Dynamic Seating: A Case Study

MICHELLE LANGE, OTR, ABDA, ATP
ACCESS TO INDEPENDENCE

I HAVE ALWAYS BEEN intrigued by the concept of dynamic seating. I have hated the fact that my clients lose range of motion when I place them in a seating system. Yet I have been fearful that movement will increase tone, strengthen already dominant muscle groups and negatively impact access to assistive technology. We have experimented with options over the years, but I never was very satisfied with the commercial and custom solutions we tried.

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Spencer is a 12-year-old boy with cerebral palsy. When I first evaluated Spencer, he was already positioned well in a molded seating system in a tilt-in-space manual wheelchair. He had a speech generating device, but was having difficulty accessing it with his switches. If Mom held him in her lap on the floor and held the switches, Spencer was able to accurately use two-switch scanning to communicate. Mom acted as both a dynamic seating system and dynamic switch mounts, meaning that she moved according to Spencer's movements and needs. Spencer really needed to access his speech generating device from the manual wheelchair and that is why he was referred for an access evaluation.

I started with his positioning, of course. It is hard to determine the best place to mount a switch until positioning is addressed. Although Spencer was positioned well and appeared to have adequate stability in the system, his arms were quite flexed, scapulas retracted and his upper trunk extended, as if he was trying to stay upright by "fixing." His parents reported that over time it was becoming more and more difficult to put a shirt on Spencer due to loss of elbow extension. I tried to provide more support at the anterior trunk, but this did not reduce this posture. I checked his seat to back angle and found that this was closed at about 85 degrees. Despite being partially tilted most of the time, I thought Spencer may demonstrate an improved posture with a more open seat-to-back angle. I was unable to make this change on the spot (since he had a one-piece molded seating system), but the manufacturer was able to increase the seat to back angle to 100 degrees. We chose this angle based on the position his mother held him in while seated on the floor. With this change, Spencer's arms were not quite as flexed and he was able to start using his arms for some switch access.

In addition to this tendency toward elbow flexion and scapular retraction, Spencer extended quite a bit in his seating system and had broken a number of components, primarily footrest hangers and headrest mounts. He was quite strong! He didn't move around very much, he just extended – and stayed extended. We had already opened his seat to back angle and his seating system and manual wheelchair were not that old, but I had another idea. Working with our local supplier, we were able to get a demo of a Kids ROCK dynamic manual wheelchair. This unique wheelchair extends at the hips and knees when the client extends. Springs guide the chair back into the starting angles. This was not going to work with the custom molded seat, since it was a one-piece system. Spencer was placed in the standard linear seat that was on the demo chair. He extended and came back to flexion – and grinned! He extended a few more times and then something unexpected happened. His arms came down. Instead of that elbow flexion, scapular retraction pattern, Spencer's arms were relaxed. His elbows came down to about 90 degrees that first day, so that his forearms actually touched

CONTINUED ON PAGE 46

CONTINUED FROM PAGE 44

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the armrest pads. That had never happened before.

Spencer tried the chair for a few weeks. He did tend to get stuck in extension at times, even with the strongest springs offered on this frame. The manufacturer worked with us to obtain even stronger springs that worked better for Spencer. The family reported that dressing was easier since Spencer's arms were more relaxed. Before we started pursuing funding, I wanted to make sure we could find independent switch access in this seating system and frame.

When in his Mom's lap, Spencer was able to use the left side of his head to access one switch and his right arm (using elbow flexion) to access a second switch. This allowed him to use two switch scanning to control his speech generating device. Once positioned in the Kids ROCK manual wheelchair, Spencer was able to use a switch by the left side of his head. This was eventually mounted on lateral swing-away hardware as a part of a Stealth headrest. Spencer had not been able to use a switch by his hands when in his wheelchair previously because his elbows were so flexed. In the Kids ROCK chair, Spencer was able to access a switch placed above his right hand. He still used elbow flexion, but it was a small, controlled movement that did not elicit any overflow.

Things were looking good, with the exception of funding. Even with all the benefits of the new system, Spencer still had a seating system and manual tilt in space wheelchair that were not very old. Sure enough, Medicaid denied the Kids ROCK chair. The family was so pleased with this system and its impact on Spencer's positioning and access that they purchased the chair themselves. Fortunately, they were able to buy the demo that Spencer had been using, saving them money and allowing him to continue using the trial chair we had been modifying.

That was about two years ago. Spencer is still using the Kids ROCK chair successfully and now accesses his speech generating device exclusively from his manual wheelchair. The family was concerned about Spencer's risk for worsening scoliosis and so worked with the manufacturer of the molded seating system, who developed a two piece system that is working very well for him.

Dynamic seating met Spencer's needs in a number of ways. His positioning improved, particularly

his arm position. This new upper extremity relaxation has made activities like dressing easier. He is able to independently access his speech generating device from the wheelchair. He no longer breaks components on the wheelchair frame. And, he likes it! That is the best outcome of all.

ABOUT THE AUTHOR:
Michelle can be reached at 720-333-2661 or michellelange@msn.com.