

## HELPING CHILDREN HAVE AN ACTIVE ROLE IN THEIR SEATING ENVIRONMENT

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A child's seating system should provide proper positioning and postural support, but not limit the child's ability to move and play an active role in their own habilitation. A dynamic seating system can help: strengthen, increase active range of motion, provide pressure relief, increase circulation and encourage active communication. This interactive program will include the initial results of a clinical study, case histories and the therapeutic rationale to support the utilization of a dynamic, active, seating system.

**An active seating system can aide in the development of motor skills.** Children, who are non-ambulatory and have not developed anti-gravity postural musculature to maintain their body in a variety of postures, consistently have poor to fair muscle strength. It is not reasonable to expect the child to strengthen, if they do not have the ability to move. How does one develop head and trunk control without opportunity? Whether a child extends due to atypical tone, agitation or merely to stretch and relieve pressure, it is very difficult to align the pelvis during extension. The child eventually returns from extension into sacral sitting or misalignment. A seating system that moves with the child helps eliminate the need for continual repositioning. Anatomically placed pivot points must be a component of the system to minimize shear and displacement during this movement.

**An active seating system can benefit the child with poor respiratory tidal volume.** Through extension, the child has the opportunity to stretch their Intercostals, and through movement, develop strength in musculature which permits active rib flare, depth of inspiration, and in some cases, improved oxygen saturation.

Many children will develop pressure issues related to shear, as well as prolonged pressure. **A seating system which allows for movement, while minimizing shear can improve comfort and reduce the potential for skin/tissue injury.**

These children need to communicate. **Interaction with others, exploration and communication, all require movement.** The ability to "animate" with changing postures during communication, move towards the person you are interacting with, or away from those that you do not wish to interact with, all require movement. In addition, we are "neurologically designed" to lean forward when our attention is required, whereas leaning backwards is our "neurologically relaxed" posture.

Children who need support to sit properly oftentimes feel trapped when they are surrounded with rigid postural supports, resulting in a battle between the child and the seating system. The rigid seating system, by nature of the hardware, usually wins. **A dynamic system works with the child, not against them.**

### Presentation of the Clinical Study:

#### "The Effects of Dynamic Seating on Spasticity and Joint Function in Children with Disabilities", University of Montana, Dr Michael Hahn

A research grant was recently awarded to Dr. Hahn from the Thrasher Research Fund to pursue basic and clinical research into the potential impact of our novel wheelchair design on functional mobility in children with cerebral palsy. The clinical measures used in this study include the Gross Motor Function Measure (GMFM), the Pediatric Evaluation of Disability Inventory (PEDI), the Modified

Ashworth Scale, and standard measures of passive and active range of motion (ROM). The GMFM is a standardized measure which evaluates gross motor function in lying/rolling, sitting, crawling/kneeling, standing, and walking. The GMFM yields a % score (with 100% representing full, normal function) and a disability classification level (1-5, with level 5 representing the most disabled). The PEDI is an adaptive assessment instrument that provides clear links between assessed functional capabilities and defined goal. It was developed to measure both fine and gross motor skills based on parent observation (through a structured interview). This device assesses both performance and capability of performing activities of daily living (ADL's) in the categories of self-care, mobility, and social function. The Modified Ashworth Scale is a common measure of muscle tonicity in response to passive stretch. Tonicity is scored on a scale from 0-5, with 5 representing the most hypertonic condition. This scale is inherently subjective. The measure's reliability has therefore been enhanced in the current study by ensuring that one single therapist administers the test with each child. The ROM measures are assessed by the same therapist, using hand held goniometers.

The expected outcomes of the study are:

- 1) increased range of motion and functional mobility in the hip, knee, and ankle joints,
- 2) decreased muscle spasticity, and
- 3) enhancement of independent daily function.

The success of these outcomes will greatly influence the child's interaction with the surrounding environment, maintaining neuromuscular function and providing enhanced mobility for coordinated development. This research will bring great benefits for children with CP, however children with other neuromuscular conditions should also benefit from the findings of this initial study. Upon completion of the initial funding period, a subsequent project will be proposed to broaden the target population to include children in under-represented areas within the United States and in developing countries.