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GET VOCAL AND TAKE ACTION!

Written by: **GERRY DICKERSON, ATP, CRTS®**

It's hard to believe that 2022 is right around the corner. It's even harder to believe that COVID-19 still dominates the news cycle and our lives.

As mentioned in my last President's Message, my messages, going forward, will be a look back over the last 30 years.

NRRTS News (the predecessor to DIRECTIONS) from the fall of 2003 continues to provide great memories and eye-opening commentary.

The reprint below, written by the great Van G. Miller, could be written today, let alone 18 years ago. Miller passed away on October 18, 2015. A visionary,

advocate and founder of Van G. Miller in Waterloo, Iowa, Miller was a true champion of our profession. Many of us at NRRTS had the great honor and pleasure of knowing Miller and calling him a friend. His thoughtful passion is evident in the Guest Editorial below. The more things change, the more they stay the same.

On behalf of myself, the NRRTS Board of Directors and the ever-capable NRRTS staff, whatever you celebrate at this time of year, may you do it with those you love the most.

To a safe, healthy and prosperous 2022.

Geez, 2022!!! I still can't wrap my head around that!

GUEST EDITORIAL: GET VOCAL AND TAKE ACTION!

(REPRINTED FROM NRRTS NEWS,
VOLUME 4, FALL 2003)

Once again, the rehab community, and by extension the entire HME industry, is under attack.

I'm referring to Operation Wheeler Dealer, which I believe represents administrative negligence and sheer gall on the part of CMS.

Unless something has changed dramatically by the time this is published, CMS is applying numerous "corrective measures" to rehab and HME suppliers.

Never mind it was rehab suppliers who spoke out in the first place and informed CMS that Medicare was being abused by unscrupulous suppliers. At VGM, U.S. Rehab's parent company, we went so far as to discuss it last winter with Sen. Charles Grassley (R-Iowa) and Rep. Jim Nussle (R-Iowa).

What concerns me is the overwhelming majority of rehab suppliers have done nothing wrong.

CMS just noticed what everyone else in the industry knew was happening for at least two years: intense and unethical marketing, questionable interpretations of Medicare laws and outright fraud were driving mobility sales through the roof.

GET MAD AND GET VOCAL - OR LEARN TO LIVE WITH THE CONSEQUENCES.

A 189 percent increase in overall power chair sales between 1999 and 2002 should have been noticeable to someone at CMS. How about a 1,000 percent increase in one year in one Texas County? In that same county, one doctor signed more than 25,000 certificates of medical necessity for power wheelchairs. Don't we pay for government data analysts and computers? CMS's chief honcho Tom Scully said, "This abuse is an insult to all Americans who pay taxes."

I believe it would have been appropriate if he had added "CMS's continuing negligence and inaction are an unforgivable insult to all taxpayers, beneficiaries and suppliers, I have terminated the employees responsible and am immediately submitting my own resignation." Nobel Prize-winning economist Milton Friedman was right when he said "If you put the federal government in charge of the Sahara Desert, in five years, there would be a shortage of sand."

One supplier called us at U.S. Rehab and related he thought this latest crisis was a "sad" situation. We disagree. It is more than "sad." It is a travesty compounded by CMS, the OIG and congressional stalwarts to blame it all on the supplier community.

It was ironic the very people who are primarily at fault – CMS and their contractors – called press conferences to blame others. If they were a private corporation, the stock would be down to under a dollar, the lawyers would be circling, and heads would be rolling.

Imagine your guard service calling you to complain or blame you because a burglary was committed while they were on the job. Or your bank blaming you, as a depositor for a successful robbery? CMS has spent billions of dollars to protect beneficiaries and taxpayers. Their job is to be sure crooks do not take money that should go to paying fair compensation for quality rehab equipment that people need.

They have failed miserably at this year after year, and it is well past time to call them to task for it.

But we let CMS get away with “the rehab/HME guys did it” time and time again. Not true! The reason you have guards is because you know there are crooks. The guards are supposed to be the experts and know how to protect you and prevent losses. CMS does not. There is no longer any question about that, and we can’t let them get away with blaming someone else for their failure. We need change, and we won’t get it by being sad. We need to get mad.

My suggestion is rehab suppliers quickly and loudly take the initiative in their communities. You need to let your neighbors, referral sources and government representatives know you are mad and simply are not going to let them put the blame on you again. Write letters to the editor, write referral sources and patients directly, and speak before civic and service clubs.

Do whatever is necessary to get this message across. You are an ethical businessperson employing people in your community. You provide a valuable and needed service. You have an absolute right to protection from government agencies paid huge sums to do a job – and fail at it. It isn’t happening and they and you are going to suffer if change doesn’t occur soon.

Get mad and get vocal – or learn to live with the consequences.



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VGM’s DC Link (www.vgm.com) can give you addresses for your local area newspapers and governmental representatives. We have also posted some sample letters you can modify and use as you see fit. Please do it today.

Article courtesy of Van G. Miller

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BROKEN BODY, AMBITIOUS MIND

Written by: ROSA WALSTON LATIMER



Ali Ingersoll in the garden outside her community in North Carolina.

"When I was sitting in jail in subzero temperatures in Northern China at 17 years old, I could have never fathomed I would be laying in a hospital bed in the ICU back in China almost 15 years later... ." This paragraph, the beginning of the "About Me" page on Ali Ingersoll's website (<http://quirkyquad.com/>), begs for more of her story, which the 38-year-old C6 quadriplegic openly shares.

In her "Quirky Quad Diaries," also on her website, Ingersoll takes an uninhibited approach to share the good and bad experiences of her life in a

wheelchair. "I intend to share all aspects of life as a quadriplegic with you as well as the crazy exploits of my life before I broke my neck," she said. "I usually approach life with a dark sense of humor and make the most out of every situation whether that be intensely terrifying or insanely comical."

Ingersoll's life before her spinal cord injury was, by any measure, adventurous and exciting. Highlights included trips into the Amazon rainforest with her family and hiking in the Australian Outback with "nothing but a map and a compass." She fondly remembers spending Christmas with her family camping on "remote deserted islands in the Bahamas and spearfishing for dinner." Her father's work took the family all over the world, exposing a young Ingersoll to many different cultures. "After high school I moved to China to live on my own," she said. "That may have not been the smartest decision, but I was a teenager. I learned Chinese, taught English, started kickboxing and worked for a Chinese newspaper as a food taster." And, by the way, the "jail time" in China when Ingersoll was 17 years old stemmed from failure by her traveling companion to ensure they had proper identification documents.

After attending university in the U.S., majoring in entrepreneurship, Ingersoll returned to China for a time and wrote business plans for pharmaceutical companies. Returning to the United States, she worked with a nonprofit political organization that focused on helping undeserved community kids have an opportunity to interact with politicians. "In 2010, I was 27 years old and living at our family home in the Bahamas where I was embarking on a new life adventure to become a financial day trader," Ingersoll said. "I had no idea the next

adventure in life would leave me paralyzed from the chest down with a broken neck from a shallow water dive." Ingersoll also had no idea how the numerous wilderness survival trips she enjoyed during her teens and mid-20s would prepare her for what she calls "the hardest journey" of her life – living life as a quadriplegic with paralysis from the chest down.

"After my accident, my father told me I had broken my body, but not my brain, and he encouraged me to get to work as soon as possible," Ingersoll said. "Even in the ICU and during my intensive rehab program, I continued my work as a day trader." For the next six years, Ingersoll seemed to experience any medical complication that could possibly happen. "I experienced cervical cancer, pulmonary embolisms and pressure sores that kept me in bed for months." The most serious setback was a severe spinal cyst that required surgery not available in the U.S. "When I was 29, we discovered a massive cyst on my spinal cord that was ascending upward and starting to kill me." My dad did a tremendous amount of research, and learned the surgery and subsequent rehab were available in China. So, once again, I went to China!" Ingersoll describes the 2 ½ - 3 years following her surgery as "a lonely existence but a stable existence." Her parents stayed with her in China, and her two older brothers and an older sister made regular visits. "That situation was not sustainable, and I moved to Raleigh, North Carolina, to be nearer to my family."



Ali Ingersoll with her mom, Ursula, on an accessible boat hosted by Shake a Leg Miami Sailing School.

AFTER MY ACCIDENT, MY FATHER TOLD ME I HAD BROKEN MY BODY, BUT NOT MY BRAIN, AND HE ENCOURAGED ME TO GET TO WORK AS SOON AS POSSIBLE

"The greatest offender of life for someone with a spinal cord injury is not being paralyzed, but it is the secondary complications that affect your life," Ingersoll said. After she settled in Raleigh, Ingersoll developed another severe pressure sore and had to wait 12 months before insurance would pay for surgery. During that time, confined to bed, Ingersoll decided she would "live life" and tried online dating. "Even though I was in this nightmare situation I embarked on a dating experiment, and I met my husband, Aaron," she said. "I never expected to fall in love from online dating! I tried many times to break up with him before surgery, because we had only known each other about a month or so, but he was very stubborn and refused!" Ingersoll and Aaron Watkins were married in May 2019.

Ingersoll enthusiastically acknowledges her husband's commitment to their life together and how meaningful their partnership is to her quality of life. She also recognizes how fortunate she is to have her family surround her. "You meet amazing quadriplegics who can do amazing things, but honestly not one of us would be here without our support system," Ingersoll said. "I owe any success to the people around me who help take care of me and make my life possible." Ingersoll is especially grateful for her mother, Ursula. "I call my mom an endangered species, my super spinal cord injury mom. She is a strong German lady, full of energy, who has dedicated the last 11 years of her life to me."



Ali Ingersoll participating in an adaptive surfing event hosted by Ocean Cure and the Life Rolls On Foundation in Carolina Beach, North Carolina.

While some of Ingersoll's life decisions may appear impetuous, she is very deliberate in her choices concerning self-care. Nerve damage from surgery has increased Ingersoll's chronic pain. "My pain starts at about a 7 out of 10 in the morning and jumps to 9 later in the day," Ingersoll said. "My coping mechanisms are self-hypnosis and meditation. These don't make the pain go away, but it turns the volume down. That 'me' time, even for 10 minutes a day, makes a big difference. Pain is very personal, and you have to find what works for you."

"Aside from the tragedy of those who lost their lives during the pandemic, COVID-19 was one of the best things that ever happened to me," Ingersoll said. "I, among many others, experienced the interesting transformation of life in general becoming virtual. Working and meeting with others was all about Zoom for everyone. Companies began to realize that any individual can effectively work at home."

Ingersoll sees this pandemic as a significant time of transition into the world of diversity, equity and

CONTINUED ON PAGE 10



Ali Ingersoll kayaking this year for the first time in 11 years, accompanied by Bridge2Sports representatives, West and Ashley and Ali's husband, Aaron Watkins, (in the white kayak), seated behind her.



Ali Ingersoll and husband Aaron Watkins, enjoying a fresh coconut poolside in Miami, Florida.



Ali Ingersoll and her husband, Aaron Watkins, at Mayan pyramids in Belize.

BROKEN BODY...
(CONTINUED FROM PAGE 9)

inclusion (DEI). "I realized about five months ago I want a career change that will put me in the corporate world of DEI," Ingersoll said. "With my professional background and nonprofit experience this seems like a natural progression. Many strategic plans do not include people with disabilities. I've begun to communicate with others with spinal cord injuries through Facebook groups. That has helped me feel a camaraderie and sense of community, and I realized there are opportunities for me to become a stronger advocate."

Ingersoll has been focusing on

communicating with mentors and business leaders and is now amid job interviews. "Even if they don't work out, it will be OK. I'll try something else. I am a "plan 'A' through 'F' kind of girl," Ingersoll said. "The word 'no' is a starting negotiating point in my life!"

That same philosophy has been beneficial for Ingersoll as she has negotiated her way through obtaining care and equipment. "I began to get denied pieces of medically necessary equipment that I needed

not only to survive, but also to thrive," Ingersoll said. "So, I learned to write my own letters of medical necessity backed up with medical journal articles and other supporting material. I taught myself how to navigate the appeal process."

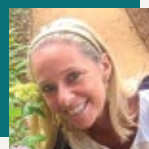
Ingersoll's advocacy work is significant and an essential part of her life. The governor of North Carolina appointed her to the North Carolina Statewide Independent Living Council, and she serves on the board for the Alliance of Disability Advocates of North Carolina. Ingersoll is also a volunteer with the United Spinal Association and the North Carolina Spinal Cord Injury Association, columnist for Push Living magazine, and is a frequent guest on podcasts such as The Lowe Down with Kevin Lowe. "I was honored to work with the Christopher and Dana Reeve Foundation as part of a consortium of advocates, doctors, nonprofits and other organizations to advocate with Medicare to have specific pieces of medically necessary equipment approved," Ingersoll said. "I also wrote a two-part blog for the foundation on the topic of self-advocacy and how to navigate the health insurance appeals system."

"I have countless stories of embarrassing moments, horrified moments, dark humor moments, and so many more stories that I'm sure many can relate to in one way or another," Ingersoll said. "Sometimes I like to take a moment out of my day to stop and appreciate how far I've come and laugh along at the moments that have made me who I am today. If you're having a bad day or something seriously embarrassing happens to you, try and find humor in it because there's usually always a good story behind it!"

CONTACT

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ALI.INGERSOLL@GMAIL.COM

Ali Ingersoll is a day trader, marketing consultant, disability advocate and public speaker. Her websites (<http://quirkyquad.com/> and <https://chinaquaddiaries.org/>) are a dynamic resource for individuals with disabilities and their caregivers.



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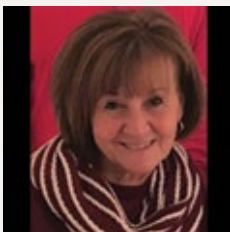
Written by ROSA WALSTON LATIMER



Jenny Siegle, host of Unite4CRT "Conversations."



Chris Collin, participant in Unite4CRT meetups and member of the event planning committee.



Annette Hodges, NRRTS Director of Education.

Whether you use technology or an old-school paper planner to manage your schedule, you'll want to add this entry for the third Tuesday each month in 2022: *Unite4CRT virtual meeting, 7:00 p.m. EST*. Whether you are a Complex Rehab Technology (CRT) user, family, caregiver, supplier or clinician, you will find this monthly, one-hour meeting informative, intentional and enlightening.

Unite4CRT is an informal forum organized by NRRTS that provides an opportunity for meaningful, energetic conversations about the reality of living with a disability. Each meetup includes the presentation of information, a Q-and-A session and an open discussion. "The participants in the group are always cheerful and even though we may talk about serious issues, we usually end up joking and having fun while doing it," said Chris Collin, sales representative with Motion Composites and a Unite4CRT participant. Collin considers the group a unique, personal resource and an

excellent way to connect with like-minded individuals. "As a wheelchair user and adaptive sports participant, I appreciate the opportunity to have conversations about a variety of subjects that support users of mobility devices and products."

The original idea for this group grew from a desire by participants in the annual NRRTS/NCART CRT conference to stay connected and continue advocacy

efforts. "The community wanted to continue with education about issues and policies that impact our industry and CRT users," Annette Hodges, NRRTS director of education, said. "We also wanted to involve those who might not attend the conference in the conversation." What began spring 2019 as a virtual town hall evolved organically into a more informal coming together. "Early on we focused on legislation, continuing to touch base with members of Congress. However, as we continued to meet, we realized that wheelchair users, of course, face many issues that are different from an industry wide focus," Hodges said. "The group began to consider topics for deeper consideration based on the conversation during meetings. As we moved toward more personal topics, we changed the name to 'Conversations.'"

When Unite4CRT comes together, the conversation might be about service dogs or caregiver issues. Advocacy continues to be important to the group. "We have someone we consider an expert to speak on a topic and then the audience weighs in," Hodges said. "Participants feel comfortable discussing personal issues they are facing and the 'experts' aren't limited to the leader of the discussion. Our participants are very knowledgeable about many topics, because they are living it day-to-day." Some past discussion subjects include smart home devices at an affordable price, how to approach business owners about ADA (Americans with Disabilities Act) compliance, travel and accessibility, and surviving the holidays. "If a hot topic comes up that affects many, we'll make time to discuss it. NRRTS provides the platform for the virtual meetings, but the group manages itself."

Advocacy has remained a fundamental pursuit as the group evolved, but Hodges notes she's seen participants become bolder when discussing complex issues. "We've created a situation where personal connection and support are not restricted by geography. Unite4CRT is a safe place, and participants are comfortable sharing ideas or suggesting a different approach to a problem. Everyone who wants to have a voice, has that opportunity. However, if a participant simply wants to listen, that's okay too. I often sit back, listen and take notes. I learn something every time we meet."

UNITE4CRT IS A SAFE PLACE AND PARTICIPANTS ARE COMFORTABLE SHARING IDEAS OR SUGGESTING A DIFFERENT APPROACH TO A PROBLEM.

Jenny Siegle, a producer for Altitude Sports in Denver, Colorado, and a wheelchair user, serves as host for the group. "I'm so proud of what Unite4CRT has become. The participants have made this group successful. The pandemic actually really helped because we started meeting virtually more frequently, and that's when Unite4CRT started to evolve."

- Navigating the complexities of personal care assistants and caregiving.
- Understanding relationships, sexuality and intimacy, and finding the right person while living with a disability.

Register for upcoming Unite4CRT meetings at:
<https://nrts.org/unite4crt/>



Scan this QR code with your smartphone camera to register for monthly virtual Unite4CRT meetings.

"I know there are other groups similar to this on social media, but I don't think they meet on a personal level like Unite4CRT," Siegle said. "I like that our group can get together once a month and discuss important topics we can all relate to. It is also nice to get to see friendly faces and be a resource for people when they don't know where else to go for help."

Unite4CRT meets on the third Tuesday of the month. "Occasionally, because of holidays or a conflicting event, that date may change. However, communication is one of the cornerstones of this group, and information is always current on our social media platforms and the website," said Hodges. "We are grateful for the help of Jennifer Mendenhall in maintaining a good flow of information. Her daughter, Codi, has cerebral palsy, and Jennifer brings the understanding of a parent and caregiver to Unite4CRT."

"Being a part of Unite4CRT has given me the opportunity to educate myself and others about Complex Rehab Technology (CRT)," Mendenhall said. "It's imperative that we advocate and educate anyone who will listen about the necessity of CRT. I so appreciate the knowledge and enthusiasm of the Unite4CRT members!"

Participants look forward to another year of lively, informative meetings. Topics planned for group discussion include:

- Health insurance advocacy.
- Ten things you should know about your supplier.
- When your child is in a wheelchair - navigating the public school system.
- From childhood to teen to adult: How do your wheelchair needs change?
- On the move: an introduction to movement, adaptive sports and recreational activities.

"When Unite4CRT was first organized, we considered it as a small group with a focus on advocacy," Hodges said. "Now the group, with an average attendance of 20-25, isn't so small and is the nexus for projecting a collective, positive voice. I believe this is the best, most effective kind of networking. Through our conversations we learn, laugh, collaborate and educate each other in a welcoming and warm environment."

Follow #Unite4CRT on Facebook, Instagram and Twitter, or visit our website: <https://nrts.org/unite4crt/>

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For more details regarding Unite4CRT, contact Annette Hodges at ahodges@nrts.org.



LOOKING TOWARD THE END OF THE YEAR

Written by: **DON CLAYBACK, EXECUTIVE DIRECTOR OF NCART**

WASHINGTON, D.C., AND CRT

For the Complex Rehab Technology (CRT) industry, our year-end focus with Congress is preventing potential Medicare payment cuts, pursuing possible supplier COVID-19 relief and establishing a permanent CRT telehealth legislation. These CRT issues were communicated to Congressional offices in September by advocates participating in the NCART/NRRTS CRT Virtual Congressional Fly-In.

The ongoing CRT requests to Congress include: (1) provide additional federal financial assistance in light of the ongoing COVID-19 operating challenges and increased expenses so CRT companies (who are limited by fixed fee schedules) can continue to provide needed equipment and services to people with disabilities; and (2) recognize the benefits of the unique CRT telehealth flexibilities that have temporarily been put in place during the public health emergency (PHE) and ensure they are made permanent and continue post-PHE to protect consumer access.

Other issues being tracked are the Medicare Sequestration Moratorium that is set to expire at the end of 2021 that could result in 2022 payment cuts and the Centers for Medicare and Medicaid Services' (CMS) DMEPOS Payment Rule, which is expected to solidify 50/50 blended Medicare rates for rural areas and hopefully extend the 75/25 blended rates for non-bid, non-rural areas as well.

POWER SEAT ELEVATION AND STANDING SYSTEMS

During the month of October, we received strong bipartisan Congressional support for the national initiative to secure Medicare coverage for power seat elevation and standing systems used with CRT power wheelchairs.

Reps. Jim Langevin, D-R.I., and Don Young, R-Ark., led the submission of a bipartisan House of Representatives letter to CMS that garnered 77 signatures. The signers included 14 members of the House committees that oversee the Medicare program. The letter encourages CMS leadership to prioritize the coverage request and expeditiously proceed to the next step in the review process.

We are also pleased to report that Sen. Tammy Duckworth, D-Ill., submitted a bipartisan Senate letter to CMS regarding this issue as well. She was joined by Sens. Bob Casey, D-Pa., and Marsha Blackburn, R-Tenn. The letter contained a very direct request to not only move forward in the review process, but also to approve the application for Medicare coverage.

We are awaiting the next step in the review process, which is CMS formally announcing the reopening of the related National Coverage Determination (NCD) and commencing a 30-day public comment period. This public comment period will be the opportunity for CRT stakeholders to express their support for coverage. We continue to collaborate with the ITEM Coalition to move this process forward.

Sincere thanks to these congressional champions for their leadership and actions. This strong show of Congressional support is a very positive step toward securing access to these important technologies that people with disabilities require and deserve.

CRT AND TELEHEALTH

Discussions indicate that Congress may be passing legislation before year-end regarding certain telehealth expansions that have been temporarily in place during the COVID-19 PHE. The good news is the PHE declaration has been extended through late January 2022 (and could be extended further), so these current policies will remain in effect until at least that date.

When it comes to CRT access, some Medicare beneficiaries with disabilities have only been able to obtain CRT because of the COVID-19 telehealth flexibilities put in place by Congress and CMS. Unfortunately, when the PHE ends, the ability for certain Medicare beneficiaries to access needed CRT via telehealth will also end unless Congress acts.

The CRT telehealth option must allow occupational and physical therapists to continue to participate remotely for CRT evaluations, fittings and training when an in-person visit is not possible due to medical risks, transportation barriers, lack of experienced clinicians in the community or other factors.

Rather than allowing these proven flexibilities to expire and harm Medicare beneficiaries with disabilities, Congress must take legislative action to make CRT

telehealth policies permanent. Visit www.protectmymobility.org to download the NCART position paper and to send a message to your Members of Congress asking for their support.

CRT VIRTUAL CONGRESSIONAL FLY-IN

The September 21 CRT Virtual Congressional Fly-In was a big success as dedicated advocates brought the CRT access message directly to Congress. This annual “visit” to Washington, D.C., is produced by NCART and NRRTS to keep CRT initiatives on the Congressional radar.

This year it was done remotely for the first time, which required a new format and presented different training and presentation challenges. We are very happy to report that all went smoothly. There were 184 attendees who made 230 visits with Congressional offices and covered 44 states. CRT advocates were able to provide important education and insight to federal policy-influencers regarding the need to protect access to CRT for people with disabilities.

As we know, CRT advocacy is a marathon, not a sprint. A big thanks to all the Virtual Fly-In attendees and to our generous sponsors who provided the needed financial support. An event like this is not possible without them, and we sincerely appreciate everyone’s commitment.

NATIONAL CRT AWARENESS WEEK

National CRT Awareness Week is our annual opportunity for the CRT community to promote a better understanding of what CRT is, who uses it and why access is important. We’re excited to share that we had nearly 100 organizations participate in the late-September event.

Sincere thanks to all our advocacy partners and other organizations who invested time in developing messaging and programs to raise awareness. Activities included joining the Virtual CRT Congressional Fly-in, hosting presentations, holding group discussions, making videos and posting to social media. Your efforts directly contributed to a greater awareness of what CRT is all about and why access matters.

CRT OUTCOMES DATA

An important part of CRT access advocacy is communicating the benefits that result from the timely and professional provision of quality products and supporting services. We need to be able to share this information with Members of Congress, policymakers and payer organizations.

To provide needed outcomes data, U.S. Rehab, in collaboration with the University of Pittsburgh Department of Rehabilitation Science and Technology, has been leading the Functional Mobility Assessment (FMA) Outcomes Program. This system is designed to collect information that illustrates increased function and safety for individuals with disabilities and decreased health care costs resulting from the proper provision of CRT.

Suppliers, manufacturers and clinicians are encouraged to become familiar with this program or other options available to assist the CRT community in gathering needed outcome information.

BECOME AN NCART MEMBER

NCART is the national advocacy association of leading CRT suppliers and manufacturers dedicated to protecting CRT access. To continue our work, we depend on membership support to take on important federal and state initiatives. If you are a CRT supplier or manufacturer and not yet an NCART member, please consider joining.

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Don Clayback is executive director of the National Coalition for Assistive and Rehab Technology (NCART). NCART is national organization of Complex Rehab Technology (CRT) providers and manufacturers focused on ensuring individuals with disabilities have appropriate access to these products and services. In this role, he has responsibility for monitoring, analyzing, reporting and influencing legislative and regulatory activities.



Clayback has more than 30 years of experience in the CRT and Home Medical Equipment industries as a provider, consultant and advocate. He is actively involved in industry issues and a frequent speaker at state and national conferences.

ELITE WHEELCHAIR RUGBY: PARALYMPICS, PANDEMIC AND POSITIONING

Written by: **SUE TUCKER, OTD, OTR/L ATP**

Wheelchair rugby is a full wheelchair contact sport that has grown in size and visibility since it was originally invented in the late 1970s. Wheelchair rugby became an official Paralympic sport in 2000 with the first Paralympic competition showcasing in Sydney, Australia. The United States of America Wheelchair Rugby (USAWR) team has a strong history of being highly competitive and has medaled in every Paralympic games. In February 2020, USAWR was in full preparation mode for the 2020 Paralympic Games in Tokyo, Japan, with high hopes of winning a gold medal, attending the King Power Wheelchair Rugby Quad Nations tournament in Leicester, U.K., along with powerhouses Great Britain and Australia. The COVID-19 pandemic halted “normal” life around the world in March 2020 and marked the first time in the history of the Paralympic Games a postponement was issued. The unknowns and rapid spread of COVID-19 placed in-person team training camps and competitions on hold for USAWR for 2020. With in-person team training on hold, USAWR pivoted to virtual video review and coaching sessions. With many fitness centers closed, athletes adjusted to training outdoors while taking advantage of the extra year of training until Paralympic Games would occur. USAWR established a committee to assist with building skills, team chemistry and maximizing performance while transitioning to in-person team training, which resumed in January 2021.

Like all Paralympic sports, wheelchair rugby has a classification system, meaning that athletes are assessed by a team of health care professionals to determine the impact of their impairment on activity limitations. The goal of classification is to equalize the playing field and ensure a fair structure for competition. For wheelchair rugby, athletes are classified and given a point value from 0.5 - 3.5 with 0.5 being athletes with the least functional ability. Four athletes are on court at the same time and their point total cannot exceed 8 points with exception of teams with a female athlete, which are allowed 0.5 extra points per female athlete on the court.

The International Paralympic Committee eligibility requirements for wheelchair rugby include:

- Athletes with impaired muscle power such as those with spinal cord injury or muscular dystrophy.
- Limb deficiency including those occurring congenitally or via trauma or illness related amputations.
- Hypertonia such as occurs with cerebral palsy (CP) or traumatic brain injury (TBI).
- Ataxia and athetosis such as that occurring with CP, TBI or stroke.
- Impaired passive range of movement.

Wheelchair rugby has evolved over the past 15 years as more athletes with disabilities other than spinal cord injury, are participating in the sport. Wheelchair rugby athletes’ sports chairs have advanced in their customization, largely due to the range of athletes’ functional abilities and the rise of elite athletes demanding precision fitting and equipment to improve their performance.

Many athletes at the elite level in wheelchair rugby rely on teammates, coaches and their own experience when selecting configurations for their new rugby chairs. Fitting an athlete for a rugby chair is quite different than traditional wheelchair evaluations and fittings as the chairs are often extremely specialized for the athlete’s role on court, and the design is much different than a typical wheelchair given the need for fixed welded frames, pickers and/or bumpers to absorb the chair-to-chair contact during play. Sports chairs



FIGURE 1 Class 1.0 athlete
Joe Jackson



FIGURE 2 Class 2.0 athlete
Ernie Chun

AS ATHLETES' SKILLS ADVANCE AND THE SPEED OF THE GAME INCREASES, EQUIPMENT AND SET-UP MUST CONTINUE TO ADVANCE TO MAXIMIZE PERFORMANCE.

are often designed to fit athletes very tightly around the trunk, hips and legs to provide stability and allow athletes to use minimal upper body movement to turn the wheelchair; in some cases, allowing athletes with trunk control to turn without pushing on the wheels. The rugby chair must be customized to the individual athlete's functional abilities and provide necessary stability during high speed chair-to-chair contact and be designed to support their role whether that be as a picker or ball carrier.

An example of the different chair setups and customizations can be seen in the photos. Figure 1 pictures Class 1.0 athlete Joe Jackson. He uses a defensive style rugby chair and requires a lot of dump in his wheelchair combined with an abdominal support belt, hip belt, thigh straps and foot strap in his setup for stability as he lacks trunk or lower body control and has limited upper extremity strength secondary to a spinal cord injury. Figure 2 is a close-up of Class 2.0 Ernie Chun's lower body securement setup. As a mid-point athlete with no trunk or lower body control, he still requires a significant amount of dump in the seat, as well as hip, leg and foot straps. Chun slid forward in the seat and into posterior pelvic tilt, requiring frequent repositioning, when picking and hitting during games and practice. To address these issues, an anterior knee belt was added to the front of his wheelchair to help prevent the forward slide. Figure 3 is Class 3.5 athlete Ray Hennagir. He uses an offensive rugby chair and requires a completely different setup with no dump in his seat, a ball holder and extra straps to go across his residual limbs to help him stay secure in the seat of the wheelchair and enable use of his good trunk strength to maneuver the chair. Figure 4 is Class 3.5 athlete Montrierus Hucherson who also uses an offensive style chair with a ball holder, low back and flat seat to help him take advantage of his excellent trunk strength and lower body strength. His wheelchair needed customization via a solid knee block as he has bilateral



FIGURE 3 Class 3.5 athlete Ray Hennagir

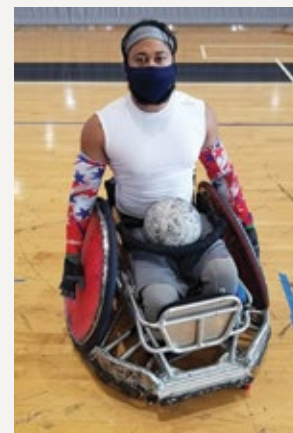


FIGURE 4 Class 3.5 athlete Montrierus Hucherson

below knee amputations, and this customization, in combination with hip strap, allows him to control the wheelchair and leverage more effectively for powerful chair to chair contact. Foam and 1" thick custom cut Supracor® sheet material was added to his knee block for cushioning and moisture management.

As athletes' skills advance and the speed of the game increases, equipment and set-up must continue to advance to maximize performance. While rugby sports chairs are customized and welded with non-adjustable centers of gravity and seat-to-floor heights, minuscule seating and positioning adjustments, such as loosening or tightening tension adjustable back or seat upholstery 0.5", can mean the difference between being able to take a hit or be flipped over by a hit. Proper equipment configurations are crucial in wheelchair rugby.

You may be wondering by now the outcome of the 2020 Paralympic Games. USAWR advanced to the gold medal game losing 54-49 to Great Britain and bringing home the silver. They now turn their focus to 2022 World Championships in Denmark, which is rapidly approaching.

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Sue Tucker, OTD OTR/L ATP, is an instructor in occupational therapy and neurology at Washington University School of Medicine where she has worked for 18 years. She is certified as an Assistive Technology Professional (ATP). She teaches graduate-level courses in the occupational therapy department, performs clinical assessments and interventions related to wheelchair seating and mobility and adaptive sports equipment, and conducts research. Aside from her work for Washington University, Tucker serves as an assistant coach for USA Wheelchair Rugby and head coach for the St. Louis Spartans wheelchair rugby team and has been coaching for 20 years. She is a member of the Clinician Task Force and AOTA.





RECLINE: CLINICAL INDICATORS

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

Recline is a feature found on many adaptive strollers and power wheelchairs and some manual wheelchairs. Recline opens the seat-to-back angle, up to 180 degrees. Recline may be used in combination with elevating legrests or tilt in space.

Many wheelchair frames allow the seat-to-back angle to be changed to meet an individual's positioning needs. This is a tool adjustment. Recline also changes the seat-to-back angle, but without tools and with the intention to be changed throughout the day to meet specific clinical goals.

MANUAL RECLINE

Manual reclining wheelchairs are typically designed for dependent mobility and offer little frame adjustment for growth or to meet specific seating requirements. Elevating legrests are usually part of these configurations. These recline systems do not include shear reduction.

Some manual and power wheelchair bases, which do include frame adjustments and growth, do offer a manual reclining back option. These do not usually recline fully.

POWER RECLINE

Power wheelchairs offering power recline typically include shear reduction technology and provide full 180 degree recline, essentially placing the client in a supine position. Shear reduction is accomplished when the back slides down during recline and slides upward when the client returns to an upright position. This movement allows the client to better remain in alignment with the support surfaces. Shear reduction systems cannot completely eliminate shear forces between the client and the seating system.

CLINICAL INDICATORS

By significantly opening the seat-to-back angle, certain tasks are facilitated including catheterization, access to G-tube or other medical ports, diapering and changing clothes. Transfers are not always practical out in the community, and so recline can eliminate the need to transfer to accomplish these tasks.

Recline redistributes pressure from the buttocks and posterior thighs to the posterior trunk and head, resulting in decreased pressures throughout. In combination with tilt in space, maximum pressure relief can be achieved in high-risk areas.

Medically, recline can be used to address orthostatic hypotension, seen in some clients with spinal cord injuries. In this condition, blood pressure can suddenly drop and recline can facilitate blood flow back to the head. In autonomic dysreflexia, there is a sudden increase in blood pressure, often triggered by a constricted bladder or constipation. Recline may alleviate these symptoms, though the head does need to remain elevated above the rest of the body.

As with tilt in space, recline can provide a position of rest to provide fatigue and post-seizure management. Gravity can assist with trunk and head control. A partial recline can also provide an improved position for swallow, visual regard, or functional tasks – particularly if the head is now upright and balanced at this seat to back angle.

Recline is an important technology in wheeled mobility and should be considered when making equipment decisions.

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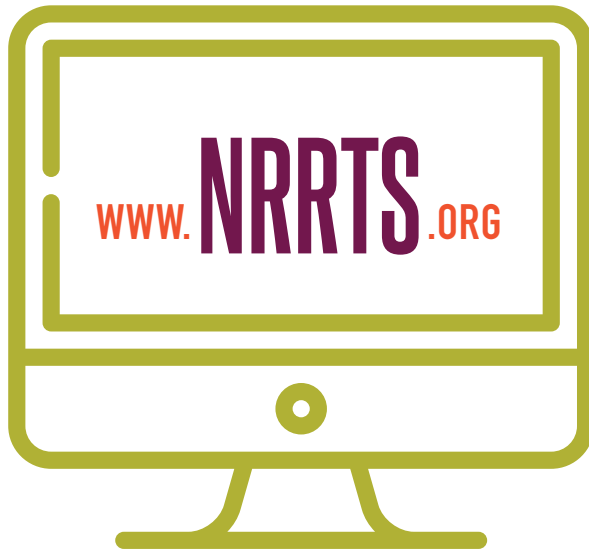
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Michelle Lange is an occupational therapist with more than 30 years of experience and has been in private practice, Access to Independence, for over 10 years. She is a well-respected lecturer, both nationally and internationally and has written numerous texts, chapters, and articles. She is the co-editor of "Seating and Wheeled Mobility: A Clinical Resource Guide," editor of "Fundamentals in Assistive Technology, Fourth Edition," NRRTS continuing education curriculum coordinator and clinical editor of *DIRECTIONS*. Lange is a RESNA Fellow and member of the Clinician Task Force. Lange is a certified ATP, certified SMS and is a senior disability analyst of the ABDA.

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JANUARY 6, 2022, AT 7 PM ET

The Flow of Innovation in Adaptive Design

Keynote Speaker: Christian Bagg

All Levels, Best Business Practice

From concept, research and customer engagement to development and repeat. The story of how to build an adaptive product a customer deserves can be proud of and a company they can grow with.

Christian Bagg is a Calgary born inventor and mechanical designer. Injured in 1996, while snowboarding, Bagg broke his back and was paralyzed from the waist down. Using his background as a machinist, he invented his way around the challenges he faced. With a love for the outdoors and a passion for problem solving, he has spent the last 20 years designing and building adaptive equipment. What started as a way to solve his own problems grew into an outlet to help others experience the very outdoors that he loves so much. Sharing his story has helped Bagg establish partnerships with government agencies, private corporations and post-secondary education institutions, all with the belief that “everyone belongs outside.”

LEARNING OUTCOMES:

- The participant will be able to describe the information gathering process for innovative adaptive design.
- The participant will be able to evaluate and integrate the design needs of a broad range of users.
- The participant will be able to describe how to incorporate the user experience to inspire the next innovation project.

For more information, visit the website www.nrrts.org



JANUARY 11, 2022, AT 7 PM ET

30 Years!! The Impact of NRRTS on Complex Rehab Technology

Speaker: Weesie Walker, ATP/SMS

Ethics, Best Business Practice, Beginner Level, SMS Prep Content

It is hard to believe that NRRTS celebrates its 30th anniversary in 2022. From the vision of a few concerned stakeholders, an organization was created to provide recognition for professional suppliers. From this humble beginning, NRRTS has become a resource for education through webinars and CEU articles published in DIRECTIONS. It is important to understand what drives the need for a standard of practice and protection of the consumers who rely on services from CRT Suppliers. The impact NRRTS has had on service delivery, legislation and best practice is key to understanding the role of the CRT Supplier.

LEARNING OUTCOMES:

- By understanding the history of NRRTS, participants will be able to explain the need for a standard of practice.
- Participants will be able to explain three key responsibilities of the CRT Supplier.
- Participants will be able to describe the importance of advocacy for assistive technology.



JANUARY 13, 2022, AT 3 PM ET

Putting the Horse Back in Front of the Cart

Speakers: Jean L. Minkel and Michelle L. Lange, OTR, ABDA, ATP/SMS

Ethics, Intermediate Level, ATP/SMS Prep Content

Like many value statements, all of us support "patient-centered care;" but are we able to provide the "care" and solutions that meet your patient's REAL needs? The Complex Rehab Technology (CRT) industry has grown, consolidated and developed lots of new technologies over the past 50 years; but are we truly offering patients better solutions which improve the person's level of participation? This webinar will explore uncomfortable trends in our practice that result from antiquated public policy and the growing gap between the professionals of CRT and our CRT consumers. This webinar will focus on calculated steps to "get the horse back in front of the cart."

LEARNING OUTCOMES:

- Participants will be able to identify the disconnect between the rights written into the ADA, protected by Olmstead and current Medicare policy.
- Participants will be able to identify at least two changes in their service delivery practice that increases the involvement of the patient during product selection and access to funding process steps.
- Participants will be able describe two common 'disconnects' between the clinic team member's needs and the patient's needs





FEBRUARY 23, 2022, AT 3 PM ET

Center of Gravity: What Does it Really Mean?

Speaker: Christie Hamstra, PT, DPT, ATP

Beginner Level, Seating and Positioning, ATP/SMS Prep Content

Sponsored by Motion Composites

What does center of gravity (COG) really refer to and how does it impact the function of a manual wheelchair?

We will review evidence related to COG selection, adjustment and optimal manual wheelchair performance and discuss the clinical significance in optimizing functional performance. We will define COG as it relates to wheelchair configuration and also to the person in the chair, examine the impact of changes in COG, and discuss clinical rationale and treatment approaches to maximize function, safety and maintain upper extremity health for manual wheelchair users. Case reports and practical examples will be reviewed.

LEARNING OUTCOMES:

- Participants will be able to identify the optimal rear wheel position of a manual wheelchair relative to the client's upper extremity static position.
- Participants will be able to describe any three manual wheelchair configuration changes that may impact center of gravity.
- Participants will be able to describe three education requirements for clients and caregivers related to wheelchair skills and center of gravity.



FEBRUARY 24, 2022, AT 7 PM ET

Person First Language: Think Before You Speak

Speakers: Tamara Kittelson, MS, OTR/L, ATP/SMS and Jenny Siegle

All Levels, Ethics, Best Business Practice, ATP/SMS Prep Content

Do you think before you speak? Expand the communication skills you use when interacting with clients/patients and customers. Spend an hour with a wheelchair rider, clinician and mother, sharing about person-first language. Learn how to speak about and to people without labeling them in negative ways. Gain confidence in your

everyday interactions with people who are more than their disability!

LEARNING OUTCOMES:

- Participants will be able to define key elements of person-first language.
- Participants will be able to describe how to differentiate between a person and their condition.
- Participants will be able to list three examples of person-first language.



MARCH 22, 2022, AT 7 PM ET

Getting Creative with Custom Molded Seating

Speaker: Lindsay Veety, PT, DPT, ATP/SMS

Intermediate Level, Seating and Positioning, ATP/SMS Prep Content

Knowing what type of seating to choose for a client can be a challenge, especially if the client presents with complex body shapes that doesn't fit into linear off the shelf seating. The difficulties that COVID has added with lack of access to clients and product availabilities and lead times, can also affect decisions. This presentation will give a brief introduction to custom molded seating. You will be presented with examples of successfully using innovative custom seating systems with different clients.

LEARNING OUTCOMES:

- Participants will be able to list three different types of available custom molded systems.
- Participants will be able to list two benefits of using custom molded seating with a client.
- Participants will be able to describe two methods of assessing if custom seating is appropriate at time of delivery.



APRIL 19, 2022, AT 7 PM ET

The Seating and Wheeled Mobility Team

Speaker: Lauren Rosen, PT, MPT, MSMS, ATP/SMS

Beginner Level, Seating and Positioning, ATP/SMS Prep Content

This webinar will discuss the roles, responsibilities and importance of all involved with the equipment provision process in seating and mobility clinic. It will include personal perspectives of a clinician, a supplier and an end user/parent. Each will discuss their role and discuss ways to solve conflicts and optimize the equipment provided for best outcomes.

LEARNING OUTCOMES:

- Participants will be able to list the roles of each participant in a seating and mobility clinic.
- Participants will be able to assure best outcomes by optimizing the roles of each member of the seating team.
- Participants will be able to describe how to solve conflicts using the team approach.



APRIL 20, 2022, AT 3 PM ET

From the Desk of the Reviewer - Your Chance to See What's Missing in CRT Documentation

Speaker: Cathy Carver, PT

Best Business Practice, Ethics, All Levels, ATP/SMS Prep Content

After a few seating and wheeled mobility evaluations, it's easy to get in a routine of using canned language to justify the equipment for the insurance to approve. Tips are provided by the supplier. Each item as a code and qualifications for those codes. Does this insurance require a certain diagnosis code to qualify for Complex Rehab Technology (CRT)? You have heard, "You must paint the picture of your patient ..." Have you ever stepped back to read someone else's documentation? Have you read your own? This practical webinar will allow you to read real letters of medical necessity and you will get to see things from the reviewer's perspective and sharpen your documentation skills.

LEARNING OUTCOMES:

- Participants will be able to list three common mistakes therapists make when doing CRT documentation.
- Participants will read example documentation and be able to identify at least two mistakes made and provide corrections.
- Participants will be able to describe at least one mistake common in their personal practice and how it can be improved.



In a time of drastic change, it is the learners who inherit the future. We appreciate our learners' willingness to adapt to the ever-changing sphere of Complex Rehab Technology, even before COVID hit our world.

We have over 100 on-demand webinars and CEU articles in our library that cover a variety of topics on seating and positioning, medical terminology, ethics, funding and best business practice.

The education program awarded over 1,356 CEUS from August 2019 to August 2020 — that equals 13,560 hours of education!

The numbers are proof that we are meeting one of our education objectives at NRRTS — to bring you quality education at an affordable price. Registrants receive education at no cost, as a benefit. FONS pay half-price and others only \$45 per course!

We've made access to education affordable, and NOW, even easier for our learners!

NRRTS is accredited by the International Association for Continuing Education and Training (IACET). NRRTS complies with the ANSI/IACET Standard, which is recognized internationally as a standard of excellence in instructional practices. As a result of this accreditation, NRRTS is authorized to issue the IACET CEU.

IACET CEUs are accepted by NRRTS for the RRTS® and CRTS® credentials and by RESNA for the ATP and SMS certification renewal. The National Board for Certification in Occupational Therapy Inc. (NBCOT) accepts the IACET CEUs as PDUs for the American Occupational Therapy Association (AOTA). State occupational and physical therapy associations also accept IACET CEUs for license renewal.

SEMINAL INNOVATIONS IN COMPLEX REHAB TECHNOLOGY MANUAL AND POWER WHEELCHAIRS

Written by **TOM BORCHERDING**

The history of Complex Rehab Technology (CRT) has almost exclusively occurred within the past 60 years. A young industry by most standards, CRT history is rich with legendary innovators, influential leaders, passionate manufacturers and powerful brands.

While the consumers we serve represent the heart of CRT, the center of CRT technology is the wheelchair itself. This article will take us on a journey covering the history of CRT manual and powered mobility in North America, reflect on how the seminal innovations and products from our history shape the CRT wheelchair industry of today, and take a quick peek at the CRT industry of tomorrow.

The purpose of this article is twofold. First, to provide recognition for the seminal inventions, innovators, manufacturers and brands from CRT manual and power wheelchair history. Second, to build historical documentation that will put a smile on industry veterans while also serving to educate future generations of CRT professionals. While some written documentation covering CRT history does exist, much of our history lives in the memories of CRT veterans.

CONTINUED ON PAGE 26



NRRTS is pleased to offer another CEU article. This article is approved by NRRTS, as an accredited 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.

Wheel Chair 1920s
8.4 USA





SEMINAL INNOVATIONS...
(CONTINUED FROM PAGE 24)

CRT MANUAL WHEELCHAIRS – HISTORY

You can't tell the story of modern manual mobility without recognizing Herbert Everest and Harry Jennings, who almost 90 years ago invented and patented the first cross-brace folding wheelchair. The company they founded, Everest and Jennings® (E&J), counted Franklin D. Roosevelt and Winston Churchill among its worldwide base of customers. E&J went on to become the first powerhouse global brand in wheelchairs and the forerunner to the Complex Rehab Technology (CRT) industry. For patent enthusiasts, an interesting sidenote: the U.S. Patent Office issued a patent to Chester L. Hockney of Wisconsin way back in 1909 for a scissors-style folding wheelchair. There doesn't appear to be any record of a resulting commercial entry.



FIGURE 1

An original QUICKIE ultralight wheelchair. Circa 1980 (Photo credit <https://sunrisemedical-group.com/about/innovation>)

ULTRALIGHT WHEELCHAIRS

One can argue that CRT arose from the game-changing invention of the **ultralight wheelchair**. First on the scene was Quadra Wheelchairs, founded in 1974 by industry pioneers Mary Wilson (Boegel), Brad Parks, Jeff Minnebraker and Eric Walls¹. Quadra introduced the first ultralight, rigid, aluminum frame chair (including quick-release axles) that laid the foundation for the modern ultralight wheelchair. Küschall Wheelchairs, a Swiss company founded in this same period by Rainer Küschall and led in the United States by legendary table-tennis champion Mike Dempsey, featured the industry's first ultralight mono-tube chair. QUICKIE Wheelchairs, however, became the company that forever changed the landscape of manual wheelchairs (see Figure 1). Initially founded in 1979 as Motion Designs by Jim Okamoto, Don Helman and Marilyn

Hamilton², QUICKIE's stylistic, colorful designs, high-quality aluminum frames and folding ultralight models inspired mobility for millions of individuals around the globe, with the powerhouse QUICKIE® brand (Sunrise Medical) relevant and popular to this day. A QUICKIE wheelchair used by Marilyn Hamilton while playing championship tennis is on display at the Smithsonian.

Whereas Quadra, Küschall and QUICKIE challenged the (then) conventional wisdom that manual wheelchairs were best constructed using chrome-plated steel, a titanium revolution was not far behind. QUICKIE was again an early player driving innovation, this time by using titanium as the primary frame material for its GPV Titanium chair, which was introduced to the market in the late 1980s. In that same period, Production Research Company (PRC) featured an early mono-tube frame built from titanium. But it was TiLite who built their brand identity around titanium, offering a true custom fit process and elegant design that resonated with increasingly educated consumers. With its origin in bicycle and golf industries, the TiLite brand (Permobil) remains one of the leading choices in ultralight wheelchairs today.

For individuals seeking an "edgy" alternative to QUICKIE and TiLite, Colours N Motion was often the choice. Founded by John Gunnar Box and developed out of an aerospace company that he created with his two brothers³, the Colours brand reflected a lifestyle of independence and individuality. Colours chairs and users were always uniquely individual and easy to spot at expos!

Multiple manufacturers introduced carbon fiber as an ultralight frame material over the years. In the early 1990s, Everest and Jennings introduced the Ellipse, with QUICKIE soon to follow with the QUICKIE Carbon. A small start-up company, Medical Composites Technology

**YOU CAN'T TELL THE STORY OF
MODERN MANUAL MOBILITY WITHOUT
RECOGNIZING HERBERT EVEREST
AND HARRY JENNINGS, WHO ALMOST
90 YEARS AGO INVENTED AND
PATENTED THE FIRST CROSS-BRACE
FOLDING WHEELCHAIR.**

(MCT) from Santa Cruz, California, would license their first two designs to Invacare Corporation where they were sold under the Action® brand as the AC and FX model chairs. Both were ground-breaking, futuristic designs where different components of the chair could be adjusted without impacting the chair's alignment and performance. In 1993 MCT was purchased by Everest and Jennings, who introduced the Nitro and Barracuda chairs, which utilized a combination of carbon fiber, titanium and aluminum using a manufacturing process that originated in the bicycle industry (see Figure 2).

TILT-IN-SPACE WHEELCHAIRS

Many readers probably picture the **tilt-in-space wheelchair** as the manual wheelchair most representative of CRT. The invention of the tilt-in-space wheelchair doesn't track to a single company or individual, rather this is shared by some of the legendary companies of our industry. Mulholland Positioning Systems pioneered a TiS seating system on a manual wheelchair base in the mid 1970s. Safety Travel emerged in this same period as a top choice TiS chair for children, notably also introducing a seating system that doubled as a car seat. Gunnell Inc. emerged as an early player in the adult TiS market. Freedom Designs® introduced a foldable TiS wheelchair in the mid 1980s, quickly becoming a brand leader in seating and mobility for children. PDG Mobility, a Canadian manufacturer founded in 1995, introduced innovative solutions in TiS including the Bentley, designed to accommodate foot-propellers, and heavy-duty bariatric models. In the early 2000s, two major manufacturers entered the picture with patented TiS introductions. Invacare® came first, introducing the patented Solara™ Wheelchair, which limited the movement of center-of-gravity when tilting, enabling a shorter wheelbase. Not resting on its ultralight laurels, Sunrise Medical introduced the IRIS®, a design that provided a means of adjusting the center of gravity to align it to the center of rotation, which made the act of tilting easier. Both the IRIS and the Solara remain popular some 20 years later.



FIGURE 2

An original E&J Barracuda ultralight wheelchair. Circa 1995 (Photo credit from Doug Garven, who captured it from an old magazine beyond which origin unknown)

SPORTS AND RACING WHEELCHAIRS

The advent of **sports and racing wheelchairs** traces back to the late 1970s when Bob Hall from Hall's Wheels began making custom racing wheelchairs for athletes seeking a competitive advantage. An interesting side note is that a Hall's Racing Wheelchair was displayed at the Museum of Modern Art in 1986². Top End® and Eagle Sportschairs soon followed, introducing custom chairs uniquely designed for individual sports such as tennis, rugby and basketball. Shadow Wheelchairs introduced the Mono-Ski, which revolutionized the sport of adaptive skiing. Some of our industry's legendary sports and peer leaders such as Randy Snow, Marilyn Hamilton, Brad Parks, Dave Kiley, Jim Black, Marty Ball, Rory Cooper and Jim Martinson all helped ignite the movement for competitive sports and recreation for individuals with disabilities (see Figure 3).

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FIGURE 3

The late, great Randy Snow. (Photo credit tennistame.com.)



SEMINAL INNOVATIONS...
(CONTINUED FROM PAGE 27)

POWER ASSIST AND POWER ADD-ON

A hybrid category of CRT manual mobility is the advent of **power assist and power add-on units**, bringing power on-demand to users of manual wheelchairs. The first patent for a power assist add-on to a manual wheelchair was issued to Sam Duke in 1950. Alber® was an early category leader in the more modern era, introducing the E-Motion wheel hub drive in 1991. Stand Aid of Iowa introduced the patented Roll-Aid system in 1991, a front tiller-drive attachment. Fortress and Damaco both marketed a friction-drive system in the 1990s. Mark Richter of Max Mobility improved upon important factors of portability and ease-of-use when he pioneered the detachable, rear-facing SmartDrive in 2005. With a related, but non-powered solution, Pat Daugherty invented the FreeWheel, a front-facing, portable wheel attachment that improved navigation across a variety of terrains.

CRT MANUAL WHEELCHAIRS – MODERN ERA

Except for airport transit and institutional chairs, lightweight and ultralight wheelchairs dominate the industry landscape today. It is hard to imagine that as recently as 40 years ago Everest and Jennings and Invacare had dominant market shares with chrome-plated steel, folding wheelchairs. How our CRT world changed in one short generation!

Relative newcomers Ki Mobility (ETAC) and Motion Composites along with QUICKIE (Sunrise Medical) and TiLite (Permobil) give ultralight-seeking consumers numerous choices to fit their performance requirements and lifestyle. International brand leaders Küschall (Invacare), RGK (Sunrise Medical) and Panthera® are also starting to promote their ultralight offerings in North America. For individuals interested in a uniquely custom designed and fitted wheelchair, manufacturers such as Melrose Wheelchairs, BOX Wheelchairs, PER4MAX® and Hands on Concepts cater to those seeking the “path less traveled” solution.

Numerous manufacturers offer tilt-in-space wheelchairs, covering a wide variety of applications ranging from pediatric to adult, transport to everyday use and institutional care. Leading manufacturers such as Invacare, Sunrise Medical, Ki Mobility (ETAC) and Convoid (ETAC) all compete in this space. A recent entry, the Liberty FT from Ki Mobility (2018), shows that portability and a lightweight design can be achieved to benefit caregivers and individuals using tilt-in-space manual wheelchairs. Integrated seating, portability, popularity and growth options reflect the maturity of this segment of the manual mobility business.

No longer targeting just the competitive wheelchair athlete, sports wheelchairs and other adaptive sports technologies attract the recreational athlete as well, opening doors for many more consumers to take advantage of opportunities to participate in sports. The expanding availability of local adaptive sports programs, the promotion of sports participation, training and competitions in the Department of Veteran Affairs (VA) and rehab centers, and the increasing and unprecedented media coverage of the Paralympic Games shine the spotlight on mobility solutions specific to sports and recreation. Top End (Invacare), QUICKIE (Sunrise Medical)

and Eagle Sportschairs offer handcycles, racing chairs and court chairs for tennis, basketball, soccer and rugby. Enabling Technologies and DynAccess LTD manufacture innovative technologies for adaptive skiing and snowboarding. Unique high-tech solutions developed by the University of Utah Rehabilitation Research Team include the TetraSki™ and Tetra Watercraft, which allow consumers who use power wheelchairs, alternative controls and even ventilators to join the fun! Aspen Seating Clinic provides customized seating and positioning solutions for athletes using adaptive sports equipment.

Emerging as the newest segment of manual wheelchairs, chairs designed for the popular action sport of wheelchair motocross (WCMX) are growing in popularity. WCMX athletes like Aaron Fotheringham show off their world class skills and extreme stunts in skate parks in what is a visually powerful adaptive sport. BOX Wheelchairs offers a full suspension WCMX wheelchair within the company's line of custom-designed sports and ultralight wheelchairs.

The CRT industry today is seeing a significant trend of manual wheelchair users seeking power-assist solutions to improve efficiency with mobility, preserve shoulder and joint health, and in some cases convert an ultralight chair to a powered handcycle. Power-assist solutions range from rear-wheel detachable drive systems such as Permobil's SmartDrive, Invacare's Alber SMOOV One and Spinergy® Inc.'s ZX-1, to hub-mounted drive systems such as Sunrise's QUICKIE XTENDER®, Alber e-Motion and Yamaha's Navione system, to front-wheel drive systems such as Rio Mobility's Firefly power handcycle attachment.

CRT MANUAL WHEELCHAIRS – PEEK TO THE FUTURE

Looking into my magical crystal ball, I see four trends emerging that will impact manual mobility across our next generation of consumers:

1. More variety in frame, wheels and component material selection. In addition to aluminum and titanium, carbon fiber will become more prominent, migrating from the performance bicycle market to become more mainstream in the manual mobility market. Look for hybrid frame designs combining multiple aerospace, ultralight materials becoming more popular as manufacturers seek to differentiate their offering and consumers seek incremental gains in weight, vibration reduction and aesthetics.
2. Ergo seating/seating systems will become increasingly integrated into the design of ultralight manual wheelchairs. These solutions have typically been separated in manufacturing and prescription due to funding categories, but with the acquisition of seating companies by wheelchair manufacturers and the gains possible in performance and styling through design integration, look for this approach to emerge in the years ahead.
3. The growth and selection of power-assist solutions will be explosive. With more manufacturers and researchers involved in innovation, with technology advancements migrating from other industries, with gains in battery miniaturization and portability, with recognition of shoulder damage caused by long-term wheelchair propulsion, and with a cultural emphasis on fitness, the growth in power assist/hybrid power could be enormous!
4. Safety systems will expand beyond just the seat belt. Why do we accept that wheelchairs can be driven into dangerous settings, such as down steps or off the side of ramps? My employer (LUCI) is working with power wheelchairs to mitigate the risk of injury by preventing a collision or fall before it happens. But this risk exists, as well, for users of manual wheelchairs. I am confident as an industry we will prioritize safety solutions to everyday mobility challenges for all users of wheeled mobility, in much the same manner as the automotive industry now requires smart safety systems for all new cars.

THE CRT INDUSTRY TODAY IS SEEING A SIGNIFICANT TREND OF MANUAL WHEELCHAIR USERS SEEKING POWER-ASSIST SOLUTIONS

CRT POWER WHEELCHAIRS – HISTORY

CHASSIS AND DRIVE WHEELS

The first record of power wheelchairs is around the time of World War I, when simple batteries and motors were added to existing manual wheelchairs. A patent for a motor drive wheelchair was issued in 1940 to Homer E. Smith of Seattle. Any commercial entry related to this patent is unknown.



FIGURE 4

George Klein, on the left, and his colleague Robert Owens on the right, with a prototype of the Klein Chair. Photo credit wheelchairjunkie.com.

While not a widely known name in the annals of CRT history, Canadian engineer and designer George Klein, leading a project funded by the Canadian Veterans Affairs in the early-1950s, pioneered the first modern-day electric wheelchair. Named the “Klein Chair,” it was designed to address the mobility needs of injured Canadian soldiers returning from World War II (see Figure 4). This chair was ultimately manufactured and marketed by Everest and Jennings, laying the foundation for CRT power wheelchairs of today².

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SEMINAL INNOVATIONS... (CONTINUED FROM PAGE 29)

**FIGURE 5**

E&J belt-drive power wheelchair. Circa 1970. (Photo credit Woodrow Seamone & Gerhard Schemmiser (<https://www.jhuapl.edu/Content/techdigest/pdf/V02-N03/02-03-Seamone.pdf>))

Everest and Jennings introduced the modern power wheelchair to the broader commercial market in the 1960s, developing rear-wheel, belt-drive mobility bases in what became a portfolio of power wheelchair products. E&J's 3P model power chair was the workhorse in the lineup during the 1970s, a model that many industry veterans remember to this day as a "product favorite" during that era (see Figure 5).

Per Uddén, a physician working for a rehabilitation hospital in Sweden, conducted research in coordination with

Rancho Los Amigos Rehabilitation Hospital that validated a need for a power chair that could navigate outdoor terrain while also being suitable for indoor use. In 1967, Per Uddén founded Permobil⁴ and commercialized a front-wheel, direct-drive power wheelchair that many believe was not only the first true indoor/outdoor power chair but also the innovation that served as the springboard to the wide variety of multipurpose power wheelchairs that we see today (see Figure 6).

The Ontario Crippled Children's Center pioneered a rear-wheel-drive modular power base with their innovative OCCC Flyer in the late 1970s. Fortress Scientific advanced the modular power base design with their rear-wheel-drive market entry in 1981, with other leading manufacturers such as Everest and Jennings and Invacare close on their heels with modular rear-wheel-drive offerings.

**FIGURE 6**

Permobil founder Per Uddén taking in the view of original Permobil power wheelchairs. Circa 1967. (Photo credit Permobil.)

Invacare took the rear-wheel drive design a further step forward with the development of the H-frame base with adjustable seat and wheel positions, introduced on the Storm Series power wheelchair lineup in 1994.

Several prominent power wheelchair manufacturers were pioneers in development of mid-wheel drive power bases. Early on the scene is a little-known Permobil model named Hexior, a mid-wheel drive indoor chair from the mid-1980s. Pride[®] Mobility introduced the Jazzy[®] Power Chair in 1996, which offered advancements in maneuverability with its small turning radius and patented mid-wheel drive technology⁵. Invacare's TDX series,

which debuted in 2004, was viewed as a revolutionary mid-wheel-drive chair with all six wheels on the ground for active driving both indoors and outdoors on a variety of terrains.

While not achieving commercial success, there is no denying that Dean Kamen's invention of iBOT[®], a "futuristic design" power wheelchair utilizing proprietary balancing technology to allow the chair to balance on two wheels, climb curbs and stairs, drive through a variety of terrains, and move while at eye-level, was revolutionary. Introduced to the U.S. market on national television in 1999, many believe the iBOT was a product ahead of its time. Kamen's DEKA Research and Development company, in partnership with manufacturing and commercial partner Johnson and Johnson, discontinued the iBOT offering in 2009. But even with its short lifespan, iBOT continues to influence designs of today as it showcased new possibilities with powered mobility.

POWER SEATING

With the expansion in both availability and popularity of power wheelchairs as early as the 1960s, parallel work was being done to bring forward advances in seating that would shape the CRT power chair industry to this day. Electrical Engineer Don Rugg, who was paralyzed as a result of an automobile accident in 1954 and did his subsequent rehab at Craig Hospital, and his associate, Bill Orr, pioneered a pressure relieving power recline system on a power wheelchair when they developed the Rugg Chair in the late 1950s. While not produced in significant quantities, Falcon Manufacturing did build approximately 20 Rugg Chairs for use with patients at Craig Hospital⁶.

Dick Devoe, MED Group[®] member and owner of Wheelchairs Inc. in Denver, was the driving force behind modern day power seating. As the rehab equipment provider to Craig Hospital, Wheelchairs Inc. worked with Gary Sandritter, founder of Folio Products, to design and supply power recliner kits to the patients at Craig in the mid-to-late 1970s. Then came the seminal moment in power seating. Dick Devoe recognized that shear forces during recline were causing pressure injuries. Following Wheelchairs Inc.'s sale to Abbey Medical in 1981, Mr. Devoe met with Greg Peek and asked Peek Brothers, a company building race cars and custom machinery, to design

**FIGURE 7**

Fortress 655 FS power base
with a LaBac Seating System.
Circa 1986.

and manufacture a power recline system with a 3" raised back post pivot point and a relocated seat actuator. LaBac Systems was incorporated in 1983 for the specific purpose of building low-shear power recliners, with the vision that power recline would be an integrated system with the power wheelchair base (see Figure 7).

Falcon™ Rehab Products was formed in 1984 when Tom Houston, paralyzed in 1980 following a fall from a scaffolding platform, acquired the assets of Falcon Manufacturing and turned the business focus to mobility. Whereas LaBac addressed shear forces during recline with a sliding back, Falcon addressed these forces with a sliding seat. Houston also designed and built a standing power wheelchair suitable for adaptive golf, leading to invitations to play with legendary golfers Chi Chi Rodriguez, Lee Trevino, Gary Player and Arnold Palmer⁷.

The history of power seating then takes a turn to Canada, where Motion Specialties entered the picture in 1985.

POWER SEATING EXPANDED TO ALSO ENCOMPASS SEAT ELEVATION AND STANDING. PER UDDÉN OF PERMOBIL FAME INTRODUCED A STANDING FUNCTION ON A POWER MOBILITY BASE WAY BACK IN 1968

Founded by David Harding, Doug Kerr, and Janet Kerr, the company focused on tilt to eliminate the risk of shear associated with recline systems and to keep the body in alignment with driving and positioning accessories. In addition to their emphasis on tilt over recline, Motion's key contribution was the addition of power tilt to a power reclining belt drive Invacare chair. The original three owners, along with Richard Eakins and Nelson Pang, formed Tarsys Engineering in 1989 as the manufacturing entity for tilt and recline systems, producing products under the Tarsys® brand. In 1991, Tarsys Engineering merged with Don Hovis and Blaine Hopson to found Genus Medical, which was subsequently sold to Invacare in 1994.

In 1996, Harding, Kerr and a group of other Canadian investors founded Motion Concepts, manufacturing the DI-45 power tilt system (originally designed by Motion Specialties) for the Invacare Arrow Storm series. Along with power positioning manufacturers LaBac Systems and Amylior, Motion Concepts went on to expand the availability of power positioning systems that addressed more than simple tilt and recline. Rotational or lateral tilt gave consumers the ability to move their bodies in multiple planes to enhance pressure reduction, help address dysphagia, increase respiratory function or find more comfortable postures. Motion Concepts was sold to Invacare in 2003.

Power seating expanded to also encompass seat elevation and standing. Per Uddén of Permobil fame introduced a standing function on a power mobility base in 1968, and numerous other manufacturers began offering the ability to raise the seat height of a system via a single elevating post or a robust scissor lifting mechanism. Quantum Rehab's iLevel® took power elevating seat technology a step further, providing consumers with the ability to drive at faster speeds while elevated to enhance outdoor mobility and independence.

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SEMINAL INNOVATIONS...
(CONTINUED FROM PAGE 31)

CONTROL SYSTEMS AND ALTERNATE DRIVING METHODS

Synonymous with CRT power wheelchairs are the complimentary power control and specialty control systems that opened the possibilities for powered mobility to consumers with a wide range of functional abilities.

In the late 1970s, industry veteran Chuck Chevillon, working with the team at the Rehab Institute of Chicago and supported by a licensing agreement with The MED Group, pioneered the Sip-n-Puff control system. Dufco Electronics was the best known of the early commercial manufacturers of Sip-n-Puff systems. Do-It Controls was an early innovator of switch and proportional control systems for wheelchair control, computer access and environmental controls. The Rehab Institute of Montreal, in partnership with Everest and Jennings Canada, pioneered the R.I.M. proportional head control.

IN 1989, INVACARE USHERED IN A NEW AGE OF DIGITAL CONTROL SYSTEMS WITH THE REVOLUTIONARY MCC (MICRO-COMPUTER CONTROL) SYSTEM

Until the late 1980s, controllers on all power chairs offered in North America utilized analog technology, which limited performance tuning primarily to a speed control and required a separate plug-in module for add-ons such as Sip-n-Puff and switch controls. Then Invacare went to work, introducing some major advances in controller technology. First, they added potentiometers on the back panel of an analog controller, which allowed for fine tuning of acceleration

and braking in addition to further speed setting controls. Then in 1989, Invacare ushered in a new age of digital control systems with the revolutionary MCC (micro-computer control) system, the first in the MK™ series of controller platforms by the company. This digital control system brought forward significant advancements, allowing the chair's driving characteristics to be more precisely matched to the driver's capabilities, and preset programs accessible to the driver via menu selection for ECU or power seat function controls.

Following Invacare into the digital control age, Dynamic™ Controls (mid-1990s) and Penny & Giles (late-1990s) introduced their versions of digital platform controllers. These brands of controllers remain popular with our mainstream brands of power wheelchairs today.

Significant developments continued around drive control and specialty control systems. Rucker Ashmore of Adaptive Switch Labs pioneered a no-contact head array utilizing proximity sensors in the early-1990s. In that same period, Bill Tuttle and Peachtree Proportional Head Control Systems adapted fighter jet technology to create a non-proportional control system using head positioning as the joystick. In the early-2000s, Magitek developed advanced switching systems using proximity switches and adjustable LED beam inputs for head control driving⁸. Stealth Products, LLC entered the market in 2015 with their revolutionary i-Drive®, which uses a computer as the interface to allow any combination of switch and proportional inputs necessary to make someone mobile. Stealth's i-Drive system was also the first driving control system to introduce a game concept to help teach a user to drive safely. In 2014, New Orleans Saints star defensive back Steve Gleason, diagnosed in 2011 with amyotrophic lateral sclerosis (ALS), participated in the Microsoft® "hackathon" event where he asked for development of an eye-tracking system to operate a power wheelchair. Originally created as a prototype by Microsoft, Team Gleason took over development of this eye-control system. In partnership with Evergreen Circuits and Jay Smith, the Independence Drive eye-gaze system was introduced with significant acclaim and opened the possibility of mobility independence to many individuals previously unable to access a wheelchair control system. This solution is now available through Tolt Technologies in partnership with Team Gleason and Every 90 Minutes¹.

CRT POWER WHEELCHAIRS – MODERN ERA

In much the same manner as manual wheelchairs covered earlier in this article, CRT power wheelchairs of today are a far cry from those of the 1960s and 1970s. My earliest memory of the popular E&J 3P wheelchair was hearing the clicking of the motors and friction of the belt-drive as the chair approached, and the awkward realization that on a downward slope the chair would inevitably follow gravity and continue to move. Again, how our CRT world changed in just one short generation!

The largest of CRT industry manufacturers, Permobil, Sunrise Medical, Quantum Rehab® and Invacare, have leading brands in today's CRT power wheelchair

A RECENT TREND THAT IS CERTAIN TO CONTINUE IS MORE COMPACT POWER CHAIR DESIGNS THAT FEATURE A SLIMMER CHASSIS, RESULTING IN A NARROWER OVERALL WHEELCHAIR PROFILE.

market. Canadian manufacturers AMYLOR Systems and ROVI (Invacare) are break-through brands taking on the industry giants. Consumers benefit from a wide range of drive solutions to best fit their mobility needs and individual lifestyles, covering front-wheel drive, mid-wheel drive, rear-wheel drive and even hybrid drive configurations.

Once considered incredibly custom, power positioning now addresses a myriad of functional and environmental needs through systems that offer anterior tilt, lateral tilt, seat elevation, power swing-away joysticks and mid-line mounts, opening new daily living, exercise and social engagement possibilities. Powered seating solutions such as Permobil's Active Reach™ and Active Height™, ROVI's Multi-Position Standing System, Sunrise Medical's C-Me seat elevation, and Quantum Rehab's iLevel® offerings, make today's choices in powered mobility nearly endless.

A recent trend that is certain to continue is more compact power chair designs that feature a slimmer chassis, resulting in a narrower overall wheelchair profile. ROVI was on the front end of this trend, positioning batteries in a front-to-back alignment to reduce the overall width of their X3 design. Quantum Rehab's Edge 3 Stretto® and Sunrise Medical's Q300M and Q500 M models are several inches narrower than traditional CRT power chair models, reducing the turning radius and allowing for improved navigation in tight quarters.

Wheelchair control systems reflect the modern electronics of our everyday world. Invacare's new LiNX® control system technology features a 3.5" touchscreen, new opportunities for wireless programming such as Bluetooth-enabled speed setting adjustments

in real-time with the user in the chair and remote diagnostics.

Connected platforms, such as Permobil's MyPermobil App sends real-time power wheelchair insights directly to the driver's smartphone and facilitates remote diagnostics. Modern platform controllers offer plug-and-play capabilities for a myriad of alternative driving controls, making for a more seamless driving experience for all consumers of powered mobility.

With the recognition that power wheelchair users require highly-specialized technologies and specific designs to access outdoor environments without limitations, a growing range of power mobility devices that can traverse sand, mud, snow, ice and steep or uneven slopes are now available. Sunrise Medical's Magic Mobility brand is designed for off-road performance and outdoor adventures. 21st Century Scientific Inc. has offered the BOUNDER chair for decades, a fast and rugged chair designed for all-terrain use. The Beach Cruiser from Outdoor Extreme Mobility does just what the name suggests, allowing mobility users access to exploring the sand and the surf. The TrackMaster from TrackMaster Mobility is a track-based wheelchair unlike traditional power wheelchairs – think combination military tank and power wheelchair!

Speaking of power wheelchairs suitable for a variety of outdoor settings, the iBOT is making a comeback. Manufactured and distributed by Mobius Mobility, the eye-level driving, curb-climbing and varied terrain capabilities make for distinctly unique solution in powered mobility.

Another unique powered mobility solution recently introduced for infants and toddlers is the Explorer Mini from Permobil. This lightweight, transportable mobility device facilitates self-initiated movement and early exploration for young children with mobility impairments. With an appearance more in line with a toy than a wheelchair, the Explorer Mini is eye-catching and sure to put a smile on your face when you see an infant or toddler experiencing self-mobility for the first time.

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FIGURE 8 LUCI's "Wheelchair Smarter" safety system. Circa 2021.

SEMINAL INNOVATIONS...
(CONTINUED FROM PAGE 33)

It is widely recognized that today's CRT power wheelchairs, while incredible machines in many ways, are behind other industries when it comes to safety systems. Tip-overs can be catastrophic events, colliding with others has the potential to cause serious injury, and drywall and door frames seem to be constant targets for collisions that result in property damage, chair damage and occasional injury. Fortunately, new safety-conscious solutions are finding their way to our CRT world. Power chair manufacturers are beginning to offer back-up cameras that display potentially hidden or dangerous conditions behind the chair. Braze Mobility Inc. from Toronto offers blind-spot sensors to help drivers of power wheelchairs identify obstacles that could become collision targets. My employer, LUCI, takes power wheelchair safety to a totally new level, with precision automotive-based sensor technology that interfaces with the power wheelchair control system to give the driver peace-of-mind by preventing most collisions and tip-over events before they happen (see Figure 8).

The migration of smart technologies into our CRT world opens numerous new possibilities. Advances in drive

control platforms and specialty control systems, in combination with smart sensor technologies, mean that more individuals will realize independence in mobility while also enjoying all the additional benefits offered by the power wheelchair products available on the market today.

CRT POWER WHEELCHAIRS – PEEK TO THE FUTURE

Again, looking into my magical crystal ball, I see five trends emerging that will impact CRT powered mobility across our next generation of consumers:

1. Smart technologies will continue to migrate from the automotive and other high-tech industries, raising the bar on expectations around wheelchair safety and driver assistance. It should not be too much to expect that as an industry we support technology solutions that will assist drivers to realize safe driving outcomes and prevent most catastrophic injuries that today result from power chair tip-overs or collisions.
2. The power wheelchair will become the primary connected platform for the driver. As chairs catch up to other industries with smart electronics and solutions, it seems obvious that the chair should be the center point of the driver's connected universe.

It is not hard to picture the day when the driver will connect home controls, social media platforms, communication devices and other connected platforms seamlessly through their “smart” power chair.

3. Advances in battery technology will positively impact the driver experience and influence future power chair designs. Does it seem like in many other industries battery technology has rapidly advanced in terms of miniaturization, range, charging speed and information reporting while in CRT we are still relying upon heavy, deep-cycle battery technology from last century? Bringing advanced battery technology into our CRT world seems just a question of when and not how.
4. Power wheelchairs will become more hybrid in design to expand capabilities outdoors without sacrifice to indoor maneuverability. Supporting this will be continued design improvements and availability of home accessibility solutions. How many drivers of power wheelchairs would love to have one single chair they could use outdoors everywhere they can imagine going, and indoors throughout their home?
5. Following the example of Permobil’s Explorer Mini and recognizing the importance of independence in mobility for younger children, more pediatric-specific power wheelchair designs will be offered. Too often today we see a child seated in an adult-sized power wheelchair, accommodating the child’s smaller size through the seating system. Shouldn’t the entire chair be designed with styling and proper fit for each individual child?

CONCLUSION

How often have you heard that lack of reimbursement stifles innovation in CRT? How many potentially life-changing CRT innovations never made it past the idea stage in a manufacturer’s board room due to reimbursement considerations? Just look around at other industries and you will get the sense that CRT has fallen behind, to the detriment of our consumers that rely upon us for independence and mobility solutions. For the pioneers recognized in this article, they accepted the risk of pursuing an idea not because it fit to a reimbursement system but rather because it would make a difference to someone living with a disability. *As an industry we need to return to this pioneering spirit, investing in innovation because there is someone with a need that we can help.* Innovation will drive future reimbursement systems, not the other way around!

I hope you as the reader have had as much fun reading this article as I had writing it! I also hope this article represents not the end but

rather the start of a journey recognizing influencers and innovators in CRT, and that other industry veterans will jump in to continue to tell the stories from the short but dynamic history of CRT that make us so passionate about our industry.

Special thanks to the industry veterans, peers and friends who helped craft and edit this article — Hymie Pogir, Tom Whelan, Kendra Betz, Brad Peterson, Greg Peek, David Harding, Alan Ludovici and Doug Garven. You are the best!

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Do you have a question or comment on this article? Tom would love to start a conversation! Email Tom directly and keep a look out for our social media posts featuring this article where you can also join the discussion.

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Tom Borcharding is a veteran in the Complex Rehab Technology industry, working in sales and sales management positions with Everest and Jennings from 1986 until joining ROHO Inc. in 1993. With ROHO,

he enjoyed global sales leadership and executive leadership positions up to the company sale to Permobil Inc. in 2015. Borcharding then worked as a member of Permobil’s global management team for five years, before joining industry start-up LUCI in October 2020. With LUCI, Brocherding is responsible for sales, education and business development with an initial focus on the U.S. market.



NEWS FROM RESNA

Written by: **ANDREA VAN HOOK, EXECUTIVE DIRECTOR, RESNA**

NEW MEMBERS JOIN PROFESSIONAL STANDARDS BOARD

We are pleased to announce the new members joining the Professional Standards Board (PSB):

- Claire Campbell, SLP, ATP
- Rob Oliver, consumer member
- Mike Osborn, ATP, CRTS®
- Marcia Scherer, PhD

All are serving three-year terms. The PSB also elected the following officers:

- Chair: Julie Piriano, PT, ATP/SMS
- Vice Chair: Kyle Walker, ATP
- Secretary: Douglas Rakoski, ATP
- Chair, Complaints Review Committee: Antoinette Verdone, ATP, RET

RESNA and the Professional Standards Board thanks our outgoing board members for their years of service:

- Michele Gunn, ATP, CRTS®
- Johnny Kelly, consumer member
- Rich Schein, PhD
- Lois Turner, SLP, ATP

RESNA TRACK @ ISS

Will we see you in Pittsburgh in January? For the first time, RESNA is sponsoring a track at the International Seating Symposium. RESNA is proud to collaborate with ISS to develop sessions that focus on technology convergence. This trend is affecting seating and mobility

professionals, who now need to know “more than wheelchairs” to best serve their clients. The RESNA track includes:

- AAC for the ATP – Beth Speaker-Christensen, SLP, ATP
- ATP Certification and Ethics for the New Era - Julie Piriano, PT, ATP/SMS; Michael Seidel, ATP, CRTS®; Carmen Digiovine, PhD, ATP/SMS, RET
- Integrated Assistive Technology Features on Power Wheelchairs - Leah Barid, OTR/L, ATP; Jill Baldessari, OTR/L, ATP
- Mainstream Smart Home Technologies for People with Physical Disabilities - Dan Ding, PhD; Lindsey Morris, OTD
- RESNA Wheelchair Transportation Safety Standards - Miriam Manary, BS, MS; Nichole Orton, BS, MS
- Seating and Mobility Technology: What's Annoying and What's Fixable – Gerry Dickerson, ATP, CRTS®
- Smart Home Makeover Disability Edition – Antoinette Verdone, ATP, RET
- Start With the Client: Increasing Your Value Through Client-Centred Practice - Emma Smith, PhD, OT, ATP; Susan Johnson Taylor, OTR/L, ATP; Jean Minkel, PT; Weesie Walker, ATP/SMS
- Supporting the Client: Extending the University of Illinois at Impact of the ATP Through Client and Caregiver Training - Daniel Cochrane, MS, MA, ATP; Brenda Sposato Bonfiglio, MEBME, ATP; Emma Smith, PhD, OT, ATP
- The ATP as the Case Manager - Michael Seidel, ATP, CRTS®; Sue Redepinning, OTR/L, ATP

In addition to the RESNA Track, two RESNA position papers will be presented:

- The RESNA Wheelchair Service Provision Guide - Mary Shea, OTD, ATP/SMS; Jessica Presperin Pedersen, OTD, MBA, ATP/SMS
- Update on the Evidence: 2021 Revision of the RESNA Ultralight Manual Wheelchair Position Paper - Jennith Bernstein, DPT, PT ATP/SMS; Theresa Berner, MOT, OTR/L, ATP; Lynn Worobey, PhD, PT, ATP

See you at ISS!

FOR THE FIRST TIME, RESNA IS SPONSORING A TRACK AT THE INTERNATIONAL SEATING SYMPOSIUM. RESNA IS PROUD TO COLLABORATE WITH ISS TO DEVELOP SESSIONS THAT FOCUS ON TECHNOLOGY CONVERGENCE.

RE-CERTIFICATION DURING THE PUBLIC HEALTH EMERGENCY

The RESNA Professional Standards Board recognizes that the public health emergency (PHE) brought about by COVID-19 and its variants may have created a situation in which some certified ATPs were unable to fulfill the work experience requirement for re-certification (.25 FTE or approximately 1,000 hours of direct service delivery over the two-year time frame. As a result, the board will consider individual exceptions to the work experience requirement for ATPs that are scheduled to be re-certified between September 1, 2021, and April 1, 2022, on a case-by-case basis. Please visit the RESNA website at www.resna.org for more information and instructions.

ATP CERTIFICATION RENEWALS DURING THE HOLIDAYS

We are fast approaching the end of the year, and that means a high volume of ATP certification renewals. RESNA will have extra staff during this time to help with renewals processing. However, we know from experience that a backlog can build up quickly. This backlog can affect those who are re-certifying early next year, in January and February. So do not delay! Follow these steps for a timely renewal:

- Make sure your RESNA on-line account is up to date! If you have not logged into your RESNA account since your last renewal, you will need to reset your password. Go to the RESNA website login page, click on "Reset Password," and follow the prompts.
- Make sure your email is current. All communications, including certificate delivery, are through email. We no longer mail physical certificates.
- Scan and email your recertification paperwork **at least four weeks prior** to your certification expiration date. Email your paperwork to certification@resna.org. Do not snail mail.
- Once the office receives your paperwork, we will place an invoice in your account and email you information on how to pay.
- Pay securely online using a credit card, or mail a check to the address on the invoice.
- We process renewals in order of payment received.

Remember, if you keep your NRRTS Registration up to date, including documentation of 1.0 CEU of continuing education every year, you meet the requirements to renew your ATP. **You can use the same CEU documentation for your ATP that you use for NRRTS.** The only difference is the ATP renewal is every two years, so submit two years of CEU documentation.

Wishing everyone in the NRRTS family a joyous holiday season and a very happy New Year!

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COMPLEX REHAB INNOVATION: LAUREN'S POWER WHEELCHAIR GETS SMART

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

I'm always amazed and encouraged when I see ongoing innovation in complex rehab technologies, especially given limitations such as restricted funding, policies and legislation. These limitations can easily squelch product innovation – to the detriment of the end user. I believe our field needs to 'make room.' Make room for new thoughts, new designs and new interventions. Funding isn't our only limitation. When I'm overloaded with work, it is harder to stay up to date with the latest and greatest, it is easier to fall back on the familiar, the true and tried. It is easy to rush through an evaluation and my documentation. Sometimes 'making room' simply lets us step back and take the time to ensure optimal product and intervention recommendations.

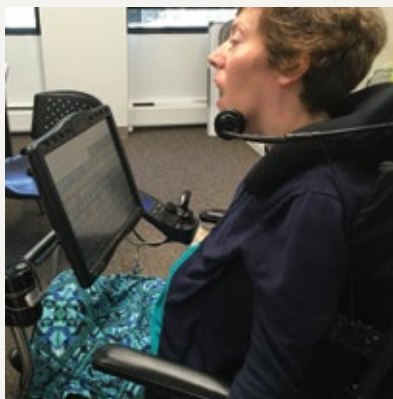


FIGURE 1

LAUREN

Lauren is a 38-year-old woman with the diagnosis of cerebral palsy. She has used a power wheelchair from a young age. Her most recent power wheelchair was a mid-wheel drive configuration with power tilt and seat elevate functions (see Figure 1). She drives using a right mounted joystick with a T shaped handle. Lauren is also able to activate small mechanical switches by her joystick for power and

mode and controls her power seating functions through the joystick. She uses a contoured back and a pressure relieving cushion. Lauren is also very proficient with a speech generating device (SGD) that she accesses using a switch mounted at the left side of her head. She uses the power wheelchair joystick via Bluetooth to emulate a mouse on her computer. Although she could access her SGD using mouse emulation, as well, she prefers switch scanning. Lauren lives with her roommate in a house with paid caregivers and her parents live close by.

THE PROBLEM

Lauren is a good driver, however, struggles in certain environments as she cannot see approximately the 180 degrees behind her or see items that are low in relation to her wheelchair. She collides with obstacles in her environment a number of times each day and this has damaged walls and doorways, as well as caused injury to Lauren (i.e. scrapes on her hands). As it is difficult for her to distinguish a curb

from the sidewalk and gutter, she has gone over these drop-offs before, and this very heavy power wheelchair has tipped over. This led to both injury to Lauren and damage to the wheelchair – as you can imagine. As a result, Lauren typically only drives when a caregiver is in the vicinity to supervise. Lauren is very anxious when driving secondary to these experiences. She tends to drive very slowly and primarily in familiar environments. She is also anxious when caregivers drive her wheelchair using the attendant control in the back – the caregivers have caused their fair share of collisions, as well!

Too many times, an otherwise proficient driver is not provided with a power wheelchair or does not drive their current power wheelchair to their full potential. Lauren could use the joystick with good control and certainly understood the task. We added tracking technologies and programmed the power wheelchair with little functional improvement. We desperately needed a better solution.

THE SOLUTION

And along came LUCI, a system that can be retrofitted to a compatible power wheelchair for the purpose of increasing safety and efficiency in driving for someone like Lauren who has motor and sensory limitations. LUCI is a combination of sensors, which are integrated with the power wheelchair electronics to specifically prevent collisions, drop-offs and modify speed as required by the driving conditions. This is not automated driving. Lauren would be in full control but would not be able to drive into detected obstacles, over an unsafe curb or into a person.

LUCI is the brainchild of two brothers, Barry and Jered Dean. Barry's daughter Katherine is a power wheelchair user and, although she is a good driver, this father was rather dismayed that such a very heavy machine could tip over, cause damage and, most alarmingly, result in injury to his daughter. His younger brother, Jered, is an engineer with a background in product development who made Barry's vision a reality in the creation of a new SMART wheelchair technology.

We were very excited about the potential advantages of LUCI for Lauren. This could dramatically reduce collisions and avoid drop-offs, as well as compensate for motor impairments, processing delays and visual field limitations. We hoped that this technology would reduce Lauren's anxiety and improve her functional driving both in familiar environments, but also beyond and into the community.

PRE-INTERVENTION

As mentioned above, Lauren had been driving a power wheelchair for a number of years. A pre-intervention questionnaire was given to Lauren and her caregivers to complete to compare current driving with future driving using SMART technologies. Here are the results:

LUCI Driving Performance Questionnaire (pre-questionnaire)

1. When using the power wheelchair, how many times a day do you (the driver) collide with obstacles in the environment?
 - a. None
 - b. 1 - 5
 - c. 5 - 10**
 - d. More than 10
 2. Has a collision with an obstacle ever led to damage of the obstacle itself (i.e. a wall)?
 - a. Yes**
 - b. No
 3. Has a collision with an obstacle ever led to damage of the power wheelchair?
 - a. Yes**
If yes, what part of the wheelchair was damaged?
armrests, tires
 - b. No
 4. Has a collision with an obstacle ever led to injury of the driver?
 - a. Yes**
If yes, please describe the injuries: **scrapes on her hands**
 - b. No
 - c. N/A, I have never collided with an obstacle
Lauren added that she has sustained injuries when her caregivers were driving the power wheelchair, including a broken toe that required an ER visit.
 5. Has the power wheelchair ever tipped over due to a drop-off (i.e. curb) or steep slope?
 - a. Yes**
 - b. No
 6. If the power wheelchair has tipped over in the past, did this result in:
 - a. Injury to the driver? No **Yes**
If yes, please list any injuries: **bump on head, scrapes**
 - b. Damage to the power wheelchair No **Yes**
If yes, what part of the wheelchair was damaged? **joystick bent, right arm pad torn**
 7. What level of supervision is required during power wheelchair driving?
 - a. None
 - b. A caregiver is in the vicinity**
 - c. A caregiver must be right by the power wheelchair at all times
 - d. I am not driving my power wheelchair at this time
 8. How do you feel about driving your power wheelchair (the driver's personal feelings)?
 - a. I feel confident
 - b. I am anxious when driving**
 - c. I am afraid to drive my wheelchair
 - d. N/A, I am not driving my wheelchair at this time
 9. How do you, as the caregiver, feel about the driver using the power wheelchair?
 - a. I feel confident when they are driving
 - b. I am anxious when they are driving**
 - c. I am afraid when they are driving
 - d. N/A, they are not driving at this time
- Comments:
- Do you have any other comments about your power wheelchair driving before trialing LUCI?
- Just a general overall feeling of unease especially near objects. When out in public, I do not drive my chair due to unknown surroundings and objects. I have my caregivers drive me.**

CONTINUED ON PAGE 40



COMPLEX REHAB INNOVATION... (CONTINUED FROM PAGE 39)

To summarize, Lauren was certainly able to drive her power wheelchair and understood the task well. However, she had a history of colliding with obstacles and even tipping over, which had resulted in injury to herself, property and the power wheelchair. Some of these issues were also a problem when caregivers were driving. Finally, these issues had led to a great deal of anxiety and hesitation when driving.

EVALUATION, RECOMMENDATIONS, AND ... FUNDING

Lauren came to the evaluation with her mom, Christy. Her supplier was Bert Lindholm, ATP, and I was the evaluating occupational therapist. During this evaluation, the team assessed Lauren's needs and ultimately recommended a new power wheelchair with power tilt and seat elevate functions, as well as new seating. Part of our recommendations included LUCI. Now, I've written a few letters of medical necessity over the years, but I knew that this one needed to include some critical information:

1. The need.
2. The recommendation.
3. How this would meet the need

Describing the need was a bit tricky. I needed the funding source to understand that this technology would help Lauren drive better, but I didn't want them to assume she couldn't drive at all and deny the power wheelchair. I needed the funding source to know what LUCI was, as this was a new and unfamiliar technology. Finally, I needed the funding source to understand that the anticipated functional benefit wasn't just bells and whistles – it was safety, and it was going to expand her world.

So, letters were written, quotes were submitted and we received an approval through Colorado Medicaid! The celebration did involve some chocolate! Eventually, everything was ordered, received, and delivered (see Figure 2). The delivery took some time, as this was so new, but everyone was quite excited!

I NEEDED THE FUNDING SOURCE TO UNDERSTAND THAT THE ANTICIPATED FUNCTIONAL BENEFIT WASN'T JUST BELLS AND WHISTLES – IT WAS SAFETY, AND IT WAS GOING TO EXPAND HER WORLD.



FIGURE 2

POST-INTERVENTION

A few issues came up during and immediately following the delivery. First, the new base clamp for her communication device mount protruded far beyond the width of the base, leading this to collide with doorways, despite LUCI, as this hardware sat above the sensors. A new base clamp was ordered, and this corrected that issue. Second, the lateral edge of each arm pad was wider than the drive wheels and so these occasionally rubbed the doorways. This was also adjusted with good results. Third, Lauren had a very unusual corner leading from the hallway into a room of the house. She was able to contact this corner with the power base as it was between the 'view' of some of the sensors. Jered actually created this corner in his design space and created a solution that benefited not only Lauren, but other drivers who may encounter unusual obstacles. It is important to note that each of these issues would have been a significant concern without LUCI and led to numerous collisions. LUCI has eliminated these collisions.

After Lauren had time to adjust to her new power wheelchair (approximately two months), I asked her to complete a post-intervention questionnaire. Here are the results:

LUCI Driving Performance Questionnaire (post-questionnaire)

1. When using the power wheelchair with LUCI, how many times a day do you (the driver) collide with obstacles in the environment?
 - a. None
 - b. 1 – 5**
 - c. 5 - 10
 - d. More than 10
 2. If you experienced any collisions, was the override activated at the time?
 - a. Yes**
 - b.No

Override is a feature that allows the driver to temporarily disable LUCI. For example, to use the footplates to intentionally push open a door.
 3. When using the power wheelchair with LUCI, has the power wheelchair ever tipped over due to a drop-off (i.e. curb) or steep slope?
 - a. Yes
 - b. No**
 4. If the power wheelchair has tipped over, was the override activated at the time?
 - a. Yes
 - b. No
 - c. N/A**
 5. Did you need to use the override feature to successfully maneuver through the environment?
 - a. Yes**

If yes, under what circumstances was override required?
Lauren sometimes used the override to maneuver around the unusually angled corner before this was addressed

 - b. No
 6. If you used override, approximately how many times a day was this required?
 - a. 1 - 5
 - b. 5 - 10
 - c. More than 10** *this occurred before the updates to address the unusually shaped corner*
 - d. N/A, I didn't use override
 7. What level of supervision was required during power wheelchair driving with LUCI?
 - a. None
 - b. A caregiver is in the vicinity**
 - c. A caregiver must be right by the power wheelchair at all times
 - d. I am not driving my power wheelchair at this time
 8. How do you feel about driving your power wheelchair with LUCI (the driver's personal feelings)?
 - a. I feel confident
 - b. I am anxious when driving** *Lauren's anxiety persisted for a number of months post-delivery, but has been steadily decreasing*
 - c. I am afraid to drive my wheelchair
 - d. N/A, I am not driving my wheelchair at this time
 9. How do you, as the caregiver, feel about the driver using the power wheelchair with LUCI?
 - a. I feel confident when they are driving**
 - b. I am anxious when they are driving
 - c. I am afraid when they are driving
 - d. N/A, they are not driving at this time
- Caregiver comments:
- Mom: **"I feel better with her driving now with LUCI. She is able to independently drive up and down the ramp into her van – she has never been able to do that before!"**
- Caregiver 1: **"I have never seen an issue while we were out."**
- Caregiver 2: **"So long as there is a caregiver with her, I am confident in her driving using LUCI. In close corners or tight turns, the sensors sometimes leave her 'stuck.' But the benefits of LUCI outweigh those sporadic occasions."**

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LET'S NOT GET TOO BUSY, TOO BURNT OUT, OR TOO TIRED TO MAKE ROOM FOR PRODUCT INNOVATIONS WHICH IMPACT THE PEOPLE WE HAVE THE PRIVILEGE TO WORK WITH!

COMPLEX REHAB INNOVATION... (CONTINUED FROM PAGE 41)

After receiving and adjusting to LUCI, Lauren now drives with increased confidence and is willing to drive outside of her familiar environments (Visit <https://vimeo.com/623813170> for the video of Lauren driving). She can drive in areas that she never was before, such as driving up and down her van's rear-entry ramp. Lauren has not sustained any injuries or tipped over since receiving this intervention. She initially was still colliding with obstacles, but with changes to the communication device base clamp, bringing in the arm pads and further programming to address an unusually angled corner, Lauren very rarely contacts anything with her power wheelchair – unless she chooses to use Override. I think she likes this option.

The LUCI system also tracks data if the client provides permission. In a one-month period recently, LUCI recorded 571 collision interventions, 17 drop-off interventions, 0 tip warnings, and 190 overrides. That is an average of 19 collisions avoided per day – and Lauren is a good and very careful driver! I believe Lauren has had more potential drop-offs than before receiving LUCI, as she now regularly drives up and down her van ramp. She didn't do this before for fear of going over the edge of the ramp, however LUCI allows her to do so safely. Finally, as the data indicates, Lauren loves using the override feature. She likes to 'take over' at times, even when the system is intervening to prevent a potential collision, and that is entirely up to her – as it should be.

CONCLUSION

Without new technologies, Lauren would have still received a new power wheelchair. She would have been able to drive around familiar environments, albeit with some anxiety. I would have had a straight forward letter of medical necessity to write. But we made room ... room for a Dad and Uncle to dream and invent something better,

room to consider a new innovative technology that made Lauren's new power wheelchair smarter, room to facilitate a new driving experience for Lauren that is expanding her world beyond the four walls of her home. Let's not get too busy, too burnt out, or too tired to make room for product innovations which impact the people we have the privilege to work with!

Dream on.

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Michelle Lange is an occupational therapist with more than 30 years of experience and has been in private practice, Access to Independence, for over 10 years. She is a well-respected lecturer, both nationally and internationally and has written numerous texts, chapters, and articles. She is the co-editor of "Seating and Wheeled Mobility: A Clinical Resource Guide," editor of "Fundamentals in Assistive Technology, Fourth Edition," NRRTS continuing education curriculum coordinator and clinical editor of DIRECTIONS. Lange is a RESNA Fellow and member of the Clinician Task Force. Lange is a certified ATP, certified SMS and is a senior disability analyst of the ABDA.

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AUDITS ONLY AFFECT THE SUPPLIER : A MYTH

Written by: **CLAUDIA AMORTEGUI**

“We were paid” - “We have a prior authorization” - “We have documentation” - “My patient is happy” – these are all comments I hear people say rather confidently when I start talking about audits. For those of you who know me, you will likely recall my response – “just because you were paid does not mean it’s right.”

Let’s start with the basics. All funding sources clearly state an approved prior authorization is not a guarantee of payment. That includes the initial payment or even if they choose to recoup a payment due to an audit. An approved prior authorization does give a supplier a leg to stand on, but it will depend on the problem the insurer claims to have found.

When it comes to Medicare, there are two types of “Prior Authorization” in the world of Complex Rehab Technology (CRT). For the CRT manual wheelchairs, there is a process called Advance Determination of Medicare Coverage or ADMC. In my opinion, this is the best one because the supplier will receive an approval or denial for each line item that will be billed on that order. For power wheelchairs, there is the Prior Authorization Program. This program was a big win for CRT, but one key issue is they currently do not provide a line-by-line decision. Technically, the approval/denial is for the power wheelchair base only.

DON'T EVER THINK THAT GETTING PAID IS THE MOST IMPORTANT PART OF THE PROCESS.

A while back Medicare did announce if an approval was provided, it could be assumed the approval would also relate to powered seating if the base code submitted included powered seating. For example, if a K0861, Group 3 multiple power option power wheelchair base is approved, a supplier could assume the approval is for both the base

and the power tilt and recline (if they are on the order). However, there is no guarantee for anything, let alone all the other billable options. This part should concern suppliers. In my opinion, people are getting very comfortable with the payments when there are many orders that would or should fail an audit.

What does this mean for the clinicians or even the funding sources? First, for clinicians, although a recoupment of a payment is not money out of their pocket, it can certainly affect their patients. The coverage and payment of future repairs would be an issue. As for the funding sources, their audits can come back and affect more than just the one supplier. If they find an opening and see consistency in claim errors, it can slow down future claims for the same item for all suppliers. To take this a step further, if suppliers do not appeal the denials appropriately, certain insurers can start “interpreting” their own policy incorrectly. Their thought is if suppliers are not arguing incorrect denials or recoupments, then it must be OK. In these cases, suppliers, clinicians and even end users need to speak up. Sometimes it is just simple education of what a product is or even what the documentation means. CRT is just that, complex; we need to be sure everyone understands not only the products but the reason a specific person would medically need an item.

When it comes to Medicaid and other insurers, they typically provide approvals for more than just the base. Some will provide a line-by-line approval or denial, and others may have a code list or dollar threshold for the items not requiring prior authorization. In either case, they clearly state on every authorization that suppliers can still receive a denial – which also means, a recoupment in an audit.

No matter the insurer, audits are happening. They are reviewing many parts of the healthcare industry including equipment orders and telehealth visits. This includes the documentation for both. Suppliers need to be sure they are thoroughly reading all the documentation. By doing this, it not only helps in avoiding possible denials, but it also gets you prepared for an audit. Keep in mind seating evaluations should not contain information that contradicts what is in the ordering practitioners (MD, DO, NP, PA) chart notes.

As the audits start to increase, suppliers and clinicians need to be very aware of what is occurring with their orders. Suppliers, you need to communicate with your referrals. Clinicians, get involved if needed. This is even more helpful during the prior authorization process. If something is denied, you could assist by participating in a peer-to-peer review with the funding source. This will certainly help with any future audits, if medical need is in question. As clinicians, you cannot help with technical errors (i.e., wrong billing modifiers), but you are key in most other areas of justification. When insurers see the same justification repeatedly, and it's not for a battery, their flags go up. In a prior authorization review, they can easily kick it back, which just means a client must wait even longer. In an audit, it becomes hard to track down supporting documentation. The order can be over five years old. Again, all of this just makes future repairs for a client difficult if not impossible. For all types of orders, it could create a problem for all.

Don't ever think that getting paid is the most important part of the process. In my opinion, that is the easiest part. Suppliers need to make sure they keep their payments – only if they should have been paid in the first place.

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Claudia Amortegui has a Master of Business Administration and more than 20 years of experience in the DMEPOS industry. Her experience comes from having worked on all sides of the industry, including the DMEPOS

Medicare contractor, supplier, manufacturer, and consultant. For many of these years Amortegui has focused on the rehab side of the industry. Her work has allowed her to understand the different nuances of complex rehab versus standard DME. This rare combination of industry experiences enables Amortegui and her team at The Orion Group to assist ATPs, referrals, reimbursement staff and funding sources in understanding the reimbursement process as it relates to complex rehab.

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ALEX CHESNEY: A RELIABLE RESOURCE

Written by: ROSA WALSTON LATIMER



Alex Chesney setting up an alternative drive control clinic mode chair for use in an amyotrophic lateral sclerosis (ALS) clinic.



Alex Chesney and her husband, David, at a recent wedding getting ready to dance the night away.

In Houston, Texas, Alex Chesney, OTR, began her career as a clinician in inpatient neurological rehab at TIRR Memorial Hermann. After five years at the rehabilitation and research hospital, the occupational therapist transitioned her experience and expertise to Quantum Rehab as the clinical sales manager of the Midwest South Region. After moving to Quantum, Chesney earned her ATP and SMS certifications, expanding her ability to provide educational services to therapists. "I love connecting as an educator with clinicians," Chesney said. "As our industry is constantly changing, it is rewarding to help therapists stay informed about opportunities for their patients."

TELL US WHAT DREW YOU TO THIS CAREER.

My father had Parkinson's disease, and when I was young, a cousin suffered a spinal cord injury. Through those experiences, I saw people who were living with these diagnoses and yet were very capable. My dad was fabulous and very active with me. Of course, there were detriments to his disease as he aged, but he was able to do many things for many years. I knew early on that I wanted to work with the neurological population, although I'm quite certain I didn't know that term yet!

I graduated from the University of Oklahoma with a bachelor's degree in multidisciplinary studies in 2011 and earned my master's degree in occupational therapy from Texas Woman's University in 2013. When I started college, I knew I wanted to work in the health care field. Initially, I looked toward the biomedical/engineering side of things and considered becoming an orthotic/prosthetic practitioner. I liked math and science, and my dad was an engineer, so that influenced my thinking. However, I realized I wanted to work with people and decided that instead of making orthotics and prosthetics, I wanted to work with those who used orthotics and prosthetics. That's when I found rehabilitation sciences and somewhat accidentally learned about occupational therapy. I decided OT would allow me to focus on what everyone wants to do in their life and help them accomplish it, whether in a traditional or nontraditional way. That was perfect for me!

HOW DID YOU DECIDE TO TRANSITION FROM YOUR WORK AS A CLINICIAN TO YOUR RESPONSIBILITIES AT QUANTUM REHAB?

I was fortunate to have the experience of working at TIRR. It is one of the top neurological inpatient rehab facilities in the U.S. I was somewhat naïve, because it was ingrained in their culture that the OT did seating and mobility. From the first day of training at TIRR, you learn about wheelchairs, mat evaluation, and mobility and equipment. We had access to any type of equipment we wanted to trial. I recognized my good fortune to have this extensive training, but I didn't realize that, for many reasons, not all therapists had those same opportunities.

When the prospect of working with Quantum came to me, I realized I would be able to educate clinicians who worked in a variety of settings and, through them, educate patients and their caregivers. Therapists are presented with a myriad of situations daily. Their work isn't just about equipment or seating and mobility. Clinicians typically are training on daily skills, helping patients cope with emotions, helping teach the family, and working on a home exercise program – all at once. I understand the clinician burnout and the clinician hustle. I believe this gives me a specific perspective



David and Alex Chesney on one of their annual national park hiking trips at the Upper Falls in Yellowstone National Park.



Young Alex with her dad, Bruce Tesmer, one of her biggest supporters and mentors.



Alex enjoying the Texas bluebonnets and a long walk with her fur babies: Riley and Brinkley.

as a clinical educator, and I welcomed the opportunity to present a collaborative process. I am available to be a resource and to help at any level. Part of my responsibility is assisting clinicians in understanding how, in their situation, they can advocate for a patient to get the equipment they need. In some settings, that means navigating the process from beginning to delivery. In other situations, a therapist may provide information to the patient to take the next step.

HAS IT BEEN DIFFICULT TO TRANSITION FROM PERSONAL INTERACTION WITH PATIENTS?

I have missed the personal contact with patients. I loved my patients, connecting with families, and helping them navigate a challenging time. However, now I've been given a different perspective, and I very much appreciate the opportunity to empower clinicians to help their patients. Often, I am invited to come to a complicated evaluation, take a look at someone's seating or help with a trial. There are also opportunities to attend

wheelchair clinics where I can be a second pair of helping hands. When I go to a patient's home with our rep and an ATP to make a delivery, I can observe the client in their everyday environment. That wasn't possible in the clinic setting. That situation almost always leads to good conversations with the client about their needs.

TELL US ABOUT YOUR FAMILY AND WHAT YOU DO OUTSIDE OF YOUR WORK RESPONSIBILITIES?

As an only child, I have always been close to my parents. My dad passed away five years ago, and I'm pleased I live in Houston and can be near my mom, Kathy. She is like a best friend to me. My husband, David, is an electrical engineer. Neither of us truly understands the other's job, but we listen and support each other. We've been married almost seven years and have two "fur" children – rescue dogs, Riley and Brinkley. We take them for walks almost every evening. Our "big" hobby is for David and me to visit a different national park each year to hike. I am a serious fitness advocate and love working out.

CONTINUED ON PAGE 48



Alex with her TIRR Memorial Hermann family supporting the annual fundraising event, Walk and Roll for SCI.

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ALEX CHESNEY...
(CONTINUED FROM PAGE 47)

I am the OT clinical coordinator for a nonprofit called RSVP Texas. Rehabilitation Services Volunteer Project was organized in 2011 and is a volunteer effort to provide neurological rehab services to those in our community. Two Saturdays a month we provide services for clients who for some reason don't have access to continued rehab services. The all-volunteer staff includes a physician, nursing care, therapy services and social work options. This work is significant to me.

YOU'VE BEEN A CLINICAL EDUCATOR FOR QUANTUM FOR OVER TWO YEARS. IS THERE SOMETHING SPECIFIC THAT YOU SEE AS THE CORE PRINCIPLE OF THE SERVICES YOU PROVIDE?

Because of my experience, I believe I genuinely understand the demanding work of therapists. I also know they are very dedicated and caring. I strive to establish a partnership that will, in some way, encourage them and make their load a little lighter.

My purpose is to be a clinical resource to present practical, helpful information to therapists positively impacting their patients. Of course, I am a resource to help with all things Quantum Rehab. However, I am also available to help clinicians navigate any component of the complex world that is seating and mobility. The bottom line, we always want what is best for the patient.

CONTACT

Alex may be reached at
ACHESNEY@QUANTUMREHAB.COM

Alex Chesney, OTR, ATP/SMS, is the clinical sales manager of the Midwest South

Region for Quantum Rehab. She provides educational services as an occupational therapist, assistive technology professional and seating and mobility specialist.



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THE ASSISTIVE TECHNOLOGY OUTCOME MEASURE PROJECT (ATOM) INITIAL IMPRESSIONS

Written by: SUSAN JOHNSON TAYLOR, OTR/L, RESNA FELLOW, ISWP CERTIFIED



High-quality clinical care requires that patients provide information regarding how they are feeling, their symptoms and any effects of prescribed treatment. In the past years, there has been an increasing emphasis on patient-reported outcomes. A patient-reported outcome one that is directly reported by the patient without interpretation by a clinician or anyone else (Weldring and Smith, 2013). Several patient-reported outcome measures have been developed that look at assistive technology in general or wheeled mobility and seating specifically. Patient-reported outcome measures are important tools in the field of Complex Rehab Technology (CRT). In CRT, outcome measures include those as in traditional medicine: symptoms, how the client is feeling and effects of prescribed treatment (Weldring and Smith, 2013). These tools gauge the effectiveness of CRT interventions from the client's viewpoint. These measures can assist in informing clinical and ATP/supplier practice, as well, assisting in shaping CRT public policy. Outcome measure results make up a core part of evidence-based practice.

In September 2020, Numotion embarked on the utilization of Assistive Technology Outcome Measure (ATOM), which is specific to the use of a CRT wheeled mobility base. This outcome measure was created and validated by Stephen Sprigle, Ph.D., (and group) of the Georgia Institute of Technology in Atlanta. Sprigle provides his expertise with the project. In addition, a relationship has recently been established with Georgia State's Center for Evaluation and Research Services for data analysis.

The ATOM is made up of three components: a permission form, 15 demographic questions and the 18-question ATOM survey. The client must be 18 years or older, able to communicate, verbally or written, and being evaluated for least their second wheelchair OR walking unsafely/non-functionally and require a CRT wheelchair to be safe.

After obtaining written permission from the client, the Numotion ATP/supplier asks the questions during the evaluation, taking about 5-10 minutes. The questions asked should be asked at an evaluation anyway and can be used as initial interview questions. The same questions are asked two more times by phone: one month after fitting of the equipment so the client has the opportunity to live with the equipment for a while and six months post-fitting. The follow-up phone calls are made by experienced seating and wheeled mobility therapists. Follow up surveys include a subjective portion in which



FIGURE 1

Sample ATOM Survey results. How safe do you feel while propelling or driving your wheelchair?

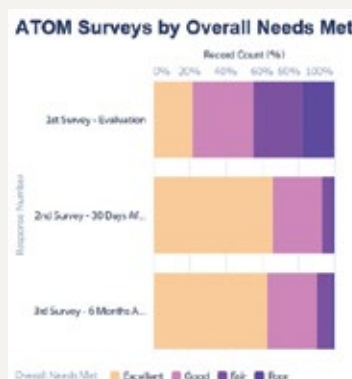


FIGURE 2

Sample ATOM Survey results. Overall, how well does this wheelchair (or scooter) meet your needs?



FIGURE 3

Sample ATOM Survey results. What is your comfort level in your wheelchair (or scooter)?

the client can message their ATP with any concerns relative to their new wheelchair. The three sets of answers are then compared.

At this writing Numotion has a total of 534 ATOM responses, broken down as follows:

- 342 evaluation surveys.
- 144 second surveys, one month after fitting (follow-up phone call by an experienced seating therapist).
- 48 third surveys, six months after fitting (follow-up phone call by an experienced seating therapist).

One small comparative analysis revolved around telehealth. A sample of 40 clients (13 in telehealth and 27 non-telehealth) submitted two ATOM surveys over an eight month period. Analysis indicated there was no association between change in outcome scores in the telehealth versus non-telehealth groups. In the telehealth group, ATOM scores increased in 85% of the clients.

As the sample graphs show, aggregates of key indicators in these areas have all been rated as improving or remaining the same between surveys. Additionally, key indicators have been rated as improving or remaining the same between surveys. We have just begun to analyze more comparative data in this new project.

CONTACT THE AUTHOR

Susan may be reached at
SUSAN.TAYLOR@NUMOTION.COM.

REFERENCE

WELDRING, T AND SMITH, S.M.S. PATIENT-REPORTED OUTCOMES (PROS) AND PATIENT- REPORTED OUTCOME MEASURES. HEALTH SERV INSIGHTS. 2013; 6: 61-68.



Susan Johnson Taylor, OTR/L, is an occupational therapist who has been practicing in the field of seating and wheeled mobility for 40 years, primarily in the Chicago area at the Rehabilitation Institute of Chicago Wheelchair and Seating Center (now the Shirley Ryan Ability Lab). Taylor has published and presented nationally and internationally. Taylor is both a member and fellow with RESNA. She is currently a member of the Clinician's Task Force and the RESNA/ANSI Wheelchair Standards Committee. She is a certified member of the International Society of Wheelchair Professionals. Taylor joined Numotion in 2015 and is the Director of Training and Education.

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DID YOU KNOW?

Written by: **WEESIE WALKER, ATP/SMS, EXECUTIVE DIRECTOR OF NRRTS**

"So they have a common voice..."

— *Adrienne Bergen*

In 1992, a group of concerned stakeholders conceived an organization designed to help consumers, clinicians and third-party payers identify qualified suppliers of positioning and mobility products and thus, the National Registry of Rehab Technology Suppliers became an incorporated organization.

The Board consisted of:

- Chair: Adrienne Bergen
- Vice Chair: Simon Margolis
- Recording Secretary: Jessica Presperin
- Treasurer: David Miller

The Regional Review Chairs were Jim Fiss, Robert Krogh, Tom Whelan, Kim Zimmerman, Sheila Delaney, Don Kirson, Terry Sapp, and Gerry Weissman.

The advisory council included Peter Axelson, Barbara Bath, Randall Caldwell, Joe Fleming, Kerry Jones, David Kreutz, Hymie Pogir, Kathy Riley, Otto Roberts, Mike Silverman, Susan Taylor, Gerry Warren, and Elaine Woods.

This impressive group of people saw a huge need as there were no standards and no requirements for the provision of rehab technology at the time. They put the term Rehab Technology Supplier (RTS) on the map. They developed the Bylaws, the Standard of Practice, the Code of Ethics, and the Complaint Resolution Process for NRRTS. They got the word out. There were

dozens and dozens of CRT suppliers. Learning about NRRTS was through word of mouth and publications such as "Team Rehab." Meetings were held at Medtrade and the Seating Symposium to promote the concept that by bringing



together the people who shared the vision of how RTSs would practice in a professional, client driven model would benefit everyone. They were truly "Raising the Bar."

Over the past 30 years, some things have changed, but most remain the same. NRRTS' mission has always been to support the professional CRTS® and RRTS® as a valuable team member in the provision of assistive technology and recognition of the specialized skill required to achieve the best outcomes.

With the dedication of countless volunteers throughout the years, NRRTS continues to thrive and improve as an asset to all people who rely on assistive technology.

As Adrienne Bergen pointed out in 1992, "We want to try and locate as many suppliers as possible and bring them together, so they have a common voice."

And that has not changed.

CONTACT THE AUTHOR

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WWALKER@NRRTS.ORG

OVER THE PAST 30 YEARS, SOME THINGS HAVE CHANGED, BUT MOST REMAIN THE SAME.



Weesie Walker, ATP/SMS, is the executive director of NRRTS. She has more than 25 years of experience as a CRT supplier. She has served on the NRRTS Board of Directors, the GAMES Board of Directors and the Professional Standards Board of RESNA. Throughout her career, she has worked to advocate for professional suppliers and the consumers they serve. She has presented at the Canadian Seating Symposium, RESNA Conference, AOTA Conference, Medtrade, ISS and the NSM Symposium. Walker is a NRRTS Fellow.

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NRRTS CANADA UPDATE

Written by: JASON KELLN, ATP, CRTS®

When this article was written, NRRTS Canada had more than 260 Registrants. Canadian NRRTS Registration officially launched in November 2020. Since that time, we have had a phenomenal response from fellow Canadians. Suppliers, manufacturers and the best people in the industry are among the ones who support us in this endeavor.

Everyone has seen the benefits. The world-class education helps Registrants become the best possible Complex Rehab Technology suppliers around. Setting the bar high is not easy. We are telling the world, clients, health science professionals, medical team members and funders we are the ones you want in your corner to find the correct solution for people who need Complex Rehab.

The Canadian committee has a similar vision to the NRRTS pioneers who started NRRTS almost 30 years ago. The amazing work that has gone into this accomplishment has helped NRRTS Registrants in Canada to grow and take hold.

The funding in Canada and the United States is quite different. However, the end goal for the client is the same. Doing the best for the client with the equipment available. If a Registered Rehab Technology Supplier® sees a client in La Grange, Georgia, or Timmins, Ontario, the client needs the best we can deliver.

THIS WILL HELP TO MAKE NRRTS CANADA BIGGER AND BETTER.

Although we do our work in different geographic jurisdictions and different funding, we still all work to provide CRT.

Over the next few months, we will inform more medical professionals, funders and governments about NRRTS and its value. This will help to make NRRTS Canada bigger and better.

The initial registration sent a loud message to professionals that we are professionals in the service area. As we enter our second year, it is important to prepare for renewal. Take advantage of the free NRRTS live webinars, NRRTS on-demand webinars and CEU article reviews. Each NRRTS Registrant will need 1.0 CEU (10 hours) to renew. For additional information, please visit <https://nrrts.org/registant-renewal/> or contact Amy Odom at aodom@nrrts.org.

CONTACT THE AUTHOR

Jason may be reached at
JASON@PHMOBILITY.COM



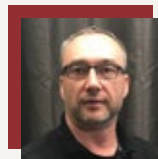
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United Spinal Association



Jason Kelln, ATP, CRTS®, works for PrairieHeart Mobility in Regina, Saskatchewan, Canada. Kelln was the first Canadian NRRTS Registrant and is currently the secretary on the NRRTS Board of Directors and serves on the NRRTS Canadian Advisory Committee.



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NEW NRRTS REGISTRANTS

Congratulations to the newest NRRTS Registrants. NAMES INCLUDED ARE FROM SEPT. 19 THROUGH NOV. 5, 2021.

Amanda Medeiros, RRTS®

Motion
122 Commerce Park Rd, Unit L
Barrie, Ontario L4N8W8
Telephone: 705-727-1009
Registration Date: 09/21/2021

John Phillips, ATP/SMS, RRTS®

National Seating & Mobility, Inc
302 Innovation Dr, Ste 500
Franklin, TN 37067
Telephone: 615-595-1115
Registration Date: 09/22/2021

Richard Morales, ATP, CRTS®

Mobility Solutions, Inc.
1001 E Cooley Dr Ste 104
Colton, CA 92324
Telephone: 909-824-2185
Registration Date: 09/29/2021

Robert Boychuk, RRTS®

Calgary Coop Home Health Care
9309 Macleod Trail SW
Calgary, Alberta T2J0P6
Telephone: 403-771-5371
Registration Date: 10/25/2021

Bobbie Lopez, RRTS®

NSM-Canada
8620 Glenlyon Pkway #101
Burnaby, British Columbia V5J0B6
Telephone: 236-330-4070
Registration Date: 10/19/2021

Kristen Benhardus, RRTS®

Handi Medical Supply
2505 University Ave W
St Paul, MN 55114-8728
Telephone: 651-398-9773
Registration Date: 09/23/2021

Rick Williams, ATP, CRTS®

Freedom Mobility
586 Parker Ave
Rodeo, CA 94572-1472
Telephone: 510-787-2013
Registration Date: 09/23/2021

Selvakkumaran Nadarajah, RRTS®

Med+ Medical Equipment Distribution
285 Midwest Rd
Toronto, Ontario L4Y3T6
Telephone: 647-268-0032
Registration Date: 09/20/2021

Gabrielle Lins, RRTS®

NSM-Canada
48 East 6th Ave
Vancouver, British Columbia V5T1J4
Telephone: 604-872-5800
Registration Date: 10/19/2021

Marco A. McFarland, ATP, CRTS®

Numotion
1821 Old Ocilla Rd Ste A
Tifton, GA 31794-1667
Telephone: 912-547-8387
Registration Date: 10/01/2021

Rita Piccioni, RRTS®

Med+ Medical Equipment Distribution
285 Midwest Rd
Toronto, Ontario L4Y3T6
Telephone: 416-477-5960
Registration Date: 10/14/2021

Shannon Comeault, RRTS®

HME Mobility & Accessibility
4011 Viking Way #130
Richmond, British Columbia V6V2K9
Telephone: 604-374-1666
Registration Date: 09/29/2021

Gene Engelhardt, ATP, CRTS®

Numotion
6460 Ronald Reagan Ave
Madison, WI 53704
Telephone: 262-282-4546
Registration Date: 10/19/2021

Richard Olwyn, RRTS®

Med+ Medical Equipment Distribution
285 Midwest Rd
Toronto, Ontario L4Y3T6
Telephone: 416-892-1250
Registration Date: 10/07/2021

Robert Colley, RRTS®

Handi-House Limited
203 Colonnade Rd S Units 13-14
Ottawa, Ontario K2E7K3
Telephone: 613-728-1115
Registration Date: 09/20/2021

Susan Mason, OTR/L, ATP, CRTS®

Freedom in Mobility, LLC
1315 Fletcher St NW, Ste B
Huntsville, AL 35801
Telephone: 615-415-0396
Registration Date: 10/13/2021



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Congratulations to NRRTS Registrants recently awarded the CRTS® credential. A CRTS® receives a lapel pin signifying CRTS® or Certified Rehabilitation Technology Supplier® status and guidelines about the correct use of the credential. NAMES LISTED ARE FROM SEPT. 19 THROUGH NOV. 5, 2021.

Gene Engelhardt, ATP, CRTS®

Numotion
Madison, WI

Richard Morales, ATP, CRTS®

Mobility Solutions, Inc.
Colton, CA

Marco A. McFarland, ATP, CRTS®

Numotion
Tifton, GA

Rick Williams, ATP, CRTS®

Freedom Mobility
Rodeo, CA

FORMER NRRTS REGISTRANTS

The NRRTS Board determined RRTS® and CRTS® should know who has maintained his/her registration in NRRTS, and who has not. NAMES INCLUDED ARE FROM SEPT. 19 THROUGH NOV. 5, 2021. FOR AN UP-TO-DATE VERIFICATION ON REGISTRANTS, VISIT WWW.NRRTS.ORG, UPDATED DAILY.

Jonathan K. Ford, ATP
Gadsden, AL

Jody Jesus, ATP
Stockton, CA

Jim Royan
Fresno, CA

Adrian Zacatenco
Lake Forest, CA

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RENEWED NRRTS REGISTRANTS

The following individuals renewed their registry with NRRTS between Sept. 19 through Nov. 5, 2021.

PLEASE NOTE IF YOU RENEWED AFTER NOV. 5, 2021 YOUR NAME WILL APPEAR IN A FUTURE ISSUE OF DIRECTIONS.

IF YOU RENEWED PRIOR TO SEPT. 19, 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.

Alan Channin, ATP, CRTS®

Alan F. Bettencourt, ATP, CRTS®

Andrew Robinson, ATP/SMS, CRTS®

Avery Smith, ATP, CRTS®

Brad Unruh, ATP, CRTS®

Brian Byler, ATP, CRTS®

Brian Marshall, ATP, CRTS®

Brian M. Crenna, ATP, CRTS®

Bryan Clever, COTA, ATP, CRTS®

Cameron Russelburg, RRTS®

Carmelo Markray, ATP, CRTS®

Charles W. Smock, ATP/SMS, CRTS®

Christopher J. Henrichon, ATP, CRTS®

Christopher J. Russell, ATP, CRTS®

Claude R. Levesque, ATP, CRTS®

Corey Clonts, ATP, CRTS®

Craig Ejik, ATP, CRTS®

Danielle Renee' Neale, ATP, CRTS®

Danny Leibach, ATP, CRTS®

Darren Esch, ATP, CRTS®

Darren J. Roberts, ATP, CRTS®

David A. McNair, ATP, CRTS®

Dennis Paul Yurt, ATP, CRTS®

Douglas D. Cobb, ATP, CRTS®

Edward O'Brien, ATP, CRTS®

Erik Lindblad, ATP, CRTS®

Ian Kingscote, ATP, CRTS®

Ilan Michael Breiner, ATP, CRTS®

Jack Badger, ATP, CRTS®

James Hearn, ATP, CRTS®

James E. Cage, Jr., ATP, CRTS®

Jamie Patton, ATP, CRTS®

Jane McNay, ATP, CRTS®

Jed Golding, ATP, CRTS®

Jeff Harbert, ATP, CRTS®

Jeff Kersey, ATP, CRTS®

Jeffery Castle, ATP, CRTS®

Jeffery A. Hennessee, ATP, CRTS®

Jeffrey W. Brown, ATP, CRTS®

Jeremy Paules, ATP, RRTS®

Jim Howe, ATP, CRTS®

Jodi Baumgard, ATP, CRTS®

Joe Scanlan, ATP, CRTS®

John Lindstrom, RRTS®

John E. Culpepper, ATP, CRTS®

John E. Morse, ATP, CRTS®

Jon Peard, ATP, CRTS®

Jonathan Threlkeld, ATP/SMS, CRTS®

Joseph Cecchi, RRTS®

Joshua Barrett, RRTS®

Kathryn Roberts, MS, ATP, CRTS®

Kendall Wilmore, ATP, CRTS®

Kenton W. Randolph, ATP, CRTS®

Lisa Michaels, COTA/L, ATP/SMS, CRTS®

Marcel J Farnet III, ATP, CRTS®

Matt Fremont, RRTS®

Matthew Corley, ATP, CRTS®

Michael Oliver, ATP, CRTS®

Michael Provines, ATP/SMS, CRTS®

Michael A. Bales, ATP, CRTS®

Michael Kristopher Ledford, ATP/SMS, CRTS®

Michael O. Kitterman, ATP, CRTS®

Mike Osborn, ATP, CRTS®

Pamela Lynn Wilks, ATP, CRTS®

Patricio Zaragoza, RRTS®

Paul Wilkie, ATP, CRTS®

Paul Arnold, ATP, CRTS®

Paul V. Pettini, RRTS®

Peter Arlauckas, ATP, CRTS®

Raul Saldivar, RRTS®

Richard M. Graver, Jr., ATP, CRTS®

Rob Kriebel, ATP/SMS, CRTS®

Robert Kavish, ATP, CRTS®

Robert Brown, ATP, CRTS®

Robert McGuckin, RRTS®

Robert B. Brewer, ATP, CRTS®

Roni Burns, ATP, CRTS®

Sandro Leone, ATP, CRTS®

Scott Duellley, ATP, CRTS®

Scott A. Whitlatch, ATP, CRTS®

Sean Kiepert, ATP, CRTS®

Sean Gordon, RRTS®

Shaya Ellinson, ATP, CRTS®

Steven M. Ortiz, ATP, CRTS®

Tammy Lynn Rosemoore, BEd, ATP, CRTS®

Terry Buetow, ATP, CRTS®

Thomas E. Adams, ATP, CRTS®

Tim Flanagan, ATP, CRTS®

Timothy Spaulding, ATP, CRTS®

Todd Freitag, ATP, CRTS®

Tracy Luedtke Sveum, ATP, CRTS®

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