Not only is custom molded seating an appropriate intervention in pediatrics, it is frequently the key intervention that provides a seated environment which promotes optimal physiological, psychological and functional benefits. As we are the first generation of caregivers providing care to people with significant disabilities who have the potential to live as long as us, we have a responsibility to provide effective intervention that will help prevent postural and functional deterioration over time. It is essential that we take a proactive approach and provide early intervention to those with neuromuscular disabilities (See Picture 1).

When providing seating for the pediatric population, the paramount objective must be optimal fit. A wheelchair seating system’s mechanism for growth is only valid if that mechanism does not compromise efficacy over time. As the majority of growth in the pediatric population occurs distally in the long bones, the mechanism for growing a seating system should reflect this. A sliding mechanism of back support relative to seat for growth alters the contours and fit proximally in an attempt to address growth distally. Planar seating systems are often selected for their ability to “grow” in this fashion. This can result in a less than optimal fit at initial delivery and further compromise over time. A potentially more responsible seating intervention is a custom molded seating system that has the ability to be grown distally, to provide and maintain optimal proximal stability, while adapting for the client’s growth over time.

An end result of normal child development is the use of asymmetry for function and stability. We use asymmetrical postures at rest for stability, and we need asymmetrical postures for stability, control and power for function. Pathological asymmetry occurs when function and stability is sought in the absence of the ability to transition in and out of different postures. A child may get “stuck” in a certain posture due to abnormal tone or reflexes, for example an ATNR (asymmetric tonic neck reflex), or as an outcome of a postural habit or strategy that results in prolonged static asymmetrical postures. Wolff’s Law states that the body grows and remodels in response to the forces that are placed upon it (Wolff, 1986). Placing specific stress in specific directions to the body can help it remodel. Fulford and Brown (1976) state that when an individual spends many hours without moving easily and often into different positions, soft tissues shorten, ligaments stretch and gravity affects the person’s body, so that slowly and gradually it becomes distorted. Eventually, the body changes shape and no longer bounces back to where it started. They state that any person with movement impairment is at risk. Hill and Goldsmith (2010) state that the body is a mobile structure that is vulnerable to distortion, but also susceptible to restoration, as long as the correct biomechanical forces are applied.

So, if a child spends the majority of time throughout a 24-hour period in a posture that does not promote balanced growth and development, that child will experience chronic postural deterioration, and as Kittleson-Aldred and Russell (2017) state, biomechanical forces are at the root of these body shape distortions that complicate wheelchair seating for many people. The inability to move or be moved into different positions leads to a multitude of complications, which include further immobility, increased asymmetries, skin breakdown, as well as cardio-vascular, cardio-pulmonary and gastro-intestinal dysfunction. These secondary complications can ultimately result in premature death in this fragile population with complex health care needs. Fortunately, accurate seating and body orientation can harness the forces of gravity to promote symmetry and stability in sitting. Planar support surfaces, even generically contoured seating, often lack the accuracy and intimacy of fit, and the ability to create precise body orientations (in all planes) to counter destructive postural tendencies. Custom molded seating may prove to be the best first intervention, rather than the avenue of last intervention.
Persson-Bunke, Måns et al. (2012) state that children with cerebral palsy have an increased risk of developing scoliosis. The reported prevalence varies between 15 percent and 80 percent depending on the client’s age and the severity of the cerebral palsy. Scoliosis has been associated with problems in sitting, pressure injuries, cardiopulmonary and gastrointestinal dysfunction, and pain. It has also been shown to be associated with pelvic obliquity, windswept tendency, and hip dislocation. In children with cerebral palsy, a spinal brace may slow the rate of progression of the curve magnitude, but most curves with a Cobb angle exceeding 40 degrees will progress, also in adulthood, if not treated surgically (Persson-Bunke, Mans, et al, 2012). This speaks to the importance of early intervention to slow or prevent postural deterioration, thereby hopefully avoiding the need for spinal surgery. Effective custom molded seating can help prevent the progression of scoliosis, or at the very least, slow the deterioration, allowing a child to reach an age where they are nearly full grown, healthy, stronger and more capable of recovering successfully from a spinal fusion.

Should spinal fusion surgery eventually be indicated, it is essential to provide responsible post surgical seating. A spinal fusion typically results in a reasonable degree of postural correction, but it does not necessarily resolve the intrinsic forces that led to the scoliosis in the first place. The abnormal forces acting upon the client’s spine will likely continue to be present postoperatively. It is essential to provide optimal postural support and protection to prevent failure of, or complications from, the spinal fusion. Additionally, a spinal fusion typically results in a less mobile sitter, and thus creates an elevated pressure injury risk profile. When done correctly, custom molded seating can provide the intimate protection and application of forces to protect the fusion and support good skin health.

Custom molded seating has clear advantages for the growing and developing child who presents with consistent and persistent destructive postural tendencies that cannot be controlled by lesser planar and generic contoured seating. Justification for any custom seating must include objective information regarding the inability of lesser technologies to control those tendencies. In addition to an objective postural assessment, further assessment of functional skills relative to seating options should also be completed.

Optimal seated posture in a classroom setting is essential to maximize the learning experience. Costigan and Light’s study (2010) on the effect of the seated position on upper-extremity access to augmentative communication for children with cerebral palsy provides evidence of the positive effects of functional seating. Success with augmentative communication devices is often key for social interaction, inclusion and a feeling of success and well-being. Consistent alignment and proximal stability is also key for children with neuromuscular disorders who are using head switch access or an eye-gaze mechanism for communication, mobility or other functions and activities (See Picture 2). Without the benefit of optimal control, alignment and stability provided by effective custom-molded seating, these tasks may become too challenging and assistive technology is often abandoned, preventing children from achieving their highest potential for independence. How many times will a child swing a bat when all they get are bad pitches?

Custom molded seating is too frequently a last-ditch effort to seat individuals with rapidly deteriorating posture. When the intervention is delayed, non-reversible postural deterioration and its severe sequelae may have already occurred. Historically, custom molded seating was too heavy, bulky, difficult to keep clean, unable to manage heat and moisture, and had no mechanism to adjust for growth and change over time. Now, with advanced design and materials influenced by orthotic and prosthetic science, options for custom molded seating are readily available that are low in profile, adjustable for growth and change, easy to sanitize and efficient at managing heat and moisture. By addressing the shortcomings of traditional custom molded seating, these new designs make custom molded seating an appropriate choice for the growing and developing child.

Prevention of postural deterioration is most effectively accomplished by concurrently addressing both lying (night-time postural care) and sitting postures (Kittleson-Aldred & Russell, 2017). Children with mobility impairments are especially vulnerable to the force of gravity because their variety of positions and movement is significantly limited. Children are at special risk during growth spurts. Poor alignment in sleeping positions, when much of the growth takes place, can also contribute to long-term musculoskeletal complications such as scoliosis and joint dislocations.

As an adjunct to custom molded seating, a 24-hour postural care plan is recommended as a gentle, non-invasive, cost-effective way to promote health and quality of life for people with motor impairments. Postural care can help protect the shape of a person’s body, balance muscle tone, reduce pain, ease physical care, improve sitting posture and tolerance, and increase the quality of sleep. Too often seating professionals will make alterations to seating systems over time to accommodate deterioration, rather than look outside of the seating system for other factors contributing to the problem at hand. Complex and rapidly deteriorating postural and functional conditions cannot be treated effectively through seating alone. Thoughtful and accurate in-and out-of-wheelchair postural care may be the key combination of
IS CUSTOM MOLDED SEATING ... (CONTINUED FROM PAGE 37)

interventions for maintaining a person’s ability to sit long-term (see picture 3).

In summary, well-designed custom molded seating is an excellent intervention for the pediatric population. Again, early intervention is key for a good outcome. Fit should always be the primary goal, and growth should not hinder performance throughout the useful life of the product. The capability of precise fit, coupled with a biomechanically sound mechanism for growth, creates a no-compromise custom molded seating option for the pediatric population. Responsible custom molded seating is extremely beneficial to the well-being and overall development of children with significant mobility impairment (see Picture 4).

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