DIRECTIONS

HOW CAN WE MAKE IT EASIER TO PROPEL A MANUAL WHEELCHAIR?

Page 12

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IN THIS ISSUE

IN EVERY ISSUE

FROM THE EDITOR-IN-CHIEF

Spring 2024 has sprung! Yay! Volume 2 features pertinent articles for your practice. I'd also like to remind you about the robust iNRRTS continuing education program. We offer relevant, cost-effective programming for the industry and profession through on-demand webinars, live webinars, CEU Article Reviews and the CRT Supplier Certificate Program. Visit https://nrrts.org/education/ for details.

Amy Odom, BS

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PRIORITY MANAGEMENT

Written by: **CAREY BRITTON, ATP/SMS, CRTS®**

We hear it every day: I don't have time to do more, learn more, teach more, advocate more. I was recently listening to a presentation by Simon Margolis from 2015, who was explaining why our industry is where it is and how to make the industry better and brighter. I am concerned we have not made significant advancements in how the world sees Complex Rehab Technology and fear it may be worse as it is trending toward being considered a commodity. We have not seen more Rehabilitation Technology Suppliers join and support many of the current organizations (NRRTS, RESNA, NCART, etc.) working toward one voice — to show the value of CRT providers and not risk losing this critical industry. We need to ensure the world sees how what we do affects health care, independence and dignity of some of the most fragile people in our population.

Competition forces us to adapt, keep up or fail (Simon Margolis, 2015). We have seen mom and pop companies nearly all disappear, whether absorbed by national companies or forced to close due to competition. We are seeing Humana Insurance own their own supply company and Amazon providing mobility and pharmacy. We are watching consolidation continuing to occur, and if not done well, it will ultimately reduce the credibility and specialness of what we do.

Every day, we see seating clinics closed because hospital systems are evaluating the return on investment of the clinics' square footage and changing to a more profitable discipline.

Our industry has had very little innovation in CRT products over the past decade. The only significant change has been utilizing technologies outside our industry and integrating them. Lack of funding and inflation has made innovation stagnate.

The industry is having difficulty recruiting and maintaining service support staff due to low labor reimbursement. Combine reimbursement with inflation, suppliers can no longer use their service department as a loss leader.

We need RTSs to remember our history, see what is happening, and have a vision of the future. Right now, each of us can lobby for change. It can be small in every interaction with end-users, clinicians and peers. When end-users complain they don't have access, explain where they can voice their concerns. If clinicians are frustrated with provider knowledge/support or noncovered items; let them know where they can complain. More powerful, ask your referral sources to only consider the RRTS®/CRTS® invitations to their clinics to ensure higher-quality representatives and outcomes. Invite your complaining peers to join NRRTS, attend events and learn how to become the voice of positive change.

Margolis said in 2015, "In the area of fee-for-service seating and wheeled mobility service delivery, the future is very bleak unless we are able, through Federal legislation, to establish a stable and sustainable business environment. It is the only through this sustainability and stability that access to appropriate seating and wheeled mobility technology will be assured for Americans with significant physical and functional disabilities."

If we do not make the time now to get involved and direct our combined voices toward showing our value and importance in this CRT process, the industry will change, but it will not likely be in the direction we would like.

Contact NRRTS and ask how you can get involved.

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Carey Britton, ATP/SMS, CRTS®, is president of iNRRTS. Britton works for National Seating & Mobility in Pompano Beach, Florida.

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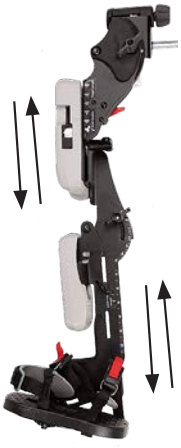

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MICKAE LEE: 'MY PURPOSE HAS GRAFTED ITSELF TO THE CRT COMMUNITY'

Written by: **ROSA WALSTON LATIMER**

After receiving a degree in education, Mickae Lee was anticipating a career in teaching. While waiting for a job opportunity in that field, she began working in customer service for a Complex Rehab Technology supplier, and her future took a momentous turn. Now, Lee, who is respected for her expert knowledge and proven advocacy skills, has been on the front lines of the industry for almost two decades. She continues to be deeply motivated by positively impacting the lives of others. "Once I began exploring the world of CRT advocacy, I was hooked," Lee said. "The people and the priorities really struck a chord with me."

> I CONSIDER MYSELF INCREDIBLY FORTUNATE NOT ONLY TO HAVE A PASSION FOR WHAT I DO BUT ALSO TO BE SURROUNDED BY MANY OTHERS WHO SHARE THAT SAME PASSION.

PLEASE GIVE US MORE DETAILS ABOUT CHOOSING CRT OVER TEACHING.

My career in the CRT industry began 17 years ago. I had recently graduated with a degree in education. While looking for a teaching job in New York, I was hired as a customer service representative for a CRT provider. I didn't expect to stay there long, but I fell deeper into the rabbit hole of CRT, document review, and Medicare appeals. Eventually, I got involved with NCART through the annual CRT Leadership and Advocacy Conference held jointly with NRRTS. I had been in legislative clubs throughout high school, and government relations had already interested me. I started working full time with

CRT advocate, Karen Roy, and Mickae Lee.

NCART in 2012 and recently began working with Permobil as senior manager of government affairs.

TELL US ABOUT YOUR RESPONSIBILITIES AS SENIOR GOVERNMENT AFFAIRS MANAGER AT PERMOBIL.

Government affairs is definitely an adventure every day! I watch for proposed legislation at the federal and state levels, participate in public meetings and committee hearings and assist with organizing grassroots advocacy campaigns. I also foster relationships with legislators and policymakers while providing needed education about CRT and this incredible community. Internally, I work with our market access, marketing and sales teams to keep them informed of anything that might impact processes, products or the community we serve. In addition to those responsibilities, I have the privilege of developing and supporting industry initiatives as a member of various industry councils, committees and boards.

Mickae Lee and fellow CRT Industry colleagues Angie Kiger and Jen Maichuk.

WHAT KEEPS YOU ENERGIZED AND INTERESTED IN THE WORK OF OUR INDUSTRY?

It is fair to say that anyone who is a part of the CRT community knows there are frustrating moments and no shortage of challenges. Some days, we've all got to dig a little deeper to stay motivated, identify solutions and keep pressing forward. I consider myself incredibly fortunate not only to have a passion for what I do but also to be surrounded by many others who share that same passion. In moments when my resolve starts to waver, all I have to do is look around me at this army of other advocates to be reminded of the importance of this work. We have an opportunity to make a life-changing impact for so many people.

Tobey and Vesper, Mickae Lee's beloved cats.

CRT advocates, John, Zoey, and Jennifer Harrison (Miss Wheelchair Michigan 2022), and Mickae Lee.

WHAT ARE SOME POSITIVE TRENDS YOU SEE IN OUR INDUSTRY?

I love seeing the industry communicating and collaborating side-by-side with consumer and clinician advocacy organizations. That's not exactly something new, but I do think we're fine-tuning how to mobilize that type of advocacy and acknowledging the critical

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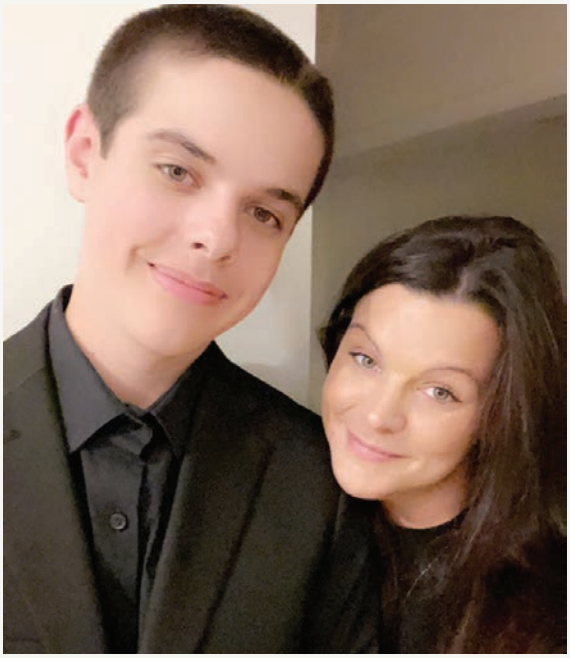

Mickae Lee and her son, Jacob.

INDUSTRY LEADER
(CONTINUED FROM PAGE 7)

importance of it. I immediately reflect on how the CRT community joined forces to advance establishing Medicare coverage of power seat elevation systems over the last few years. That was a mammoth undertaking that required every facet of our community to show up and speak out as one. There is so much more work to be done. Continuing to build on that foundation of understanding and partnership will only increase our chances of identifying strategies that result in lasting, meaningful change.

WHAT PERSONAL VALUES GUIDE YOU IN YOUR WORK?

Values are like an internal GPS for our choices, decisions and interactions with others. Whether it is the road of my professional or personal life, I always want my direction to be determined by integrity, honesty, kindness, respect and action. It is a little tricky to summarize but, for me, that means committing to moral and ethical principles and striving for consistency between my words and actions. This means choosing truthfulness even when it's uncomfortable, listening and engaging with diverse perspectives, valuing others and their unique experiences, and translating my convictions into active pursuits. I am far from perfect, and I am sure I have missed a few turns here and there, but these are the core values I'll always keep front and center.

ARE THERE ANY FUTURE PLANS YOU WOULD LIKE TO TELL US ABOUT?

I don't have a crystal ball, although that would be exceptionally convenient given my line of work. However, I am confident that I'll remain firmly rooted in CRT advocacy for the duration of my career. My purpose has grafted itself onto this community and the individuals who are a part of it, and I don't see that ever changing.

TELL US ABOUT YOUR FAMILY AND WHAT YOU DO WHEN YOU ARE NOT WORKING.

I'm sure many people would claim this title, but I truly am the proudest mom to the most amazing teenager, Jacob. My grandparents, parents, four siblings, and six nieces and nephews are all within driving distance, and we cherish every opportunity to spend time together. I also have two cats, Tobey and Vesper, who would be utterly offended if I didn't include them in the family lineup.

In my free time, you can usually find me cooking something in the kitchen, enjoying the outdoors, drinking coffee and curling up with a good book. I also enjoy concerts, watching hockey, going to the gym and hanging out with my son.

Mickae Lee and her dad, Jan Brown.

Mickae Lee (center) with (left to right) her grandmother, Jennie Conrad; her brother, Matt; her grandfather, Gene Conrad; her sister, Jordan; and her mother, C. Ann Conrad.

My "day job" advocacy work keeps me pretty busy, but I love working with consumer advocacy organizations as often as possible. Permobil has some volunteering opportunities that I haven't had a chance to explore fully, but I'm excited to check those out and get involved.

You may contact Mickae at MICKAE.LEE@PERMOBIL.COM

Mickae Lee has been working in the Complex Rehab Technology industry for 17 years. Currently, she is the senior manager of government affairs at Permobil. Lee was previously the director of advocacy and communication and the associate director for NCART.

NCART UPDATE AND 2024 INDUSTRY ISSUES

Written by: **WAYNE GRAU**

POWER SEAT ELEVATION

The Centers for Medicare and Medicaid Services issued their final coding and payment decision on Complex Rehab Technology power seat elevation. The fee schedule and coding go into effect April 1, 2024.

NCART coordinated CRT industry experts to present information regarding concerns and recommendations in response to CMS's preliminary decision. The final decision included:

- CMS has established one CRTcode — E2298.
- Fee schedule amount of $2,000.34.

CMS delayed a decision on replacing standard power seat elevation codes K0830 and K0831 — the DME MACs will calculate local fee schedule amounts to pay claims for covered items during this interim period until a final decision is made.

NCART is very disappointed with the final decision to lower the fee schedule by $261 from the preliminary decision late last year, which was concerning. We have reached out to CMS to understand the data they used to reduce the fee schedule. We will report back once we have additional information.

UPDATE ON COVERAGE FOR POWER STANDING SYSTEMS

The industry eagerly awaits CMS's decision to open the coverage determination for power standing systems. We have confirmed that the NCD for power standing is on the CMS waitlist posted on its website. We have also contacted our legislative champions to ask CMS when we can expect the NCD to be released for public comment. We will continue to monitor the website for any changes.

Once the National Coverage Determination is released, we will mobilize CRT advocates to provide information and comments to CMS just as we did for power seat elevation systems. Stay tuned for additional updates in 2024!

> I HAVE BEEN IN THIS INDUSTRY FOR OVER 20 YEARS AND HAVE SEEN FIRSTHAND THE INCREDIBLE WORK CRT MANUFACTURERS, SUPPLIERS AND ATPs DO TO TAKE CARE OF PEOPLE WHO UTILIZE CRT EQUIPMENT.

UPDATE ON THE CONSUMER CHOICE BILL FOR TITANIUM AND COMPOSITE WHEELCHAIRS — HR 5371

HR 5371 would provide consumers with the choice of a lighter weight manual wheelchair to best fit their lifestyle. Should this legislation become law, consumers will once again be able to choose either a titanium or carbon fiber manual wheelchair frame. They will be allowed to pay for this upgrade using their personal funds. Medicare beneficiaries are currently prohibited from upgrading to this equipment that may be the best option to accommodate their needs.

The bill was successfully voted out of the Committee on Energy and Commerce of the U.S. House of Representatives last fall. We anticipate a full Houses vote, and lobbying efforts have begun in the Senate.

PARTNERING WITH CTF TO FIGHT IMPROPER MEDICARE ADVANTAGE POWER WHEELCHAIR DENIALS

NCART and the Clinician Task Force continue to gather data about improper Medicare Advantage denials. The data will be used to evaluate whether the Medicare Advantage plans follow Medicare guidelines when they are prior authorizing power wheelchairs. Any information shared with the CTF will be kept in the strictest of confidence, and all data will be scrubbed and de-identified to ensure confidentiality and compliance. If your company or a consumer you work with has had a power wheelchair that you believe was improperly denied, please go to https://tinyurl.com/3k5mrvmy and submit your information.

NCART HIRES A PUBLIC RELATIONS FIRM

NCART has hired a public relations firm to help spread the word about the incredible value that our industry delivers and how all CRT members take care of their clients. I have been in this industry for over 20 years and have seen firsthand the incredible work CRT manufacturers, suppliers and ATPs do to take care of people who utilize CRT equipment. We must get the word out to the public, consumers, regulators and legislators. This is the first step in NCART's new marketing plan. Stay tuned, more to come.

THANK YOU

I want to thank all the volunteers who serve on the NCART executive committee, the board of directors and all NCART committees. NCART is a small, focused organization made up of incredible volunteers who go beyond to provide direction and governance for our organization. NCART would be unable to fulfill its mission if it were not for these volunteers. I want to thank each one of them personally. THANK YOU.

BECOME AN NCART MEMBER

NCART is the national advocacy association of leading CRT providers and manufacturers dedicated to protecting access to CRT. To continue our work, we depend on membership support to take on important federal, state and payer initiatives. Please consider joining if you are a CRT provider or manufacturer and not yet an NCART member. Add your support to that of other industry leaders. For information, visit the membership area at www.ncart.us or email wgrau@ncart.us to schedule a conversation.

CONTACT THE AUTHOR

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Wayne Grau is the executive director of NCART. His career in the Complex Rehab Technology industry spans more than 30 years and includes working in rehab industry affairs and exclusively with CRT companies. Grau graduated from Baylor University with an MBA in health care. He's excited to be working exclusively with CRT manufacturers, providers and the individuals who use CRT equipment.

HOW CAN WE MAKE IT EASIER TO PROPEL A MANUAL WHEELCHAIR?

Written by: **DEBORAH L. PUCCI, PT, MPT, AND CURT PREWITT, MS, PT, ATP**

Sponsored by: **KI MOBILITY**

We know end-users need the easiest-to-propel manual wheelchairs we can provide! As providers and clinicians, our job is to have the expertise to make that happen. To be experts, we must understand how manual wheelchairs work as machines and how riders interact with these machines. How do we validate our expertise and gain new knowledge we can use? The best practice is to take an evidence-based approach, and the best evidence comes from good research.

This article is the first of two that explores the topic of ultralightweight manual wheelchairs and what factors will impact performance and ease of propulsion based on research. The first article focuses primarily on the manual wheelchair as a machine, independent of the rider. It includes both the basic science and current research on how manual wheelchairs operate, what influences their operation and how this information can be put into practice. The second article will focus on the rider, who is the "engine" that propels the machine. It will address the research on the interaction between the rider and the wheelchair and how it can be optimized for propelling and for performing Activities of Daily Living.

Medicare defines an ultralightweight manual wheelchair (ULWC) as one that weighs less than 30 pounds (13.61 kg) without the front riggings, has a lifetime warranty on the frame and cross brace and has an adjustable rear axle wheel position.[1] Further, the current RESNA Position Paper on the Application of ULWC states: "It is the position of RESNA that ULWCs, which are customizable including configuration and adjustability while minimizing overall weight, are the only acceptable choice for individuals who rely on (manual wheelchairs) for independent manual mobility, regardless of propulsion method and across multiple care settings and diagnoses."[2]

Because a manual wheelchair is the primary (if not sole) means of independent mobility for many riders, performance is a critical consideration in manual wheelchair configuration and adjustment. Of course, every manual wheelchair rider would like their chair to perform well, but what does performance mean to that rider? In automobiles, performance might relate to the fastest, most powerful or most fuel-efficient car. In manual wheelchairs, however, performance is all about efficiency – using as little energy (fuel) to move as possible. When it comes to efficiency, which factors have the greatest impact and are most important to consider? Is it the weight of the chair? Is it the component selection? Like an automobile, is it how it is tuned or set up that optimizes efficiency?

Efficiency is impacted by scientific principles involved in translating human movement, or propulsion, into the movement of the wheelchair.[3] As we will see, this includes considering factors that contribute to energy loss. These scientific principles must be considered in everything from the selection of wheels and tires to where those wheels are placed under the rider to how the rider is oriented over the wheels.

Work is a measure of efficiency. In physics, work is defined as force x displacement (W=FxD). In this formula, work is the measure of energy transfer when a force moves an object through a distance. When propelling a manual wheelchair, the rider grasps the hand rim of the drive wheel and imparts a force on it to move the wheelchair across a distance. The most efficient wheelchair is the one that results in the least amount of work.

So, work can be used as a measure of efficiency, and efficiency is an indication of the energy expended to accomplish a given task. What is it that burns or eats up energy? In the context of propelling a manual wheelchair, a rider must contend with two principles of physics that lead to energy consumption: inertia and friction. Inertia is the resistance to motion due to an object's mass (weight). For example, moving a crate full of feathers is easier on a given surface and for a given distance than moving that same crate filled with bricks. This is because the crate filled with bricks has more mass (more inertia) and is, therefore, more resistant to a change in its state of motion (i.e., it requires more force to move it).

Friction comes into play in this context as well. Friction can be defined as the resistance to relative motion between two objects in contact with one another. Let us re-examine the crate. We compared the difference in mass between feathers and bricks on the same surface, but what if we changed the characteristics of the surface on which the crate sits? What if the surface was smooth concrete instead of rough concrete? Now, with the same mass (the same weight of bricks in the crate), we can make it easier to slide across a surface. By making the surface smoother, we reduce the friction, or the resistance to relative motion between the two objects in contact – the crate and the concrete surface. Similarly, friction significantly affects the effort required to propel a manual wheelchair. Researchers refer to it as an "energy loss parameter". Rolling resistance is a commonly used term to refer to the effect of friction on the movement of a wheelchair.

Much like an automobile, every manual wheelchair has an inherent mechanical efficiency. How it has been designed, configured and adjusted determines that efficiency. The driver of a car can do nothing, in the act of driving it, to make it more efficient. Likewise, in the act of propelling the wheelchair, the rider of a manual wheelchair can do nothing to make it more efficient. In both examples, the operator of the machine (car or wheelchair) can only detract from the efficiency of the system. This can happen in many ways, such as frequent repetitions of slowing and acceleration. For a wheelchair rider, an example could be sliding their hands back up the handrims following a push stroke. Even with the most efficient propulsion pattern, however, every regrasp of the handrim will result in a momentary slowing of the spinning handrim as the rider tries to match the speed of their push stroke to the existing motion of the drive wheel.

Although not through the act of propulsion, the mechanical efficiency of a manual wheelchair can indeed be improved. Referencing a car once again, much like a mechanic can tune a car to make it more fuel-efficient, a professional skilled in manual wheelchair evaluation and set-up can optimize a wheelchair setup to make it more efficient to propel. One of the most influential aspects of manual wheelchair set-up, if not the most influential, is system weight distribution. By system, we mean the combined weight of the rider, the chair and everything else that may be in or on the chair. The backpacks many riders commonly hang on the back of their chairs is a good example of one of those additional items that may be "in or on" the chair. Weight distribution is the proportion of system weight over the

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CLINICAL PERSPECTIVE
(CONTINUED FROM PAGE 13)

chair's drive wheels compared to that over the caster wheels. This is commonly expressed as a percentage (see Figure A). This single aspect of manual wheelchair setup and adjustment significantly influences propulsion effort. Numerous studies have shown that the more system weight that can be placed over the drive wheels, the lower the energy cost of propelling that wheelchair.

For example, Sprigle and colleagues observed that when one can achieve 80% of system weight over the drive wheels, caster selection becomes relatively insignificant regarding their effect on rolling resistance. Zepeda et al. pointed out that if 70% or more of the system weight is placed over the drive wheels, casters will have minimal effect on rolling resistance.[4, 5, 6] And Misch had this to say in his 2020 article on modeling propulsion costs:

"The results clearly indicate that adjusting a chair to place a greater portion of weight on the drive wheels results in a lower propulsion cost during every maneuver."[7]

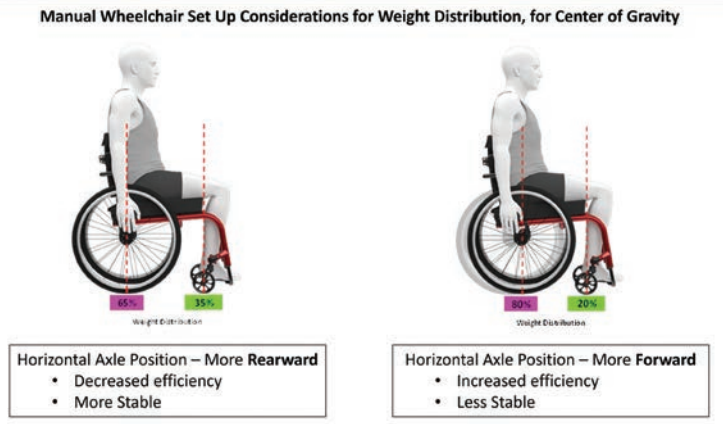

FIGURE A Graphic of weight distributions of 65/35 and 80/20

HOW DO WE ADJUST WEIGHT DISTRIBUTION?

One of the hallmarks of the ultralightweight manual wheelchair is adjustability. We can alter the wheelbase by adjusting the position of the drive wheels, and sometimes the caster wheels, on the manual wheelchair frame.

Horizontally adjusting the drive wheels under the rider is commonly referred to as CG or center of gravity adjustment. Moving the drive wheels horizontally forward, more under the rider, will result in more of the system weight resting on them. Conversely, moving the drive wheels horizontally rearward will shift more system weight onto the caster wheels (see Figure A). We can also adjust the relative position of the rider's weight as it sits over that wheelbase. For example, adjusting the seat-to-back angle to a more open position will result in a rearward shift of the rider's mass (head and trunk weight), increasing the proportion of system weight over the drive wheels (see Figure B). In short, the wheel position can be adjusted under the rider, or the rider's position can be adjusted over the wheelbase (through postural adjustment). Regardless of why it was done, either adjustment will influence the

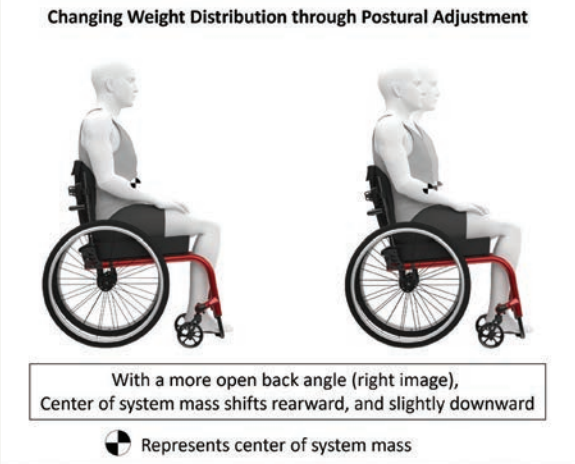

FIGURE B Graphic of shifting center of system mass with opened back angle.

proportion of system mass over the rear and the front wheels. The rationale for postural adjustments will be addressed in the second article.

However, there is a trade-off when increasing system weight over the drive wheels. While placing more system weight over the drive wheels will increase propulsion efficiency, it can also make a chair prone to tipping

FIGURE C Image of rigid wheel chair longer frame selection

backward with minor weight shifts or propulsive effort. We must always consider the rider's skill and ability as we strive to balance efficiency for propulsion with that individual's need for safety and stability. Let's quickly recall that many riders have backpacks on the backs of their chairs, often with a considerable amount of "stuff" in them. Indeed, placing a weighted backpack behind the back support of a chair can cause a rearward shift of the system weight. Still, in practice, it often leads to a less efficient-to-propel system. Because of this posterior placement of the weight of the backpack, some systems will exhibit that tendency to tip backward. A common compensation is for many riders to adopt a less efficient propulsion pattern to keep from tipping over backward. They do this without realizing that hanging the heavy pack on the back of the wheelchair negates the benefit of optimized drive wheel position.

It is also possible to shift more system weight onto the drive wheels by increasing the distance to the front wheels, the casters. Placing the casters farther forward with no concurrent change in drive wheel position will result in more of the system weight being borne on the drive wheels. On a rigid manual wheelchair, this can be done by specifying a longer frame length (see Figure C) or a particular caster position (see Figure D).

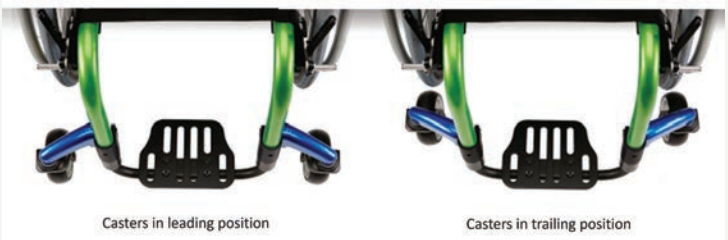

FIGURE D Images of rigid wheel chair casters in trailing and leading positions (Clik)

On many folding manual wheelchairs, the position of the casters can be changed in the field by changing the caster mount from a trailing to a leading position (see Figure E). The trailing position is where the caster stem is behind the vertical tubing of the front of the frame. In a leading position, the caster stem is positioned in front of that tubing (see Figure E). Whether by specifying a longer frame or by manipulating caster position to shift system weight to the drive wheels, there is a trade-off for this scenario as well: moving the caster wheels of the wheelchair further forward results in a chair with a longer turning radius. Manipulating the caster position may also result in interference with the foot or footrest position. Due to the path that a caster travels when it swivels around the caster stem, and depending on factors such as caster size, caster stem and caster fork, the caster may strike the foot or footrest.

ULTRALIGHTWEIGHT WHEELCHAIRS — WHAT'S IN A NAME?

We mentioned that adjustability is a hallmark of the ultralightweight manual wheelchair. However, even the name of this device would seem to categorize it based on weight. As noted earlier, according to reimbursement guidelines, an ultralightweight manual wheelchair weighs under 30 pounds and has an adjustable rear axle position. When considering propulsion efficiency, how much does a small difference in the mass (weight) of the wheelchair make?[3, 6] The difference in weight between one ultralightweight manual wheelchair and another of the same size and configuration can differ in a range measured in ounces up to a pound or two. In the context of a system, described previously as the chair, rider, and all other items on the chair, the rider is the predominant component of the system's weight, at least when considering most adults. Common weight differences among comparable ultralightweight manual wheelchairs become relatively insignificant when viewed in the context of the whole system.

According to the Centers for Disease Control and Prevention, the average weight of an adult male in the U.S. is 197.6 pounds. Let's use that information in an example: If we have a chair, with seating, that

CONTINUED ON PAGE 16

FIGURE E Images of folding wheel chair casters in trailing and leading positions

CLINICAL PERSPECTIVE
(CONTINUED FROM PAGE 15)

weighs 30 pounds, and we use the average adult male weight of 200 pounds for a rider (rounded), that represents a system weight of 230 pounds. That 30-pound chair represents 13.04% of the system weight. If we reduce the chair's weight by 2 pounds, making it a 28-pound chair, it results in a 228-pound system, and the chair would represent 12.28% of the system weight. The 2-pound difference in chair weight is 0.76% of the total system weight – a significantly small portion of the overall system weight (0.77% if using the actual rider weight of 197.6 pounds).

That's not to say the chair's weight is not a factor. There may be many reasons why the weight of a manual wheelchair is important, but let's consider this specifically in the context of propulsion efficiency. In Sprigle and Huang's 2015 study on the impact of mass and weight distribution, the authors described four conditions of propulsion: 1) propelling straight or 2) turning while either 3) accelerating or 4) moving at a steady state. They compared the influence on propulsion effort of the wheelchair's mass to how the system mass was distributed on the wheelbase. They used two manual wheelchairs with a weight (mass) difference of 12.3 pounds, and they configured each with either 55% or 70% weight distribution over the drive wheels. Looking at propulsion in these four conditions, they found that the weight distribution of the wheelchairs had a more substantial influence on propulsion effort than a 12.3-pound weight difference in three out of four test conditions. In those three conditions, the propulsion effort increases ranged from 5.1% up to 73% for the different test conditions on tile and on carpeted surfaces. The 73% increase was observed during steady state turning on tile with the 55% weight distribution (vs. the 70%). The significant increase in propulsion effort in this condition highlights the energy cost of placing a lesser proportion of system weight over the drive wheels.

The one condition where the 12.3-pound weight difference did have a more significant influence was during straight acceleration, such as a rider would experience at startup. In this condition, propulsion effort increases ranged from 5.8% up to 7.4% for straight acceleration on tile and on carpet, respectively. Note that a 12-pound difference is not the magnitude of difference we would expect to see among comparably sized and configured ultralightweight manual wheelchairs.[8] So, when viewing it as a factor influencing propulsion effort or propulsion efficiency, how the weight of the entire system is distributed on the front and rear wheels is highly significant when considered against the actual weight of the chair.

Let's also recognize that the advertised weight of ultralightweight wheelchairs does not reflect the actual weight of a complete usable chair. Often, manufacturers will tout the transport weight of their chair in its lightest configuration. This sometimes excludes many common features that would not actually be removed for transport, such as wheel locks and upholstery. However, a configured chair that is set up for a rider and ready to propel does, in fact, include those components, along with drive wheels, cushion, back support and often many other features. An ultralightweight manual wheelchair that is claimed to have a transport weight of 12 pounds, for example, can easily weigh 30 pounds or more with the inclusion of necessary features.

TIRES AND WHEELS

TIRES

Along with weight distribution, wheel and tire selection also significantly influence manual wheelchair propulsion efficiency. Tires must contend with friction because of their contact with the ground. As we stated before, friction is resisting relative motion between two bodies in contact. Resisting relative motion results in energy loss. Let's examine what basic science and research tell us about tires and energy loss. We have discussed the energy efficiency or propulsion efficiency of a manual wheelchair, so naturally, we must recognize that energy is expended during manual wheelchair propulsion. Unfortunately, an appreciable amount of the energy expended by a manual wheelchair rider does not go directly into the maneuvering of the chair.

Numerous opportunities exist for energy expenditure to be lost and not result in intentional chair movement. One of the biggest "culprits" of energy loss is rolling resistance, a reflection of friction in the system as the tires roll across a surface. In this case, that energy loss occurs where the rubber meets the road, where the tire contacts the rolling surface. However, it is not so simple as finding a way to eliminate friction. We all need friction to move about. Friction provides the traction, for our shoes or our wheelchairs, that is necessary to maneuver. While we need friction, it is, at the same time, consuming energy.

Though we must accept that movement involves energy loss, our objective should be to minimize that loss beyond what is necessary for the system to operate. This is where wheel and tire selection come in. Tires, specifically, will have a significant influence on rolling resistance.

Let us consider the three main categories of tire types.

First, there is the classic pneumatic or air-filled tire. It consists of an outer casing, or shell, made of rubber. Inside that casing is a softer rubber inner tube with a valve that protrudes through the rim of the wheel. The tire is inflated with air through that valve.

Next, there are two types of solid tire options. The first of these uses the same kind of tire used with an inner tube for the pneumatic tire. Instead of an air-filled inner tube, it contains a low-density foam insert where the inner tube would be. This type of tire is known by a couple of familiar names: the flat-free insert or the airless insert.

The last option for solid tires is one that is made entirely of solid material. It is not a "hollow shell" but a rubber or polyurethane (synthetic rubber) material composing the whole tire. While some tire manufacturers may make their solid tires with a different compound on the contact surface, it is still solid material through and through.

A perceived advantage to the two solid tire types is that they are essentially maintenance-free. For example, if a thorn or a nail puncture one of these tires, it will not go flat. In contrast, the pneumatic tire is perceived to be at a disadvantage because it does require maintenance. It is necessary to keep this type of tire inflated, and it is recommended to keep it inflated at or close to the stated maximum tire pressure listed on the tire's sidewall. Additionally, if a thorn or nail punctures this tire, with its inner tube filled with air, the tire can go flat and must be repaired. For many manual wheelchair riders, this perceived risk of losing independent mobility due to a flat tire is a genuine concern.

While there may be legitimate concerns about tire maintenance or lost mobility due to a flat tire, we owe it to our riders to inform them of the potential trade-offs. The research that speaks to the rolling resistance of each tire type tells us a clear story. Research consistently shows that the pneumatic tire is the best option for achieving the most efficient propulsion.[6, 9, 10] The airless or flat-free insert is the worst for propulsion efficiency between the two solid

CONTINUED ON PAGE 18

FIGURE F Tire Selection Considerations

CLINICAL PERSPECTIVE
(CONTINUED FROM PAGE 17)

options. A study done by Sawatzky et al. compared a small sampling of both solid and pneumatic tires. One of their findings was that even when the pneumatic tires investigated were inflated as low as 25% of their recommended pressure, they still outperformed the solid tire options, most notably the airless insert tire. Additionally, the authors noted the value of selecting pneumatic tires, even because they require maintenance:

"Health care facilities are finding ways to decrease costs by using solid tires on all wheelchairs. This study shows that benefits to clients and staff using pneumatic tires far outweigh the minimal cost in time to maintain adequate tire inflation."[9]

Research by Ott et al. also noted that pneumatic tires are the best of the three choices.[6] Kwarciak et al. pointed out that the "penalty" sustained by propelling on solid tires becomes proportionally more significant as the load increases.[10]

WHEELS

We talked about tires for wheelchairs. What about the wheels they go on? The machine we are discussing is called a wheelchair, after all, and the wheels can certainly influence the performance of a wheelchair. The type of wheel selected, what it is made of and how it is constructed can all influence efficiency.

Let us revisit our principle of inertia and remember that it can be defined as a resistance to motion due to mass (weight). When we talk of inertia in the context of a rotating wheel, or the right or left turning of an object like a wheelchair, we can call it rotational inertia. In physics, it is more accurately called moment of inertia, and can be defined as the resistance to a change in velocity of a rotating object.

How much a wheel weighs and where that weight is located on the wheel will affect the ability to accelerate, decelerate and generally maneuver each wheel. Because of the way rotational inertia is calculated, the weight of an object in rotation, as well as how far that weight is located from the axis of rotation, will both have a profound effect on the effort it takes overcome

THOUGH WE MUST ACCEPT THAT MOVEMENT INVOLVES ENERGY LOSS, OUR OBJECTIVE SHOULD BE TO MINIMIZE THAT LOSS BEYOND WHAT IS NECESSARY FOR THE SYSTEM TO OPERATE.

that rotational inertia, i.e., rotate the wheel. A wheel with more mass will take more effort to maneuver than a comparable one with less mass. Additionally, a wheel with the same amount of mass as another but having that mass located farther from the axis of rotation will also be more challenging to maneuver. Those of us who have ever pedaled the type of exercise bike with the heavy metal flywheel have experienced this phenomenon. It takes a lot of effort to get that heavy flywheel moving, and once it is up and spinning around, it can take a bit of effort to bring it to a stop.

While we're on the topic of rotational inertia, let's integrate some concepts we introduced earlier. Recall in our topic of weight distribution that we discussed that we could shift more system weight onto the drive wheels by configuring a wheelchair to place the caster wheels farther forward. We noted that a trade-off for this is a longer turning radius. This longer turning radius may make maneuvering the chair a bit more challenging for some riders. Additionally, this configuration places some mass farther away from the axis of rotation of the entire system, and as discussed above, that can require more energy during maneuvers such as turning right or left. The axis of rotation for a manual wheelchair in turning will be located approximately at the center point between the two hubs of the rear wheel (the center of the length of the camber tube). Carry this principle a bit further and realize that the wheels themselves are located at a distance from that axis of rotation. If we use wheels or tires that are heavier than others, we are also increasing the rotational inertia of the system.

There are two primary categories of wheelchair wheels: the "mag" wheel and the spoke wheel. Within our industry, most mag wheels are made from a plastic compound and not magnesium, contrary to what the origin of the name indicates. Some of the design characteristics and materials used to make many of these mag wheels result in a wheel with an appreciable amount of mass (refer to mass in rotation above) and can also exhibit a fair amount of flex during maneuvering, most notably lateral flex during turning maneuvers. That flex is another example of a propulsive effort that is essentially expended energy, which does not contribute to intentional maneuvering.

In their 2019 published study on measuring scrub torque and rolling resistance, Sprigle, Huang and Misch concluded that there is no perfect drive or caster wheel for all surfaces. However, they went on to point out that drive wheels are more sensitive to load and that shifting more load onto the drive wheels is the most effective means of reducing rolling resistance. Further, as noted previously, they stated that caster selection became insignificant when 80% of the load was on the drive wheel.[4]

WRAP UP:

When integrating all this information into some practical takeaway knowledge, much of what it takes to configure and adjust a manual wheelchair to make it more efficient for a rider to propel comes down to adhering to two basic principles. Those two principles are friction and system weight distribution, and they are both intertwined. System weight distribution has a significant influence on manual wheelchair propulsion efficiency. Further, the influence of the mass of the system and how that mass is distributed on the wheelbase is primarily reflected in the frictional energy loss. In other words, friction appears to be "baked in" to mass and weight distribution. From Misch, Haung and Sprigle in 2020:

"Overall system mass has little impact on cost of propulsion that was not already accounted for by the energy loss parameters [frictional energy loss],

"Shifting weight from the casters to the drive wheels resulted in an overall decrease in the cost of propulsion."[7]

With that in mind, consider these two points:

1. Wheel and tire selection is very important because it will influence friction, and friction represents energy loss.

2. Weight distribution is very important because it can influence friction, and friction represents energy loss.

(See Figure G and chart on next page)

As we look to the next article in this two-part series, we'll encourage you to consider how people use ultralightweight manual wheelchairs in their everyday lives. Even though everyone thinks of an ultralightweight manual wheelchair as a mobility device, are we doing our end-users a disservice when we focus solely on setting it up for moving about efficiently? The research tells us that ultralightweight manual wheelchair riders only propel about 10% of the time in their chairs. That begs the question of what they're doing the other 90% of the time, and what else we should be considering when setting up the manual wheelchair for an individual.

In the conclusion of this series, we will discuss how people use their manual wheelchairs in their daily lives and what we need to consider for each individual as we help them to make prescriptive decisions regarding their wheelchairs. What does the research say about optimal joint angles, the ability to generate propulsive force, etc.? We will also discuss the strategy and challenge of prescribing for today while planning for the likelihood of changes in circumstances or needs during the useful life of a given manual wheelchair.

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CONTINUED ON PAGE 20

WEIGHT DISTRIBUTION

"How do I measure weight distribution of a manual wheelchair?"

When we discuss the importance of weight distribution, we are often asked, "How does one measure the weight distribution of a wheelchair (system) in the clinical setting?"

While we recognize the method may not be feasible for many settings, we will try to briefly explain here how it may be done. However, the important takeaway is that rather than knowing exactly what percentage of system weight is over the drive wheels, we need to understand that the more we can shift system weight over the drive wheels – without sacrificing stability and safety – the more efficient we can make that wheelchair in terms of propulsion effort.

Set up to measure weight distribution in the clinical setting.

You must be able to weigh all four wheels of the wheelchair system (wheelchair, user, accessories, backpacks, etc.). This can be done using four common bathroom scales if you don't have access to a scale large enough to weigh the entire system at once. The critical components are to be able to record the weight of the whole system, and separately record the weight of at least one end of the system (drive wheels or caster wheels). Regardless of how the system is weighed, the wheels of the chair MUST rest level, as if the chair were resting on a level floor. If using the four separate scales method, summing the weights of all four scales will equal the entire system weight, and summing the weights of a particular set of wheels (e.g., the right and left drive wheels) will equal the portion of system weight over those wheels. Now, knowing the weight of the entire system, and the amount of that system weight that is resting on the single wheelset (e.g. drive wheels), the respective percentages can be calculated.

Percent of system weight on drive wheels = weight on both drive wheels, divided by entire system weight, times 100.

% Syst. Wt on DW = (Wt on DW / Syst. Weight) x 100

The calculator here will give you that information (https://nrrts.org/calculating-weight-distribution/)

Example weights shown are for a 180 pound system, with 80% of system weight on drive wheels (72 pounds on each Drive Wheel, or 144 pounds on both Drive Wheels; 18 pounds on each Caster Wheel, or 36 pounds on both Caster Wheels)

To determine the weight distribution of your system, enter the appropriate values in the cells in row 5 or row 10, and the corresponding system weight and weight distribution over the drive wheels will be calculated and displayed in column F rows 14 and 16, or rows 18 and 20. (see Figure G)

METHOD USING 4 SEPARATE SCALES, ONE UNDER EACH WHEEL					
	Drive Wheels		Caster Wheels		
Right and Left	Right (RDW)	Left (LDW)	Right (RCW)	Left (LCW)	
weight, in pounds	72	72	18	18	
METHOD USING ONE LARGE SCALE THAT CAN WEIGH ENTIRE SYSTEM, AND WEIGH ONE END OF THE SYSTEM					
Both	Both Drive Wheels (BDW)		Both Caster Wheels (BCW)		
weight, in pounds	144		36		
					System Weight
System	System weight = entire system as weighed on a single large scale OR				
	System weight = RDW+LDW+RCW+LCW OR				180
	System weight = BDW + BCW				180
Weight Distribution	% Weight Distribution on Drive Wheels = (BDW / System Weight) * 100				80%
	% Weight Distribution on Drive Wheels = ((RDW + LDW) / System Weight) * 100				80%

WORKSHEET FOR CALCULATING WHEELCHAIR WEIGHT DISTRIBUTION

Example weights shown are for a 180 pound system, with 80% of system weight on drive wheels (72 pounds on each Drive Wheel, or 144 pounds on both Drive Wheels; 18 pounds on each Caster Wheel, or 36 pounds on both Caster Wheels)

FIGURE G

CLINICAL PERSPECTIVE
(CONTINUED FROM PAGE 19)

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SETTING THE STANDARD: THE CTF'S MILESTONE IN SEATING AND WHEELED MOBILITY CLINICAL PRACTICE

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Establishing a scope of practice for seating and wheeled mobility (SWM) clinical services is an accomplishment that is far-reaching and will produce a ripple effect of positive change throughout the industry.

The availability of these guidelines is also perfectly timed as clinicians and industry stakeholders grapple with systemic pressures, denials and the growing demand for Complex Rehab Technology (CRT) due to demographic shifts. According to the World Health Organization, the global population of people aged 60 years and older is expected to more than double by 2050, reaching nearly 2.1 billion. With this aging demographic, the prevalence of people with mobility-related disabilities is beginning to rise significantly.

> WITH FULL ACKNOWLEDGMENT OF THE PROGRESS WE'VE MADE, BEST PRACTICE IS STILL HAMPERED BY BUREAUCRATIC SYSTEMS THAT COMPEL CLINICIANS TO SWIM UPSTREAM.

For clinicians involved with or interested in interventions related to mobility-related disabilities, there is a true and urgent need to set expectations and securely establish best practice criteria.

While most practitioners and stakeholders in the SWM industry are invested in best practice habits, the demand for higher level systems change across practice settings is inadvertently influencing service delivery methods and the depth of care needed. This shift creates an opportunity for businesses to recognize, adopt and ethically expand services for individuals who need seating and wheeled mobility (SWM) equipment. Closures of wheelchair clinics put additional stress on clinicians in home- and community-based practice to identify and meet the need or recognize when client goals must be met by referral to a SWM specialist.

With full acknowledgment of the progress we've made, best practice is still hampered by bureaucratic systems that compel clinicians to swim upstream. It's important to recognize the complexity and administrative burden of existing policies and procedures emerged in response to instances of fraud and a lack of understanding of procedures, policy and CRT products. This includes deliberate misconduct as well as unintended consequences of being ill-informed.

Burnout and moral injuries among clinicians across all practice settings are firmly acknowledged and significantly affect the sustainability of care delivery, particularly in the SWM industry, which faces additional challenges due to its relatively small workforce and the risk of attrition. This concern serves as a catalyst for implementing measures to support the well-being of the client, and the clinicians responsible for providing high quality care for complex individuals. Fortunately, the trajectory of policy reform and adoption of best practice frameworks has the potential to balance the pendulum between client-centered care and well-informed, empowered clinicians.

Guidelines for SWM clinical practice aim to recalibrate this imbalance by providing clarity and alleviating clinicians of the burdens they encounter when providing care to individuals in need of CRT. By standardizing the practice, clinicians and stakeholders can better identify and assess practices that deviate from what is expected, ensuring better quality of care and minimizing the risk of adverse outcomes for their clients.

While existing practice guidelines such as the World Health Organization Wheelchair Provision Guidelines and the RESNA Wheelchair Service Provision Guide primarily focus on the CRT team, the Clinician Task Force identified a notable gap. Clinicians required a specific document to shed light on the necessity for extended (billable) time and expertise in CRT practice to achieve optimal client outcomes. This gap is particularly critical to address considering the frequent association between burnout and reactive responses to adverse events resulting from ill-informed prescription and utilization of CRT products.

Consequently, as the CRT industry evolves with new technologies, so should it evolve in practice, policy and standards to help clinicians keep pace with existing need and imminent future demand.

Cara E. Masselink, PhD, OTRL, ATP, executive director of the CTF, stresses the significance of this trajectory for the industry - "(The CTF) saw a need arise for a succinct document explaining the core responsibilities and considerations for clinicians that will guide them toward an appropriate wheelchair recommendation whether they do this frequently or infrequently in their practice." This scope sets a precedent and serves to ensure that everyone receives comprehensive, person-centered care.

Masselink further highlights the significance of the "Scope of Practice for Seating and Wheeled Mobility Clinical Services," noting that it covers the core knowledge and tasks necessary for enabling the best outcomes for clients. Improving client outcomes through better understanding will reduce common adverse events, such as pressure injuries, hospital readmissions, pain, repetitive strain injuries and equipment abandonment.

Central to this scope is the collaborative partnership between clinicians and vendors/suppliers. This partnership aims to coordinate and integrate changes brought about by the scope, as well as support existing service delivery methods. Through strategic planning, the respective expertise of each team member is leveraged and aligned with ethical principles and standards that maximize the client's potential.

Here's a look at a few key activities in CRT service delivery and how the scope benefits all involved in procurement of an appropriate wheelchair.

PREPARATION: UNDERSTANDING THE NEED

Those in need of SWM services often experience challenges across multiple body systems, impacting their daily mobility and functioning. Understanding their medical history is essential for providing tailored care.

While having access to comprehensive medical histories is ideal, it's not always the case. In those instances, SWM clinicians must rely on their keen observation skills and a little creative guessing — like modern-day hunter-gatherers tracking down elusive clues. Just kidding — no spears involved, just sharp clinical acumen.

Supplementing physician findings with the functional and objective presentations of the person is the best way to understand and describe the individual needs for CRT in a continuum of care and will ensure the funding source considers the equipment needed is a covered benefit. Resources exist to guide the conversation, but full understanding of need requires knowledge of the client, insurance rules, regulatory body expectations and when to ask questions that may diverge from standard protocol.

INTRODUCTION: GETTING TO KNOW THE TEAM

Understanding who's who on a CRT team is a critical first step. By establishing clear roles of the client, health care providers and CRT supplier (or ATP) in the process of service delivery, the client has better clarity for how to access and direct their health care. A transparent relationship allows for open communication and trust, leading to greater health outcomes, equipment satisfaction and lower overall risk to the clients.

ASSESSMENT: SOLUTIONS TO FIT THE PERSON

Matching the person to the technology requires specific discussions of the individual's baseline performance in their activities of daily living and consideration of body functions. The clinician leads the equipment selection process based on client centered goals, and the CRT supplier aids the process. This may involve documenting relevant measures (including but not limited to: cognitive assessments, MMT, ROM, Timed Up and Go, Braden Scale, Modified Ashworth Scale, etc.) to be re-tested later with equipment as required. A postural assessment on a firm surface, such as a mat table, should always occur to ensure an accurate understanding of posture, balance and the musculoskeletal system. The CRT supplier

CONTINUED ON PAGE 24

CLINICIAN TASK FORCE
(CONTINUED FROM PAGE 23)

may drive the final equipment recommendations when clinicians do not understand working knowledge of wheelchair bases and accessories.

DEVICE TRIALS: THE CLIENT EXPERIENCE

Suppliers and manufacturers serve as valuable partners in the trial process, ensuring clients have ample opportunities to explore various product options. This hands-on experience significantly minimizes errors, reduces uncertainty, alleviates overwhelm during the final delivery and mitigates risk. Trials and product demonstrations are especially important for first-time wheelchair users, and for individuals with absent sensation or a history of pressure injury, pressure mapping is strongly recommended for optimal fit, comfort and safe use.

Trialing appropriate devices empowers clients to make informed decisions about equipment selection and understand how it meets their needs and preferences in real time. Distinguishing among various wheelchair components and seat functions aids in comprehending the equipment's suitability for the individual and their environment, along with its impact on disease management and functional goals.

DOCUMENTATION AND DELIVERY: PROMOTING TRANSPARENCY AND ACCOUNTABILITY

Detailed documentation from a strong clinical lens is critical to effectively match specific client needs with equipment recommendations and secure funding. Appropriately documenting all aspects of the equipment recommendation reflects a thorough assessment, continuity of care and reduces preventable mistakes.

Clinicians work closely with suppliers to craft persuasive letters of medical necessity tailored to insurance payer requirements, providing a holistic view of the client's needs and maintaining accurate records of their ongoing equipment needs. Team engagement in delivery sessions completes the loop by allowing for a thorough review of equipment fit and functionality, addressing concerns and offering personalized training on proper usage and maintenance.

COLLABORATIVE ETHICS

The SWM industry evolves continuously, driven by technological advancements and clinical trials designed to influence evidence-based practice to benefit clients. At the core of realizing the positive impact of implementing the SWM "Scope of Practice" is a dedication to ethical conduct and integrity. Keeping pace with these dynamics requires commitment and fosters a meaningful movement focused on prioritizing client welfare through a deeper understanding of every steward and each step of the procurement process.

In the past, fraudulent service delivery, outdated clinical practices and unaddressed needs stemming from low reimbursement rates and heightened productivity demands increased scrutiny and bureaucratic challenges within the medical device sectors, including CRT products and services. Embracing a culture rooted in standardized collaboration and accountability promotes ethical practice and calls greater attention to the outliers.

LOOKING AHEAD: EMBRACING CHANGE AND INNOVATION

While challenges persist within the industry, a forward-looking approach is necessary for improving care and establishing trusted standards of service delivery. The "Scope of Practice" document along with the "Clinician Checklist," serve as valuable resources to guide clinical reasoning and align with best practices as defined by professional associations like AOTA and APTA.

In clinic, home, and community-based settings, practitioners can use this information as a developmental resource. It is complemented by resources from NRRTS, RESNA and NCART, along with other CTF offerings, and ensures that standards of practice align with industry needs and comprehensively inform greater academic understanding of individuals with mobility-related disabilities. Further, pursuit of certifications from RESNA and NRRTS demonstrates an informed commitment to ethics and integrity and strengthens the voices of clinicians and suppliers who strive to bridge gaps in quality care.

This work is an intentional stride by the CTF toward recognition and full appreciation of the preventative and therapeutic benefits of CRT products and their role in disease management. The well-being of all individuals hinges on opportunities for self-care and participation in everyday life. Having a defined scope of practice sets clear expectations and responsibilities for clinicians, regardless of experience, and returns full decision-making power to the client.

Implementation of the "Scope of Practice" framework not only holds significance in the United States, but also serves as a reference for continuity of care in resource-limited settings and other countries by promoting fundamental best practice of seating and wheeled mobility services.

The Clinician Task Force is a nonprofit organization of health care providers across the United States that advocates for access to appropriate equipment and has made the "Scope of Practice"

document available on its website (Resource Center > CTF Resources). The Clinician Task Force acknowledges that resource limitations, resistance to change and regulatory requirements do impact clinical practice, even with the best intentions. Mentorship, support, education and advocacy for individuals using CRT and assistive technologies is available through the Clinician Task Force and our industry partners on this and many other topics.

For more information, visit the Clinician Task Force website at: https://cliniciantaskforce.us/resource/scope-of-practice-for-seating-and-wheeled-mobility-clinical-services

Source: World Health Organization, "Ageing and Health," https://www.who.int/news-room/fact-sheets/detail/ageing-and-health

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Tabatha works as a supplier-side ATP/SMS, and is strongly guided by her occupational therapy lens. Since 2014, she has worked with assistive technologies, and fully immersed into the practice of seating and wheeled mobility in 2019. A graduate of the University of Illinois at Chicago, Tabatha has consistently worked with diverse populations across the lifespan, and is passionate about the intersectionalities of physical medicine and rehabilitation, preventative care and equitable healthcare distribution for people with disabilities who need CRT. She contributes her insights and CRT expertise as a member of the Clinician Task Force and RESNA.

Amber Ward has been a treating occupational therapist for 29-plus years. She has treated a wide variety of patients, of all ages and functional levels. She currently is an adjunct professor at the OTA and MOT programs at Cabarrus College of Health Sciences in addition to working in the clinic. She received the RESNA Assistive Technology Professional certification in 2004, the Seating and Wheeled Mobility certification in 2014, and became AOTA board certified in physical rehabilitation in 2010. She runs the seating clinic at the Neurosciences Institute Neurology Specialty Care–Atrium in Charlotte, North Carolina.

Cara Masselink, PhD, OTRL, ATP, is an associate professor at Western Michigan University in the Doctor of Occupational Therapy program and executive director of the Clinician Task Force. Masselink's clinical background working with a variety of populations and in various settings led her to assistive technology, where she found her passion. With a desire to impact equipment access at a greater level, she pursued a doctorate in interdisciplinary health sciences, which facilitated current research and publications focused on guiding clinical practice for appropriate equipment provision and ensuring access to Complex Rehab Technology equipment for people with complex medical conditions.

THE DANGERS OF 'I'VE SEEN THIS 100 TIMES BEFORE'

Written by: **KRISTEN CEZAT, PT, DPT, NCS, ATP/SMS**

In this volume, we have taken the opportunity to revisit a fantastic case study authored by Kristen Cezat, PT, DPT, NCS, ATP/SMS. This is a compelling reminder to give each individual earnest and novel consideration for their unique needs. While we all take with us lessons learned and knowledge gained from our experiences, this case provides a vivid reminder to treat our interactions with those we serve with a fresh perspective. It also reaffirms the value of continuing education and a commitment to ongoing professional development within our world of complex rehabilitation. As a reminder, iNRRTS has many impactful rehab case studies available on its website that can be accessed at: nrrts.org/case-studies/.

I first encountered this client working as a physical therapist in an inpatient rehabilitation setting. It was a typical busy and hectic day like so many others. I looked at my full schedule and thought to myself, "I need to be on top of my game to get through this busy day efficiently." My 10 o'clock client was a 37-year-old man who had experienced a spinal cord injury three weeks prior. He was an active young man who was a father, worked a full-time job, and loved to fish and be outdoors. I remember as I looked through the client's chart that I had a sense of comfort knowing that I had seen clients with paraplegia hundreds of times in my career. As I first met the client, I thought to myself, "This should be relatively straight forward and easy," and my mind was already moving toward the "go to" things that I often prescribe in clients with this diagnosis.

One common error easily made in our profession is complacency. For those of you who have practiced in Complex Rehab Technology for many years, you know that it is easy to slide into a safety zone despite your best efforts to stay fresh. It is easy to repeat the same process over and over, making decisions based on the hundred other cases that you have seen just like this one. It is essential to stay up to date with an industry of constantly evolving technology. As a physical therapist, I strive to familiarize myself with current literature, products and available technology as a part of my standard practice. What happens when the straight-forward client does not "fit the mold" — responding differently to a seating intervention that has worked for hundreds of clients with a similar diagnosis and presentation? Let's discuss this exact scenario for our 37-year-old client who did not respond to my standard seating interventions.

There are over 17,000 new cases of spinal cord injury in the United States each year. Many of these individuals living with a spinal cord injury need to establish a trusted relationship with a clinical team that specializes in seating and wheeled mobility for the rest of their lifetime. This clinical team often consists of a physician, physical therapist, occupational therapist and wheelchair supplier. Each team member plays an integral role and has a unique perspective in understanding the individual client's function, mobility and specialized wheelchair needs.

IT IS EASY TO REPEAT THE SAME PROCESS OVER AND OVER, MAKING DECISIONS BASED ON THE HUNDRED OTHER CASES THAT YOU HAVE SEEN JUST LIKE THIS ONE. IT IS ESSENTIAL TO STAY UP TO DATE WITH AN INDUSTRY OF CONSTANTLY EVOLVING TECHNOLOGY.

FIGURES 1 & 2 Before intervention, side and front views

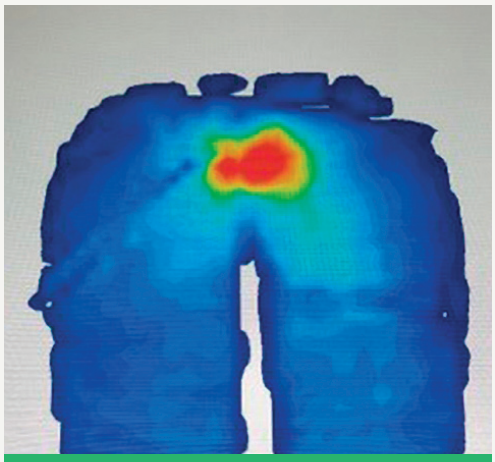

FIGURE 3 Pressure map before intervention

Spinal cord injury results in a cascade of secondary effects that may result in paralysis, diminished sensation, respiratory complications, neurogenic bowel and bladder, pain, and spasticity. These effects contribute to a laundry list of problems and create major complications for a person living with a spinal cord injury. One common example is skin breakdown due to lack of sensation, mobility, shearing and incontinence. Early intervention through optimal seating, positioning and wheeled mobility is paramount in prevention of long-term complications, especially in those living with paralysis.

Our client presented with a T8 incomplete ASIA Impairment Scale B injury (sensory incomplete) resulting in paraplegia. He did not have any comorbidities or prior medical complications. His motor complete paralysis was characterized by generalized hypotonicity and neurogenic bowel and bladder. In the three weeks he was hospitalized, he experienced several complications related to his spinal cord injury including pneumonia, a urinary tract infection and a stage 2 pressure wound over his coccyx/sacrum. His functional self-care and mobility were impaired by poor trunk control and decreased balance, which is common in many clients with a new spinal cord injury. He required minimal assistance for sit pivot transfers from his wheelchair to household furniture and was able to perform manual pressure relief techniques including forward and lateral trunk leaning with independence.

When I first encounter a client in the clinic, I often find myself using the International Classification of Function (ICF) Model as a road map to break apart complex cases into a prioritized problem list. The ICF Model classifies the individual client's health condition into three main categories: body function/structure, activity and participation. These categories are interrelated and are uniquely affected by two subcategories including environmental factors and personal factors. By using the ICF model, I not only address the client's medical needs, but also ensure that the client is assessed as an individual, rather than a diagnosis seen a hundred times before.

I found myself creating a prioritized problem list to best address this client's seating and mobility needs based off of the ICF model. He arrived at the appointment to our inpatient seating clinic in a rigid frame, hybrid cushion and an after-market back rest that had been selected by his primary therapy team. This was a trial configuration to determine if these products matched his needs. He demonstrated posterior pelvic tilt, thoracic kyphosis, forward head and rounded shoulders, as well as mild hip abduction of his bilateral lower extremities; however, he was functioning well in the wheelchair (see Figures 1 and 2). The immediate problem list for this client included the stage 2 sacral and coccyx skin breakdown, poor shoulder/trunk positioning, hip abduction and decreased trunk balance.

My initial "go to" seating intervention for a client with T8 paraplegia typically includes a rigid frame wheelchair, some type of hybrid cushion for

CONTINUED ON PAGE 28

FIGURE 4 TiLite Ergonomic Seating

REHAB CASE STUDY
(CONTINUED FROM PAGE 27)

positioning and skin protection, as well as an appropriate after-market back rest. I usually set up a wheelchair to allow modifications to meet the client's evolving needs when working with someone who has a new injury. For example, a backrest initially positioned higher on back canes to aid in trunk stabilization while the client's postural control is poor but lowered as balance improves. Or arm rests and anti-tippers which may be needed for safety initially but are often not required in the future as wheelchair skills improve. As seen in Figure 1, the client's posture and positioning are not ideal, but did not seem to impede his function. Situations like this can often fall through the cracks because a less than desirable posture does not result in immediate problems. But what would the long-term ramifications for this client be if this "less than ideal" positioning is not addressed?

When paralysis is present, it is common for the client to seek a position of stability. Due to a decrease in trunk control and balance, the client often seeks stability through a posterior pelvic tilt. A posterior pelvic tilt increases the contact area of the pelvis on the seating surface and, as a result, provides a sense of improved stability. Despite the client's increased stability, posterior pelvic tilt contributes to a cascade of negative effects including thoracic kyphosis, forward head/neck positioning and transfer of weight distribution from ischial tuberosities to that of the sacrum and coccyx. Respiratory capacity may be affected by thoracic kyphosis. The long-term effects of posterior pelvic tilt positioning often result in sacral and coccyx deep tissue and pressure injuries, shoulder related pathology including impingement and rotator cuff injury from repetitive use of shoulder with poor mechanics, and neck pain due to the forward head posture and capital extension of the client's neck.

Common interventions depend on whether the client's posterior pelvic tilt is reducible or non-reducible. One of the first lines of defense for correction of pelvic positioning is a positioning cushion. In the case of this client, his posterior pelvic tilt was reducible due to the hypotonic muscle tone and acuteness of his injury. Several different cushion designs made of various materials were trialed to remedy his posterior pelvic tilt while also providing adequate pressure relief including foam, air and fluid. Despite cushion designs aimed at achieving a neutral pelvis, the client's pressure mapping continued to reveal increased sacral pressure (see Figure 3).

I realized that the interventions I traditionally use were not solving this client's positioning problems. A standard rigid frame, positioning cushion and rigid

FIGURES 5 & 6 After intervention, side and front views

FIGURE 7 Pressure map after intervention.

back support were not sufficient to achieve ideal positioning in this client's case. I consulted with the seating team prior to the formal wheelchair evaluation. The wheelchair supplier suggested that instead of trying to neutralize the pelvis and hips through a cushion only, a trial of a more aggressive wheelchair frame design to help capture the client's pelvis was warranted. Our seating team recommended a trial of "Ergonomic Seating" on his TiLite rigid frame. This addition to the frame was selected to provide a pelvic shelf in combination with seat tapering to give further support to the pelvis not achieved through cushion trials alone. The client was measured from the posterior buttocks to the anterior superior iliac spine with an inch added to determine where the wheelchair frame begins to bend upwards to create a shelf. This shelf aids to prevent the pelvis sliding forward into posterior pelvic tilt positioning (see Figure 4). In this case, the ergonomic frame design achieved the positioning that the client and team desired. To address his hip abduction, seat taper through the frame was used with a back seat width measured at 15 inches and front seat width measure at 13.5 inches. This seat taper provided a more contoured fit to allow for neutral hip position. The tradeoff of seat taper was mild contact of the wheelchair frame against the client's lateral lower leg. Despite this contact, boney prominences of the lower leg such as the fibular head were not impacted. With trial of the frame, skin remained intact without compromise.

The next decision was determining the optimal cushion and back. Air cushions are not always our first choice for aggressive pelvic positioning. However, in this case, an air cushion was trialed to meet the more aggressive bends of the wheelchair frame. A full air cushion molded to the bends of the frame, as well as provided appropriate pressure relief to boney prominences. An immediate improvement of the client's static seated posture was noted: a neutral pelvic position with elimination of his thoracic kyphosis, forward head and rounded shoulders (see Figures 5 and 6). Pressure mapping with this new frame and cushion configuration confirmed that the pressure was shifted off his sacrum and coccyx (see Figure 7). When determining the back support, the team considered height, contour, weight and position. A 10-inch, mildly contoured back was selected and positioned roughly 2 inches below the inferior angle of the client's scapula. This back provided posterior support to the client's pelvis and trunk, allowing for improved balance, alignment and comfort.

As a physical therapist, I was next concerned about the client's posture with dynamic movement in function and mobility. Could the client scoot forward in his seat for transfers in such an aggressive frame? Would his static postural improvements remain during propulsion and other dynamic activities? There are many considerations for wheelchair frame design beyond static seated positioning. In this particular client's case, this intervention worked during dynamic activities. This success helped to seal the deal for wheelchair frame design as it solved our client's priority problem list while providing independent mobility.

As Assistive Technology Professionals, physical and occupational therapists, and wheelchair suppliers, we are very fortunate to work in an era of constantly evolving and improving complex rehab technologies. These improvements allow us to better meet the needs of our clients, but not without challenges. The evolution of our industry requires constant learning to stay up-to-date. There is so much technology available at our fingertips and, as in the case of this client, it takes a combined effort of the entire seating team to match the right technology for each individual client. It is important that we do not fall into the habit of placing a client into the "I have seen this a hundred times before" category. Remember to look at every client as an individual in order to fit them with the best available technology to provide optimal outcomes.

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Kristen Cezat is a board-certified specialist in neurologic physical therapy and a RESNA-certified ATP/SMS. She has dedicated her career to rehabilitation and improving lives for adults with spinal cord injury and other neurologic conditions. Cezat has presented nationally on various topics related to assistive technology prescription, interventions and current evidence in spinal cord injury rehabilitation, emphasizing translation into clinical practice.

SPRING RENEWAL: EMBRACING THE SEASON OF GROWTH

Written by: **ANDREA MADSEN, ATP**

As the seasons change and winter gives way to spring, there is a palpable sense of renewal in the air. The longer days, blooming flowers and warmer weather serve as a reminder of the cyclical nature of life and the opportunities for growth and transformation that accompany each new season. Spring serves as a metaphorical season of renewal, where nature undergoes transformation and rejuvenation. Similarly, in our professional lives, spring can be a catalyst for reinvigorating commitments, setting new goals and embarking on paths toward growth and success.

In many cultures, spring is celebrated as a time of rebirth and renewal. It represents a transition from darkness to light, stagnation to growth and dormancy to vitality. Just as the earth awakens from its winter slumber, we as professionals can use this season as a catalyst for our own personal and professional growth. As professionals, our commitment to growth and development is crucial for staying relevant and achieving success. Spring serves as a reminder that change is inevitable and that embracing it can lead to new opportunities and experiences.

Central to the concept of spring renewal is the notion of growth — a commitment to continuous learning and improvement. Additionally, cultivating a growth mindset — embracing challenges, persisting in the face of setbacks and seeking feedback — can significantly enhance our ability to learn and adapt. By cultivating a growth mindset, we as professionals can overcome self-limiting beliefs, embrace change and unlock our full potential.

In the face of challenges and setbacks, resilience is essential for maintaining momentum and staying on course toward our objectives. Just as plants resiliently push through the soil to reach the sunlight, we as professionals must cultivate resilience to navigate obstacles and emerge stronger on the other side. Amidst the backdrop of spring, I encourage you all to renew your commitment to continuous learning and development. This can take various forms, including pursuing further education, seeking mentorship opportunities or actively seeking out new challenges. By investing in growth and development, you not only enhance your skills and knowledge but also position yourselves for future success.

> TO HARNESS THE ENERGY OF SPRING IN OUR PROFESSIONAL LIVES, LET US SEIZE THE OPPORTUNITY TO RECOMMIT OURSELVES TO PERSONAL AND PROFESSIONAL GROWTH.

Spring is a season of change, and we must embrace this change as an opportunity for innovation and advancement. To harness the energy of spring in our professional lives, let us seize the opportunity to recommit ourselves to personal and professional growth. By reflecting on our goals, cultivating resilience and fostering a growth mindset, we can embark on a journey of renewal and transformation, poised to achieve new heights of success and fulfillment in the seasons to come.

As the poet T.S. Eliot once said, "April is the cruelest month, breeding lilacs out of the dead land, mixing memory and desire, stirring dull roots with spring rain." Let us harness the energy of spring to stir our own roots, revitalizing our commitments and embracing the endless possibilities that lie ahead.

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

RESNA UPDATE: SPRING 2024

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

RESNA ON THE ROAD IN 2024

This year, RESNA is traveling to other assistive technology conferences to meet with members and Assistive Technology Professionals. So far, we've been to ATIA (January, in Orlando), and AOTA (March, in Orlando). Coming up, we will be traveling to the Heartland Conference, June 10-12, in Waterloo, Iowa.

We're looking forward to being at Heartland "officially" for the first time. RESNA will have a booth in the exhibit hall, and RESNA members will be presenting at sessions, including the popular "AAC for the ATP." Staff will be on hand to answer questions about certification, membership and more. In addition to RESNA, there's a Complex Rehab Technology track at this year's Heartland. Check out the speakers and sessions for the CRT track, and we hope to see you in Waterloo.

SEATING AND MOBILITY SPECIALIST CERTIFICATION EXAM NOW AVAILABLE

After being on hiatus for a few months, the RESNA SMS exam is now back and available for scheduling. A panel of subject matter experts revised and updated the exam to reflect the latest industry standards and technological advancements.

SMS candidates must be ATPs in good standing, with a primary focus on seating and mobility. Compared to the ATP, which is more of a broad-based generalist exam, this is an advanced specialist exam. The SMS certification is intended for clinicians, suppliers, engineers and others involved in seating and mobility provision, including CRT.

For a limited time, approved candidates will receive a $50 discount on the cost of the exam, which is normally $250. This is because candidates will not receive their score reports right away, to give RESNA time to complete the standard setting process for this updated exam. Score reports should be available starting in May. Please see our website for more details, or email info@resna.org.

RESNA WEBINARS

Our 2024 webinar series got off to a great start in February, with "Assistive Technology and Sensory Integration/Processing." This session is now available on-demand in RESNA Learn for 0.1 IACET CEUs.

The webinar series continues every third Wednesday of the month at 12 p.m. ET. Check out "Future Travel Opportunities for Wheelchair Users in Automated Vehicles and Aircraft" (March) and "Dynamic Seating: Providing Movement for Clinical Benefit" (April). If you miss a live webinar, don't worry – the recording will be available a week later, and for IACET CEU credit.

In addition to our regular webinar series, we are launching "Tech Tuesdays" product demos on April 2, with a presentation on the "Future of Cooking in AT: Brava's Smart Oven Technology." Tech Tuesdays presentations are available for contact hours. We hope to announce more Tech Tuesdays soon, so stay tuned!

ANNUAL NOTICE: HOW TO FILE A COMPLAINT WITH RESNA

All iNRRTS registrants should be aware of the options they have if they believe RESNA-certified ATPs are engaging in unethical practices in violation of our Code of Ethics and Standards of Practice. The Complaints Review Committee of the Professional Standards Board may investigate and subsequently act when/if it receives evidence that a certified ATP has engaged in conduct that undermines the integrity of the certification process and/or the credential.

In the certification section of the RESNA website, there is clear information about the types of complaints

that can be filed, as well as a downloadable copy of the complaints policy. Anyone can file a complaint, including consumers. There is an online complaint form that is easy to use and convenient.

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

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WHO WINS WITH BLIND BIDDING?

Written by: **WRITTEN BY MICHELLE HARVEY, BSC HONS OT, RRTS®**

We explored the blind bidding topic from the perspective of clients, therapists and vendors who have all experienced blind bidding in their provinces with different funders and for different equipment.

We interviewed all three parties, and we asked them the same three questions:

1. Do you believe blind bidding works, and why or why not?
2. Do you feel blind bidding allowed you or your client to receive the equipment and service they needed?
3. Do you believe blind bidding should continue in certain provinces or with certain funders?

Blind bidding has been a topic of discussion in Canada for well over a decade. It is very prevalent in some provinces and almost extinct in others.

Different funders have maintained the practice of blind bidding, where others have tried and failed.

The following interview with Eli Paradis, RRTS® Regional Sales Manager, HME Home Health, British Columbia, is the second in a three-part article series and represents the vendor's perspective. You can read the first interview in Directions 2024v1.

QUESTION 1. DO YOU BELIEVE BLIND BIDDING WORKS AND WHY OR WHY NOT?

Given the complex nature of the assessment process for equipment in our industry, I feel blind bidding doesn't promote best practice. It's not client focused and doesn't take into consideration the nuances of the equipment being quoted.

Furthermore, blind bidding reduces the important relationship of an iNRRTS Registrant (RRTS®/CRTS®) with the therapist and the family. Blind bidding is trying to force what should be a custom process with the client into a generic process that does not serve the end-user well.

QUESTION 2. DO YOU FEEL BLIND BIDDING ALLOWED YOU OR YOUR CLIENT TO RECEIVE THE EQUIPMENT AND SERVICE THEY NEEDED? WHY?

No. By reducing the relationship into a form-based process, the end-user loses the specialized knowledge gained over time by an iNRRTS Registrant (RRTS®/CRTS®) Over time, iNRRTS Registrants learn clients' needs and work with family as part of a medical team. Blind bidding allows the client to receive the intended equipment, but not with the same care and attention that a dedicated provider would offer, if they were involved from assessment to delivery.

Service may lack, and blind bidding removes the consideration of the clients' personal preference on who they are comfortable working alongside.

QUESTION 3. DO YOU BELIEVE BLIND BIDDING SHOULD CONTINUE IN CERTAIN PROVINCES OR WITH CERTAIN FUNDERS?

I believe blind bidding should not continue regardless of province or funder. Best practice encourages collaboration between the vendor, client and therapist. Collaboration allows the best choice of equipment and sets us up for the final delivery.

If we change the practice and clients were allowed time to select their preferred vendor at the start and all three vendors agreed to use published MSRP, would that not offer the client choice and best economical value for the funder?

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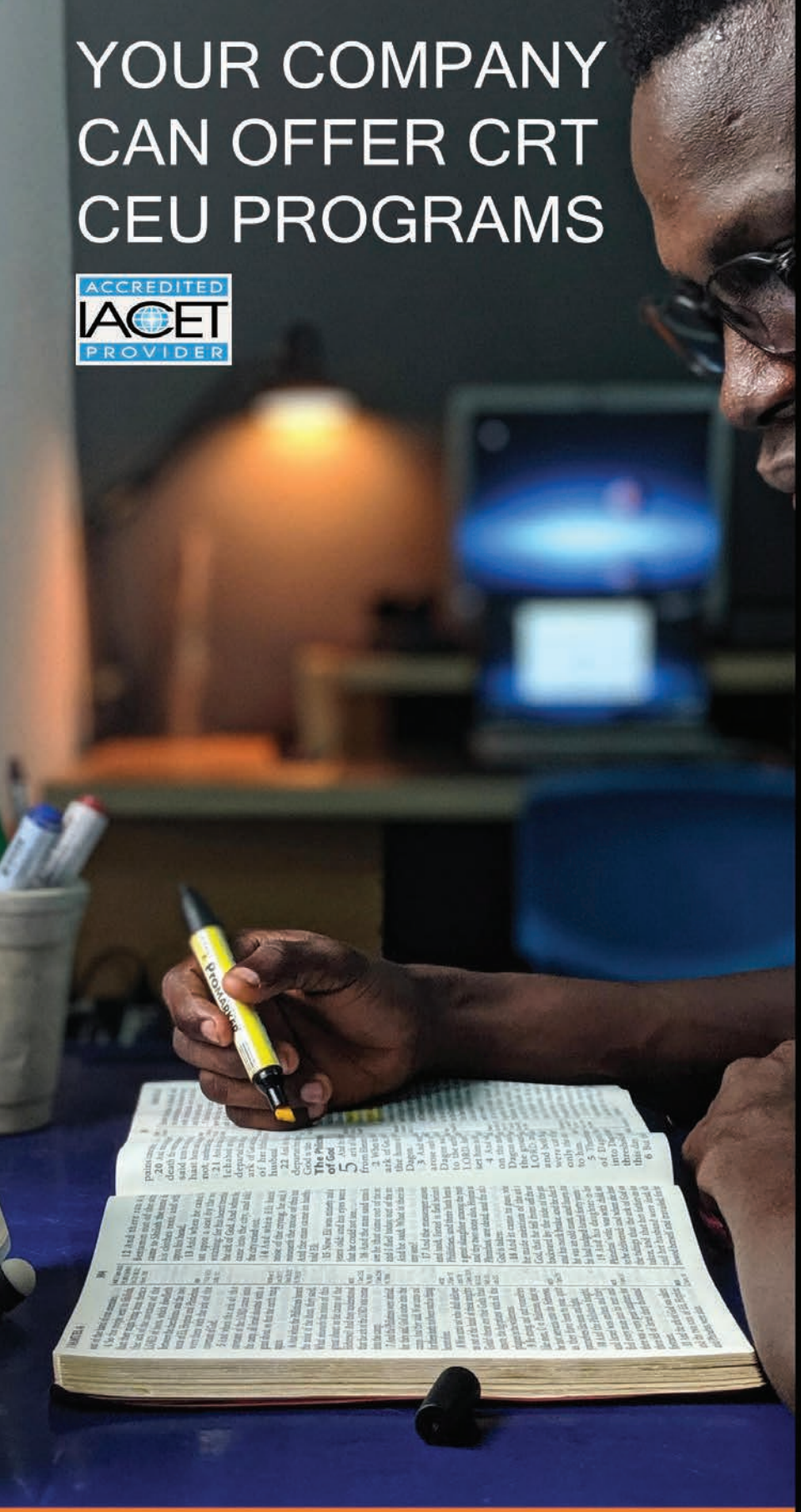

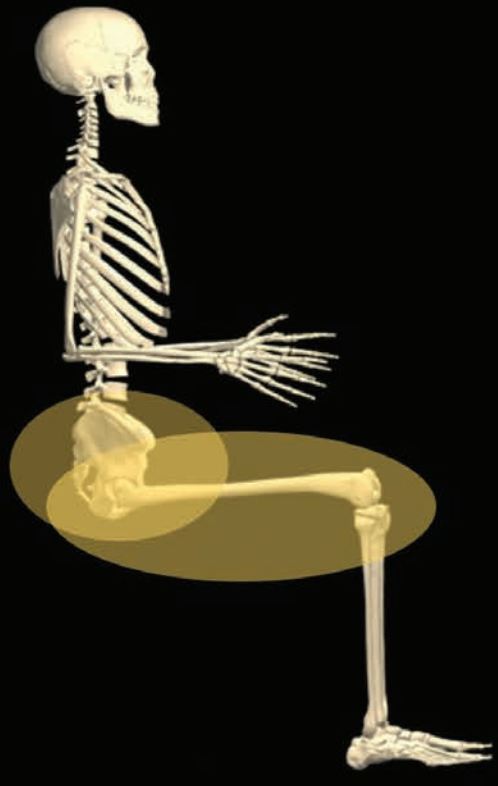

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C10RT: PART 2

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

Whenever there is an issue, especially a persistent issue, the phrase made famous by the movie, Jerry McGuire, "Show Me the Money!" comes to mind. Invariably, you can track the root cause of the problem to money.

Looking back at the Separate Benefit Category, as I remember, we were looking at $10 million a year over five years. I always remember the look of surprise on Congressional staffers faces as they asked, "$10 million, with an 'M', not billion with a 'B'?" They would then describe how they didn't think this would be an issue. Odd I thought. Then why are we never able to move this forward? Ten million dollars is a lot of money to me, to all of us. I decided to look at what Congress might define what a lot of money is.

Please keep in mind as you read further, the largest issue we continually have thrown in our faces is waste, fraud and abuse. In the eyes of Congress, the perception of the public is we are all ripping off the system. When you don't have a good argument, you default to something you feel you can use to defend your point. Case in point, waste, fraud and abuse.

We are constantly accused by the Government of waste, fraud and abuse, or questioned with the paradox of "only $10 million?" when discussing a Separate Benefit Category. I looked deeper into where some of the money went. Other than the first example below, I don't make any judgment. Everyone has different views and beliefs, so what one of us finds completely wasteful another may find a good use of financial resources.

COURTESY OF OPEN THE BOOKS OCTOBER 2023

This chart represents over $3 billion for furniture purchased during the pandemic, a period when virtually no one was in the office. How is this possible? How does this happen and how is there is not an expose' on waste, fraud and abuse? Ponderous, simply ponderous.

OTHER EXAMPLES OF INCOMPETENCE:

IRS sends $3.6 billion in stimulus checks to 2.2 million dead people.[1]

In June 2020, the Government Accountability Office reported that more than one million dead people got $1.4 billion in stimulus checks. By September 2021, the GAO admitted 2.2 million payments flowed to dead people and costs exceeded $3.6 billion.

The IRS administered the stimulus program, but the agency didn't check the Social Security's "decreased persons list" before cutting the checks. So, the IRS asked for the money back, but dead people are notoriously bad about paying up. The federal government is equally bad about clawing it back.

$3.6 billion in Paycheck Protection Program (PPP) paid out to 57,000 recipients on the "Do Not Pay List." [2]

At the height of the pandemic, while the U.S. was in economic lock down, Congress provided PPP funds to small businesses. Instead, 57,000 people on the Do Not Pay list were paid $3.6 billion. How? The SBA, the Small Business Administration, administered the program and didn't check the Do Not Pay list housed at the Department of Treasury before cutting the check. Why have a Do Not Pay list if you don't check the list before cutting the check?

CONGRESS CRAMS 5,000 EARMARKS INTO BUDGET BILL COSTING TAXPAYERS $9 BILLION 3

While Congressional earmarks were banned for a decade, they made a comeback in 2021. When Congress passed its $1.5 trillion omnibus spending bill, with House approval in less than 24 hours, they were able to cram 5,000 earmarks totaling $9 billion into the final version of the bill. This included 3,682 earmarks totaling $5 billion from Democrats, 1,014 earmarks totaling $3.4 billion from Republicans, and 266 earmarks, totaling $609 million on a bipartisan basis. Some of the largest earmarks came from Sen. Richard Shelby, R-Alabama, the

> IN THE EYES OF CONGRESS, THE PERCEPTION OF THE PUBLIC IS WE ARE ALL RIPPING OFF THE SYSTEM. WHEN YOU DON'T HAVE A GOOD ARGUMENT, YOU DEFAULT TO SOMETHING YOU FEEL YOU CAN USE TO DEFEND YOUR POINT.

ranking member of the powerful Senate Appropriations Committee, netted a cool $551 million in total earmarks for his home state, the highest total amount out of all Members of Congress.

Being a news junkie, I always have talk radio on when I'm in the car. Nothing is referenced, but here are reports that just boggle the mind:

A con artist accused of stealing $100 million from the Army will be allowed to keep her pension, even if convicted.

Amid a $1 billion shortfall from the Indiana Medicaid program, due apparently to an accounting error, Indiana cuts aid to the aged and disabled.

Chicago public schools cannot account for, or find, over $20 million in missing laptops and tablets.

If you are a consumer of Complex Rehab Technology, a clinician prescribing CRT, a RRTS®, ATP, CRTS® providing CRT, I don't know why you aren't mad as hell and demanding Congress make some changes! The national debt is now $34 billion and growing by $2 billion a year. It is not sustainable. Soon, budget cuts will begin to happen. Guess who is on the chopping block first?

We need a better way.

Statements contained in this document are mine and mine alone. They in no way reflect the opinions of iNRRTS, The iNRRTS Board of Directors or my employer, National Seating & Mobility.

REFERENCES

1. OPENTHEBOOKS.COM WHERE'S THE PORK? JUNE 2022, PG. 9
2. OPENTHEBOOKS.COM WHERE'S THE PORK? JUNE 2022, PG. 9
3. OPENTHEBOOKS.COM WHERE'S THE PORK? JUNE 2022, PG. 13

CONTACT THE AUTHOR

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Gerry Dickerson, ATP, CRTS® is a 40-plus year veteran of the Durable Medical Equipment and Complex Rehab Technology industry. Dickerson, immediate past president of NRRTS, works for National Seating & Mobility in Plainview, New York. Dickerson is the recipient of the NRRTS Simon Margolis fellow award and is also a RESNA fellow. He has presented nationally at the RESNA conference, ISS and the National CRT conference and is a past board member of NCART.

RENEWED iNRRTS REGISTRANTS

The following individuals renewed their registry with iNRRTS between Jan. 27, 2024, and Mar. 19, 2024.

PLEASE NOTE **IF YOU RENEWED AFTER JAN. 27, 2024,** YOUR NAME WILL APPEAR IN A FUTURE ISSUE OF DIRECTIONS.
IF YOU RENEWED PRIOR TO NOV. 10, 2024, 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.

Adam Majors, ATP, CRTS®
Adam Sliwon, MScPT, RRTS®
Allain Pelletier, RRTS®
Anthony Hendricks, ATP, CRTS®
Becky Bertoncino, ATP, CRTS®
Ben Peters, ATP, CRTS®
Bradley S. Hannan, ATP/SMS, CRTS®
Brenda L. Roehl, ATP, CRTS®
Brian Gough, ATP, CRTS®
Brian Perkowski, PT, ATP, CRTS®
Brian Quach, RRTS®
Brian McKenzie Shoemaker, ATP, CRTS®
Butley J. Mahler, Jr., ATP, CRTS®
Caleb Prall, RRTS®
Casey Peterson, ATP, CRTS®
Chad E. Hayes, COF, ATP, CRTS®
Charles Edward Nichols, ATP, CRTS®
Cheryl Henckel, OTR, ATP, CRTS®
Chris Cooke, RRTS®
Christina Natale, DPT, ATP, CRTS®
Christopher Savoie, ATP/SMS, CRTS®
Christopher Boyd, ATP, CRTS®
Christopher Rosso, ATP, CRTS®
Dan Nederhood, ATP, CRTS®
Darice Cochrane, RRTS®
Darrell Mullen, RRTS®
David Nix, ATP, CRTS®
David Rowland, MBA, ATP, CRTS®
David Gurganus, ATP, CRTS®
David Glancy, ATP, CRTS®
David Namehas, ATP, CRTS®
DeAnna Potts, RRTS®
Dena Paxton, ATP, CRTS®
Derek Register, ATP, CRTS®
Dewey L. Seagraves, ATP, CRTS®
Drew Oursbourn, RRTS®
Edward C. Lipositz, ATP, CRTS®
Emily Vennor, RRTS®
Eric Hardy, ATP, CRTS®
Erin Cummings, ATP, CRTS®
Eugene Salisbury, PTA, ATP, CRTS®
Frank T. Zugovitz, ATP, CRTS®
Gene Engelhardt, ATP, CRTS®
Gerald Tisdale, RRTS®
Gregory Allan Moorhouse, ATP, CRTS®
Gregory M. Fleming, ATP/SMS, CRTS®
Heather Bailey, ATP, CRTS®
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James Randall Blackwell, ATP, CRTS®
Jason Eubanks, RRTS®
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Jeff Cook, RRTS®
Jeff Burns, RRTS®
Jennifer Baulke, RRTS®
Jill Porter, OTR, ATP, CRTS®
Jocelyn Fast, RRTS®
Joel C. Maxey, ATP, CRTS®
John Petter, ATP, CRTS®
John Kevin Conley, ATP, CRTS®
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Jonathan Hyzak, ATP, CRTS®
Jorge Cabrera, RRTS®
Joseph Cecchi, RRTS®
Joseph Smith, ATP, RRTS®
Karl Thomas Eklund, ATP, CRTS®
Katherine Slusarski, MBA, ATP, RRTS®
Keith Jolicoeur, ATP, CRTS®
Ken Spicer, RRTS®
Kenneth Livengood, ATP, CRTS®
Kenneth Broz, ATP, CRTS®
Kevin Jackson, ATP, CRTS®
Kevin Peterson, RRTS®
Kurtis L. Schmidt, ATP, CRTS®
Leander Nelson, RRTS®
Leigh Ann Matthews, RN, MSN, ATP, CRTS®
Leslie Benjamin Todd, ATP/SMS, CRTS®
Lois Mombourquette, RRTS®
Marco Vega, ATP, RRTS®
Marcus Parris, RRTS®
Marie Mete, RRTS®
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Michael Bolton, ATP, CRTS®
Michael Friesen, RRTS®
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Rafael Ibarra, ATP, CRTS®
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Randall D. White, ATP, CRTS®
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Roger Dabbs, ATP, CRTS®
Ron Spenst, RRTS®
Ronald D. Hejna, ATP/SMS, CRTS®
Samuel Goff, RRTS®
Sara Beswick, ATP, CRTS®
Sarah Kubal, ATP, CRTS®
Sergio Ribeiro, PTA, ATP, CRTS®
Shelby Bass, ATP, CRTS®
Shelby Leveille, RRTS®
Stephane Robichaud, RRTS®
Stephanie Jane Longden, RRTS®
Steven Edwards, ATP, CRTS®
Steven Francis Bennardo, RRTS®
Steven J Carpenter, RRTS®
Susan Sutter, RRTS®
Tim Newman, RRTS®
Timothy Shaner, ATP, CRTS®
Tina Kriegl, RRTS®
Tracie Morales, ATP, CRTS®
Victor Camara, RRTS®
Vincent Wolrab, Jr., ATP, CRTS®
Walter Tejada, ATP, CRTS®
Willis Smitherman, ATP, CRTS®
Xavier Harrison, ATP, CRTS

NEW iNRRTS REGISTRANTS

Congratulations to the newest iNRRTS Registrants. NAMES INCLUDED ARE FROM JAN. 27, 2024, THROUGH MAR. 19, 2024.

Anton Croxford, RRTS®
Independent Living Specialists

Jill Arrowsmith, RRTS®
Access Abilities

Jody Snider, RRTS®
NSM-Canada

Jordan Yancey, OTA, ATP, RRTS®
Certified Seating & Mobility

Katie Goodine, RRTS®
Motion

Leane Biache, RRTS®
Phoenix Rehab & Mobility

Lewis Johnson, ATP, CRTS®
Rehab Medical Inc.

Matthew Jones, ATP, RRTS®
CoxHealth Home Support

Raymond Torres, RRTS®
Mobility Professionals

Ryan Shaffer, RRTS®
National Seating & Mobility, Inc.

Shannon ODonnell, RRTS®
Universal Health Products

Tanya Sharpe, RRTS®
Ontario Home Health

Zachary Taylor, ATP, RRTS®
CoxHealth Home Support

NEW CRTS® REPORT

Congratulations to iNRRTS 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 Jan. 27, 2024 through Mar. 19, 2024.

Bhavin Joshi, ATP, CRTS®
Rehab Medical Inc.
Fayetteville, GA

Erin Cummings, ATP, CRTS®
CareLinc Medical
Grandville, MI

Lewis Johnson, ATP, CRTS®
Rehab Medical Inc.
Augusta, GA

Olugbemileke "Kola" Pacheco, ATP, CRTS®
Rehab Medical Inc.
Fayette, GA

Sara Beswick, ATP, CRTS®
Island Mediquip
Victoria, British Columbia

FORMER iNRRTS REGISTRANTS

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

NAMES INCLUDED ARE FROM JAN. 27, 2024, THROUGH MAR. 19, 2024. FOR AN UP-TO-DATE VERIFICATION ON REGISTRANTS, VISIT WWW.NRRTS.ORG, UPDATED DAILY.

Efrain R. Guerrero, QRP, ATP
Linda Donaldson, ATP
Susan Mason, OTR/L, ATP
Tony Cresta, ATP
Justin Horn, ATP
Joshua Janiszewski, ATP
Amroh Solomon
Graham Plant
Gabrielle Lins
David Thompson

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