions are suggested for custom contoured seating in relation to specific orthopedic conditions.

Accommodate	Correct
Pelvic Obliquity	
- add to high side to maximize surface support – lateral posterior edge to trochanter	- slowly add to low side to shift balance to midline - firmer support to increase shift
Posterior pelvic tilt	
- open hip angle - increased ischial well with pre ischial support - leg trough: avoid too aggressive abduction - seat angle based on fixed/flexible trunk position - maximum thigh support	- optimal ischial support - maximize trough to ↓adduction - surface materials more friction - optimal thigh support
Anterior Pelvic Tilt	
- observe for pubic compression of abductor pommel - leg trough: avoid too aggressive adduction positioning - maximize thigh support - seat angle for trunk position	- surface materials higher friction optimal thigh support - maximize leg trough to decrease abduction

Rotation		
	- lengthen forward side of base to support thigh - observe and lengthen ischial shelf/ well on forward side or reduce on opposite side - accommodate leg trough for windswept position	- maximize abductor/ adductor trough to maintain leg alignment - optimize seat depth/ height for function
Kyphosis		
	- open seat/ back angle with sacrum support and relief for kyphotic area - provide tilt in seat/ frame and open angle of back to change orientation for visual field	- provide sacral support and open for back extension above pelvic crest - avoid high backs with full lateral curvatures promoting shoulder protraction
Scoliosis		
	- support curvature to maximize pressure relief - support to gain head in midline where possible	- 3 pt. positioning, forces at apex of spine (not rib cage), and on opposite side high/ low - monitor ability to position in chair interference of laterals on transfers/ clothing changes
Rotoscoliosis		
	- contour around rib hump supporting at lateral apex - monitor iliac crest on rib cage, observe for breathing	- avoid “lifting” as trunk will collapse back and increase pressure

Although often seen as a very daunting task, customized seating will provide your client with the best shape to increase surface contact where required for comfort, support and pressure relief. Human beings come in all different shapes and sizes and so their seating system should accommodate each individual peculiarity.

Speaker Bio

Sheila is an Occupational Therapist from Milton, Ontario and has been actively working in the field of seating and mobility for over 20 years. Sheila is the owner of Therapy NOW! Inc. – an Occupational Therapy company providing consultation, assessment and treatment in the area of accessibility, ergonomics, and seating & mobility. She can be reached at therapynow@cogeco.ca .