

**Client:** Jeff

**PT/OT/Supplier:** Suzanne Eason, OT/L

**Location:** Norfolk, VA

Jeff (not his real name) is an adorable eight-year-old boy who was born at 23 weeks gestation secondary to maternal infections. He was on a ventilator and was hospitalized for 10 months. He had grade 4 interventricular hemorrhages with hydrocephalus that was managed with ventriculoperitoneal shunts. This eventually led to periventricular leukomalacia. Jeff had numerous shunt revisions and currently has two internal shunts. Jeff came to live at St. Mary's Home in Norfolk, VA at one year of age. He had limited volitional active movement, no visual engagement, and difficulty self-calming.

His first mobility system was an adaptive stroller which supported him well but did not allow for self-propulsion and interaction with his environment. Jeff began to show improved volitional movement as well as trunk and head control. In 2010, when he was 3 years of age, we ordered him a mobility system that would encourage self-propulsion. On evaluation, Jeff had good alignment of his spine and pelvis and functional range of motion throughout his upper and lower extremities with the exception of limited ankle dorsiflexion. He had less active movement in his right arm when compared to his left. His gross motor abilities included rolling and, when placed in sitting, he needed support at his pelvis and trunk. We recommended a reverse configuration manual wheelchair with a one arm drive and a simple planar seating system with lateral trunk supports, head support, pelvic positioning belt, and shoe holders.

## Movement

Jeff did well with this system until he started to rock it with side to side movement of his trunk. We decided to enhance this movement for two reasons: 1. to safely encourage this movement he was seeking and, 2. to help keep the wheelchair and seating system intact. This movement could lead to wear and tear on the seating system and wheelchair frame.

## Dynamic Seating

Sometimes a commercial product does not exist and necessity becomes the mother of invention, requiring you build something with what you have available. The important thing is to provide a solution to the need.

We placed polymer washers between his lateral trunk support mounting brackets and the back at the point the brackets attached to the back and between his seat mounting hardware and the seat rail (Images right and below). The polymers we used were leftovers from various dynamic components. Jeff was able to rock side to side and



*Polymer washer between lateral trunk support mounting brackets and the back at the point the brackets attach to the back*

## Quick Notes

### Challenges:

- ✓ Rocking
- ✓ Wear and tear on equipment
- ✓ Risk of client injury
- ✓ Decreased function

### Areas affected:

- ✓ Back

### Equipment Used:

- [Dynamic Rocker Back](#)
- [Dynamic Footrests](#)
- [Static Footrests](#)
- [Dynamic Head Support](#)
- [Static Head Support](#)
- [Spreader Mount](#)

- ✓ Custom solution

the polymers absorbed this force and movement on each side. This provided the movement that he needed and craved, and his system remained in good working order.

## Development

After the dynamic addition to his mobility system, Jeff began to show improvements in his gross motor skills. He is now able to go from supine to a seated position with no assistance and can sit independently for a prolonged period of time with supervision. The dynamic components on his wheelchair enhanced his gross motor abilities.



*Polymer between the seat rail and seat mounting*

Jeff has grown considerably, and we are looking at a new mobility system to further enhance his movements. At this point, we are recommending use of polymers in the seat, back and lateral hardware.

## Results

Through evaluation and trials, dynamic components enhanced Jeff's life by contributing to his overall improvement in gross motor skills through neuroplasticity.

Jeff is now 12 years old and has recently undergone hip adductor releases, followed by 6 weeks in casts. He currently uses dynamic lateral trunk supports to accommodate his side to side rocking. Despite 15 degrees of camber, he sometimes tips his manual wheelchair to the side. He is being discharged from the St. Mary's Home.

**Suzanne Eason, OT/L**  
**Norfolk, VA**

"I believe that allowing a seating system to move with an individual will enhance his or her development through neuroplasticity."

*This case study was adapted from a NRRTS Directions article, "Enhancing Development with Dynamic Wheelchair Components", 2015.*

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### **About the Author**

Michelle Lange is an occupational therapist with 30 years of experience and has been in private practice, Access to Independence, for 15 years. She is a well-respected lecturer, both nationally and internationally and has authored numerous texts, chapters, and articles. She is the co-editor of *Seating and Wheeled Mobility: a clinical resource guide*, editor of *Fundamentals in Assistive Technology*, 4th ed., NRRTS Continuing Education Curriculum Coordinator and Clinical Editor of *Directions* magazine. Michelle is a RESNA Fellow and member of the Clinician Task Force. Michelle is a certified ATP, certified SMS and is a Senior Disability Analyst of the ABDA.

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