

A TRANSITIONAL DRIVER'S LICENSE:

MOBILITY AND TEENS

One of the unique aspects of providing power wheelchairs to children is that mobility needs tend to change. As children grow, less supervision may be required, the environments in which the child moves expand and motor abilities often change. Children with conditions such as Duchenne muscular dystrophy and spinal muscular atrophy, type II, may be transitioning to power mobility in the early teen years. Children with increased muscle tone as a result of cerebral palsy or traumatic brain injury experience a change in biomechanics due to growth, range of motion loss, orthopedic changes and ongoing tone management. These changes may affect the teen's ability to control the power wheelchair, and new drive controls may be required. Children with developmental delays who may have struggled with power mobility use at younger ages, may be developmentally ready for this task in the teen years.

Jonathan is a 13-year-old teenager with the diagnosis of cerebral palsy. He was referred to this evaluator to assess his current seating and access to a speech generating device, as well as determine his potential to use a power wheelchair. Jonathan was seated in a linear seating system including an anti-thrust seat, biangular back, pelvic and thigh lateral supports, trunk lateral supports, shoeholders with ankle straps and head support. As he grew and the 90 degree footrest hangers were extended, the footplates began to interfere with the front casters, and so the family began to position him in a mild tilt at all times. He does not have adequate hamstring length for a different angle hanger. Despite his young age, Jonathan had a past pressure ulcer and was still getting red over his ischial tuberosities and sacral areas with prolonged sitting. He has a mild lateral scoliosis at this time and significant muscle tone. He has begun puberty, and his dad is very tall. As such, Jonathan

HE NEEDED A LOT OF CALM AND SIMPLE REASSURANCE, AS HE CAN BECOME QUITE ANXIOUS AT TIMES AND THE ENTIRE EXPERIENCE WAS RATHER OVERWHELMING.

could be entering a growth spurt which could lead to further spinal asymmetries. With the current pressure concerns and potential for orthopedic changes, a molded seating system was recommended to better address these issues.

Jonathan had reportedly been evaluated for power mobility at ages 3 and 5 years, though a power wheelchair was not recommended at that time. The reasons were not clear, though it appears that Jonathan did not yet see a power wheelchair as a potential means to move around the environment, but rather as something the team was "making him do."

This underscores the importance of approaching a power mobility evaluation at a developmentally appropriate level. It is critical to engage the child, to get down to their level, crack jokes about Sponge Bob, etc. Jonathan may still not have been ready at these young ages, but evaluation of young children can be a process over multiple evaluations. Unfortunately, Jonathan did not receive any pre-mobility training to develop his skills and prepare him for future power wheelchair use. Finally, it appears that the only access method trialed at these young ages was a joystick, and Jonathan has little volitional control of his hands, at least currently.

Back to present day. The team decided to wait for Jonathan to receive his new molded seating system, an Aspen Seating Orthosis (ASO), before performing a power wheelchair evaluation. This evaluator had been working with Jonathan to determine his best access method for communication and he was using a switch by the left side of his head quite well for single switch scanning. He demonstrated strong potential to use his head for driving, as well. Furthermore, Jonathan was doing quite well on his new speech generating device and demonstrating cognitive skills that indicated that he should certainly be able to understand power wheelchair use.

Jonathan's ASO was placed in a demo power wheelchair with a Stealth Products iDrive head array (see picture 1). This tripod headrest has embedded

PICTURE 1



Jonathan seated with head array

proximity switches for control of forward, left and right directional control. He very quickly demonstrated cause and effect, stop and go concepts, directional concepts and fair problem solving and judgment. At one point, he indicated that he wished to go outside. It was cold, and he was told that we could not do so. He drove with good accuracy directly to the door leading outside. We were so pleased with his driving abilities that we all went out with him for a while as he drove in the parking lot. When told it was time to go back in, Jonathan very intentionally avoided the ramp back to the entrance! He did not want to stop driving, despite the cold – a great sign! Jonathan demonstrated strong readiness for a power wheelchair, and I anticipated that he would be a proficient driver with some mobility training (see picture 2). He was very motivated and careful, even if he didn't follow directions to go back inside.

Next, the team needed to put together an order. Jonathan required more stability to optimize his driving and so a suboccipital pad was added to the head array. This pad not only provides stability, but also provides a “starting point” or template from which to move from to activate switches. A midwheel drive power base, the Permobil M300, was recommended as midwheel drive requires less switch activations

(CONTINUED ON PAGE 48)

PICTURE 2



Driving with the head array in a demo chair

A TRANSITIONAL DRIVERS LICENSE (CONTINUED FROM PAGE 47)

to get from Point A to Point B than front or rear wheel drive configurations. This is because less switch activations are required to compensate for the front and rear casters. Tracking technologies were also recommended as this has been shown to increase efficiency (less switch hits, less time) for head array drivers by approximately 69 percent (Lange, Brown, 2013). A power tilt was added, so Jonathan could shift his weight; particularly important with his pressure issues. The R-Net 2 electronics were programmed in sequence, so Jonathan could access features such as reverse, speeds and power seating through the drive control without having to visually monitor the display. This required a reset switch, which was positioned by his left hand. Jonathan has adequate vision for driving, but not to read the display. Finally, an input output module and interfacing cable were required, so Jonathan could access his speech generating device through the left proximity switch of the head array from Auxiliary mode.

After Jonathan received his new power wheelchair, he was seen again. Speeds and acceleration had to be reduced a bit to allow Jonathan time to react and change course. He needed a lot of calm and simple reassurance, as he can become quite anxious at times and the entire experience was rather overwhelming. Once he was reassured and the wheelchair programmed, Jonathan settled down and drove his new chair with great potential. His team was instructed in some mobility training techniques, and I believe he will do quite well.

Jonathan may not have been ready for power wheelchair use at a younger age developmentally. Perhaps he could have been with pre-mobility training to develop the skills required. He may have simply required a different access

method to provide independent mobility sooner. Even if Jonathan had been successful in power wheelchair driving at a younger age, his access could have changed as his body changed – particularly during those teen years.

If you are working with kids using power wheelchairs, keep an eye on them. As their bodies change from child to adult, physical growth occurs. Body changes can also lead to significant changes in function. A child who was able to get around in a manual wheelchair, may now require power, and kids who could drive a power wheelchair with one driving method may require another. One of the greatest challenges of assistive technology is meeting client's changing needs. A one-time evaluation is rarely all that is required. If a client requires new equipment or intervention, it isn't because we didn't get it right the first time, it may be because both client and the technology continue to change.

CONTACT THE AUTHOR

Michelle may be reached at MichelleLange@msn.com.

REFERENCES:

LANGE, M. AND BROWN, L. TRACKING TECHNOLOGIES: A PHASE 1 STUDY TO VALIDATE EFFICACY. MOBILITY MANAGEMENT. JUNE 2013.