


# Dynamic Seating: Why, Who and How

*(Encourage movement, for movement's sake!)*

Suzanne Eason, OT/L  
St. Mary's Home For Disabled Children



St. Mary's Home  
for Disabled Children  
*A special place for special children*

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## St. Mary's Home for Disabled Children

- Intermediate care facility for children and young adults with severe and profound disabilities.
- Mission statement: Provide quality, specialized care, within a home-like environment, so each child can achieve his/her fullest potential.
- Our department, Occupational Therapy Support Services, evaluates, creates and modifies most of the adaptive equipment each individual needs

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## For my peeps



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Risk taking



"Yea, though I walk through the valley of the shadow of death, I will fear no evil" Psalm 23  
"Yea, though I walk through the valley of the shadow of death, I will fear no evil" Psalm 23



**COURAGE**  
Do one brave thing today... then run like hell.

Do one brave thing today, then run like hell.

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And....

- \* Explore/research neuroscience and the changes that have taken place during the last 20 years.
- \* Research and try new equipment that is available.
- \* Provide a comprehensive review of dynamic systems and components that are available.



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What is Dynamic Seating?

- (or as I like to call it 'your turn to talk')

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Why choose dynamic seating?

- \* Comfort
- \* Pressure relief
- \* Improve range of motion
- \* Spasticity reduction
- \* Preservation of equipment
- \* Improve respiratory status.
- \* How about.....

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Neuroplasticity!

- \* The ability of the human brain to change as a result of one's experiences.
- \* Critical periods of neuroplasticity?
- \* Can happen at any age and at any time after an injury.



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- \* Neural connections can be encouraged in a challenged or damaged brain through the following:
  - \* Functional map expansion
  - \* Compensatory masquerade
  - \* Homologous region adaption
  - \* Cross model reassignment
  - \* Synaptic pruning

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### Research and Resources

- \* Dr. Edward Taub: Constraint Induced Movement Therapy
- \* Paul Bach y Rita: Brain port, sensory substitution. Father recovered from a severe brain stem stroke.
- \* Brain Science Podcast: Ginger Campbell, MD

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- \* Linder-Ganz et.al.: non- disabled individuals move every 6-15 minutes during prolonged wheelchair sitting.
- \* Dr. Jill Bolte Taylor: *Stroke of Insight*.
- \* Norman Doidge: *The Brain That Changes Itself*.
- \* Fumagalli research project: Dynamic seating reduced extensor thrusting and increased range of motion.

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Who

- \* Anyone who has a brain (yes, even us with no known or found brain damage).
- \* Focus on users with known damage:
  - \* Cerebral Palsy
  - \* Stroke, CVA
  - \* Traumatic Brain Injury
  - \* Progressive nuerological disorders: MS, Parkinson's disease



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All Movement is Purposeful..

- \* Motivation, intention, spontaneous, just right, these are the foundation of neuroplasticity.
- \* Reflexes are foundations of higher movement patterns.

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Why do we want our seating systems to be dynamic?



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- \* Traditionally, we have sought out stability for our users.
- \* Can we still find a balance between stability and movement?
- \* Dynamic Seating allows or enhances controlled natural movement patterns while providing stability. Allen Siekman

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### How do we sit, how do they sit?

- \* Can you imagine sitting in a static position all day?
- \* How do our clients look after sitting in a static position for most of their lives?
- \* Learned Helplessness: means a condition of a human being or an animal in which it has learned to behave helplessly, even when the opportunity is restored for it to help itself by avoiding an unpleasant or harmful circumstance to which it has been subjected

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### How can we encourage neuroplasticity?

- \* In our clients' seating systems.
- \* Extensive mat and functional evaluation (sensory, motor and ADL levels).
- \* Hands on feel (assessment) of our client's abilities.
- \* Interview the family, care takers and the old seating system.

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Two sources for equipment

- Commercial
- Customized



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Frames/mobility bases/seating systems

- \* Kids Up Inc:
  - \* Fast
  - \* Kids Rock 1, 2 and 3
    - \* All in one dynamic system, allows for hip and spine and knee movement.
  - \* Tilt
  - \* Currently unavailable: Dale Mandeville, "Lots of interest in the company and hoping to find other ways of providing this product".



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### Seating systems

- \* JCM Seating:  
Triton  
Dynamix
- \* R 82/Snug  
Seat: X panda  
dynamic  
seating



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### Backs

- \* Degage back



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More Backs

\* Miller's Adaptive Technology: Dynamic Backrest Interface



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Back Hardware

\* Freedom Designs: Econo-eze spring loaded back hardware



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Seats

- \* Corewerks: Dynamic seat
- \* Air Cushions



Wheelchair Seat Insert Frame without cushion.  
Adjustable Adaptor pan to mount seat to different wheelchair frames  
Hand Pump to allow stiffness of HT resistance to be adjusted.

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Headrests

- \* Whitmeyer: Dynamic forehead strap
- \* Stealth: Tone deflector



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Headrests

- Miller's Adaptive Technology: Dynamic headrest interface



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- \* Symmetric Designs: Axon Rotary Interface



- \* Freedom Designs: Spring Loaded Headrest

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Lateral thoracic pads

- \* JCM Seating and Leckey
- \* Thin light weight flexible lateral pads.



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### Footrest/front riggings

- \* Miller's Adaptive Technology:
  - \* Dynamic Articulating Footrest
  - \* Dynamic Gas Springs
  - \* Dynamic Coil Springs



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### Casters

- Frog Legs Suspension



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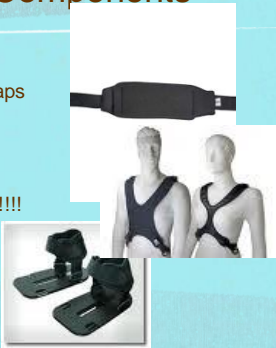
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Anterior Components

- Neoprene Chest Harnesses and Straps
- Neoprene ankle huggers
- Anything Neoprene!!!!



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Micro stimulation Backs/seating system

- \* Thevo twist: Thomshifen, distributed by Exomotion



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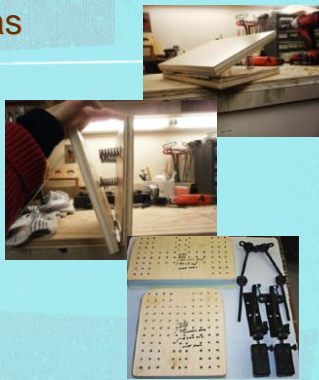
Custom Ideas

- \* Spring loaded backs:

- \* Hydraulic backs

The following parts make up the Dynamic backrest:

- Two Solid back inserts
- Two Miller's Adaptive Technologies Dynamic headrest interfaces
- Two Auto lock Mounting blocks
- Two Multi-plane Vertical adjustment bars
- Two Horizontal adjustment bars with Sockets



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Add air bladders...

- \* Backs
- \* Seats



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Rubber and Spring washers



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Foot rests/front hangers

- Extra foam!
- Neoprene hardware



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What improvements can the seating community provide?

- Thinner/stronger materials which allow for movement and then come back to a designated spot.
- Rotational components.
- Forward flexion.

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More Research

- Neuroplasticity: MRI's
- Gross Motor assessments to target changes
- Behavioral assessments to show improvements



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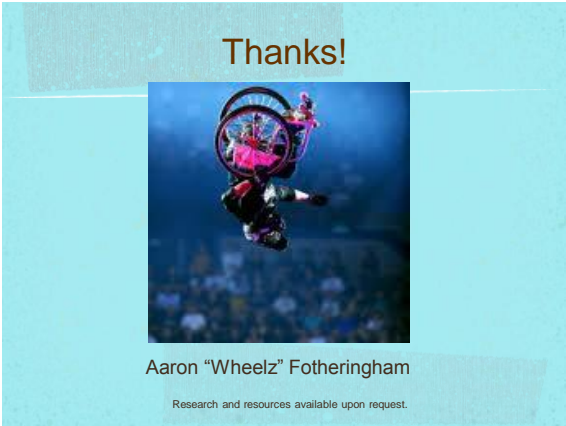
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