



# DYNAMIC SEATING – PROVIDING MOVEMENT FOR CLINICAL BENEFIT

## A PEDIATRIC CASE STUDY

Written by: **MICHELLE L. LANGE, OTR/L, ATP/SMS**

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### INTRODUCTION

We are wired to move. Most of us are born moving and continue to do so our entire life. Our bodies are designed to move – it is easier to move than to stay still! When movement is prevented or restricted, we experience negative physiological effects. Research has demonstrated that prolonged sitting has many negative health consequences, including increased stress on the tissues and systems of the body, pain, fatigue and decreased productivity. In the United States, the average adult sits for 9.5 hours a day (Matthews, et al., 2021)!

Many wheelchair users sit for the majority of their waking hours. Just as movement is important and healthy for everyone, movement is also important for people using wheelchairs. Movement is sometimes provided in a power wheelchair through power seating functions such as tilt, recline, elevating leg rests, seat elevation and standers. Tilt and seat elevation do not actually cause movement of the client's body parts in relation to one another, as the seated angles do not change. While some of these features are available on manual wheelchairs, the client is typically dependent on others to activate this movement.

Depending on the individual and the required seating system, the client may not move very much within that seated position. Most wheelchair seating systems are static. If the client moves, they will move out of alignment with the seating surfaces. Some clients can move in relation to their seating system and independently return to an aligned position; however, many clients will require repositioning by a caregiver.

Dynamic seating can provide movement in response to client forces. Depending on the force exerted, a dynamic back, dynamic

footrests and/or dynamic head support hardware will move a corresponding distance. The design of these components is critical to ensure that the client can move and maintain postural alignment within the seating system. This is achieved by placing the pivot points of the dynamic seating components as close as possible to the body's natural pivot points, particularly at the hips and knees.

Dynamic seating is used in three primary clinical scenarios. First, it is used to diffuse force that could otherwise lead to client injury, equipment breakage, loss of position within the seating system, decreased sitting tolerance, increased agitation, decreased function, and further increases in extension and energy consumption. Secondly, it is used to allow movement to provide sensory input, increase alertness and decrease agitation. Thirdly, dynamic seating can improve postural control, stability and function.

### MEET JOZIE

Meet Jozie, a 3 ½-year-old little girl with the diagnoses of epilepsy and West syndrome. West syndrome is now often referred to as infantile spasms syndrome and is characterized by spasms, developmental regression and hypsarrhythmia (a highly irregular pattern of brain electrical activity). She underwent a corpus callosotomy in April 2021 (at age 10 months) to better control her seizure activity by dividing the corpus callosum, the bundle of nerves connecting the two cerebral hemispheres. Jozie reportedly now has on average one seizure a day (tonic clonic, followed by spasms), typically while



**FIGURE 1** Jozie in a Rifton Activity Chair with a dynamic back.

asleep. She has cerebral visual impairment, and her hearing is normal. Jozie can sit independently for 20 to 30 minutes, though can fall over during this time. She can roll from her stomach to her back, is non-ambulatory and non-verbal. She receives physical, occupational and speech language therapies at home. Jozie also receives augmentative communication therapy at an outpatient clinic.

### INITIAL EVALUATION: AGE 2 ½ YEARS

When I first met Jozie, she was 2 ½ years old. She used a standard baby jogger style stroller and highchair. She also had a Leckey Squiggles stander (now under Sunrise Medical), Firefly Splashy bath seat, Rifton Pacer gait trainer and AFOs. Jozie spent time on the floor, in a Lazy Boy chair and in her highchair, which she was outgrowing. The standard stroller did not provide adequate postural support and so she was unable to sit upright in this base.

### MAT EVALUATION

Jozie had full range of motion with slight hamstring tightness. She was able to sit on the edge of the mat table with minimal assistance, though would lean into me if I moved away. Jozie sought out movement and other sensory input; particularly she liked to rock from her hips. This rocking appears to calm her, as well as increase alertness. She was showing us that she wanted, and needed, to move.

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## REHAB CASE STUDY (CONTINUED FROM PAGE 29)

### EVALUATION:

Jozie needed a mobility base to transport her from location to location and provide adequate postural support. We discussed adaptive strollers vs. manual wheelchairs and decided on a manual wheelchair to provide maximum growth, support an appropriate seating system and support a mounting system for a future speech generating device. I thought she would also benefit from a dynamic back, as she tended to rock and seek out movement.

Jozie was placed in our clinic's Rifton Activity Chair with a dynamic back (Figure 1 shows Jozie in the activity chair moving the dynamic back). This activity chair provided more support than her standard stroller and simulated many of the postural supports we were considering. This adaptive seat also allowed us to see how she responded to a dynamic back. She quickly found that the back moved if she extended at her hips, and she began to rock. She enjoyed this movement, which appeared to increase her sitting tolerance as well as calm her.

### RECOMMENDATIONS

We recommended a tilt-in-space manual wheelchair to allow a position of rest if she fatigues due to her young age and post-seizure fatigue. This base needed to be stable so that it would not tip due to her rocking movements. We recommend a Ki Mobility ARC pediatric manual wheelchair with rotational tilt to maintain stability. This base was also compatible with a Seating Dynamics dynamic back (the Dynamic Rocker Back interface). We recommended an off-the-shelf cushion (Comfort Company Embrace with anti-thrust modification) with a pelvic positioning belt (mounted at 60 degrees to limit posterior pelvic tilt), and an off-the-shelf back (Comfort Company Acta Embrace) with swing-away lateral trunk supports and a chest strap. The footplates were padded as she often goes barefoot or wears only socks. A simple contoured head support (Stealth Products Adjustable Comfort Plus) was added to provide posterior and lateral support during tilt. Finally, a tray was ordered to provide a work surface.

Other dynamic components were not recommended. Jozie did not require dynamic footrests as she does not tend to extend her legs. Dynamic head support hardware was not indicated as she does not extend at the neck. Her movement was confined to a rocking motion at the hips, which was best addressed with a dynamic back.

We also recommended a Rifton activity chair with mobile base, tilt, hi-low base and dynamic back. This provided an alternative seat that could be used at various heights for different activities in the home.

Finally, the current bath seat was not working well for Jozie as she had to sit up straight and the postural supports got in the way of hygiene and her movements. Instead, we recommended a Leckey Advance bath chair, which could support her in a reclined position. This was much safer if Jozie had a seizure during bathing, as well.

### RESULTS

Jozie fit well in her new manual wheelchair, as adequate postural support was provided (see Figures 2 and 3). This support improved her ability to access her speech generating device via scanning using switches by her hands.

At the delivery, the dynamic back was configured with elastomers of medium resistance, which is the default. Although the dynamic back moved slightly in response to her hip extension, the resistance was too high (see Video 1). Yellow (soft) elastomers were placed in the dynamic back, which then responded more readily to her rocking movements (see Video 2).

### RE-EVALUATION: AGE 3 ½ YEARS

Only eight short months after delivery, Jozie was already growing out of her seating system. She had undergone considerable growth in this time period. The current cushion was at maximum growth, and she was tending toward a posterior tilt in sitting. A new cushion that incorporated future growth and provided more anti-thrust build-up in the contour was recommended. Used in combination with the current dynamic back, this would promote a more neutral pelvis.



When a client extends their hips, the body can push off the back of the seating system into posterior pelvic tilt. The dynamic back moves in response to these forces, diffusing much of the force and guiding the client to return to a neutral upright position. As the pivot point is at the same level as the natural pivot point of the hips, movement is allowed into mild hip extension and back to upright without a loss of posture.

The off-the-shelf back was also at maximum growth, already being raised 3 inches above the surface of the cushion. If this was raised further, her posterior pelvis would be unsupported and collapse into a posterior tilt.

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**VIDEO 1**

Jozie moving the Dynamic Back, though not very far, indicating a softer level of resistance was required.

**VIDEO 2**

Jozie more readily moving the Dynamic Back with a Soft (Yellow) level of resistance.

**FIGURE 2** Jozie in her new seating system from the front.



## REHAB CASE STUDY (CONTINUED FROM PAGE 31)

A new, taller back was recommended with swing-away lateral trunk supports. A new chest strap was also recommended. The new back incorporated a bi-angular shape to promote an upright pelvis and trunk extension. The swing away lateral trunk supports were curved as Jozie tended to get her arms trapped between her body and the current flat lateral trunk supports.

Even though quite young and not weighing very much, Jozie has been rocking in her dynamic back for eight months and has worn out the current elastomers. These were replaced with new Yellow (soft) elastomers, as this level of resistance was still appropriate. As the current elastomers were worn, we noted that the back was “sagging” into a more open seat-to-back angle. Her parents noticed that it was getting more difficult to latch (lock-out) the dynamic back, as the elastomers were worn. Replacing the elastomers restored the correct seat-to-back angle, eased latching the dynamic back and made the back more responsive to Jozie’s movements.

### RECOMMENDATIONS

A new cushion that incorporated future growth and provided more of an anti-thrust build-up in the contour was recommended (Comfort Company Inception with contoured anti-thrust). A new, taller back was recommended with swing-away lateral trunk supports and chest strap (Stealth Products True Forming linear back with I back, biangular back shape and curved swing-away lateral trunk supports). The worn elastomers in the dynamic back were replaced with new elastomers of the same resistance level.

### RESULTS

Jozie has received her new seating and is positioned well. She is well aligned, stable and able to move at her hips without loss of position. The new seating system has growth built-in to accommodate her growth, we hope, for a long time.

Without dynamic seating, Jozie would certainly “fit” in her wheelchair seating system. The seating system would match her body dimensions and provide postural support where needed. However, despite appropriate seating, Jozie’s repeated hip extension would continue to push her into a posterior tilt. And a



**FIGURE 2** Jozie in her new seating system from the side.

lack of movement would lead to increased agitation and decreased alertness. Providing movement as a part of the wheelchair and seating system was a critical part of the overall solution.

### CONCLUSION

Movement is important and healthy for all of us. Let’s not forget that movement within the seating system is a valid wheelchair seating goal!

### FUNDING UPDATE

The Centers for Medicare and Medicaid Services approved Healthcare Common Procedure Coding System Level II code E2398 “Wheelchair accessory, dynamic positioning hardware for back” effective January 1, 2020. A Preliminary Medicare Payment Determination was made in May 2022, comparing E2398 to E1015 “Shock Absorber for Manual Wheelchair.” When CMS is trying to determine a fee schedule for a code, one of their methods is to do a cross walk, which compares that item to



# Made to Move

## Dynamic Benefits

- ✓ Decrease Pain, Injury & Agitation
- ✓ Prevent Equipment Breakage
- ✓ Maintain Client Position
- ✓ Increase Sitting Tolerance
- ✓ Increase Alertness & Function



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another coded item which already has a fee schedule. The payment determination for the code is then based upon the cost of the item which already has a fee schedule. The proposed reimbursement rate was between \$152.55 to \$183.02, far below the cost to manufacture any Dynamic Back. Despite significant industry efforts over several years, the new payment schedule went into effect April 1, 2024. Seating Dynamics is working hard to continue to provide the Dynamic Rocker Back to those who need this intervention.

#### REFERENCES

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#### CONTACT THE AUTHOR

Michelle may be reached at  
[MICHELLELANGE1@OUTLOOK.COM](mailto:MICHELLELANGE1@OUTLOOK.COM)



Michelle Lange is an occupational therapist with over 35 years of experience and has been in private practice, Access to Independence, for over 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* and is a Friend of iNRRTS, RESNA Fellow and member of the Clinician Task Force. Lange is a RESNA certified Assistive Technology Professional and Seating and Mobility Specialist.