

THE SIMPLICITY OF COMPLEX SEATING

In a rational world, one could assume that an individual with complex physical needs would require complex seating solutions. When broken down into basic components, the options facing the seating and mobility team have become simplified. With some basic principles to follow, seating the complex individual no longer has to be a challenge.

Complexity is in the eye of the beholder. To simplify the situation, seating professionals need to have a basic understanding of what constitutes complexity. Similar to a mobility system, complexity can be broken down into seating needs and mobility needs. One area should be tackled at a time, often starting with the seating, as this is the basis for function. The mobility options become more obvious once a position for function is determined. We will be focusing on seating solutions in this article.

A complex client can present many ways. I tend to think of a complex client as an individual who is unable to “fit” into ready-made seating options or as someone who has very specific issues with seating and mobility that require out of the box thinking. It is often assumed that clients need to sit in a traditional manner: upright head balanced over upright and level shoulders, level and upright pelvis with hips flexed to 90 degrees, and knees and ankles fully supported in an aligned manner. When we consider how we often sit throughout the day, all of us could be considered complex in our needs. Once we get away from the “traditional seated posture,” we can be more successful in meeting clients’ needs, including postural, functional and comfort.

Complex clients need to be viewed by presentation, not diagnoses. Although funding for seating is often diagnostically driven, the seating team needs to focus on presentation while considering the client’s funding source. Complex clients can present with a variety of issues:

- Imbalanced or abnormal muscle tone
- Decreased strength and endurance
- Lack of active sitting skills due to absent or minimal function of the intrinsic musculature in the trunk
- Impaired sensation – hypersensitivity, as well as limited sensation
- Orthopedic/skeletal asymmetries – with or without the presence of neurological based muscle tone abnormalities

One of the common threads is a limited ability to participate in functional activities of daily living throughout the environments encountered on a daily basis.

EVALUATION PROCESS

As with all clients, the evaluation process is vital in determining seating needs. From the initiation of the evaluation, goals and outcomes will be determined. Through the interview process, needs and expected outcomes will be expressed by the client and caregivers. It is important that education also starts immediately. Clients with complex needs can have unrealistic expectations of the pursued equipment. For instance, a client with a severe scoliosis, pelvic obliquity and limited head control might identify that she would like to sit with her head in an upright position. It would be appropriate to address reasonable expectations of the recommended equipment.

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Although the mat evaluation is mandatory in all evaluation processes, it has even more importance when dealing with complexity. To fully understand motoric and postural limitations, a full picture of the client's abilities needs to be obtained. Since many complex clients present with motor limitations, sitting on the edge of a mat table may not be an option. Instead, the team members might need to use their bodies to provide the external support that the client needs to accomplish this task. As this support is increased or lessened, the evaluator determines how much external support is needed for an upright posture to be gained. This information helps lead to the recommendation of specific seating options. Individuals who are unable to sit independently or by using their hands on the mat table surface, often referred to as prop sitters, might need to spend some extended time in desired positions. The use of simulation can be helpful; either a planar simulator or a molding simulator can be used. Simulation helps the evaluation team and the client to determine if the desired position can be tolerated.

DETERMINING SEATING OPTIONS

As the evaluation process continues, discussion regarding possible seating options will occur. From the mat evaluation, the type, location and amount of external support will be identified. This can range from minimal support to total contact based on the client's needs. The mat evaluation findings are of utmost importance: Does the individual need contact at key points of control to maintain an upright posture or does he need total contact? What happens to his ability to participate in functional tasks when

varying levels of support are provided? Is correction or accommodation needed? Many questions arise leading the team to address three different areas: angles of support, orientation of support and surface contours.

ANGLES OF SUPPORT

When seating clients with complex needs, a seating system can be either a success or a failure based on how the angles of support are set up. An individual who has only 75 degrees of hip flexion cannot be expected to sit in a seat-to-back angle of 90 degrees. Instead, the seating needs to be set at 105 degrees to accommodate this limitation. If not accommodated, transfers will be difficult, and the client's seated posture will not be maintained. If a posterior pelvic tilt is uncorrectable to neutral but flexible into greater asymmetry, a 90-degree, seat-to-back angle will not work. Instead, an accommodated position as determined during the mat evaluation is needed. Many seating systems for individuals fail due to simple errors with angles of support (see picture 1).

ORIENTATION OF SUPPORT

Orientation in space tends to be underutilized. Although many bases with tilt in space are used, clients and caregivers may be reluctant to actively change the tilt position once the initial set up is complete. Tilt needs to be varied throughout the day to offer optimal work positioning, pressure redistribution opportunities and periods of rest. Again, when looking at our own sitting patterns, we constantly change position, create pressure relief and seek comfort. Individuals with complex seating needs are frequently unable to do this. Instead, we have a history of locking clients into a position for function without regard to comfort. The use of tilt, whether power or manual, attendant or self-controlled, can offer this opportunity. Keep in mind that anterior tilt can be as beneficial as posterior tilt, especially to re-orient one's visual field and create a work ready position.

Another consideration for orientation in space is lateral tilt. This, provided on the base either through power or manual options, can help re-orient head and upper trunk positioning, provide pressure redistribution and facilitate basic vital function. Lateral tilt is very effective and underutilized for individuals with complex orthopedic issues. Lateral tilt can be beneficial to clients who have limited tolerance for posterior tilt or experience extreme postural instability. The movement into lateral tilt impacts the nervous system in a lesser manner, eliminating the discomfort that can go along with posterior tilt.

CONTOUR OF THE SURFACES

As important as angles of support and orientation in space is the contour beneath and behind the individual (see picture 2). As previously discussed, complex sitters are frequently prop sitters, relying on varying degrees of external support to maintain an upright position. Support surfaces can come in several presentations: planar, density contoured through foam, generically shaped foam or custom made foam options. The shape of the contour is dictated by the complexity of the

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client. For an individual who lacks active intrinsic muscle control of her trunk but has no orthopedic issues, a ready-made seat with different types of foam might be adequate. Softer foam under the ischial tuberosities with firmer foam under the femurs and more distal buttocks might provide more than enough stability, positioning assist and pressure redistribution. For an individual with a severe pelvic obliquity, and multicurve scoliosis with rotation, a custom seat would be needed to accommodate the asymmetry; otherwise very little contact would occur between a planar seating system and the client's body surfaces. The mat evaluation determines the location and type of support that is needed in the back. The support beneath the pelvis and thighs will also dictate the amount and type of support that is needed behind the individual's back. Keep in mind that as complexity increases, the amount of contour will probably also need to increase. Be aware of the natural and asymmetrical curves of the back. When seated, the body does not have a prominent lumbar curve and so a back support does not need a large lumbar support built in. Individuals who are lordotic will migrate away from lumbar supports; individuals who are kyphotic will tend to slide forward. Seating components need to simplify complexity, not increase it.

OUT OF THE BOX THINKING

Complexity does not always fit within the "box" that we think of when it comes to seating and positioning (see picture 3). For prop sitters who display significant skeletal asymmetries that cannot be corrected, accommodation has to occur. For that reason, we always

needs to be open to "out of the box" solutions. Knees and lower legs do not need to be directly forward of hips and the pelvis. Attempts at correction of severe asymmetries usually lead to poor outcomes. Compromise needs to be discussed throughout the evaluation process as goals are being generated. If an upright head position is the utmost goal but a severe multicurve scoliosis causes the head to be positioned laterally off the side of the "box," consideration needs to be given to nontraditional angles and orientation. By allowing the lower extremities to sweep to one side and accommodating the pelvic obliquity, improved head and upper trunk control can be gained. The team needs to problem solve how the lower extremities will be properly supported. Again, angles, orientation in space and contour of the support surfaces will provide the necessary solutions.

If an individual presents with severe limitations in hip flexion, a combination of orientation, angles and contours needs to be used. When opening the seat- to-back angle, the hip limitations can be accommodated, however this may impact the client's visual field. When an open seat- to-back angle is used in conjunction with anterior tilt, a more appropriate visual field can be gained. To prevent the person from sliding forward when anteriorly tilted, an exaggerated custom contoured seat may provide a solution.

In summary, seating for individuals with complex needs can be simplified by looking at three aspects: orientation in space, angles and contours. By considering these areas throughout the evaluation process, function can be enhanced and problems minimized. The use of a skilled seating team facilitates the process when each member brings his or her expertise to the evaluation.

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PICTURE 1

PICTURE 1: The use of an open seat- to-back angle accommodates hip flexion limitations, leading to a more upright trunk and head position.



PICTURE 2

PICTURE 2: The key to successful wheelchair positioning is the location and amount of support provided.



PICTURE 3

PICTURE 3: Nontraditional postures can allow for improved function for clients with complex needs.

