



PEDIATRIC MOLDED SEATING

A CASE STUDY

REHAB CASE STUDY

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Children who require wheelchair seating are often placed in linear seating systems that have flat or generically contoured surfaces. Linear seating systems come in a wide range of sizes, are easily grown and seating angles can be readily changed as needed. Some children require additional support from a molded seating system. These systems provide intimate contact with the child for increased postural support, alignment and stability. By molding the seating system to the child, orthopedic asymmetries can be accommodated with good pressure distribution and support. This degree of postural control may slow the progression of spinal curvatures, control excessive muscle tone and improve stability and support for function. Molded seating systems do not “grow” as readily as linear systems and are more costly. Documentation must include why a less costly category of seating system will not meet the child’s needs.

Taylor is 8 years old and has cerebral palsy. He has significant extensor tone in his extremities and low tone in his trunk and neck. He has a tilt in space manual wheelchair and a linear seating system. He is unable to self-propel a manual wheelchair and is non-verbal. He was evaluated for positioning, access to a speech generating device and power mobility.

THIS DEGREE OF POSTURAL CONTROL MAY SLOW THE PROGRESSION OF SPINAL CURVATURES, CONTROL EXCESSIVE MUSCLE TONE AND IMPROVE STABILITY AND SUPPORT FOR FUNCTION. MOLDED SEATING SYSTEMS DO NOT “GROW” AS READILY AS LINEAR SYSTEMS AND ARE MORE COSTLY. DOCUMENTATION MUST INCLUDE WHY A LESS COSTLY CATEGORY OF SEATING SYSTEM WILL NOT MEET THE CHILD’S NEEDS.

Taylor is small for his age and, hopefully, has some significant growth ahead of him. He may be receiving a gastrostomy tube in the near future, which could lead to some much needed weight gain. He does not have any orthopedic surgeries planned, though his rehabilitation physician would like to place a Baclofen pump in the future once Taylor has grown. Each of these factors could certainly change his seating requirements.

In his current linear seating system, Taylor tends to sit in a posterior pelvic tilt, lateral trunk flexion to his left and forward head flexion (See Picture 1). He frequently extends with significant force. He does not appear comfortable in this seat, though does not indicate discomfort when asked. The pelvic belt was mounted at 45 degrees. This was changed to 60 degrees in an attempt to better limit the rotation of his pelvis into a posterior tilt. Taylor sits on an anti-thrust cushion, but this was quite deep, unweighting

ALTHOUGH TAYLOR HAS NOT YET DEVELOPED ANY FIXED SCOLIOSIS, HE IS AT HIGH RISK. WHEN EXAMINED IN SUPINE ON THE MAT TABLE, HE HAS ALMOST NO LATERAL TRUNK FLEXION TO HIS RIGHT AND EXHIBITS EXCESSIVE LATERAL FLEXION TO THE LEFT.

his pelvis. The “well” behind the anti-thrust curb was filled in a bit to match his anatomical needs. Taylor could be positioned in a neutral pelvic tilt in this seating system, however, despite these changes, he continues to extend into a posterior pelvic tilt and exerts so much force that he was developing redness and obvious discomfort below the ASIS (See Picture 2).

The position of the lateral trunk supports were adjusted to better control his lateral trunk flexion, however even three-point control was inadequate to maintain his spine in alignment. Although Taylor has not yet developed any fixed scoliosis, he is at high risk. When examined in supine on the mat table, he has almost no lateral trunk flexion to his right and exhibits excessive lateral flexion to the left. This asymmetry in range is a strong indicator of the direction in which a future curve will develop.

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PICTURE 1

Posterior pelvic tilt, lateral trunk flexion, head flexion in LSS



PICTURE 2

Continued posterior pelvic tilt despite several changes



PICTURE 3

Aspen Seating Shape Capture with Eric Harja and Noel Mojar



PICTURE 4

Taylor's Aspen Seating Orthosis



PICTURE 5

An unhappy, but aligned, Taylor (He is usually a happy guy)

HE WAS BETTER ABLE TO HOLD HIS HEAD UPRIGHT WHEN PROVIDED WITH A HEAD SUPPORT WHICH INCLUDED SUBOCCIPITAL AND LATERAL SUPPORT, HOWEVER, HIS HEAD POSITION WAS GREATLY IMPACTED BY HIS POSITION WITHIN THE SEATING SYSTEM AND HIS OVERALL EXTENSION PATTERNS.

Taylor was using a fairly generic head support. He was better able to hold his head upright when provided with a head support which included suboccipital and lateral support, however, his head position was greatly impacted by his position within the seating system and his overall extension patterns. More than a different head support was required.

After trying a number of modifications to the current linear seating system with minimal postural improvement, we decided to try a molded seating system. We were concerned that the modified linear system was not providing adequate postural support, alignment or stability. Taylor was not very functional in this system, and I hoped that increasing his support and stability would allow him to access a speech-generating device and power wheelchair. We were concerned that Taylor was at high risk for developing a spinal curvature and believed that a molded back would provide the best spinal alignment.

I met Taylor at Aspen Seating for an appointment. There, we re-evaluated his positioning needs and did a shape capture (See Picture 3). The shape capture

process was challenging. Taylor has some sensory issues and the thin plastic covering the shape capture bag didn't feel good to him. Fortunately, Mom had brought a long-sleeve sweatshirt and hood and he tolerated the process well while wearing this. Despite his small size, Eric Harja and Noel Mojar of Aspen Seating had to keep a firm hold of Taylor and maintain him in a flexed posture to successfully capture his shape.

Documentation was completed and funding approval was obtained on the first submission. Documentation

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TAYLOR WILL HAVE MORE LINEAR GROWTH THAN IN WIDTH AND THE BACK HEIGHT AND SEAT DEPTH CAN BE GROWN IN THIS MOLDED SEATING SYSTEM. IF HE COMPLETELY OUTGROWS THIS WITHIN THREE YEARS OF DELIVERY, THE ENTIRE SEATING SYSTEM WILL BE REPLACED UNDER WARRANTY.

included pictures of Taylor in the current linear seating system and in the molding bags to support our recommendations and illustrate what we were trying to accomplish. The fitting process takes some time, as Taylor had to sit in the new Aspen Seating Orthosis (ASO) for long periods of time to ensure that he did not develop any redness or other issues. Taylor tolerated the new seating system very well (See Picture 4).

This system maintains Taylor in postural alignment. His extension is well controlled, with the exception of his upper extremities (See Picture 5). With so much support and stability, Taylor was able to access a switch placed at the right side of his head to control – a speech-generating device. After giving him time to learn how to use his speech-generating device, he was also evaluated for power mobility. The ASO was placed into a demonstration power wheelchair and Taylor was able to drive using a head array.

TAYLOR WILL HAVE MORE LINEAR GROWTH THAN IN WIDTH AND THE BACK HEIGHT AND SEAT DEPTH CAN BE GROWN IN THIS MOLDED SEATING SYSTEM. IF HE COMPLETELY OUTGROWS

Growth is a definite concern. One of the reasons we recommended the ASO is that it can be grown. Taylor will have more linear growth than in width and the back height and seat depth can be grown in this molded seating system. If he completely outgrows this within three years of delivery, the entire seating system will be replaced under warranty.

Taylor is symmetrical at this time and has significant growth ahead of him. However, standard cushions and backs or a linear seating system were not able to address his needs. Taylor required intimate contact to maintain his postural alignment, control his extension tone and minimize risk of future spinal curvatures secondary to an imbalance of muscle tone on either side of the spine.

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