

DIRECTIONS

THE JOURNAL OF COMPLEX REHAB TECHNOLOGY

ISSUE 2 OF 2026 | \$10.00 USD

Innovation in Motion

Technology, Design, the Future of CRT



REHAB CASE STUDY

Eden's Journey

Empowered by
Perseverance,
Support,
Technology,
and Purpose

Eden Schroeder
Jessica Presperin Pedersen

Page 41

CLINICAL PERSPECTIVE - CEU ARTICLE



Innovation in Motion

Advancements in CRT that will
Move us into the Future

Jay Doherty, OTR, ATP/SMS

Page 24

MOMENTS WITH

MADSEN

Page 6

LIFE ON WHEELS

Page 15

NOTES FROM THE FIELD

Page 10



IN THIS ISSUE

- 4 FROM THE iNRRTS OFFICE**
From Science Fiction to Standard Practice:
How Assistive Technology Has Surpassed Our
Imagination
- 6 MOMENTS WITH MADSEN**
Strengthening CRT's Future Through Connection,
Professional Development
- 10 NOTES FROM THE FIELD**
Rainer Olson: Here for the Long Haul
- 12 INDUSTRY LEADER**
Beavers' Eye-Gaze Technology Supports
Independence for People with Disabilities
- 15 LIFE ON WHEELS**
We Are The Contingency Plan
- 18 CLINICALLY SPEAKING**
Centering Families and Real Life in Our Work
- 21 TECH CORNER**
Innovation in Motion: Emerging Technologies Are
Transforming CRT
- 24 CLINICAL PERSPECTIVE - CEU ARTICLE** 
Innovation in Motion: Advancements in CRT That
Will Move Us Into the Future
- 32 CLINICAL EDITORIAL**
Clinical Commentary: Advances in Power
Mobility for Children and Adults with Non-
Ambulant Cerebral Palsy
- 35 OP ED**
AI with Purpose: Improving Access Through
Practical Innovation
- 37 DIRECTIONS CANADA**
CRT Innovations Advance in Canada
- 41 REHAB CASE STUDY**
Eden's Journey: Empowered by Perseverance,
Support, Technology and Purpose
- 43 RESNA**
RESNA Update: Tech Tuesdays, Events, New
Training Opportunities
- 44 CRT UPDATE**
NCART's Update on CRT Regulations,
Opportunities
- 46 CLINICIAN TASK FORCE**
Charting AI-based Technologies Impact in CRT
Documentation

FROM THE EDITOR-IN-CHIEF

Spring 2026 has officially arrived, and we're excited to share Volume 2 with you. This issue highlights timely, practice enhancing articles, including features on emerging technology. As an industry, we must continue embracing innovation for our benefit and, most importantly, for the benefit of the remarkable customers we serve. Thank you to all contributors for continually elevating the quality of our content.

Amy Odom, BS

EDITOR-IN-CHIEF
Amy Odom, BS

DESIGN
Sydni Oviedo-Blomquist
- Hartsfield Design

EDITORIAL ADVISORY BOARD
Andrea Madsen, ATP
Bill Noelting
Kathy Fisher, B.Sc.(OT)
Weesie Walker, ATP/SMS

IN EVERY ISSUE

- 49** Renewed iNRRTS Registrants
- 48** CRT Supplier Certificate Program
- 48** Former iNRRTS Registrants
- 48** New iNRRTS Registrants
- 48** New CRTS®
- Back Cover** Charter Corporate Friends of iNRRTS
Corporate Friends of iNRRTS
Association Friends of iNRRTS

ADVERTISERS

| | |
|------------------|---------|
| Clarke HC | Page 34 |
| iNRRTS | Page 03 |
| Numotion | Page 36 |
| MK Battery | Page 45 |
| Kalagon | Page 23 |
| Quantum | Page 09 |

THE OFFICIAL PUBLICATION OF
The International Registry of
Rehabilitation Technology Suppliers
VOLUME 2026.2 | \$10.00 USD

The opinions expressed in **DIRECTIONS** are those of the individual author and do not necessarily represent the opinion of the International Registry of Rehabilitation Technology Suppliers, its staff, board members or officers. For editorial opportunities, contact Amy Odom at aodom@nrts.org.

DIRECTIONS reserves the right to limit advertising to the space available. **DIRECTIONS** accepts only advertising that furthers and fosters the mission of iNRRTS.

iNRRTS OFFICE
5815 82nd Street, Suite 145, Box 317, Lubbock, TX 79424
P 800.976.7787 | www.nrts.org

For all advertising inquiries, contact Bill Noelting at bnoelting@nrts.org

CRT Supplier Certificate Program



First & Only Education Program Designed Specifically for CRT Suppliers

Learn More <https://b.link/CertProg>



**Interactive On-Line
Self-Paced Modules**

**IACET CEUs Awarded for
Each Course**

**Designed Specifically for
CRT Suppliers**

**Assessment & Certificate
Managed by iNRRTS**

**Comprehensive Content by
Experts in the Field of CRT**

Three Certificate Levels

From Science Fiction to Standard Practice: How Assistive Technology Has Surpassed Our Imagination

WRITTEN BY: Jason Kelln, ATP, CRTS[®]

Every professional in the assistive technology and Complex Rehab Technology field shares a common origin story. Few of us chose this work because it promised ease or glamour. We entered this field because, at some point in our lives, we witnessed the transformative power of the right technology placed in the right hands at the right moment. We saw independence restored. We saw identity and dignity protected. We saw someone's world expand in ways that were once unthinkable.

For many, including myself, that moment of inspiration traces back to childhood. My own spark was lit by episodes of "Star Trek," where imaginative technologies shaped the lives of entire crews: voicedriven computers, universal translators, instantaneous communications and devices responsive to subtle gestures. As a child, I viewed those tools as pure fantasy, the stuff of distant futures. At the time, no one could have imagined that these concepts would eventually move from television screens into everyday clinical practice.

Yet here we are, decades later, and the landscape of assistive technology in 2026 is not merely catching up to science fiction; in many ways, it has surpassed the imagination of those early writers and futurists.

A Field That Has Moved Beyond What Was Once 'Revolutionary'

To appreciate how far we've come, it helps to reflect on earlier milestones. Consider the introduction of the TARSYS tiltinspace system, which many of us recall as groundbreaking. It represented a major leap in posture control, pressure management and personal dignity. At the time, it truly felt like we were experiencing the future.

But in hindsight, innovations like TARSYS were only the beginning. The systems we work with today have evolved dramatically, becoming smarter, more intuitive and profoundly more personalized than anything envisioned in those early years.

Modern power mobility platforms now integrate a spectrum of advanced access methods, including:

- Voiceactivated actions for power seating systems and environmental control systems
- Headtracking interfaces that enable precise directional movement
- Gestureresponsive controls that interpret subtle motion patterns
- Comprehensive eyetracking technologies that allow users to drive, communicate and manage digital environments
- Tonguedriven systems designed for individuals with the most significant physical limitations

These innovations reflect a shift: We once tried to adapt people to technology, today we adapt technology to people. What once seemed extraordinary has become standard, and what was once standard is now viewed as a baseline expectation.

The Emergence of Connected Intelligent Mobility

Perhaps the most remarkable transformation is the seamless integration of mobility equipment with smarthome

ecosystems. Home automation has become far more than a convenience; it is a vital extension of personal independence.

Individuals using home automation and assistive technology can now open doors, adjust lights, regulate indoor climate, send messages, initiate video calls, manage entertainment systems and interact with digital assistants — entirely through adaptive access methods. These capabilities allow people to move through their homes, workplaces and communities with levels of autonomy that were nearly unimaginable 20 years ago.

Parallel to these advances are innovations like munevo and similar headbased control systems, which translate nuanced head movements into precise commands. For individuals living with advanced neuromuscular conditions or highlevel spinal cord injuries, such technologies have redefined what mobility means. Where options were once extremely limited, users now experience genuine control, agency and freedom of movement.

FROM THE NRRTS OFFICE

The Extraordinary Made Ordinary

In our daily work, we often become so focused on assessments, fittings, programming and troubleshooting that we forget the incredible progress our field represents. We operate in an era where:

- The impossible has become achievable.
- The futuristic has become routine.
- The unimaginable has become the foundational expectation for quality of life.

The pace of development is staggering. Advancements in sensors, artificial intelligence-driven interfaces, robotics, materials science and connectivity are accelerating faster than our policies, funding structures and training programs can keep up. And yet, the heart of assistive technology remains unchanged: It is, at its core, human work. Human-centered design, human problem-solving and a human commitment to dignity and independence.

iNRRTS and the Spirit of Relentless Progress

This spirit is embodied in iNRRTS, whose Registrants and professionals continually refuse to settle. They advocate, innovate, adjust, rebuild, troubleshoot and adapt. They collaborate with clinicians, support clients and families, push manufacturers and challenge systems — all to ensure that every person who relies on CRT has access to the tools they need to live fully.

Our field is not simply evolving; it is accelerating. And with each breakthrough, we carry forward a responsibility to ensure these technologies are not only invented but also implemented; not only created but also accessible; not only available but also meaningful in the lives of those we serve.

Looking Ahead: Building the Future, Not Waiting for It

If we have already surpassed the science fiction that once inspired us, then the next decade holds possibilities we can barely imagine. Autonomous mobility? Predictive postural management? Ambient computing environments that respond dynamically to user behavior? These advancements are no longer theoretical; they are emerging realities.

Our clients are counting on us to lead the way.

Our field is progressing faster than ever.

And the future of assistive technology isn't something on the horizon — it's something we are actively building, every single day.



CONTACT THE AUTHOR

Jason may be reached at
JASON@PHMOBILITY.COM

Jason Kelln, ATP, CRTS®, is president of iNRRTS and became the first Canadian iNRRTS Registrant in 2018. Kelln is the recipient of the 2025 Simon Margolis Fellow Award. Kelln serves on the Rehabilitation Engineering and Assistive Technology Society of North America's Professional Standards Board and has been an owner of PrairieHeart Mobility since 2022.

MOMENTS WITH MADSEN

Strengthening CRT's Future Through Connection, Professional Development

WRITTEN BY: Andrea Madsen, ATP

Each year, the Complex Rehab Technology community gathers at conferences and industry events that serve as far more than calendar milestones. They are opportunities to reconnect with colleagues, welcome new professionals into our field, exchange ideas and collectively reaffirm the values that shape our work. This winter and early spring, I had the privilege of representing iNRRTS at two important industry events: the annual U.S. NSM Symposium (National Seating & Mobility) in Dallas, Texas, in February and Medtrade in Phoenix, Arizona, in March.

Both gatherings offered an invaluable opportunity to engage with the people who make CRT such a unique and vital profession: dedicated supplier professionals committed to improving the lives of individuals who rely on complex mobility and seating technologies.

As executive director of iNRRTS, I am continually reminded that the strength of our organization lies in the passion and professionalism of this community.



Andrea Madsen, ATP, iNRRTS executive director (center) at the 2026 U.S. NSM Symposium with iNRRTS past-presidents Carey Britton, ATP/SMS, CRTS*, 2023 Simon Margolis Fellow, and Denise Harmon, ATP, CRTS*, 2005 Distinguished Service Award recipient.



Bill Noelting, iNRRTS director of marketing, and Andrea Madsen, ATP, iNRRTS executive director at the Medtrade 2026 Expo, held in conjunction with the conference.

A Community Reconnected

The energy at the NSM Symposium in Dallas was unmistakable. As an exhibitor, I had the opportunity to connect directly with supplier professionals across a wide spectrum of experience, from individuals who have spent decades advancing CRT service delivery to those just beginning to explore the field.

Conversations at our booth frequently began with familiar themes: questions about the Registry, interest in continuing education or curiosity about

how iNRRTS supports supplier professionals at different stages of their careers. What made these discussions particularly meaningful was the shared recognition that professional development is not optional in CRT; it is essential.

The complexity of the technologies we provide continues to grow. Clinical expectations are rising; documentation requirements are evolving and the stakes for consumers remain high. Within that environment, supplier professionals must have access to structured, credible

pathways to develop and demonstrate their expertise.

iNRRTS exists to support precisely that goal. Through professional designation, continuing education and industry collaboration, we strive to ensure that supplier professionals have the resources they need to deliver the highest level of care and service.

Events like the NSM Symposium remind us that these efforts resonate deeply with the professionals we serve.

MOMENTS WITH MADSEN

Medtrade: Education and Engagement

Just several days later, members of the CRT community gathered again, this time for Medtrade in Phoenix. At this event, I had the opportunity to participate as both an exhibitor and presenter, offering an opportunity to share our mission with an even broader audience, many of whom were not fluent in CRT.

The chance to present and engage in educational dialogue at Medtrade was particularly rewarding. Education has always been at the core of the iNRRTS mission, and the opportunity to discuss the role of professional development in sustaining CRT excellence sparked thoughtful conversations among attendees.

One theme that consistently emerged was the need to cultivate both seasoned expertise and emerging talent within the supplier community. The CRT profession depends on individuals who possess not only technical knowledge but also a commitment to lifelong learning and ethical practice.

For experienced supplier professionals, iNRRTS offers opportunities to formalize

and expand their expertise through continuing education programs designed specifically for the CRT environment. These programs recognize the depth of experience many professionals bring to their work while also supporting ongoing growth in a rapidly evolving industry.

At the same time, our profession must actively welcome and develop the next generation of CRT supplier professionals.

Building Career Pathways

One of the most encouraging aspects of conversation at both events was the strong interest in career pathways for individuals new to the field. Many attendees shared stories of technicians, customer service representatives or new hires who show promise but need guidance and structured development to grow into CRT supplier professionals.

This is an area where iNRRTS continues to focus its efforts. Establishing clear pathways into the profession is critical for the sustainability of CRT services. As demand for complex mobility solutions increases, the industry must ensure that skilled professionals are prepared to meet those needs.



Andrea Madsen, ATP, iNRRTS executive director, presenting a CRT Live session at the Medtrade 2026 Expo.

Through programs like the iNRRTS CRT Supplier Certificate Program, we are working to create an accessible entry point for individuals who want to build meaningful careers in CRT. These programs are designed not only to teach technical knowledge but also to introduce new professionals to the ethical and service-oriented values that define this field.

For employers, these pathways provide a framework for cultivating talent within their organizations. For individuals, they offer a roadmap for professional growth and recognition. And for the industry as a whole, they represent an investment in the future of CRT service delivery.

The Value of Personal Connection

While educational sessions and program discussions are important, one of the greatest benefits of attending events like the NSM Symposium and Medtrade is the opportunity for personal connection.

Over the course of these two events, I had the privilege of meeting many long-standing iNRRTS Registrants, supplier professionals who have championed the organization's mission for years. Their continued support and commitment to professional excellence are inspiring.

Equally meaningful were the conversations with individuals who were discovering iNRRTS for the first time. For some, the organization represented a new opportunity to engage with the broader CRT community. For others, it provided a framework

for advancing their own professional development.

In every conversation, there was a shared understanding that delivering CRT is more than a job. It is a profession built on the goal of improving mobility, independence and quality of life for individuals who rely on CRT.

Looking Ahead

As I reflect on these recent experiences, I am struck by a sense of optimism for the future of the CRT profession.

The individuals working in this field bring remarkable dedication, creativity and compassion to their roles. They navigate clinical complexity, regulatory challenges and operational demands with the shared purpose of ensuring that consumers receive the mobility solutions they need to live full and independent lives.

Organizations like iNRRTS exist to support that work.

Our role is to provide the standards, education and professional recognition that allow supplier professionals to continue raising the bar for excellence in CRT service delivery. Through collaboration with industry partners, employers, clinicians and educators, we aim to strengthen the foundation of this profession for years to come.

The conversations at the NSM Symposium and Medtrade reinforced that this mission resonates strongly across the CRT community.

Gratitude for a Dedicated Community

I would like to extend my sincere gratitude to everyone who took the time to visit the iNRRTS booth, attend our presentations or simply stop to share their perspective on the future of our profession. These conversations are invaluable in guiding the work we do.

They remind us that iNRRTS is not just an organization; it is a community of professionals who believe in the importance of excellence, education and ethical practice in CRT.

As we move further into 2026, I look forward to continuing these conversations and expanding the opportunities for supplier professionals to grow, connect and lead within our industry.

Together, we are shaping the future of CRT and strengthening the profession that makes this essential work possible.



CONTACT THE AUTHOR

Andrea may be reached at
AMADSEN@NRRTS.ORG

Andrea Madsen is the executive director of iNRRTS, the International Registry of Rehabilitation Technology Suppliers. She has over 20 years' experience providing Complex Rehabilitation Technology to adult and pediatric patients in Southern Minnesota, Western Wisconsin, Northern Iowa and internationally through her work with the Mayo Clinic. She earned a Bachelor of Science in business management and finance, is a credentialed Assistive Technology Professional and has been a Certified Complex Rehabilitation Technology Supplier®. She served for 10 years on the iNRRTS Board of Directors and as committee chair for the Midwest Association of Medical Equipment Services. She has lectured for the University of Minnesota Rochester, University of Wisconsin La Crosse, Mayo Clinic College of Medicine and Science, and at the International Seating Symposium and Medtrade.



EDGE[®] 4

The leading edge in Group 3 just took a quantum leap.



The Edge[®] 4 is engineered for quiet performance, minimizing vibration and noise.



7" casters and fully independent suspension deliver premium ride quality that feels smooth, stable, and effortlessly controlled.



Integrated accent lighting completes the experience, adding refined visibility and a modern, high-end finish.

Contact your Quantum Rehab[®] Product Specialist to learn more.

[quantumrehab.com](https://www.quantumrehab.com)



866.800.2002

QUANTUM[®]

Quantum[®] Power Chairs are FDA Class II Medical Devices designed to aid individuals with mobility impairments.

NOTES FROM THE FIELD

Rainer Olson: Here for the Long Haul

WRITTEN BY: Rosa Latimer

It's a clear winter morning in southern Saskatchewan, Canada, and the temperature is minus 16 C. The sun is bright, but it doesn't bring much warmth. Rainer Olson drives a packed service van along a long stretch of highway.

"When you've got a big van full of equipment, you're just driving a big kite down the highway," said Olson, the Registered Rehabilitation Technology Supplier for PrairieHeart Mobility.

The open road between clients sets the pace for Rainer's day. At 23, Olson works for the family business his grandfather founded, and his father now leads. With locations in Moose Jaw, Regina, and Saskatoon, PrairieHeart Mobility serves communities across Saskatchewan and parts of Alberta and Manitoba. "I primarily work out of the Moose Jaw location, covering a rural area," Olson said.

Given the vast territory he covers, long drives are just part of the job, making careful planning a must. Rainer got an early start in the business. The day he got his driver's license at 16, his father, Aaron Olson, sent him straight out on a delivery.

Growing up around the business gave Olson a unique view. By then, his grandfather, Dan Olson, had already built strong

relationships across the region. Some longtime clients even called him "Uncle Dan." Now, when Olson mentions his last name, people often recognize it. "They'll say, 'You're Dan Olson's grandson?'" They always seem pleased to make the connection," he said.

One of Olson's first installations, which he completed with his grandfather, changed everything for him. "We installed a vertical platform lift for a woman who was struggling to access her home. When the installation was complete, she was so happy with the way it changed her life that she cried," Olson said. "Right then, I knew this work is what I wanted to keep doing for the rest of my life."

His path to this career wasn't just about following in his family's footsteps. Olson first went to the University of Regina in Saskatchewan to study medicine, but after two semesters of biology, he switched to accounting. Three semesters later, he realized something important.

"Accounting felt like the same task again and again with different numbers."

Olson finished his accounting degree but decided to focus on mobility instead. "With this work, it's always different. My favorite part is when an occupational therapist brings



Hashem Alshater, Rainer Olson with PrairieHeart Mobility clients after installation of a CRE stairlift in their home.

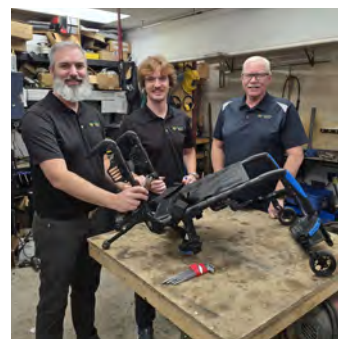
a complex situation and asks for my help," he said. "It's a rewarding way to think critically. No two people are the same. I'm always exploring options to find what works best for each individual."

PrairieHeart Mobility does more than just Complex Rehab Technology. Much of their work is with durable medical equipment, and some staff focus on advanced seating and mobility.

"We offer a wide range of services," Olson said. "When something life-changing happens, clients don't need multiple resources. They can come to us, and we'll take care of everything." That kind of consistency is important, especially since patients often have to explain their situation and needs multiple times. By working with one provider, PrairieHeart clients can build long-term relationships with



The PrairieHeart Mobility ski team at the YEAR Sasktel Classic Challenge Cup. (from left) Rainer Olson, Sam, Julien Skyler LAST NAME with skier Emilie LAST NAME and her slope guide.



Three generations of Olsons working at PrairieHeart Mobility: Aaron Olson, Rainer Olson and Dan Olson.

the people who support their mobility needs.

"Our clients see a familiar face who understands them. They know they can depend on us."

Olson began his career in service before moving into sales and complex rehab. He often stays involved with equipment for its entire lifespan, delivering, adjusting and repairing as needed.

NOTES FROM THE FIELD



PrairieHeart Mobility staff from the Regina and Moose Jaw locations.

“It’s one thing to sell somebody a \$20,000 wheelchair,” he said. “But if something breaks and they’re stuck without it for six weeks, how helpful is it really? We pride ourselves on fast responses.”

Service calls can be challenging. When important equipment stops working, people get frustrated quickly.

“I can certainly understand how a client feels,” Olson said. “They depend on this equipment to operate in their life. It’s the worst thing in the world when it doesn’t work.”

If someone gets upset or raises their voice, Olson tries to focus on how he can improve the task at hand. “It can be tough not to feel defensive, but I try to understand the client’s situation and do my best to fix it.”

Luckily, these situations don’t happen often, and sometimes, clients who were upset later call back to apologize.

Outside of work, Olson enjoys a more relaxed pace. He and his fiancée often host board game nights, playing games like Settlers of Catan, Seven Wonders, Dominion or Axis & Allies. They also get together with friends for long Dungeons & Dragons sessions.

“We play at least one board game a night,” he said. “It’s a good way to be around a table and actually interact with others.”

Olson also volunteers regularly. He has taken part in wheelchair relays to support spinal injury programs and recently joined a ski fundraiser at Mission Ridge for the SaskTel Classic Challenge Cup, <https://saskalpine.com/event/286/> where adaptive skiers of all abilities hit the slopes.



Team Chairforce One at the Spinal Cord Injury Wheelchair Relay. (from left), Sam Julien, Jack and Rainer Olson.

“Our challenge skier this year was blind,” he says. “It was amazing to see her go down the hill.”

These experiences outside of work are a reminder to Olson that the right support can turn obstacles into momentum.

The CRT industry often expresses concern about its future workforce. Experienced clinicians and technicians retire. Younger professionals sometimes overlook the field entirely, unaware that it exists as a fulfilling career path. Olson champions this industry.

“There are a lot of opportunities here for people who want to make a difference,” he said. “This isn’t just about equipment. It’s about helping someone move through their life more easily.”



CONTACT

Rainer may be reached at RAINER@PHMOBILITY.COM

Rainer Olson, BBA, RRTS®, is a rehabilitation technology specialist providing seating, mobility, and accessibility solutions with Prairie Heart Mobility. He is a third-generation team member with the company founded by his grandfather. Prairie Heart Mobility has three locations in Saskatchewan, Canada.

INDUSTRY LEADER

Beavers' Eye-Gaze Technology Supports Independence for People with Disabilities

WRITTEN BY: Rosa Latimer

When Tracy Beavers co-founded the first commercial internet service provider in Alaska in the early 1990s, she was part of a movement that connected people to unprecedented opportunity and information. Decades later, as founder and owner of Tolt Technologies in Duvall, Washington, she is again building connections. This time, the bridge links eye-gaze communication devices and powered wheelchairs, unlocking independence for people who cannot move their bodies but can reliably move their eyes. In a sector where technical precision meets deeply personal impact, Beavers has emerged as a tenacious and thoughtful leader.

For readers who may not be familiar with your company, how do you describe it? What led you to create Tolt Technologies?

Tolt Technologies makes Ability Drive, a product that allows complete wheelchair control via eye movements. The device is designed for those who are locked in and can't move at all or who have a condition like cerebral palsy and move too much, but they can reliably control their eyes.

About 80% of people using this technology also use an eye-gaze device for speech, using their eyes to look at keys on a screen to type, enabling them to speak



The Beavers family.

and communicate with the world around them. Our 'drive-by-eye' system uses eye tracking and wheelchair controls to drive a chair by looking at arrows on a screen. It serves as the link between the eye-gaze device and the power wheelchair. We work with as many speech-generating devices and wheelchairs as possible so people can use the equipment they already have.

The company came about when the former New Orleans Saints football player, Steve Gleason, who now has ALS, stated that he could do all sorts of wonderful things with his eye-gaze device, but he is 'stuck.' He could communicate, but he could not independently move.

Gleason's comment made an impression on me. Discussing it with my spouse, we realized

that this was something very important for people to have available, but it didn't fit the model of an investable business. So, we took a second mortgage on our house to fund its creation. As a family-owned business, we can focus on bringing this solution to the people who need it.

Tell us about your manufacturing process.

We are an American-based manufacturer, and most of our manufacturing is done in-house here in a small rural town, Duvall, Washington. We use 3D printers to make many of our parts. Parts that need high-end machining are also manufactured here in the United States. Our electronics are manufactured and assembled in Portland, Oregon, and Chicago,

Illinois; those have to be done by a very specialized team, but we oversee the entire process.

I handle the business side of the company and also all travel for shows and conferences. My husband, who oddly enough works for me, oversees all the engineering. Our oldest son, Joshua, runs all the printers and does the mechanical engineering work. We have two more full-time employees: Austin Howell handles technical support and testing, and Shea Ako does much of our software and electronics design.

Because our product is a safety-critical system, every change must go through what we call a 'full test pass.' That test pass is a month-long process of someone sitting in the chair and driving with it in a very controlled fashion. Making a change, even something that seems simple, is a really big lift for us. Such a change is not only a commitment at the beginning; it is a responsibility for the product's entire future.

Your market is relatively small. How do you view that challenge?

The number of individuals who need this technology is very small, which is a good thing. But even though it isn't a large number, the need is undeniable. Our goal is for the person who needs the technology to be

INDUSTRY LEADER



Tracy Beavers and her daughter, Alyssa, in Japan for an exhibit of the Ability Drive technology.



Jay and Tracy Beavers at the first business location for Tolt Technologies in Duvall, Washington.



Jay and Tracy Beavers beside the statue of President Franklin Delano Roosevelt at the FDR Memorial in Washington, D.C.



Tracy Beavers demonstrating Ability Drive at a recent conference.

successful very quickly. They experience many frustrations in life, and the helpful equipment can be complex as well. We did not want our driving system to be one more layer of complexity. I have people at shows who have never sat in a wheelchair or used an eye-gaze device, but they can drive through a door in under a minute using Ability Drive. It is really simple to use. That is our goal.

Would you share some of the positive experiences of Ability Drive users?

A 17-year-old with cerebral palsy has always used a manual tilt-in-space chair. When she got Ability Drive, she felt independent for the first time. She was so excited that she could go places by herself.

I was recently talking to an occupational therapist who has a 5-year-old patient going to kindergarten and is using our system to move himself to his classroom. No longer having to depend on a caregiver to push you to a group of friends is life-changing.

We have little guys as young as 3 using our product. The earlier you get kids moving, the better their developmental path.

You often speak about being a bridge between disciplines. What does that mean in practice?

We have a foot in both the speech device and wheelchair worlds. There is funding for speech devices and funding for wheelchairs, and then there is us. Typically, most physical and occupational therapist know little about speech devices, and speech therapists know little about wheelchairs. That has probably been one of the more challenging parts of the business, being that connector and saying, 'I know you are speech, but now we need to work with mobility. And I know you are all about mobility, but now we need to understand this eye gaze device.' This is a learning curve for folks. Assistive Technology Professionals are used to joysticks, switches and head arrays. Now we add this computer with an eye-gaze camera, which needs to be configured for each person.

How did your past experiences equip you to create and lead Tolt Technologies?

I grew up in a logging camp in Alaska. It is a very self-sufficient culture. You have to do whatever needs doing. I was in the computer science program at the University of Alaska Fairbanks in the '90s when I met Jay Beavers. We realized that people in Alaska should have access to the internet and decided that, with my computer programming knowledge and his engineering know-how, we could make it happen. And we did! We established PolarNet, the first internet service provider in Alaska. I believe that you keep working on the problem until it is solved.

After Jay and I married, I paused my career to have a family and raised seven children. If you have seven children, you always have a whole lot of plates in the air. I

CONTINUED ON PAGE 14

often say that God was training me well to run a business. From 1997 until 2020, when I founded Tolt Technologies, I homeschooled all of the children.

Among many other things, homeschooling taught me a lot about individuality. There are so many ways to accomplish a goal, and you have to keep thinking and being creative until it works. Some children learn by doing, some by reading and some by hearing. You meet them where they are. That translates directly into what we do now. Every client is different. Not a single one is the same.

What continues to drive you?

The knowledge that a little bit of technology can make an immense difference in someone's life. Ability Drive gives an individual the capability to join a group, to leave a room when angry and to have some autonomy. I felt strongly that we needed to bring this product to market. Even though the market is small, it matters. These people and their families matter.

In an industry that demands both regulatory rigor and human empathy, Tracy Beavers embodies both. Her path from Alaska pioneer to assistive technology innovator reflects a consistent theme: See a need and keep working the problem until you find a solution.



CONTACT

Tracy may be reached at
TRACY@TOLTTECHNOLOGIES.COM.

Tracy Beavers established Tolt Technologies (<https://www.tolttechnologies.com>) in Duvall, Washington, in 2020. The family-owned company manufactures Ability Drive and has distributors in the U.S., Argentina, Australia, Canada and New Zealand, and throughout Europe. The innovative system is an eye-gaze-based powered wheelchair control system. Beavers has a Bachelor of Science from the University of Alaska Fairbanks and, with her husband, Jay Beavers, she co-founded PolarNet in the mid-1990s, the first internet service provider in Alaska.

We Are The Contingency Plan

WRITTEN BY: Rosa Latimer

Julie Keon spends her professional life walking alongside people as they face mortality. As a psychotherapist, she supports individuals confronting terminal diagnoses, traumatic grief and the long shadow of caregiving. Her 2011 essay, “What I Would Tell You,” became the foundation for a widely acclaimed book, and she now teaches courses on death preparation and has trained in community-led death care.

Yet the role that shapes her most is not found on a resume. “More meaningful and important than all of my professional endeavors,” she said, “is mothering Meredith.”

Meredith Graham, now 22, experienced a lack of blood and oxygen to her brain during birth (hypoxic-ischemic encephalopathy) resulting in a diagnosis of severe cerebral palsy. She is non-verbal and medically fragile. Early on, Julie and her husband, Tim Graham, were told their daughter would likely not live past age 7 or 8. She has exceeded that life expectancy by more than a decade.

Her story is familiar in one critical way: Medical advances have outpaced systems. Children who once would not have survived are now young adults with profound and ongoing needs. Families

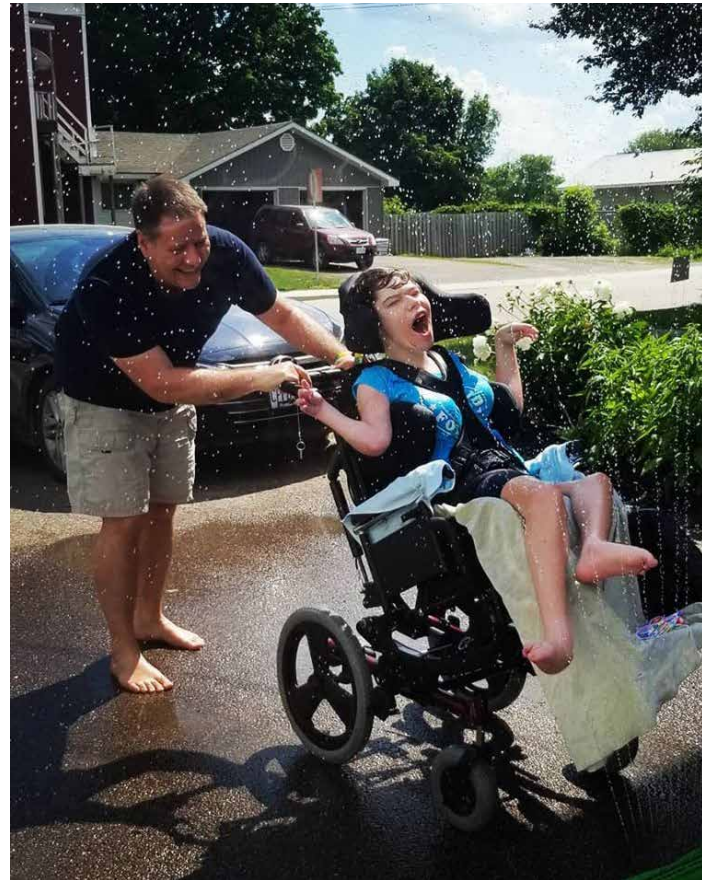
are grateful, yet they are also navigating uncharted territory.

“When Meredith turned 18, she did not change. Her needs were the same, but everything relating to her care changed,” Julie said. “For 18 years, Meredith had been supported by pediatric specialists, children’s hospital teams and even a children’s hospice program. She is considered palliative, not because she is actively dying, but because she lives with a life-limiting condition.”

Then she aged out. “It felt like we were starting over again,” Julie said. “All of the care teams and systems we had in place for the first 18 years of her life were suddenly cut off because she was no longer a child.”

For many families, this transition is abrupt and destabilizing. The pediatric system is often coordinated and family-centered. Adult systems can be fragmented and less prepared for individuals whose needs begin in infancy.

Julie and Tim had something many families struggle to secure: an established team and documented severity of need. Because Meredith’s care is so complex, funding and adult supports have, somewhat ironically, improved. “As Meredith gets older and as we get older,” Julie said, “the



Meredith Graham cooling off in the sprinkler with her dad, Tim Graham.

understanding is that she will do best if she is at home. And, in order to be at home, we need to have consistent help in place.”

At this time, a night nurse allows Julie and Tim to sleep. Daytime caregivers help so both parents can work. But the safety net remains thin. “If a night nurse cancels,” Julie said, “We suddenly have to pull an all-nighter. It doesn’t matter what I have scheduled the next day. If I have a full day of clients in clinic, I still must see them, and Tim still has to go to work.”

Julie and Tim are, as Julie puts it plainly, “the contingency plan.”

Some of the most transformative changes in Meredith’s life came through equipment and positioning. Before custom seating and skilled therapists improved Meredith’s tolerance for positioning, Julie or Tim spent the entire day with their daughter in their arms, supporting her body. “For the first eight and a half years,

CONTINUED ON PAGE 16



Meredith Graham and Tim Graham on the trail.



Meredith Graham riding the merry-go-round with her mom and dad, Julie Keon and Tim Graham (forefront).

Meredith would not tolerate sitting in a wheelchair,” Julie said. “She would go completely rigid and start screaming indefinitely.” When experienced therapists gained an understanding of Meredith’s body and sensory profile, and when custom seating was introduced, life changed drastically for the young girl. That experience clearly illustrates the power of proper seating, positioning and patient-centered problem-solving. Now Meredith, who weighs about 95 pounds, can sit comfortably in her wheelchair throughout the day. “That changed everything,” Julie said. “I wouldn’t be able to hold her all day now.”

When Meredith was born, a social worker in the neonatal

intensive care unit pulled Julie and Tim aside. “You two need to really communicate,” she told them. “A lot of marriages don’t survive this.” At the time, Julie could barely think beyond pumping milk and learning how to feed her newborn through a tube. Marriage felt secondary to survival.

Tim and Julie will celebrate 27 years of marriage in June. “We are very strong and happily married,” Julie said. “I’m very proud of our marriage and proud of our little family.”

That strength did not come without strain. Grief arrived in waves, and not always at the same time. “There were periods where I was hit with a whole lot of grief for all the things

we had lost,” Julie said. “And Tim would be trying to focus at work, but worrying about what was happening at home. Then, he would have his own period of insomnia or depression. It’s not linear. You don’t both grieve at the same time.” They learned to take turns. “This is my week,” Julie jokes, “Tim can have next week.”

The couple sought therapy and made their marriage a priority in small, consistent ways. An hour each evening between Meredith’s bedtime and the night nurse’s arrival becomes sacred space. There are no phones, just conversation. In winter, Julie and Tim snowshoe in a nearby forest. Occasionally, they stay in a nearby hotel for a couple of nights. “We’re really good friends,” Julie said.

“We love being together.” They are also very motivated to stay well. Julie works out at 5 a.m. after Tim leaves for his hour-long commute to work in information technology for Canada’s Department of National Defense, and Meredith is sleeping. Strength-training is a necessity because Julie knows she may be caregiving for decades to come. The couple prioritizes sleep. They do not drink alcohol because it disrupts rest. These strategies serve them now and help sustain them for the long term.

Isolation, Julie believes, is a real threat to the well-being of caregivers. She urges other parents of medically fragile children to “find your community, even if it’s one other parent who understands your life. You need that as much as you need food, water and air. You can take advantage of online groups, virtual meetings and even shared stories across continents. But community requires courage. It takes a leap of faith to expose yourself and find your people,” Julie said. “But it is necessary for survival.”

The reality of the caregiving experience can be lost in statistics and system gaps. There is exhaustion. There is anxiety. There is grief for what might have been and a

LIFE ON WHEELS



Meredith Graham with the family pet, Angus.



Tim Graham, Julie Keon and Meredith Graham at the couple's 20th wedding anniversary celebration in 2019. Meredith is wearing her mother's wedding dress.



Meredith Graham on her 22nd birthday in 2025 with her parents, Tim Graham and Julie Keon.

fear of what is to come. There is also joy. Meredith brings “tremendous joy and pride,” Julie said. “We just can’t imagine any other child for us.

“When Meredith was young, our fear was that she would die. Now, a new fear has taken its place. The fear of our daughter outliving us.”

For parents of medically complex adults, this is the quiet terror. Advances in neonatology, pediatric critical care and Complex Rehab Technology have changed survival rates. But residential models, long-term funding streams and adult systems have not evolved at the same pace.

In a recent blog post titled “Contingency Plan,” Julie confronted the question: What happens if she and Tim die before Meredith? An answer to this prodigious question came when Julie’s sister read the post and sent a message. If something happened, she wrote, she would retire early and, together with Amanda, the family’s longtime caregiver, take over Meredith’s care.

“Amanda has been with our family 20 years,” Julie said. “It is very rare to have someone that dedicated for that long.”

The message from Julie’s sister was reassuring and also a call to action. “I realized that I need

to update the “Meredith Care Manual” with more detailed instructions,” Julie said. “If something were to happen suddenly, others would need to know how we pay the workers, who to contact for supplies, how everything works.”

Julie’s reality of the need for this information broadens the transition-planning conversation: transition is not just from pediatric to adult systems. It is from parent-led care to whatever comes next.

As plans for Meredith’s care if she outlives them begin to take shape, Julie and Tim live with a quieter, harder truth that underlies their daily life: Their daughter is likely to die before them. Julie has written candidly about preparing for the death of a child in her book, “What I Would Tell You.”

“No amount of begging, negotiating or praying will chase death away,” Julie said. “It is a reality for everyone and everything that lives. For now, Meredith is oblivious to what is to come, and I choose to meet her where she is. We will accompany her along her life for as long as she has.”

Julie refuses to let fear consume the present. “When I find my worry starts to accelerate,” she said, “I come back to this truth: *In this moment, all is well.*”



CONTACT

Julie may be reached at JULIE@READYORNOTEOL.COM.

Julie Keon is many things: a Psychotherapist, certified Life-Cycle Celebrant, end-of-life doula, death educator, published author and most importantly, a mother to her daughter, Meredith, who is medically fragile. Her book, *What I Would Tell You—One Mother’s Adventure with Medical Fragility*, offers insight and perspective for those who are raising a medically fragile child and for the professionals who care for them. Julie lives with her husband, Tim, and their daughter, Meredith, in the Ottawa Valley of Ontario, Canada. (<https://whatiwouldtellyou.com/>)

CLINICALLY SPEAKING

Centering Families and Real Life in Our Work

WRITTEN BY: Rosa Latimer

For more than 40 years, Ginny Paleg, PT, DScPT, MPT, has worked to expand what is possible for non-ambulatory children. She particularly focuses on those at GMFCS Levels IV and V, the most involved classifications of cerebral palsy, indicating significant limitations in mobility and reliance on other people and assistive technology for functioning, activity and participation.

Paleg earned her master's degree at Emory University in Atlanta, Georgia, and her doctorate at the University of Maryland, Baltimore, and she has authored more than 60 peer-reviewed articles on standing programs, supported stepping, power mobility, hypotonia and hip health. She is the lead author of the American Academy for Cerebral Palsy Hypotonia Care Pathway and an active member of the American Academy for Cerebral Palsy and Developmental Medicine and the American Physical Therapy Association.

But in conversation, what emerges is a clinician shaped by families, driven by questions and anchored in one unwavering belief: access to exploration and participation is a human right.

What first drew you to children who are often considered the most medically complex?

Part stubbornness, part curiosity and part very practical math. Early on, I was drawn to the children labeled “most medically complex” because the status quo for them was ... almost nothing. Expectations were so low that I remember thinking, “I can’t possibly do worse than this.” Anything thoughtful, anything that centered the child as a child first was already an improvement.

These were children with enormous personalities and very clear preferences. And their families? Absolute masters of adaptation. They didn’t need someone to “fix” their child. They needed someone willing to try, to problem-solve, to admit what we didn’t know yet and to keep showing up.

I didn’t have language for frameworks then. I didn’t know about the F-words yet: functioning, family, fitness, fun, friendships, future. But families were already teaching me those values every day. They kept asking, “Is this worth our time? Is this helping our child live a bigger life?” That kind of partnership lit the research fire in me: the need to dig, verify, question and sometimes stand up and say, “This popular thing? It’s not helping the way people think it is.”

Those kids shaped how I define success. Not by how “normal” something looks, but by how much life a child gets to live now and into their future.

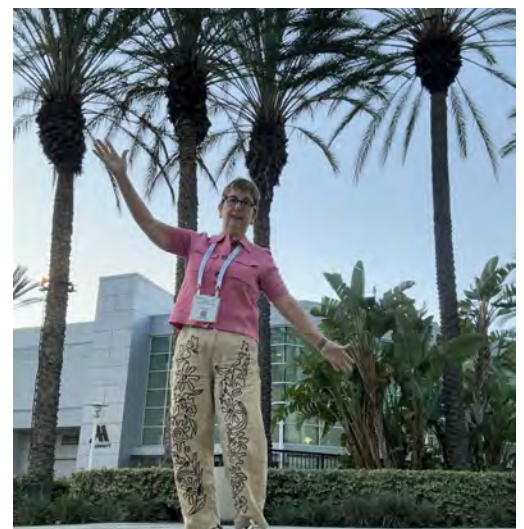
What have families taught you about resilience that no professional training ever could?

Families taught me that resilience is not heroic music and dramatic movie moments. It’s packing a feeding pump, extra clothes and a sense of humor into one backpack and still making it to the zoo. It’s celebrating a head turn, a glance, a shared laugh or a powered toy car lap like it’s an Olympic medal.

Professional training doesn’t fully capture the creativity of a parent who has redesigned daily life from the ground up and still makes joy non-negotiable. Families also have an incredible instinct for asking the questions that matter. Watching families chase possibilities while staying deeply practical is one of the most honest forms of evidence



Ginny Paleg playing pickleball at the American Physical Therapy Association Combined Sections Meeting in Anaheim, California.



Ginny Paleg is a conference junkie! She has attended conferences in over 15 countries!

CLINICALLY SPEAKING

appraisal there is. Resilience looks less like “never giving up” and more like “fine, we’ll do it differently ... and probably better ... with snacks.”

And the biggest lesson? Resilience isn’t something professionals give families. It’s something families model for us, over and over, if we’re paying attention.

When you meet a child for the first time, what are you noticing that might never appear on an assessment form?

Of course, I’m thinking about safety, medical history and functioning. But I’m also watching things that will never show up in an outcome measure.

Is there fire in their eyes when something interests them? Do they scan the room looking for the next interesting thing? Do they laugh when someone is silly? Do they get that perfectly developmentally appropriate “naughty” sparkle that says, “I have opinions?” Those moments reveal drive, personality and social curiosity. They tell me what might motivate learning far more than a test item ever could.

I’m also paying attention to the family’s emotional weather. Hopeful? Guarded? Exhausted? Curious? Therapy doesn’t happen in isolation. It lives inside the life of a family.

I’m not just looking for what a child can do. I’m looking for who they are and what kind of life they’re trying to grow into.

How do you help families reframe mobility devices as tools for childhood rather than symbols of limitation?

This is one of my favorite conversations. A lot of my framing comes from Jean Minkle; the “power of ‘and.’” Not either/or. Not “if we use wheels, we give up on walking.” Childhood is big enough to hold multiple goals at once.

We’re working on exploration now because it triggers learning. When children can get to what interests them, we often see growth in cognition, communication, problem-solving, social connection and confidence. Movement is not just about muscles; it’s about access. And we will also work on walking, transfers and daily life skills that matter to a family. Mobility devices become tools for childhood when we anchor them in what children actually want to do: chase siblings, get to friends, participate at childcare, choose where to go instead of waiting to be carried.

Development is not a straight ladder where you must earn one skill before you’re allowed the next. Using wheels or power doesn’t “turn off” walking potential. If anything, it often

turns on motivation and practice because the child is finally an active participant.

I often borrow an analogy: We don’t refuse eyeglasses and wait for eyes to get stronger. Assistive devices should be viewed the same way. Mobility devices aren’t symbols of limitation. They’re symbols of access to play, friendships, curiosity and being known for who you are.

Have you noticed differences in how different cultures define independence for children with disabilities?

Absolutely. Culture shapes what independence even means. In some places, independence is defined as doing things without help. In others, interdependence — being part of family life, contributing meaningfully even with assistance — is the goal. Neither is inherently right nor wrong. They reflect deeper values about belonging.

The most pervasive “culture” I see cutting across everything is ableism. The quiet message that walking is the only mobility that counts. That effort is morally superior to access. That looking typical is more valuable than living fully. Families absorb that message from health care, education, media and sometimes even therapy.



Ginny Paleg is very engaged in social media.

What gives you hope when you think about the next generation of therapists?

They are motivated, values-driven and connected in ways we weren’t early in our careers. They’re asking harder questions sooner. They are less willing to accept, “This is just how it’s always been done.” They are engaging with lived-experience voices alongside research.

The therapists I meet are ready. Curious. Collaborative. They don’t seem as interested in being “the expert in the room.” They want to be part of teams with families, adults with disabilities and other disciplines. That shift alone changes the future of care.

But they need mentors. No one publishes, presents or meaningfully shifts practice alone. Every confident voice you see on a stage is standing on layers of mentorship. Mentorship isn’t just editing abstracts. It’s helping someone

CONTINUED ON PAGE 20

learn how to think critically, handle pushback, survive reviewer comments and stay grounded in families while pushing systems forward.

What questions still keep you thinking about this work?

The longer you do this, the sharper the questions get. Why does it take so long for good evidence to reach everyday practice? We can have strong, replicated findings and still see a decade pass before it becomes standard care. During that gap, children are living real lives.

How do we reach the average therapist? The one who has never attended a national conference, who is managing productivity pressures and documentation loads, who is trying to do right by families at 7:30 in the morning? If evidence only lives in journals and conferences, we haven't changed practice. We have just changed conversations among people who were already listening.

I think a lot about translation. How do we make evidence practical and usable in real clinical contexts? How do we compete with something simple, confident and beautifully branded when evidence says, "It depends"?

Underneath all of that is one deeper question: How do we keep centering families and

real life while systems and commercial interests try to pull the focus elsewhere? Those questions keep me reading, listening and (nicely, mostly) arguing.

Outside of work, what grounds you?

Being a grandma is at the top of the list. Loving a whole new generation without being the primary decision-maker is magic. It is pure delight and a constant reminder that childhood deserves space for joy, mess and personality.

I love pickleball for the game and the laughter. I love mahjong for the rhythm and connection. And one of my favorite rituals is sitting on the back porch with my husband, watching birds. It's quiet. Grounding. A reminder to notice small things.

If I had to sum it up, outside of work I value connection, play and quiet moments, which, now that I think about it isn't much different from what I value in my work.



Ginny Paleg is an educational consultant for Prime Engineering, a fellow of CanChild and an honorary research fellow at University of KwaZulu-Natal, School of Health Sciences.



CONTACT

Ginny may be reached at
GINNY@PALEG.COM

Ginny Paleg, PT, DScPT, MPT, is a physical therapist and researcher with more than 40 years of experience advancing care for children with significant motor impairments. She holds degrees from Emory University in Atlanta, Georgia, and the University of Maryland, Baltimore and has authored more than 60 peer-reviewed articles on standing programs, supported stepping, power mobility, hypotonia and hip health.

Innovation in Motion: Emerging Technologies Are Transforming CRT

WRITTEN BY: Bart Van der Heyden, RPT

In the rapidly evolving field of Complex Rehab Technology, innovation is no longer a future promise — it's happening now. From assistive devices that boost independence to seating systems that rethink posture and function, emerging technologies are transforming how clinicians support mobility, comfort and quality of life. At the heart of this transformation are clinician-innovators — individuals who combine frontline experience with creative problem-solving to birth new solutions.

One such innovator who embodies this intersection of clinical practice and inventive design is Bart Van der Heyden, PT, owner of Superseating. Bart is a physical therapist whose deep understanding of movement, human function and unmet clinical needs informs his work. His recent inventions — now on the market through leading manufacturers — illustrate how clinician-led innovation accelerates advancement in CRT.

The Need for Innovation in CRT

CRT serves individuals with significant mobility limitations due to neurological, congenital or traumatic conditions. CRT isn't just equipment; it's a lifeline. Devices must optimize function, promote

independence and support health over the lifespan.

Yet the complexity of the human body, the diversity of clinical presentations and everyday life demands challenge designers and clinicians alike. Traditional products often address singular needs — stability or mobility, posture or comfort — leaving gaps in function or user experience.

Emerging technologies — materials science, self-adjusting support systems and user-centered design — are bridging these gaps. When clinicians lead product conceptualization, the results can be transformative.

The quadruple helix model, an innovation framework involving collaboration among academia, industry, government and civil society, has increasingly highlighted the critical role of clinicians in the development of products for wheelchair seating and mobility. Clinicians through their direct interaction with client challenges can offer indispensable insights into user needs, ergonomics and functionality, which are essential for creating effective and user-friendly seating and mobility solutions.^{1,2}

Innovation #1: A Dynamic Arm Support

Van der Heyden's journey toward innovation began with a recurring clinical observation: Many wheelchair users with weak or uncoordinated upper extremities suffer from glenohumeral subluxation, leading to damage of the non-elastic shoulder capsule, range of motion deficits and shoulder pain. Prevalence rates of GHS with clients post stroke range from 17 % to 81% but are also high with other client populations.

A second observation is the high prevalence rate of wrist and finger contractures. Up to 84% of clients with traumatic brain injury develop contractures. Conventional wheelchair arm supports often fail; pillows don't stay in place or do not provide enough support to prevent contractions and GHS.

This triggered Van der Heyden to dive into the pathomechanics of GHS and hand contractures and develop a prototype based on three key principles: 1) a contoured elbow support to stabilize the GH joint; 2) when deep wrist and finger flexor muscles (flexor digitorum profundus, superficialis, flexor carpi radialis and ulnaris) are short they influence the elbow, wrist and fingers. In order to

manage the effect of tone in these muscle groups the elbow, distal forearm and hand needs to be supported with the hand supported minimizing adversely sensory input and neutral joint positions of the articulation of the hand. When tone occurs of the deep flexors, metacarpal and phalangeal flexion is possible while interphalangeal joints remain extended.

Van der Heyden developed a proof of concept and a prototype and collaborated with engineers to translate clinical insight into mechanical design. The final product, called Dynamic Arm Support, licensed to Bodypoint, is now available on the market. The Dynamic Arm Support³ is a mobile support for the elbow, forearm and hand that attaches to a manual or power wheelchair. It provides upper extremity support, functional dynamic range of motion at the shoulder and an innovative, flexible hand support that promotes hand function and helps to minimize flexor tone and contractures. This product includes modular components that can be adjusted for a customized orthotic fit. A pivot mechanism allows users to exercise the shoulder in a functional, dynamic range of motion. The flexible hand support helps to position

CONTINUED ON PAGE 22

the wrist, hand and fingers in neutral alignment and minimize flexor tone and contractures. This product is designed to be mounted on a variety of wheelchair models with height adjustable armrests and can be easily removed for transfers by utilizing the quick-release function.

More info: <https://app.bodypoint.com/product/dynamic-arm-support-kits>



Wheelchair user using the Dynamic Arm Support.

Innovation #2: Postural Variation Seating Concept/ EPiC Seating.

Van der Heyden's second major innovation addressed the limitations of current positioning approaches and technology in the field. He made the following observations:

1. Static seating solutions often fail because of postural fatigue setting in. The wheelchair user often sits in the same position for extended periods of time leading to fatigue of postural muscles, kyphotic seating, sliding and a flexed head position.

2. Lumbar support has limitations: Clients seated in a passive position (posterior pelvic tilt) tend to have a flat and posteriorly oriented lumbar spine. In addition, lumbar segments tend to be stiff, so the force created when pushing the lumbar spine toward lordosis and extension generates a sliding force resulting in a slouched position and sliding forwards position.

3. Recline systems have an axis of movement different than the movement of the wheelchair user, so recline backward changes the position of postural supports upward in relation to the user's spine (laterals, pelvic, lumbar supports and head support position changes in relation to the spine). The opposite movement is occurring when reclining forward so variation in recline during the day has a consequence on the client's posture.

His observations have led to an ergonomic study whereas a new postural concept was developed, tested and validated:

1. A seat with an adjustable PSIS support was developed to accommodate to hip range of motion deficits of wheelchair users.
2. The lower thoracic area can move in sync with the client's back so laterals, pelvic, lumbar supports and head support position remain aligned regardless of adjustments made.

3. Bringing the lower thoracic area backward with the PSIS supported increases lumbar lordosis without direct force on the lumbar spine. Instead, the lumbar spine moves actively towards to the position of the thoracic spine.

4. Postural variation is introduced whereas the caregiver can change the position during the day for function or comfort without postural consequences.

5. For clients with tone, the system can self-adjust to postural changes and tone. The system's range of movement and resistance level can be adjusted individually according to each client's needs.

Clinical trials have showed that most wheelchair users benefit from this approach, from users with degenerative conditions such as multiple sclerosis, muscular dystrophy, motor neuron disease, ALS and Parkinson's disease to users with postural deficits and clients with tone.

Together with the engineers at Stealth Products a postural system called EPiC (Effortless Postural Control) seating was developed.⁴ The EPiC system is added to the existing mobility base using adaptor tubes and provides an adjustable PSIS support and anatomically segmented postural support, which can be operated without tools. Releasing the handles maintains an alignment and locking the same handles will

absorb tone and allow postural variation or movements of the client. Range of motion and resistance of client movement can be individually adjusted.

More info : <https://epic-seating.stealthproducts.com>



Wheelchair user with trunk stability and head position challenges (left); same wheelchair user using EPiC (right)

Van der Heyden's design process highlights key principles: observe clinical needs, iterate through prototypes, collaborate with manufacturers and license strategically. His work demonstrates how clinician-driven innovation can shape the future of CRT.

As emerging technologies continue to evolve, innovators like Van der Heyden ensure that CRT solutions remain grounded in real human needs — improving independence, function and quality of life.

TECH CORNER

REFERENCES:

1. Etzkowitz, H., & Leydesdorff, L. (2000). The dynamics of innovation: From National Systems and "Mode 2" to a Triple Helix of university-industry-government relations. *Research Policy*, 29(2), 109-123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4)
2. Carayannis, E. G., & Campbell, D. F. J. (2009). 'Mode 3' and 'Quadruple Helix': Toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management*, 46(3-4), 201-234. <https://doi.org/10.1504/IJTM.2009.023374>
3. Bodypoint, Inc. (n.d.). Dynamic Arm Support. Retrieved from <https://www.bodypoint.com/dynamic-arm-support>
4. Stealth Products, LLC. (n.d.). Epic Seating System. Retrieved from <https://www.stealthproducts.com/epic-seating-system>

**CONTACT THE AUTHOR**

Bart may be reached at
INFO@SUPERSEATING.COM

Bart Van der Heyden, RPT, is a skilled and well-known clinician with more than 29 years of experience in wheelchair seating and wound care. He is also the owner of a physical therapy clinic in Ghent, Belgium. He founded SuperSeating, a seating competence center that develops and delivers clinical courses for health care professionals on seating and wound care challenges. Through SuperSeating, he has

presented courses around the world and created methods and techniques that enhance seating assessments, interventions and clinical decision-making. Van der Heyden has collaborated with innovative manufacturers globally, supporting them with training materials, clinical expertise and research and development initiatives. He has also served on the scientific committees of POSIT'F, the French National Wheelchair Seating Conference, the European Seating Symposium and the International Posture and Mobility Conference in the U.K. Since founding SuperSeating in 2009, he has inspired clinicians

worldwide with his structured approach to solving complex seating needs, including a five-step program and unique clinical assessment techniques for evaluating supra and infrapelvic scoliosis, kyphosis, dystonia and lower extremity range of motion deficits. In addition to supporting seating-, mobility- and support surface manufacturers with product development and clinical education, his ergonomic expertise is sought after even outside the medical equipment industry by prominent manufacturers looking to optimize user comfort and performance.

**DESIGNED BY ROCKET ENGINEERS,
 BUILT FOR EVERYDAY COMFORT**

BONDAR™
 Kalogon®



ORBITER™MED
 Kalogon®



Kalogon® **BONDAR™ CUSTOM BACK CUSHION (E2617)**
ORBITER™ MED CUSTOM CONFIGURED CUSHION (E2609)

+1 (321) 465-4504 ✉ CONTACT@KALOGON.COM 🌐 KALOGON.COM/MEDICAL



Innovation in Motion: Advancements in CRT That Will Move Us Into the Future

WRITTEN BY: Jay Doherty, OTR, ATP/SMS

Some products in this article are described in general terms. Please refer to a manufacturer's website for specific information on these products.

Introduction

Having entered the Complex Rehab Industry in 1995 as an occupational therapist on a spinal cord injury rehabilitation unit, I quickly discovered a passion for the CRT field. To say the landscape of this industry has changed over the years is an understatement. The advancements within the industry have been nothing short of incredible, especially in recent years. Things just seem to be moving in leaps and bounds now.

The last few years involving the introduction of artificial intelligence and smart technology in general have seemed to accelerate the advancements we and our technology users are seeing. Electronics continue to become more advanced, continually offering greater levels of independence and integration with advancing smart technology from the public.

Mainstream demand for emerging technology helps to drive technology applications for those in the community who live everyday with

disabilities. Advancements in smart devices (phones and tablets) and smart home technology that is available to the public continue to develop and grow. In addition to smart devices, automotive technology advances for the general population as well. This includes self-driving automobiles, such as Waymo autonomous vehicles, down to a simple backup camera and front and rear sensors to prevent impacts from occurring. These products that benefit the public in turn provide opportunities for technology to be made available for individuals who are living with disabilities and utilizing power mobility in their daily lives. These technological advancements often offer a greater level of independence for individuals who have disabilities and may even offer the potential to, in some cases, reduce caregiver hours and advance the ability of the individual to be able to do more for themselves.

Some of these technologies are smart devices, Bluetooth, video and internet applications to assist with technical support, environmental control and drive control systems (assisted driving and alternative drive controls).

With people who have disabilities living longer and wanting to age in place, some of these technological developments have helped create a safer and more independent environment for these individuals. With that in mind, technology is not for everyone but certainly has its place when it is easy to utilize.

CRT and Advancements

Bluetooth Technology is Advancing Environmental Controls

Bluetooth technology is available within most Group 3, or complex rehab power wheelchair electronics, today. Whether it be for programming or access to smart devices and computers, Bluetooth technology has advanced the independence levels of individuals who need high end electronics to be able to control a power wheelchair. This technology can allow a CRT Supplier or seating technician to program a wheelchair, the way it drives and how its controlled all using a smart device such as a phone or tablet. The benefit is that changes can often be made via Bluetooth technology, and some power wheelchair brands allow live programming for these changes to take place while the wheelchair

user is driving. This provides immediate chair responses for the wheelchair user to feel and experience allowing the user to provide verbal feedback about the change in chair performance. Since most suppliers or technicians have smart phones these days, this programming capability is always with them through an app.

Beyond programming is the smart phone's capability to control things within the home through a Wi-Fi network. Thirty plus years ago environmental control units used to cost more than \$20,000 for a system to control the home environment (lights, TV, temperature control system and possibly a door opener). Today, a do-it-yourself starter kit can range from a few hundred dollars to thousands of dollars. Of course, if professional installation is needed, then cost is reflective.

Smart technology continues to grow in popularity, and its widespread adoption has significantly reduced the cost of converting a home into a smart home environment.

Smart home control systems, such as Home Assistant, Amazon Alexa, Google Home, Apple Home, Vivint Smart Home and Samsung SmartThings (just a few

CLINICAL PERSPECTIVE

of the available systems), enable individuals across the general population, as well as CRT users, to independently manage their home environments. One of the greatest advantages of these systems is their flexibility: They can be built gradually as a person's budget allows. Many users begin with simple functions such as controlling light bulbs, wall switches or outlets, and then expand their system over time. As financial resources permit, additional features can be added to increase environmental control, helping ease both the initial cost and the overall impact on the individual.

These technologies can be integrated and controlled with a smart device such as a smart phone or tablet. This is when Bluetooth technology on a power wheelchair can provide significant independence. Bluetooth connectivity allows a wheelchair user who may not have the upper extremity function to hold and access their phone to utilize their driver control (joystick, head array, sip and puff, etc.) to access their phone or other personal electronic device. All the major power wheelchair manufacturers offer some level of Bluetooth technology. The specific Bluetooth capability and cost (if not included in the driver control) should be investigated if the consumer/user of the wheelchair desires

this type of device control. In addition, the Android and Apple iOS operating systems utilize different Bluetooth functionality: mouse mover (Android), switch control (Apple iOS), voice activation with Siri (Apple iOS) or Google voice control (Android), and assistive touch on Apple iOS. This technology can offer a great level of living more independently for people who utilize CRT power.

Remote Technical Access to Chair Electronics

Advancements in technology have made it possible to remotely access and troubleshoot the electronics

of power wheelchairs. Faster internet speeds, widespread home WiFi and the near-universal availability of cellular service have helped bring these remote capabilities into the CRT industry. One example is Quantum Rehab's Interactive Assist, which allows Quantum's technical and sales support teams to view a chair's electronics in real time to help an on-site technician or wheelchair user with troubleshooting or programming needs. In addition, some suppliers and manufacturers offer secure apps that use video — operated by the wheelchair user or a caregiver — to show

technicians what may be wrong with the equipment. This approach speeds up parts ordering, reduces unnecessary service visits and ensures that when a technician arrives, they have the correct components on hand, minimizing delays and multiple appointments.

These types of remote services are a time saver and benefit for the supplier and the consumer.

Artificial Intelligence and Internet Search Options

With today's internet resources — whether through traditional web searches or the use of artificial intelligence — wheelchair users can access more information than ever before. While these tools won't account for an individual's personal preferences unless specifically prompted, they do provide valuable general insights into available products. For someone beginning the search for equipment that supports mobility and independence, these online resources can serve as an excellent starting point.

Just like the general population, a person who needs a mobility device for independent mobility can do a search for options and benefits offered before meeting with their evaluating team.



A young woman uses a robotic arm with a Vigo proportional head control.

CONTINUED ON PAGE 26

The evaluating team can then provide the individual with further information regarding what products are available and what may match their individual needs. The team approach is still an important part of the product selection process to provide the most clinically appropriate product features for the individual to ensure optimal outcomes.

Assisted Driving Options

Some advancements in technology are collision alerting/avoidance systems for individuals who may experience challenges with power wheelchair driving due to visual, perceptual, behavioral or cognitive issues that impact their ability to safely operate and maintain control of a power wheelchair. These technologies provide options for the evaluating team to consider for individuals who may be considered borderline for safe power mobility driving and give them opportunities to have greater independence.

These collision avoidance systems are similar to those in automobiles that we have all become accustomed to. Devices such as **backup cameras** that show an individual their surroundings, the **LUCI system** that utilizes sensors and avoids impacts and accidents, and the **Braze Mobility system** that offers a blind spot sensor system are options currently available.

Backup cameras — The most basic of these safety enhancement systems is a backup camera. Quantum Rehab offers a backup camera that utilizes a separate screen. This camera is plugged into the power wheelchair's electronics system. The system offers two options: Option 1 is when a reverse command is given, the camera (which has night vision capability) turns on allowing the wheelchair user to see behind the wheelchair on the screen mounted in front of them. Option 2 is to have the camera on with a switch hit and a second switch hit turns the camera off.

Braze Mobility also has a backup camera system in which a switch turns the camera on and when the switch is clicked again it turns the backup camera off.

These backup camera systems are very cost effective for an individual to purchase for use with their wheelchair and offer additional safety to the wheelchair user of knowing they can see behind the wheelchair before backing up, which for many wheelchair users is a challenge due to physical limitations.

The Braze Mobility System – as stated above, has a back camera system but in addition it has sensor systems that notify the wheelchair user of potential impact danger. The system

does not prevent impacts from occurring, and it identifies objects that are 2 feet from the system with a warning light/beep or vibration sensor on the chair. At 1 foot it provides a danger light/auditory beep or vibration to the user to notify of the danger. This system will not control the power wheelchairs movement; it is only a warning system to help individuals maneuver in spaces where the user may have blind spots and not be able to adequately see the space.

As stated earlier the Braze Mobility system does not take control or stop the chair so that still requires the wheelchair user to possess that skill set for reaction time. The Braze system also does not detect drop-offs so the wheelchair user must be able to utilize their depth perception and vision to identify these community dangers.

The LUCI system — This system is one of the more sophisticated assisted driving systems in the CRT industry today. The LUCI system utilizes a sensor to help an individual avoid impacts with objects, people or even avoid drop-offs, according to the LUCI website.

LUCI's website states "their system offers Mobility Level 2 (partial automation)," which allows the user to have control and receive technical assistance. The LUCI system

will slow a wheelchair down or even stop the wheelchair to avoid a collision or prevent the wheelchair from going off a drop-off. The website informs that "the system works in the home, indoors and outdoors day or night." The website also reports that "Seeing drop-offs in the built environment is easier for LUCI than when you are "off-roading." So, driving on natural surfaces, like a grassy field or gravel path, may lead LUCI to slow you down."

LUCI has a "crowded driving environment" benefit as well. When in a crowd of people, the LUCI system will slow the chair down to avoid striking another person who may not be paying attention to the individual in the wheelchair. This may prevent a power wheelchair user from unintended contact with a person or object leading to potential injury when negotiating through congestion. Knowing that the chair can adapt to this type of environment can assist in reducing stress and anxiety and reduce potential embarrassment for the wheelchair user.

This type of driving assistance system should be evaluated by a clinician and supplier to see if the technology may be able to assist individuals with depth perception and visual and perceptual issues be able to independently drive a power wheelchair.

CLINICAL PERSPECTIVE

Autonomous automobiles have started to advance this technology further. It appears that this type of technology may one day make power mobility more accessible for individuals who are currently unable to operate a power wheelchair. Such advancements have the potential to significantly influence the future of mobility devices.

Robotic Devices

The Jaco robotic arm is a device that can be mounted to a power wheelchair to support individuals with limited upper extremity function who are unable to independently take a drink, feed themselves, participate in leisure activities or perform work-related tasks (see Picture 1 of a young woman using a robotic arm with Vigo control). Once installed, the arm can be operated through the wheelchair's electronics or through an alternative control interface such as a joystick or computer. These systems can significantly enhance independence, autonomy and self-esteem while also reducing the need for caregiver assistance.

Drive Controls

The complexity of power wheelchairs continues to evolve over time. The advancements described above represent only a portion of the technological progress that

has expanded opportunities for independence. Modern programming features now allow the clinical team to finely tailor a wheelchair's performance to the specific needs of each individual. These adjustable parameters influence how the chair drives, how the power positioning system moves and how the user manages their health, comfort and functional needs throughout the day. Thoughtful programming can significantly enhance how a person utilizes their wheelchair, supporting optimal function and greater independence.

One area where power mobility is rapidly developing is drive controls. Drive controls or alternative driving devices have many advanced features that can significantly optimize the individual's abilities to independently control their power wheelchair.

There are two distinct types of driver controls: proportional and non-proportional, often referred to as switched or digital controls. Proportional controls allow the user to incrementally control the chair speed and direction of movement typically using extremity movements to influence the force and direction applied to the drive control. Proportional controls tend to be very efficient from a usage and driving perspective.

Switched drive controls do not regulate speed and direction as efficiently as proportional controls as contacting the switch can only turn a function on or off. A switched controlled system can be successful for individuals with limited movement and range of motion, muscle control/tone issues or for those who have challenges with motor planning.

Proportional Drive Controls

Development of proportional controls has evolved and there are now a variety of options designed to meet different force and throw requirements suitable for access with different body parts including hand/finger, head, chin, lip and foot.

Most applications for proportional control tend to be at the head and upper and lower extremities. Proportional controls may be available from the power wheelchair manufacturer or from a specialty drive control manufacturer. Suppliers and evaluating teams can be very creative with how these devices are positioned and utilized with the individual. The drive control on a power wheelchair can be just as unique as the individual driving the power wheelchair.

For purposes of discussion, the proportional controls will be divided into sections: large throw, short throw, head controlled and foot controlled. For reference, large throw joysticks has to do with the distance the joystick moves from providing a minimal speed command to a full speed command to move the power wheelchair in the desired direction. These require greater active movement to achieve maximum driving speeds and often require more force to move the joystick itself.

Large throw proportional joystick controls — includes what most people would commonly refer to as Standard joysticks. These are typically similar in size, and the joystick knob on many of these devices can be substituted with different shapes for a more optimal hand grip when the standard option is not appropriate. Beyond the standard offering of joysticks by each of the power wheelchair manufacturers, a variety of specialty control manufacturers have developed controls to provide individuals with drive control challenges with proportional electronic assistance to manage both uncontrolled movement (tone, tremor) or weakness. The three main companies of alternative drive controls are Mo-Vis (Stealth Products), Adaptive

CONTINUED ON PAGE 28

Switch Labs (ASL/Invacare) and Switch-It (Sunrise).

The larger throw joysticks also can vary in the amount of force needed to deflect the joystick in the direction desired. For individuals who have larger or strong (high tone) movements, there are heavier force options. The heavy-duty joystick from Mo-Vis requires 650 grams of force to deflect, allowing these individuals who apply a great deal of force into a joystick to be able to have the possibility of driving with a proportional drive control. These larger throw joysticks have lighter force joystick options as well. Some such options include the ASL Compact joysticks, Switch-It VersaGuide and the Mo-Vis All Around light, which only requires 120 grams of force and 7 mm of throw to drive full speed.

There are so many options today that allow evaluating teams of therapists and suppliers to truly match the unique characteristics needed by the individual to the right device.

Short Throw Proportional controls — These proportional drive controls have a much smaller, or shorter throw, and lighter force required to deflect the joystick and are very small and compact in overall size. They are often used by individuals who have very limited movement and strength and often are only able to move their finger(s). These small throw proportional controls require minimal strength to deflect the joystick — from 50 grams to as little as 8 grams of force. Since these are very small and compact, they can be recessed into a palm support (arm pad or tray) and utilized with the fingertip. (see Picture 2 of an individual with small throw proportional device with custom mounting).

There is often a little more training required with use of short throw proportional controls since they are more fragile. Unfortunately, because the individual driving the wheelchair does not have a lot of strength, these are not often

broken due to the wheelchair user but typically broken by the caregivers. This fragile nature of the alternative drive control needs to be addressed with the home team at initial delivery.

Head-controlled proportional drive controls — The RIM proportional drive control was one of the first in the industry. There are still power wheelchair drivers who drive with this system today. Proportional head-controlled drive controls have evolved significantly over the years, and there are now several ways to drive with head movements. The first and most important factor is the individual's preference: at the lips/mouth, the chin and head are all available in proportional controls.

The control at the chin has been utilized for many years. The benefit of driving this way today is that the drive controls are much smaller and require smaller movements to drive independently. When looking at chin controls the size of the joystick may be important to the individual. The all-around joysticks from Mo-Vis, compact Joysticks from ASL and the VersaGuide from Switch-It are all options but tend to be on the larger size and require more force to deflect. The Mo-Vis Multi and the ASL Orbit only require approximately 50 grams of force to deflect and are relatively small in size, so other people see more of the person instead of the drive control. These devices are mentioned over some of the lighter force proportional controls because



Short throw proportional device with custom mounted joystick.



The Mo-Vis proportional head control

CLINICAL PERSPECTIVE

when driving with the head these are a good match for the forces applied to the drive control.

The lips/mouth is another location at the head that a proportional control can be placed, and the very light force proportional controls like the ASL Molecule, Mo-Vis Micro and Switch-It Micro Guide tend to be good choices since they require much smaller forces and are very small in size. The industry has seen advancement in mounting these devices. There are manual swing away booms, power swing away booms and harnesses that the individual wears. It truly is up to the individual to decide what option is preferred for their situation.

A control for the head, from a proportional perspective, that has seen the most change and advancement over the years is the proportional head array. This started many years ago with RIM control and has since advanced significantly. There are several proportional head control systems that use pressure sensors inside the head pads to allow proportional driving to take place. The three main proportional pad head controls available today are the Switch-It Dual Pro, ASL Fusion and the Mo-Vis Proportional head control (see Picture 3 of the proportional head control from Mo-Vis). They allow the driver to drive proportionally

in all directions by allowing the user applying a certain amount of force on the pad in the direction they want to drive causing the wheelchair to speed up to the speed desired. These types of drive controls continue to advance with time.

The last proportional control for the head is a sensor that the wheelchair user wears and then controls the proportional movements of the wheelchair with forward flexion, lateral right and left flexion and capital extension of the neck. The newest additions to these head controls are Sunrise Medical's Vigo, munevo DRIVE and the Magitek system. Each of these is worn in a different manner. The Vigo is an earpiece the user wears, and it senses its position in space from the starting neutral position. The munevo system relies on the individual to wear a pair of google glasses and senses the position in space. Magitek is typically worn on a head band or hat, and just like the other systems adjusts speed according to head position in space. These systems all can reset neutral which is an advantage to people whose posture may change some during the daytime.

The variety of proportional head controls available today truly allows evaluating teams to match the right device to the individual and their specific physical, functional

and aesthetic requirements. Experience has proven that while individuals with similar conditions and functional abilities may require similar technology, what works for one person doesn't always work for another.

Foot-controlled proportional drive controls — The final location that teams may see sufficient movement for proportional controls is at the foot. These devices can be categorized into two types: gross movement and finer movement proportional controls.

Gross movement proportional foot controls – These types of controls are when the larger movements of the legs are utilized. The movements associated are typically knee extension, knee flexion, and external and internal rotation of the hip or in some individuals it may include abduction and adduction of the hip. The mushroom joystick is often utilized as this type of proportional foot control. These proportional controls are ideal for individuals who may have tone or some muscle control issues in their body, and these drive controls are often dropped into a custom location in the footplate of the power wheelchair. These foot controls allow the individual to move the joystick and drive very functionally, adjusting their speed and direction smoothly.

Although the mushroom joystick has been around, it is mentioned because it has led to advancements in the finer movement proportional foot controls discussed next.

Fine movement proportional foot controls — These foot proportional controls require finer movements located down at the ankle. The body movements these devices require are plantar flexion, dorsiflexion and ankle rotation to the right and left. These movements tend to allow a finer level of proportional driving than the more gross motor controlled proportional controls. The two proportional foot drives on the market are the ASL foot control mounting adaptor, which requires a proportional compact joystick to be added to the mount and the Mo-Vis proportional foot drive control, the newest advancement with proportional foot driving, which has been well-received in the industry.

These proportional foot-drive controls can allow a person with a progressive neurological condition such as ALS or an individual diagnosed with a central spinal cord injury be able to drive proportionally with their foot, which as discussed is more intuitive and efficient for independent mobility.

CONTINUED ON PAGE 30

Switch Drive Controls

If an individual cannot consistently access and maintain control of a proportional drive control and yet has movement in at least one body part, then advancements in switch technology allow individuals to be able to achieve independent power mobility.

Switches have developed into mechanical options, requiring force to activate and electronic options, responding to body contact or light sensitive (where the body movement breaks the beam of light to activate). The manner in which they can be integrated into a drive control continues to evolve.

Head arrays using three switches embedded in the rear, right and left head pads with optional mode switches, as well four- and five-switch array systems (often mounted on trays) have not changed significantly over the years. However, two switches, one switch and eye gaze driving systems have made advancements.

Two switch driving systems — Stealth Products has a device called the iDrive that offers a driving option for two switches. The power wheelchair electronics programmed as a three-switch drive control. The iDrive is programmed as a linked drive control, and the

two mechanical or electronic switches are plugged into the iDrive unit; the left switch drives left, and the right switch drives right. When both switches are pressed, they drive forward. If both switches are clicked together and released quickly, the directional arrow on the display toggles to the reverse direction, and when both switches are engaged again the chair drives reverse. This form of driving can maintain not only independent driving but also access to powered seat functions and electronic device access (using Bluetooth) through the power wheelchair for a longer time. (see Picture 4 of linked driving with mechanical switches mounted at lateral knees for access).



Linked driving setup with mechanical switches mounted at lateral knees for access.

One switch driving system — One switch driving utilizes a scanner, which may be built into the electronics or may require a separate unit plugged into the power wheelchair to allow for single switch scanning driving to take place; it depends on the manufacturer as to which scanning system is available.

Single switch scanning is often looked upon as tedious and a last resort for driving. This may be true for some individuals but for others it is a way of maintaining independent mobility. The single switch scanning systems available have continued to evolve in different ways. All scanning systems offer a visual scanner that lights up in some way (some have an arrow that turns yellow,

and others utilize LED lights to signify a driving direction when the switch is activated.) Some manufacturers have developed scanning sequences to enhance driving efficiency (but may require a greater understanding of the sequence to get to the direction they want). Other manufacturers offer the ability to program a custom scanning pattern (ask your manufacturers reps for further information on what their electronics offer). Some scanning systems offer auditory beeps (auditory beeps can be activated or shut off).

Although this form of driving may initially take longer than traditional driving, with practice clients learn the sequencing and chair response to become efficient independent drivers. If some individuals find it too difficult or tedious to drive this way, it can also offer them independent power positioning control so they can continue to access their power positioning system to assist in managing their health independently (skin integrity, change of position, respiratory positioning, etc.).

Eye gaze drive control systems — Eye gaze is a technology that has been utilized for quite a long time for communication and computer control. Only in more recent years has it been applied toward independent control of a power wheelchair.

CLINICAL PERSPECTIVE

This is technology that I would still consider somewhat in its infancy. An eye gaze system allows individuals to drive by looking at a tablet or computer mounted on their wheelchair (these devices show what is on the other side of the device for safe driving). The device has a camera system on it that focuses on the eyes of the individual. When they move their eyes while looking at the screen, the directional arrow lights up representing the direction they want to drive. As their gaze remains on that arrow, the power wheelchair drives in that direction.

This technology can provide independence to continue to drive and control a power wheelchair for individuals who have progressive neurological conditions although continuing to lose functional movement. Like other switch drive systems, eye gaze technology allows individuals independent access to driving and control of other chair functions and technologies (power positioning, communication devices, computers and personal electronics).

This technology continues to advance and offers more options for individuals who do not have consistent movement of any other body part. There are, however, some drawbacks such as outdoor driving, which can be impacted by the sunlight.

The companies selling this technology (Tolt Technologies, Ability Drive and the Home Brace System) continue to make advancements in the usability of this technology in all environments (one such advancement is the Home Brace system offers a system that utilizes a pair of glasses with a camera that helps with sunlight interference, this will be a very personal choice for the individual). While this technology is expensive, consider the value of independence that can be achieved or maintained when the technology is utilized. Those of us in the CRT industry know you cannot put a price on independence and a maintained sense of productivity.

Conclusion

Technology has advanced in leaps and bounds and in more recent years has accelerated significantly. The technologies utilized in the CRT industry continue to evolve, expanding opportunities for independence. The challenge now lies in getting these devices funded so they can be provided. As an industry and as users of the equipment, our job is to create awareness so that the functional and health benefits of these technologies can be understood by government officials and funding sources develop funding for the implementation

of these devices. This is not an easy task and requires time and significant effort.

Another ongoing challenge for manufacturers and suppliers is keeping pace with rapid technological change while continuing to refine existing equipment and develop new solutions. Ultimately, every advancement circles back to a single goal: supporting greater independence for the individuals served by the CRT industry.

This article is approved by iNRRTS, as an accredited IACET provider, for .1 CEU. After reading the article, please visit <http://bit.ly/CEUARTICLE> to order the article. Upon passing the exam, you will be sent a CEU certificate.



CONTACT THE AUTHOR

Jay may be reached at
JDOHERTY@QUANTUMREHAB.COM

Jay Doherty, OTR, ATP/SMS, is the senior manager of clinical education at Quantum Rehab and is a respected leader in Complex Rehabilitation Technology. With more than 31 years of experience, he brings deep clinical expertise supported by Assistive Technology Professional and Seating and Mobility Specialist certifications from the Rehabilitation and Engineering and Assistive Technology Society of North America. Doherty provides strategic direction for Quantum's clinical education team and delivers high-quality education on the functional and therapeutic applications of Quantum products. A seasoned presenter and program developer, he has shared his knowledge globally, advancing best practices and innovation throughout the CRT community.

Clinical Commentary:

Advances in Power Mobility for Children and Adults with Non-Ambulant Cerebral Palsy

WRITTEN BY: Roslyn W Livingstone MSc (RS), OT, and Ginny S Paleg PT, DScPT, MPT

Power mobility devices include ride-on toys, specialty devices for young children, platform training devices, sit-to-stand power wheelchairs and power wheelchairs. This clinical commentary will discuss recent advances in technology and changes in philosophical approach that influence their use with children and adults with cerebral palsy or similar conditions.

In addition to the stigma, where a power wheelchair may be perceived as a “last resort,” the most widely reported challenges are the size and weight of the device, transportation, and home and community accessibility. For young children (and their parents) these issues are particularly challenging. The “ON-Time” mobility framework proposes that children have the right to age-appropriate mobility opportunities and equitable developmental experiences.¹ This means that developmentally appropriate power mobility options are needed before 12 months of age.

Although modified ride-on toys have been used since the 1980s, their use has grown exponentially since publication

of the first technical report in 2012 from the University of Delaware,² and the development of Go Baby Go programs worldwide. Most toys are adapted with a single-switch, the controls cause an initial jolt that is difficult for some children to tolerate and steering is challenging even with adaptations. More complex adaptations such as proportional joysticks and graded speed modulation,³ and line-following capabilities for children with severe visual impairments using single-switch control,⁴ are now available in some settings. The technical support available particularly influences their use with children who need more complex seating or alternate control options.

Limitations in the functionality of ride-on toys include their size and large turning radius. Dual control toys are more maneuverable and have been successfully used with children as young as 10 months with spinal muscular atrophy. Seating and handle adaptations suggested,⁵ may also be suitable for some young children with cerebral palsy. The Explorer Mini is available in Europe and has been available in the U.S.

since 2020.⁶ It addresses many of the functionality concerns of modified ride-on toys, but the joystick position cannot be adjusted, and the postural support is limited. It is also much more expensive than ride-on toys, limiting widespread use. Shriners Children’s in Utah developed a Babybug, suitable for children from 8 months to 18 months in their state to address ON-Time mobility.

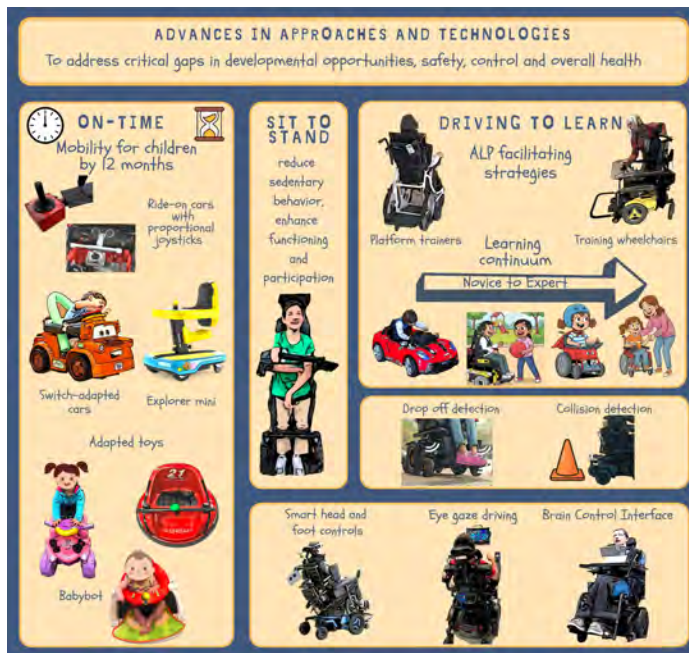
In 2003, the term “Driving to Learn” was introduced: a new approach for children and adults with cognitive disabilities who made developmental gains even if they didn’t meet criteria for power wheelchair prescription. This led to the development of the Assessment of Learning Powered mobility use and the accompanying learning strategies (<https://lisbethnilsson.se/en>) that address the whole learning continuum from the novice, who doesn’t understand the connection between the joystick and device movement, and the expert, who uses the power wheelchair to participate in daily life. Assessment of Learning Powered mobility facilitating strategies are increasingly

reported as the approach used in power mobility training for young children and those with complex disabilities.

Platform training devices are often used for initial training with children and adults who are not typical power wheelchair candidates. They can be shared by several individuals, as users remain in their own seating and wheelchair systems. A recent development is the IndieGo (<https://www.theindiego.org/>). These devices, however, are expensive and often are only available in institutional and research settings. Portable platform devices that are low-cost, such as the Carry-LoCo (<https://www.mech.usp.ac.jp/~maw/KLP2016/home.html>), currently only available in Japan, could increase power mobility training opportunities for complex populations.

For individuals with cerebral palsy who are unable to use a proportional joystick, head-arrays are commonly used. Eye gaze controls are commercially available with products such as Ability Drive (<https://www.tolt.tech/products>) that work through the user’s augmentative and alternative communication tablet or

CLINICAL EDITORIAL



Advancements in power mobility.

device. However, use outdoors is not recommended due to sunlight interference. Research into brain control interface technologies for power mobility suggests that children can improve their Assessment of Learning Powered mobility phase and achieve meaningful goals following training in a lab setting, although setup and calibration can take more than 20 minutes each time.⁷ This can be frustrating for the user, suggesting that further development of this technology is still needed.

Individuals with severe dystonia and dyskinesia, often use alternate access sites (body parts) and/or control methods. CoMoveIT (<https://comoveit.com/en/>) was developed through a research program in Belgium and combines head and/or foot sensors with artificial intelligence and

machine learning. The system aims to accurately distinguish between intended (volitional) commands and involuntary movements. CoMoveIT is not yet available in North America.

Intelligent driver assistance systems can help to address safety concerns. LUCI (<https://luci.com/>) is a sensor-based collision avoidance system that also avoids drop-offs, and unsafe slopes. This system may be very beneficial for those with additional sensory or cognitive impairments, or erratic control due to movement disorders. There are, however, difficulties with funding due to the high-cost, and the system may limit purposeful maneuvers or diminish the perception of complete control.

Incorporating sit-to-stand into the power wheelchair may help address the negative secondary health effects of sedentary behavior for individuals with non-ambulant cerebral palsy. Most evidence is reported for individuals with muscular dystrophy, however recent reports include children with cerebral palsy as young as 5 years,⁸ and children and adolescents using head-array as well as proportional joystick.⁹ Evidence to date suggests that while sit-to-stand power wheelchairs provide physical, functional and psycho-social benefits, they may not always replace the need for a separate stander to meet weight bearing and contracture prevention goals.

Recent advances in power mobility technology and approaches can support the ON-Time provision of power mobility interventions for infants and young children, provide mobility and learning opportunities for children and adults not typically considered as potential power wheelchair users, and help address critical gaps in developmental opportunities, safety, control and overall health. Some technologies are available now, while others remain a hope for the future. We need to advocate for development and research, and for increased availability of the right products at the right time for our clients, through funding or loan programs as appropriate.

References

- Sabet A, Feldner H, Tucker J, Logan SW, Galloway JC. ON Time Mobility: Advocating for Mobility Equity. *Pediatric Physical Therapy*. 2022;34(4):546-550. doi:10.1097/pep.0000000000000939
- Huang HH, Galloway JC. Modified ride-on toy cars for early power mobility: A technical report. *Pediatric Physical Therapy*. 2012;24(2):149-154. doi:10.1097/PEP.0b013e31824d73f9
- Aceros J, Lundy M. Enhanced Steering and Drive Adaptations of Modified Ride-On Toy Cars for Improved Directional Control in Very Young Children With Severe Multiple Developmental Impairments. *Front Pediatr*. 2020;8(567):1-8. doi:10.3389/fped.2020.00567
- Aceros J, Lundy M. The Effects of Power Mobility on Self-Care, Mobility, and Social Function in Very Young Children with Severe Multiple Developmental Impairments. *Frontiers in Rehabilitation Sciences*. 2025;6:1551536. doi:10.3389/fresc.2025.1551536
- Ródenas-Martínez M, de Andrés-Beltrán B, Plasencia-Robledo M, Coello-Villalón M, Díaz-López CI, Palomo-Carrión R. Power mobility in children with motor impairments: adaptations in electric toy cars to improve handling in natural environments—a case series. *Disabil Rehabil Assist Technol*. 2025;20(8):3014-3026. doi:10.1080/17483107.2025.2520369
- Plummer T, Logan SW, Morress C. Explorer Mini: Infants' Initial Experience with a Novel Pediatric Powered Mobility Device. *Phys Occup Ther Pediatr*. 2020;41(2):192-208. doi:10.1080/01942638.2020.1819935
- Hammond L, Rowley D, Duck C, et al. BCI move: exploring pediatric BCI-controlled power mobility. *Front Hum Neurosci*. 2025;19(April):1-17. doi:10.3389/fnhum.2025.1456692
- Kenyon LK, Aldrich NJ, Behl SL, Bazary SG, McDonagh ER, Miller WC. Enabled to Stand: A Single-subject Research Design Study Exploring Pediatric Power Wheelchair Standing Device Use. *Pediatric Physical Therapy*. 2024;36(3):316-327. doi:10.1097/PEP.0000000000001110
- Field DA, Borisoff J, Chan FHN, Livingstone RW, Miller WC. Standing power wheelchairs and their use by children and youth with mobility limitations: an interrupted time series. *Disabil Rehabil Assist Technol*. 2024;19(2):454-464. doi:10.1080/17483107.2022.2096933



CONTACT THE AUTHOR

Ginny may be reached at
GINNY@PALEG.COM

Ginny Paleg, PT, DScPT, MPT, is a pediatric physiotherapist based in Silver Spring, Maryland, with more than 40 years of experience working with infants and young children (0–3 years) in home and childcare settings, using the F-words framework to guide her practice. She is an associate of CanChild at McMaster University in Canada and an honorary research fellow in the School of Health Sciences at the University of Kwazulu-Natal in South Africa.

Paleg earned her master's in physical therapy from Emory University in Atlanta, Georgia, and her Doctorate in Physical Therapy from the University of Maryland, Baltimore. Her clinical expertise centers on assessing and intervening for children with severe motor impairments, particularly those at GMFCS Levels IV and V. She is certified in the Prectl General Movement Assessment and the Hammersmith Infant Neurological Examination, and she is trained in Routines-Based Interventions and coaching methodologies. A prolific researcher with more than 60 peerreviewed publications on standers, supported stepping devices and power mobility for children with complex needs, she is the lead author of the American Academy of Cerebral Palsy Hypotonia Care Pathway and has held numerous leadership roles, including chair of the academy's communications committee and member of the nominating committee. Additionally, she is served in 2022 as a member of the scientific committees for the academy and the European Academy of Child Neurology. Paleg currently serves on the academy's Care Pathway Council.



CONTACT THE AUTHOR

Roslyn may be reached at
ROSLIVINGSTONE@GMAIL.COM

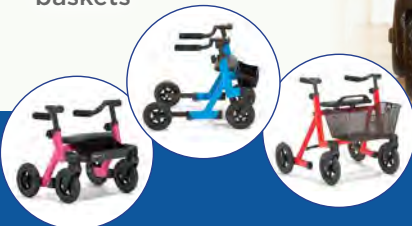
Roslyn Livingstone is an occupational therapist with more than 30 years of experience in assessment and provision of positioning, mobility and other assistive technologies with children who have multiple and complex disabilities. She is a clinical assistant professor at the University of British Columbia, Canada, an investigator at BC Children's Hospital Research Institute and an honorary research fellow and doctoral student at the University of Kwazulu-Natal, South Africa. She has published extensively on topics related to adaptive seating, supported standing, supported stepping, wheeled mobility and assistive technologies. Her doctoral studies focus on the experience and meaning of power mobility use for children with complex non-ambulant cerebral palsy.

Introducing our littlest rollator for the smallest clients.

marcy. There for you from the start.

Marcy is an anterior rollator destined to be your child's new best friend for walking and play. Adjustable and adaptable, Marcy can grow as needs change.

- ▶ Fun colors encourage use
- ▶ 8 models let you choose best fit
- ▶ Options include braking, motion controls, seat and baskets



ZITZI™ STARFISH PRO

Children's shower and commode chairs with infinite growth possibilities

Easily build a custom chair to fit today and grow tomorrow.

- ▶ 3 frame sizes
- ▶ 3 chassis styles
- ▶ Over 100 options to design a perfect fit



Distributed by: Clarke Healthcare Products www.clarkehealthcare.com 888-347-4537

AI with Purpose: Improving Access Through Practical Innovation

WRITTEN BY: Sam Darraj

THIS ARTICLE IS SPONSORED BY NUMOTION.

Access to mobility equipment can be life-changing, but the process of obtaining it is often complex. From clinical documentation to insurance verification, multiple administrative steps stand between evaluation and delivery. While these safeguards are necessary, they can create delays for individuals who rely on mobility to participate fully in daily life. At Numotion, we believe innovation should reduce that complexity. By thoughtfully integrating artificial intelligence and automation into our operations, we are working to streamline processes, improve accuracy and help customers receive essential equipment more quickly.

For many of the people we serve, time matters in very real ways. Waiting for a power wheelchair, customized seating system or other mobility solution can mean postponing school, work, therapy or simply the ability to move safely at home. Reductions in processing time can have meaningful impact. That perspective guides how we approach technology. Our goal is not to adopt artificial intelligence for its own sake, but to apply it in practical ways that remove friction from the system.

One area where this has made a difference is in reviewing insurance coverage criteria. Coverage policies vary by payer and are frequently updated. Determining whether clinical documentation meets specific requirements can be detailed and time-consuming. By using AI-driven tools to analyze documentation and determine whether coverage criteria are met, we can complete internal reviews more efficiently and flag potential gaps earlier.

This early visibility allows our teams to work more proactively with clinicians and funding sources. Instead of discovering missing elements late in the process, we can address them sooner. That reduces the back-and-forth and shortens the overall timeline. Importantly, AI supports our team members rather than replacing them. Experienced funding specialists and clinicians remain central to every decision. Technology simply helps surface information more quickly so they can focus on problem-solving and service.

We are also applying automation within the funding and verification process, which is often one of the longest stages between evaluation and delivery. Verifying

benefits, confirming eligibility, submitting documentation and tracking approvals traditionally require multiple manual touchpoints. By embedding automation into these workflows, we can initiate eligibility checks more quickly, identify inconsistencies in real time and route tasks efficiently to the right team members.

The result is greater consistency and, in many cases, fewer days between evaluation and equipment delivery. While each case is unique, removing days from the process can make a meaningful difference for someone waiting on equipment that supports independence and safety.

Beyond Numotion's core Complex Rehab Technology operations, our sister company SpinLife is also using AI to improve the customer experience at the beginning of the journey. Selecting mobility equipment can feel overwhelming, particularly for individuals navigating new diagnoses or changing needs. SpinLife's AI-powered quiz asks customers targeted questions about their lifestyle, home environment and daily routines. Based on their responses, it provides personalized product

recommendations aligned with their needs.

This tool does not replace human guidance, but it helps customers start with clearer direction. It reduces uncertainty and supports more informed conversations. Like our broader use of AI, it is designed to simplify a process that can otherwise feel complicated.

As a health care provider operating in a highly regulated environment, we approach every AI initiative with care. Data privacy, compliance and security are foundational to our work. We move deliberately, ensuring that new tools strengthen our processes without compromising trust.

AI will not solve every challenge in health care. But when applied thoughtfully, it can help reduce administrative burden, improve accuracy and accelerate access. At Numotion, that is our focus. We are committed to using practical innovation to remove unnecessary delays so the people we serve can receive the mobility solutions they need when they need them.

CONTINUED ON PAGE 36



CONTACT THE AUTHOR

Sam may be reached at
SAM.DARRAJ@NUMOTION.COM

Sam Darraj, chief revenue cycle officer at Numotion, has more than 27 years of experience in the Complex Rehab Technology industry across a range of executive and leadership roles. He leads Numotion's Funding and Reimbursement organization, overseeing insurance verification,

medical documentation, prior authorizations, billing and collections, cash posting, payer profile management, and credentialing. Darraj began his career in 1998 with NeighborCare Home Medical in an entrylevel position and advanced to regional revenue manager within seven years, managing the full revenue cycle. He later led billing and collections for 12 locations at Chesapeake Rehab, and following its acquisition by ATG Rehab in 2011, he became director of

accounts receivable. After the merger that formed Numotion, he was promoted to vice president of reimbursement, expanded his responsibilities in 2019 to include funding operations as senior vice president and ultimately advanced to his current executive role. Darraj earned a Bachelor of Science in business management from the University of Phoenix and is a proud U.S. Marine Corps veteran, honorably discharged after six years of service.

numotion®

Leading provider of Complex Rehab Technology (CRT). Through our collection of brands, we provide those living with disabilities greater independence.



Canada's leading provider of customized mobility and home accessibility solutions.



Urological and supply needs for better bowel and bladder management.



Customizable Augmentative and Alternative Communication (AAC) solutions.



Retail mobility and lifestyle products providing independence to adult and pediatric users.



Ancillary services to help insurance carriers support injured workers.

numotion.com/our-brands

CRT Innovations Advance in Canada

WRITTEN BY: Linda Norton, B.Sc.OT, M.Sc.CH, Ph.D., OT Reg. (Ont), and Michelle Harvey, B.Sc. Hons OT, RRTS*

This issue of Canada DIRECTIONS highlights innovative products and research emerging in Canada that have the potential to influence the provision of CRT, whether through new approaches, technological advancements or product development.

This article is presented into two sections: Research and Product.

Research Innovation in Canada

Finding all the research occurring related to Complex Rehab Technology in Canada is challenging as there isn't a central repository describing all the current research initiatives, but that doesn't mean that innovation isn't happening. Research related to CRT in Canada is occurring in many areas, including smart wheelchair and assistive mobility research, seating and pressure injury prevention research, wheelchair skills training, and spinal cord injury and rehabilitation. While not a comprehensive list, below are several innovations that are being explored.

Smart Wheelchair and Assistive Mobility Research

- **Device choice impacts on autonomy** (<https://mech.ubc.ca/2022/11/28/caris-research-on-wheelchair-users-sense-of-autonomy-in-nov-issue-of-assistive-technology>) Researchers focused on how wheelchair users' sense of autonomy changes depending on the device and

environment. The highest satisfaction with perceived autonomy occurred with manual wheelchair users who used a power add-on device as it provided the greatest flexibility between environments. Research continues on how certain features such as speed and maneuverability influence the personal autonomy of people who use a wheeled mobility assistive device in various contexts. (<https://caris.mech.ubc.ca/research/research-areas/mobility-assistive-technologies/>) This research will help inform prescription practices of CRT to ensure autonomy is maximized.

- **Performance of power-assisted wheelchairs** (<https://caris.mech.ubc.ca/research/research-areas/mobility-assistive-technologies/>) Currently available push rim-activated power-assisted wheelchairs haven't changed users' life satisfaction regarding the need to coordinate pushes on each wheel, safety and controllability on declines, difficulty of stopping and changing directions, battery life, chair weight, and assembly and disassembly. Research in this area is two-pronged: 1)

developing control algorithms to improve the ease of coordination and use of push rim-activated power-assisted wheelchairs and 2) taking a modular approach to the push rim-activated power-assisted wheelchairs so that they can be configured for the individual. This research has the potential to change the types and configurations of power add-ons and the usability of these for our clients.

- **Brain-computer interfaces for wheelchair control** (<https://nserc-crsng.canada.ca/en/awards-database/773444> and <https://www.ctvnews.ca/montreal/article/meet-milo-a-mind-controlled-mcgill-created-automated-wheelchair/>) As the name suggests, this project is aimed at harnessing the user's thoughts to translate them into the input to drive the power wheelchair. Currently experimental in virtual reality, users can control their movement using their thoughts. The aim is to create a new type of specialty control that could be prescribed for power wheelchair users that would enable them to control their wheelchair with their thoughts.

Seating and Pressure Injury Prevention Research

- **Expert-driven weighting of pressure injury risk factors for wheelchair users: A Delphi study** (<https://pubmed.ncbi.nlm.nih.gov/40953084/#:~:text=A%20Delphi%20study-,Expert%2Ddriven%20weighting%20of%20pressure%20injury%20risk%20of%20factors%20for%20wheelchair,Online%20ahead-%20of%20print>) This study examines the personal risk factors for pressure injuries in wheelchair users. Among the highest ranked factors are immobility, current or past pressure injuries, malnutrition and sensory perception impairments. Although this research may not change the factors considered when recommending a skin protection cushion, it does reinforce the need to consider several factors.

CONTINUED ON PAGE 38

Wheelchair Skills Program Research

• **The Wheelchair Skills Program** (<https://wheelchairskillsprogram.ca/en/>) is a set of free online low-tech, high-impact, evidence-based resources for the assessment and training of users' manual and powered wheelchairs and motorized mobility scooters (with or without the assistance of caregivers). The program is a collection of wheelchair users, clinicians, educators and researchers with interest in and expertise related to the assessment and training of wheelchair skills.

The program is based in Halifax, Nova Scotia, with members contributing from multiple continents. Their research (<https://wheelchairskillsprogram.ca/en/publications-impact/>) spans many areas of wheelchair skills testing and training including design, training and provision of wheelchairs in varied geographical and living environments.

Currently there are ongoing studies investigating wheelchair service providers perspectives on a rear anti-tip device in enhancing participation without compromising safety. The device self-deploys through an arc when needed. It is designed for use with rigid or folding manual wheelchairs and is

intended to improve skill and access level by assisting in skills such as weight shifting in an aided-wheelie and increasing abilities to overcome curbs and inclines as well as avoiding the issue of conventional rear anti-tips interfering with care providers feet and increasing the rear length of the wheelchair.

Research and development also continue with the training program. In addition to the free manuals, videos and other resources (please review conditions of use) supplemental supports are being researched and developed to target specific groups such as caregivers, users of languages other than English (<https://wheelchairskillsprogram.ca/en/related-sites/#lang>) and pediatric wheelchair users (<https://wheelchairskillsprogram.ca/en/pediatric/>). Specific propulsion patterns of manual wheelchairs are also being studied. These self-directed online courses were designed to complement the existing resources by providing structured tutorials to help manual wheelchair users develop practical skills for everyday life.

(https://pitt.co1.qualtrics.com/jfe/form/SV_0cVklB2FgDwpCoC)

All inquiries regarding the team's research can be directed to: wsp@dal.ca

Spinal Cord Injury and Rehabilitation

• **MindMove™** (<https://myndtec.com/myndmove/>) has been designed to help regain hand and arm movement and function for clients who have paralysis from a stroke or spinal cord injury. It is non-invasive and uses electrical signals to stimulate the brain to form new neural connections. This may have implications for individuals who need power mobility, and may be able to access a joystick rather than using specialty controls.

Other Research

• **Canadian Foundation for Innovation: Improving access to rehabilitation services for people living with complex rehabilitation needs using high-quality telerehabilitation services.** (<https://www.reachablerehab.com/rehabilitation-and-technology>) The vast distances in Canada creates a geographic barrier to health equity. An individual with complex rehabilitation needs has a different ability to access care, including the prescription of a mobility device, depending on their geographical location in Canada. One way to improve equity is to provide telerehabilitation programs. This research, while focused on individuals with traumatic brain injuries, cerebral palsy or stroke, has implications for clients who require CRT and may help to inform

telerehabilitation practices for the provision of CRT in remote areas. Virtual assessment will never replace the need for a hands-on postural assessment by a clinician, but it may help improve the efficiency of the assessment process and focus the hands-on components.

• **Fabric-Based Research Platform (FIBRE)** (<https://kite-uhn.com/fibre>) is a group of researchers investigating using textile-based HealthTech with a view to create “human-centered design and accessibility solutions.” Artificial Intelligence is used to interpret the data collected through the fabric to make recommendations. (<https://myant.ca/>) This has the potential to provide new approaches to CRT.

Imagine a world where clothing could deliver electrical stimulation to improve postural control, a textile that promotes wound healing or a garment/seat cushion cover that could detect the early signs of skin damage, especially for those with darkly pigmented skin for whom early detection of pressure injuries is often missed. This information could be sent to the individual and/or their care team to prompt proactive interventions.

Another example is Skiin™ Osmotex. (<https://www.myantx.com/osmotex/>) This material is “self-drying” not just wicking moisture away but actively transporting moisture away from the body.

Product innovation in Canada

• **The ASL 504 Remote Stop Switch for R-Net** is a safety device allowing caregivers to stop a power wheelchair within a 20-foot range. It uses a single switch to instantly halt the chair, aiding in training or for users with limited motor control. This product (https://www.asl-inc.com/products/product_detail.php?prod=48) is often used in crowded environments or for safety with individuals who have severe seizure disorders, providing an immediate remote stop system.



The ASL 504 Remote Stop Switch for R-Net.

• **Hello Sunrise** (<https://www.sunrisemedical.ca/power-wheelchairs/switch-it-electronics/drive-controls/ctrl-5> and <https://www.sunrisemedical.ca/about-sunrise/latest-news/2025/august/sunrise-medical-launches-industry-first-voice-acti>) is a feature within **Sunrise Medical's QUICKIE Q300 M Mini Power Wheelchair** that allows for voice-activated seat elevation.

By saying "Hello Sunrise," the user can activate the seat functions to lift or descend without pressing buttons.

How it Works: Users can say "Hello Sunrise" to activate, followed by commands like "Sunrise 1" through "Sunrise 10" to tilt, recline, or elevate the legs.

Most suppliers have struggled to provide independence to the client who can activate a switch or their joystick when in an upright position, but once they are tilted, they lose the ability to access the switch and then lose the ability of reposition themselves. "Hello Sunrise" is the first voice activated system that would allow a client to control their power seat functions with simply their voice. There is some training and set up required, but this technology has the potential to allow clients more independence, even as they are losing motor control of their body.



Hello Sunrise.

• **LUCI** (<https://luci.com>) is a currently available, smart technology for power wheelchairs. LUCI is a collision avoidance and obstacle avoidance system. The LUCI system actively senses and avoids obstacles when the client is driving the chair.

The client still drives their power wheelchair and has autonomy as they drive; however, the LUCI system will slow down the chair and avoid obstacles in the user's path. The intent of this technology is to preserve the client's driving independence while improving the client's safety. It is an exciting technology as it offers the opportunity for independence for clients who may have difficulty steering around obstacles and may have been denied power mobility in the past.



LUCI.

• **Braze Mobility** (<https://brazemobility.com>) is a set of blind spot sensors that can attach to many different wheelchairs. These blind spot sensors provide feedback to the client to help them detect obstacles that may be in their way and then allows the user to navigate around those obstacles. Unlike the LUCI system it does not have an obstacle avoidance system that controls the wheelchair, avoiding the obstacle is totally in the hands of the client. This technology may be helpful for a client who has good motor control to drive their chair but does not have the mobility to look behind them or who may have low vision.



Braze Mobility.

• **WHILL autonomous powerchairs** (<https://whill.inc.us/>) are available at several major airports globally (such as Canada's Winnipeg Richardson International, Los Angeles International and Miami International in the U.S., Japan's Narita International and Amsterdam's Airport Schiphol) to assist passengers with mobility issues in navigating terminals and reaching gates. Currently in Canada, WHILL autonomous (self-driving) powerchairs are available as a full-time service for passengers at Winnipeg to navigate between check-in and departure gates.

These self-driving units allow users to enter their gate number, and the chair drives them autonomously, returning to a docking station when finished. This innovation will enhance the independence of these travelers with reduced mobility and make traveling as easy as possible for them.



WHILL autonomous powerchairs.

Three innovative products are described above to help draw attention to innovations we can access in Canada. The products featured, doesn't necessarily denote a recommendation, but do illustrate that innovation is happening in Canada.

Although this amazing technology is available, lack of awareness by suppliers may make this technology unavailable to our clients.

Dissemination of this innovative research and products is challenging. Perhaps there is an opportunity for iNRRTS to collaborate and provide input, so we can bring these opportunities to the CRT community.



CONTACT THE AUTHOR

Linda may be reached at
LINDA.NORTON@MOTIONCARES.CA

Linda Norton, B.Sc.OT, MSc. CH, Ph.D., OT Reg (ONT), is an occupational therapist passionate about the provision of appropriate seating and mobility equipment and the prevention of chronic wounds. Her diverse experience in various settings including hospital, community and industry, and in various roles including clinician, educator, manager and researcher, gives Norton a unique perspective. She has completed the International Interprofessional Wound Care Course (IIWCC), a master's in community health focusing on pressure injury prevention and a Ph.D. in occupational science focusing on chronic wounds.



CONTACT THE AUTHOR

Michelle may be reached at
MICHELLE.HARVEY@HMEBC.COM

Michelle Harvey, B.Sc. Hons OT, RRTS®, is an iNRRTS board member, serves on the Canadian Advisory Committee and became a NRRTS registrant in July 2021. She is vice president of sales and product for HME Home Health.

REHAB CASE STUDY

Eden's Journey: Empowered by Perseverance, Support, Technology and Purpose

WRITTEN BY: Eden Schroeder and Jessica Presperin Pedersen

Eden Schroeder, co-author, is also subject of this article. She began swimming competitively at 8 years old and continued through high school, before entering her freshman year at Florida State University. During a weekend trip with friends in Naples, Florida, her life changed in an instant when she unknowingly dove into a shallow sandbar. She sustained a C5 spinal cord injury and was paralyzed from the chest down.

After two weeks in the intensive care unit, Eden transferred to Shepherd Center in Atlanta, Georgia, where she spent six months in intensive rehabilitation. The early stages of recovery were daunting, but her determination carried her through what she describes as the hardest year of her life.

A major turning point came when Eden moved in with her physical therapist, Heather, and Heather's husband, Austin. With their support, she continued therapy while completing her Bachelor of Arts in psychology at Georgia State, also in Atlanta. She attended classes remotely because navigating ramps, curbs and unfamiliar walkways in a manual wheelchair made campus travel difficult.



Eden Schroeder and Chippy, her trained canine companion.

Eden later earned her driver's license using hand controls and now uses a modified van for transportation. She transfers from her chair to the driver's seat. Chippy is her trained canine companion, who assists her throughout the day.

Eden knew a power wheelchair would give her greater independence; however, it prevented her from driving with friends and getting into homes. Navigating ramps and long distances using her manual wheelchair were still significant barriers. Eden worried about losing control on downhill slopes

and often avoided unfamiliar environments, putting her in a position where she was dependent on others being with her on most outings. Almost five years after her injury, Eden gained increased independence when she paired an Empulse M90 power-assist system with her QUICKIE Nitrum chair. The setup helped her climb ramps, control descents more safely and travel independently with greater confidence.

With increased confidence, freedom and the ability to navigate the ramp into her van and transfer to the driver's seat

independently, Eden has been able to focus on her long-term goals. She is currently in her second semester of a doctoral program in clinical psychology at Mercer University in Macon, Georgia, where she hopes to support others navigating life after spinal cord injury.

Eden enjoys many adaptive sports, including hand cycling and skiing, but swimming remains her greatest passion. She competes in the S1 classification, which is reserved for athletes with the most significant physical impairments. There are only two female S1 swimmers in the world. To compete in the 2028 Paralympics, she must qualify to make the team alongside S2 and S3 swimmers, as there is currently no S1 team competition. She continues training with the Shepherd Sharks as she works toward that goal.

Eden also shares her experiences, both the challenges and the victories, on her TikTok account, hotwheel2.0, where thousands follow her journey.

Through resilience, determination and the unwavering support of her

CONTINUED ON PAGE 42



Eden at the pool with her coach, Nick LAST NAME

community, Eden continues to transform adversity into opportunity. In the water — her “happy place” — she finds freedom and a powerful reminder of everything she has overcome and everything she is still pursuing.

REFERENCES:

Price, K. (November 20, 2025). Eden Schroeder, The Country's Lone S1 Swimmer, Is Carving A New Path In Para Swimming, Eden Schroeder, The Country's Lone S1 Swimmer, Is Carving A New Path In Para Swimming | U.S. Paralympics Swimming

Presperin Pedersen, J. (August 8, 2025). From Fear to Freedom: How the Empulse M90 Power Assist Changed Eden's Life. Sunrise Medical EIM Blog. From Fear to Freedom: How the Empulse M90 Power Assist Changed Eden's Life | Education in Motion Blog | Sunrise Medical

Schroeder, E. (January 2024). My Experience As a Quadriplegic Competitive Swimmer January. Live Quickie blog My Experience As a Quadriplegic Competitive Swimmer | Live Quickie | Sunrise Medical



Eden Schroeder, right, with Heather and Austin.



CONTACT THE AUTHOR

Eden may be reached at
EDENSCHROEDER02@GMAIL.COM

Eden Schroeder, BA, is currently enrolled in the clinical psychology graduate program at Mercer University in Macon, Georgia. She lives with friends and remains active in outdoor activities, cycling, skiing and training for local and national swimming meets. She also serves as a peer mentor at Shepherd Center in Atlanta, Georgia, where she shares her experiences with newly injured patients and demonstrates effective strategies for re-engaging in daily life. Schroeder is preparing for her upcoming internships, allowing her to integrate her clinical psychology knowledge into practice.



CONTACT THE AUTHOR

Jessica may be reached at
JESSICA.PEDERSEN@SUNMED.COM

Jessica Presperin Pedersen, OTD, MBA, ATP/SMS, FAOTA, is an occupational therapist with close to 50 years of experience specializing in complex rehab. She has contributed to the industry through clinical service delivery, presentations, publications and advocacy and was one of the founders of iNRRTS, serving as its first secretary. Pedersen is the director of clinical education for Sunrise Medical.



Erica Walling, PT Sunrise Medical, with Eden Schroeder and Jessica Presperin Pedersen.

RESNA Update:

Tech Tuesdays, Events, New Training Opportunities

WRITTEN BY: Andrea Van Hook, RESNA Executive Director

Tech Tuesdays at RESNA

Check out Tech Tuesdays, a monthly product demonstration webinar by the Rehabilitation Engineering and Assistive Technology Society of North America, held on the fourth Tuesday of the month at 3 p.m. ET. During this one-hour virtual event, manufacturers demonstrate new products and features directly to RESNA members and certified Assistive Technology Professionals, answer questions and talk about what's in the pipeline. All webinars are recorded and offered on demand for one contact hour. These webinars are free for RESNA members; non-members pay \$15. The remaining Tech Tuesdays for 2026 are:

- May 26 – Quantum Rehab
- June 23 – Doorbotics
- July 28, August 25 – TBD
- Sept. 22 – Tobii Dynavox
- Oct. 27 – Quantum/Stealth
- Nov. 24 – TBD

Webinars now available on demand: Restorative Therapies (functional electrical stimulation) and Matrix Seating USA (custom wheelchair seating solutions).

Next for RESNA on the Road

We're on the road in 2026! Make sure you say hello to RESNA staff and volunteers and snap a

picture if you're attending these events:

- Abilities International Accessibility Conference in New York Metro, April 30 – May 1; RESNA sessions include leveraging data in assistive technology service provision, a guide to do-it-yourself assistive technology, augmentative and alternative communication for the non-speech-language pathologist, adaptive video gaming, scientific papers and the Student Design Challenge.
- Heartland Conference in Waterloo, Iowa, June 8 –10; RESNA members are scheduled to present in several sessions! More information is coming soon.

RESNA Monthly IACET CEU Webinars

Starting in May, RESNA will be offering monthly continuing education webinars that will include the opportunity to earn IACET continuing education units. Monthly webinars will be offered on the third Wednesday of every month at noon ET and are scheduled for May and June. After summer break, the webinars start back up in September. Keep an eye out for the announcement, coming soon!

AT Fundamentals Course

RESNA's signature course, "AT Fundamentals," is an online

instructor-led course that is offered several times a year. It meets two times a week in the evening over four weeks. All class sessions are recorded for unlimited view and review by course participants for 60 days following the last class. The instructors are certified Assistive Technology Professionals and longtime RESNA members with deep experience in assistive technology.

While not a prep course for the ATP exam, the curriculum does cover the basics of assistive technology service and provision, as well as touching upon the most common areas of assistive technology. Included in the course registration fee is a complimentary ATP practice exam. Additional course dates are:

- June 2–25, Tuesday and Thursday evenings from 7 p.m.-9 p.m. ET
- Aug. 4-27, Tuesday and Thursday evenings from 7 p.m.-9 p.m. ET
- Oct.13 –Nov. 5, Tuesday and Thursday evenings from 7 p.m.-9 p.m. ET

Annual Notice: How to File a Complaint with RESNA

All iNRRTS members and Registrants should be aware of the options they have if they believe RESNA-certified ATPs are engaging in unethical practices in violation of our Code of Ethics and Standards of Practice. The Complaints

Review Committee of the Professional Standards Board may investigate and subsequently act when/if it receives evidence that a certified ATP has engaged in conduct that undermines the integrity of the certification process and/or the credential.

In the certification section of the RESNA website, there is clear information about the types of complaints that can be filed, as well as a downloadable copy of the complaints policy. Anyone can file a complaint, including consumers. There is an online complaint form that is easy to use and convenient.

Please note that we cannot accept complaints about professionals who are not RESNA certified. We also cannot accept anonymous or hearsay complaints. The person filing the complaint must have direct knowledge of the unethical practice violation. Please contact certification@resna.org if you have questions. Feel free to ask to speak to me if you are unsure or wish to discuss something.



CONTACT THE AUTHOR

Andrea may be reached at EXECOFFICE@RESNA.ORG

Andrea Van Hook is executive director of RESNA. She has more than 20 years of experience in nonprofit association management and lives and works in Washington, D.C.

NCART's Update on CRT Regulations, Opportunities

WRITTEN BY: Wayne Grau

Washington DC. CRT Product Expo Confirmed

The International Registry of Rehabilitation Technology Suppliers, National Coalition for Assistive & Rehab Technology and US Rehab have once again teamed up to educate our national legislators and their staff about the importance of the role that Complex Rehab Technology equipment plays in the lives of our clients. On May 13, 2026, this group will be hosting a Washington, D.C., product exposition for legislators and their staff in the Capitol's Cannon House Office Building.

When it comes to CRT equipment, legislators do not fully comprehend the incredible importance of proper CRT equipment in the consumer's daily life. This exposition will include manufacturers, providers, clinicians, therapists and consumers. We want the legislators to see and try the equipment to ensure they understand why good policy is needed. We will be asking the public to call or write to their legislator's office to ask them to attend the expo. More information is forthcoming, stay tuned.



Important Regulatory Updates

The Trump Administration announced a series of significant Medicare and Medicaid program integrity actions as part of the administration's ongoing crackdown on fraud and abuse in the Medicare, Medicaid and CHIP programs.

The announcement outlines new enforcement steps focused on fraud prevention, including a nationwide, temporary, six-month moratorium on enrollment of new Medicare suppliers for six types of suppliers for durable medical equipment, prosthetics, orthotics and supplies (DMEPOS) as well as a Request for Information seeking stakeholder input on future regulatory actions.

These DMEPOS types are:

- Medical supply company
- Medical supply company with orthotics personnel

- Medical supply company with prosthetic personnel
- Medical supply company with prosthetic and orthotic personnel
- Medical supply company with a registered pharmacist
- Medical supply company with a respiratory therapist

Some exceptions include hospitals, physicians, physical therapists, pharmacists and other types of suppliers. The Centers for Medicare and Medicaid Services does not anticipate a disruption of patient access to care largely because of the large number of existing suppliers and the fact that these exempted suppliers can fill the need in areas where patient access becomes an issue.

NCART supports rooting out fraudulent companies from the Medicare and Medicaid program; we do not support honest, compliant, and law-abiding CRT providers being denied the ability to grow their business and take care of CRT clients. NCART

will be working with other industry stakeholders to submit comments on ways to strengthen defenses against fraud.

Thank You, CRT Partners

I would like to take the opportunity to thank iNRRTS, the Clinician Task Force, Rehabilitation Engineering and Assistive Technology Society of North America, and US Rehab for their continued support to work closer together to ensure that we protect access to CRT equipment for the people we serve. With our continued cooperation, we expect positive outcomes for our constituents and for all the consumers who use CRT equipment. A focus on the CRT consumer is something all the groups strive for every day!

Advocacy Quotes

"People who have committed to a service/advocacy role will tell you that some of the sublimest pleasures they have ever experienced come in the context of that work. You get way more than you give."

— Charles Garfield

CRT UPDATE

**CONTACT THE AUTHOR**

Wayne may be reached at
WGRAU@NCART.US

Wayne Grau is the executive director of NCART. His career in the Complex Rehab Technology industry spans more than 30 years and includes working in rehab industry affairs and

later exclusively with complex rehab companies. Grau graduated from Baylor University with an MBA in health care. He's excited to be working exclusively with complex rehab manufacturers, providers and the individuals we serve who use CRT equipment.



The **Power** You Rely On. The **Parts** You Need.
The **Service** You've Grown To Expect.

One Call Gets It ALL

Trusted Power • Smart Chargers
Premium Parts

MK Battery
800.372.9253 • mkbattery.com



Charting AI-based Technologies Impact in CRT Documentation

WRITTEN BY: Leslie Jackson, OTD, OTR/L, ATP, CEASIII, LSVT BIG Certified

The rapid emergence of new technologies has created key opportunities for innovation in health care. Artificial intelligence has the potential to transform many aspects of the health care landscape, including clinical documentation in Complex Rehabilitation Technology. AI-based tools may incorporate natural language processing, speech recognition and machine-learning capabilities, and they are increasingly being integrated into documentation systems, clinical decision tools and user-facing chatbots.¹

As AI expands across health care settings, it is essential to recognize the tension between its potential and the challenges that may arise. Although this dynamic relationship accompanies the adoption of most new technologies, one cornerstone of clinical practice must remain unchanged: the importance of meaningful, client-centered care. This article explores the potential benefits and challenges of integrating AI into clinical documentation and provides insights from Clinician Task Force member Elaine Lu, PT, MHED, ATP, who is actively shaping how AI is utilized in CRT documentation within her clinical practice.

Streamlining Clinical Documentation

Recent reviews of scholarly literature indicate that AI-based systems can improve the accuracy and efficiency of health care documentation.¹ Streamlining documentation and reducing administrative burden may allow clinicians to devote more time to direct patient care, with a likely secondary benefit of reducing clinician burnout.¹

In “A Giant Leap: How AI is Transforming Healthcare and What That Means for Our Future,” Dr. Robert Wachter indicates electronic documentation is a key contributor to burnout among health care professionals.² Navigating numerous electronic screens, completing additional digital tasks and managing constant software notifications can quickly become overwhelming.² CRT professionals understand that no single seating or wheeled mobility system meets the needs and goals of every client, environment and functional task. This same mindset should apply to AI-enabled systems in clinical practice. While AI does not need to be a perfect solution to make a measurable impact on quality, safety and patient experience, the tool should demonstrate clear and practical improvements in clinical practice.²

Potential Challenges of AI Integration

While these benefits are promising, integrating AI into clinical documentation is not without challenges. Managing documentation errors, navigating legal liability and integrating AI tools within existing electronic health record systems are among the most cited barriers.¹ Ethical concerns regarding the use of AI with patient data have also been widely noted.¹

Although these tools may improve accuracy and efficiency, their use can raise concerns related to core principles of patient-centered care.⁴ Users’ reluctance to adopt new technologies, lack of trust, risk of system abandonment and misalignment of established workflows warrant careful consideration.^{3,5,6} Therefore, further study is needed to evaluate the long-term impact of AI-based technologies across and within health care settings.⁶

A Clinician’s Role in Shaping AI in CRT Documentation

CTF member Elaine Lu offers valuable insights into the application of AI capabilities within clinical documentation software. In recent months, Lu collaborated with the team at Jane Software Inc. to expand CRT-specific content within their platform. Their software

offers customizable templates, quick prompts for key phrases and AI Scribe features that uses speech recognition technology to support clinical documentation.⁷

The AI Scribe feature allows clinicians to record clinical sessions or upload dictated audio files, while also allowing them to manually enter narratives, measurements and recommendations. Using information captured during the clinical encounter, the software generates clinical notes and reports in a fraction of the time required for manual entry. The platform also allows clinicians and health care organizations to manage audio data by choosing whether to delete or securely store recordings.⁷

As a physical therapist with specialized CRT expertise, Lu advocated for the development of CRT-focused content to better support documentation needs specific to this specialized practice area. By collaborating with software programmers, she helped develop CRT-specific phrases, prompts and templates to enhance the platform’s speech-recognition and natural language processing capabilities. She also structured outlines with narrative fields to allow clinicians to capture outcome measures, qualitative findings and detail clinical recommendations. Since using this AI-based platform in her practice, Lu has experienced

CLINICIAN TASK FORCE



greater efficiency with generating clinical reports and equipment justifications, while continuing to thoroughly review and edit all documentation before finalization.

Lu also shared practical strategies for navigating logistical challenges associated with AI-based scribing. Minimizing extraneous background noise within the clinic can be helpful to improve transcription accuracy. Additionally, intentionally introducing and repeating the names of all individuals present during the clinical visits helps the software distinguish between the clinician's voice and those of the client, care partners, supplier and other professionals present during evaluations, equipment trials and follow-up sessions.

Through this experience, Lu identified broader lessons relevant to the CRT community. CRT stakeholders communicate through discipline-specific terminology. However, they may be less familiar with AI technologies and software development. Collaborating with professionals outside the CRT field often requires additional time and effort to

clearly communicate clinical goals and translate them into functional software solutions.

According to Lu, many CRT colleagues and suppliers have expressed curiosity and enthusiasm about the integration of AI into clinical documentation software. At the same time, others have been hesitant about these tools due to ethical concerns, limited time and bandwidth for training, or uncertainty as to how system will impact their established workflows. The adoption of technology in health care is multifaceted, impacting culture and requiring alignment among staff, processes and organizational values.⁶

Looking Ahead

CRT stakeholders are navigating a period of change as AI-based technologies continue to expand across health care settings. The potential for streamlined processes and increased efficiencies is enticing. However, it is equally important to acknowledge and address the unintended challenges associated with implementing AI in clinical documentation. Given the essential nature of their work, CRT professionals routinely adapt to changes related to technology, legislation, research and payer systems. Through ongoing education, research and advocacy, the CRT community will continue to respond thoughtfully to

these evolving systems. By approaching AI adoption with intention, collaboration and critical reflection, CRT professionals can leverage innovative systems while ensuring that patient-centered care remains the foundation of practice.

Acknowledgement

The author gratefully acknowledges Elaine Lu, PT, MEd, ATP, for her valuable contributions to this article and for sharing her clinical insights and experiences related to integrating AI into CRT documentation.

REFERENCES:

- Lee, C., Britto, S., & Diwan, K. (2024). Evaluating the impact of artificial intelligence (AI) on clinical documentation efficiency and accuracy across clinical settings: A Scoping Review. *Cureus*, 16(11), e73994. <https://doi.org/10.7759/cureus.73994>
- Wachter, R. (2020). *A Giant Leap: How AI is Transforming Healthcare and What That Means for Patients and Providers*. New York: Oxford University Press.
- Wenderott, K., Krups, J., & Weigl, M. (2026). Comprehensive recommendations for the implementation of artificial intelligence in healthcare: a narrative review on facilitators and barriers. *British Medical Journal Open Quality*, 15, e003639. <https://doi.org/10.1136/bmjopen-2025-003639>
- Kumah, E. (2025). Artificial intelligence in healthcare and its implications for patient-centered care. *Discover Public Health*, 22, 524. <https://doi.org/10.1186/s12982-025-00924-9>
- Sarraf, B., & Ghasempour, A. (2025). Impact of artificial intelligence on electronic health record-related burnouts among healthcare professionals: systematic review. *Frontiers in Public Health*, 13, 1628831. <https://doi.org/10.3389/fpubh.2025.1628831>

6. Greenhalgh, T., Wherton, J., Papoutsis, C., Lynch, J., Hughes, G., A'Court, C., Hinder, S., Fahy, N., Procter, R., & Shaw, S. (2017). Beyond Adoption: a new framework for theorizing and evaluating nonadoption, abandonment and challenges to the scale-up, spread and sustainability of health and care technologies. *Journal of Medical Internet Research*, 19(11), e367. <https://www.jmir.org/2017/11/e367>. <https://doi.org/10.2196/jmir.8775>

7. Jane Software. (2026). Charting, forms, surveys, & AI Scribe. Retrieved March 3, 2026, from <https://jjane.app/features/charts-forms-documentation>



CONTACT THE AUTHOR

Leslie may be reached at
OTRJACKSON@YAHOO.COM

Leslie Jackson, OTD, OTR/L, ATP, CEASIII, LSVT BIG Certified, has served as an occupational therapist for over 25 years in various settings, including outpatient, acute care, home health, acute rehab and a doctoral-level academic program. She currently leads the outpatient Seating and Mobility Clinic for Marion Health and serves as an occupational therapist for the Department of Veterans Affairs. Jackson earned the Assistive Technology Professional certification from RESNA in 2008 and is certified in ergonomics and LSVT BIG, a treatment protocol for individuals living with Parkinson's disease. She volunteers as an executive board member for Services for the Visually and Hearing Impaired, a nonprofit organization providing assistive technology and education to its clients. Jackson is honored to contribute through the Clinician Task Force's advocacy and educational initiatives.

Renewed iNRRTS Registrants

The following individuals renewed their iNRRTS Registration between February 7, 2026 through March 31, 2026.

PLEASE NOTE **IF YOU RENEWED AFTER MARCH 31, 2026**, YOUR NAME WILL APPEAR IN A FUTURE ISSUE OF DIRECTIONS.

IF YOU RENEWED PRIOR TO FEBRUARY 7, 2026, YOUR NAME IS IN A PREVIOUS ISSUE OF DIRECTIONS.

FOR AN UP-TO-DATE VERIFICATION ON REGISTRANTS, PLEASE VISIT WWW.NRRTS.ORG, WHICH IS UPDATED DAILY.

| | |
|--------------------------------------|---------------------------------|
| Allain Pelletier, RRTS® | Jorge Cabrera, RRTS® |
| Ben Peters, ATP, CRTS® | Karl Thomas Eklund, ATP, CRTS® |
| Blake St. John, RRTS® | Kenneth Broz, ATP, CRTS® |
| Brian McKenzie Shoemaker, ATP, CRTS® | Kevin Grundey, ATP, RRTS® |
| Charlotte Skelton, RRTS® | Leander Nelson, RRTS® |
| Chris Cooke, RRTS® | Lewis Johnson, ATP, CRTS® |
| Christopher Savoie, ATP/SMS, CRTS® | Mark Gingles, ATP/SMS, CRTS® |
| Christopher Rosso, ATP, CRTS® | Matthew Jones, BS, ATP, CRTS® |
| Christopher Boyd, ATP, CRTS® | Maxwell McCoy, RRTS® |
| Christopher Liquori, ATP/SMS, CRTS® | Mylene Tendler, RRTS® |
| Christopher Friesen, RRTS® | Nathan Curran, RRTS® |
| Curtis Fraser, RRTS® | Omar Rozo, RRTS® |
| Dan Nederhood, ATP, CRTS® | Randall Keith, RRTS® |
| Darrell Mullen, RRTS® | Raymond Serafini, ATP, CRTS® |
| David Namehas, ATP, CRTS® | Richard Morales, ATP, CRTS® |
| David Rowland, MBA, ATP, CRTS® | Richard Olwyn, B.A., RRTS® |
| David Glancy, ATP, CRTS® | Robbie Scott, RRTS® |
| Dene Rauchle, RRTS® | Rubin Mejia, ATP, CRTS® |
| Gerald Tisdale, RRTS® | Samuel Goff, RRTS® |
| Graham Broome, RN, BSN, ATP, RRTS® | Sara Beswick, ATP, CRTS® |
| Gregory M. Fleming, ATP/SMS, CRTS® | Sergio Ribeiro, PTA, ATP, CRTS® |
| Heather Bailey, ATP, CRTS® | Stephanie Jane Longden, RRTS® |
| James Drechsel, ATP, CRTS® | Steven Francis Bennardo, RRTS® |
| James Randall Blackwell, ATP, CRTS® | Steven J Carpenter, RRTS® |
| Jeanine Jackson, R. Kin, RRTS® | Tanya Sharpe, RRTS® |
| Jeff Cook, RRTS® | Timothy Shaner, ATP, CRTS® |
| Jennifer Baulke, RRTS® | Tina Kriegl, RRTS® |
| John Petter, ATP, CRTS® | Tracie Morales, ATP, CRTS® |
| Johnathan Grimes, ATP, CRTS® | Willis Smitherman, ATP, CRTS® |
| Jonathan Hyzak, ATP, CRTS® | |

→ **BE SURE TO FOLLOW iNRRTS ON SOCIAL MEDIA!**



Congratulations to the following individuals who have completed Level 1 of the CRT Supplier Certificate Program.

These individuals can state they are a iNRRTS Certified CRT Supplier, Level 1.

NAMES LISTED ARE FROM FEBRUARY 7, 2026 THROUGH MARCH 31, 2026.

Michael Tedman

Nathan Curran

Former iNRRTS Registrants

The iNRRTS board determined RRTS® and CRTS® should know who has maintained his/her registration in iNRRTS, and who has not.

NAMES INCLUDED ARE FROM FEBRUARY 7, 2026, THROUGH 3/31/2026. FOR AN UP-TO-DATE VERIFICATION ON REGISTRANTS, VISIT WWW.NRRTS.ORG, UPDATED DAILY.

Mala Aaronson, OTR/L, ATP
Southboro, MA

Robert Rex Johnson, ATP
Memphis, TN

Veronica Kowalchuk
Red Deer, Alberta

Susan Kupusa
St Catharines, Ontario

Stephen W. Brewton, ATP
Farmers Branch, TX

Joseph Loza, ATP/SMS
Tucson, AZ

Mark Malone
Belleville, Ontario

Patrick Shantz
New Westminster, British Columbia

New iNRRTS Registrants

CONGRATULATIONS TO THE NEWEST INRRTS REGISTRANTS. NAMES INCLUDED ARE FROM FEBRUARY 7, 2026, THROUGH MARCH 31, 2026.

Alejandro Bravo, RRTS®
Verio Healthcare
Riverside, CA

Dustin Green, RRTS®
KJK Service
Indianapolis, IN

Joseph Marina, PTA, ATP, CRTS®
National Seating & Mobility, Inc.
Jacksonville, FL

Milad Roshan Zanjani, RRTS®
HME Mobility & Accessibility
North Vancouver, British Columbia

Ashtan Deosammy, RRTS®
Motion
Mississauga, Ontario

Isaac Childs, ATP, RRTS®
Hometown Medical
Flowood, MS

Keith Rogers, RRTS®
Cook Medical Supply
Morton, MS

William Konkright, BS, ATP, RRTS®
National Seating & Mobility, Inc.
Macon, GA

Charles Fielder, RRTS®
Stance Health Solutions
San Bernardino, CA

Jacob Johnson, RRTS®
Rehab Medical Inc.
Peachtree Corners, GA

Maria Angelos, MS, ATP, RRTS®
National Seating & Mobility, Inc.
Tampa, FL

Zachary King, RRTS®
KJK Service
Indianapolis, IN

David Duarte, Jr., ATP, CRTS®
Quipt Home Medical
San Antonio, TX

Jordan Joslin, ATP/SMS, CRTS®
Action Seating & Mobility
Denver, CO

Michael Tedman, RRTS®
Independent Living Specialists
Adelaide, South Australia

New CRTS®

CONGRATULATIONS TO INRRTS REGISTRANTS RECENTLY AWARDED THE CRTS® DESIGNATION. A CRTS® RECEIVES A LAPEL PIN SIGNIFYING CRTS® OR CERTIFIED REHABILITATION TECHNOLOGY SUPPLIER® STATUS AND GUIDELINES ABOUT THE CORRECT USE OF THE DESIGNATION. THE NAMES LISTED ARE FROM FEBRUARY 7, 2026, THROUGH MARCH 31, 2026.

David Duarte, Jr., ATP, CRTS®
Quipt Home Medical
San Antonio, TX

Drew Oursbourn, ATP, CRTS®
Alliance Rehab & Medical Equipment
Ozark, MO

Jordan Yancey, ATP, CRTS®
Numotion
Norcross, GA

Joseph Marina, ATP, CRTS®
National Seating & Mobility, Inc.
Jacksonville, FL



5815 82nd Street, Suite 145, Box 317
Lubbock, TX 79424
P > 800.976.7787

Friends of iNRRTS [FONS]

As Corporate Friends of iNRRTS, these companies recognize the value of working with iNRRTS Registrants and support iNRRTS' Mission Statement, Code of Ethics and Standards of Practice.

CHARTER CFONS



CFONS



AFONS

