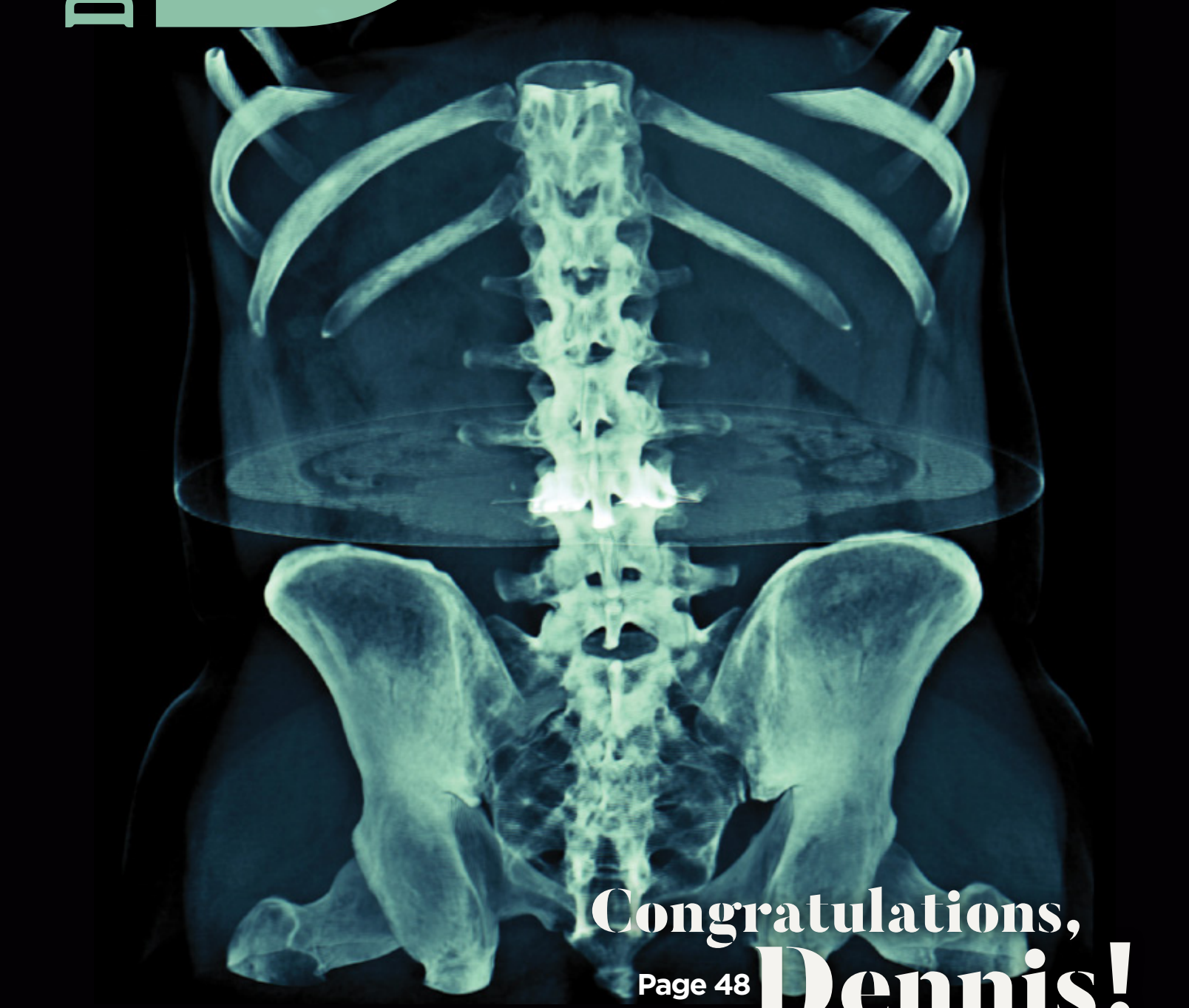
DIRECTIONS

Research Sheds New Light on What Causes

Page 34

PRESSURE INJURIES



Congratulations,

Page 48

Dennis!

THE OFFICIAL PUBLICATION OF THE NATIONAL REGISTRY OF REHABILITATION TECHNOLOGY SUPPLIERS | ISSUE 5 OF 2018 | $5.00

THE IDEAL SOLUTION FOR ANGIE
POWERED BY INVACARE

Angie's Ideal Solution is the Invacare® TDX® SP2 Power Wheelchair thanks to its stability and driving performance, rehab-redefining LiNX® Technology and Ultra Low Maxx Power Tilt/Recline Positioning System. One hundred possible color combinations of shroud and hub inserts are nice, too.

Power Mobility's Ideal Solution is Invacare, giving you access to rehab's most powerful portfolio with one call—plus the expertise and support to put it all together for you.

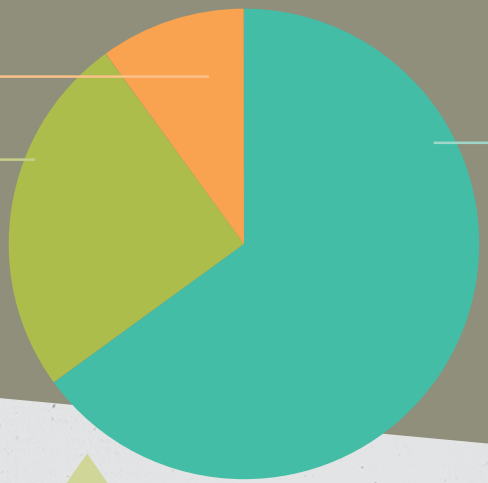
Visit Invacare.com/IdealSolution

INVACARE
Yes, you can.®

Motion Concepts · pin-dot · ASL · matrx SEATING SERIES

ADVERTISE in DIRECTIONS

DIRECTIONS, the official magazine of the National Registry of Rehabilitation Technology Suppliers, is published six times annually and reaches industry professionals, including skilled, influential and rehab-focused Rehabilitation Technology Suppliers located in all 50 states, Canada and Puerto Rico. **DIRECTIONS** has a readership of approximately **65 percent suppliers, 25 percent clinicians and 10 percent consumers. Between the print and digital editions of DIRECTIONS, the circulation approaches 10,000 per issue.**



Suppliers, Consumers, Clinicians, CRT Advocates!

We have something for everyone in our featured sections.

A few of these include **Notes from the Field, Industry Leader, Clinically Speaking** and **Rehab Case Study.**

Each issue contains something relevant to clinical content, human interest stories, CEU articles, funding and legislative issues. Consumers share their personal stories in a special section of **DIRECTIONS' "Life on Wheels."**

DIRECTIONS is also available for immediate download from **www.nrrts.org/directions**

The DIRECTIONS digital edition has over 10,000 unique visits per year. All website addresses on ads are live links.

DIRECTIONS uses **social media** (Instagram, Facebook, Twitter) to attract additional readers.

Bonus hard copy distribution is available at annual industry conferences.

DIRECTIONS offers **pass along copies** – featured individuals are passed along to family and companies.

"DIRECTIONS puts Stealth Products in front of our key target audience. With well-written and informative articles by industry leaders, DIRECTIONS has become a publication in the complex rehab industry that you almost have to be seen in. Advertising in DIRECTIONS is well worth the return on investment."

BARRY STEELMAN, DIRECTOR OF MARKETING - STEALTH PRODUCTS

IN THIS ISSUE

ADVERTISERS

The Official Publication of
The National Registry of Rehabilitation Technology Suppliers
Volume 2018.5 | $5.00

NRRTS OFFICE
5815 82nd Street, Suite 145, Box 317, Lubbock, TX 79424
P 800.976.7787 F 888.251.3234 | www.nrrts.org

For all advertising inquiries, contact Amy Odom at aodom@nrrts.org.

EDITOR-IN-CHIEF
Amy Odom

CLINICAL EDITOR
Michelle Lange, OTR, ABDA, ATP/SMS

EDITORIAL ADVISORY BOARD
Weesie Walker, ATP/SMS
Michelle Lange, OTR, ABDA, ATP/SMS
Annette Hodges

DESIGN
Cari Caldwell - Hartsfield Design

COVER CONCEPT
Weesie Walker, ATP/SMS

PRINTER
Craftsman Printers, Inc.

Call to order

888.433.6818
motionconcepts.com

Motion Concepts

ROVI
ADVANCING MOBILITY

CAMARADERIE

Written by: **ELAINE STEWART,** ATP, CRTS®

Here I sit at my desk thinking about a topic to write about. It's not something that just jumps onto paper! Then it came: how our NRRTS board members like to work together.

I find that we develop great friendships and support networks along the way. This group works for the whole, not the individual, in our industry. We all face the same battles. It is a group made up of people who are willing to participate on behalf of all the RTSs in the field to develop a quality organization. It is not about this company or that company but the hundreds of dedicated professionals who make up the Registry. Many of our Registrants have served on the board in many positions.

I have been blessed with a great group of people to brainstorm with to develop a strategic plan for NRRTS. Michele Gunn, ATP, CRTS® has been on our board since 2008. She has served as president, president-elect, past president, review chair and an at-large director. Her energy, comedic relief and ability to recall past information has been invaluable.

Mike Barner, ATP, CRTS® has served since 2009. He is an unstoppable ball of energy. His ability to articulate his point of view is always engaging. He has served as president, resident-elect, past president and an at-large director.

Both Michele and Mike have been willing to participate on committees and conferences to aid in the development of our organization and its importance. As they both step down, they will become non-voting members of our board. I am excited because they are not totally leaving. They will serve in an advisory capacity, providing ideas and assistance with projects that are in development. I want to say THANK YOU for all of your support, insight, discussions and most of all camaraderie.

I also want to give a large thank you to Dennis Sharpe for his wonderful support and friendship over the past 20-plus years. He has been an active supporter of the Complex Rehab Technology (CRT) community and a wonderful advocate for all other clients we service. When I first met Dennis, I was working in Evansville, Indiana, and was using a different battery provider as they were just up the road from my office. He would visit and inquire, but he never pushed. Over the years and me moving away from Evansville, the company I was using stopped providing wheelchair batteries.

I decided to give MK Battery a try and have not been disappointed with that decision. I will miss Dennis's smile, industry knowledge and most of all his friendship. I wish him well in his next life adventure … by the way, his wine is wonderful! ***Please see pages 48-60 to read other well wishes to Dennis Sharpe.***

CONTACT THE AUTHOR
Elaine may be reached at
ESTEWART@NSM-SEATING.COM

Elaine Stewart is president of NRRTS and works for National Seating & Mobility in Fort Wayne, Indiana.


Q700M
SEDEO® ERGO™
YOU DESERVE
THE BEST SEAT
IN THE HOUSE
Shawn H., Motivational Speaker
QUICKIE
ADVANCED ENGINEERING.
CUSTOMIZED FOR YOU.
SUNRISEMEDICAL.COM

A LIFELONG DREAM UNFOLDS

Written by: **ROSA WALSTON LATIMER**

Bailey Kernea is beginning her second year of medical school with high energy and excitement. Actually that is pretty much the way Kernea approaches life. The 26 year old explains, "You have to be your own person and also be confident in the fact that you're a little different. I believe you have to embrace this or you'll never make it." Kernea admits that medical school is difficult, "But medical school is tough for everyone. I am no exception. There's nothing special about me." However, those who know Kernea might disagree with her.

Kernea was diagnosed with a mild form of cerebral palsy when she was very young. The entire right side of her body is weaker than the left. "This creates endurance problems and turns out to be more of a strength and conditioning challenge," she said. "I used a walker and a cane until I was 11 or 12 years old when I experienced a growth spurt. That's when I started using a wheelchair full time." From the very beginning she wanted a fast wheelchair. "I've always had a Quickie."

With a decidedly positive outlook, Kernea recognizes that her life has always pointed her in the direction of a career in medicine. "I am very lucky because I grew up in a small town and for most of my life I went to a very small school," she said. "From pre-school to eighth grade, I went to the same school and graduated eighth grade with three people. I never experienced bullying or not being accepted. Even my high school was super small – it was great! Whatever the other kids were doing, they made sure I could do it too. These situations helped me gain self-confidence."

"I have been interested in medicine as long as I can remember," Kernea said. "My great-grandmother was a nurse and my mother has been a nurse at Children's Hospital in Chattanooga, Tennessee, for over 30 years." As a teenager, Kernea volunteered at the hospital. "I was born three months premature and began life in NICU. I grew up learning how I came into the world and what people did to help me along the way. My experience from the time I was very small showed me that I wanted to study medicine, and I wanted to work with kids."

"I LEARNED SO MUCH FROM MY DAD, HE HAS HAD A LOT OF TRIALS BUT HE NEVER COMPLAINS AND HAS CONTINUED TO WORK." KERNEA'S BROTHER NOW WORKS WITH THEIR FATHER IN THE FAMILY BUSINESS. "WE DO REAL ESTATE APPRAISALS. I WAS VERY HAPPY THAT SOMEONE ELSE WANTED TO CONTINUE THE FAMILY BUSINESS SO I WAS FREE TO GO INTO MEDICINE."

Kernea's father has multiple sclerosis (MS), and she remembers that the family discussion around the dinner table often related to medical subjects. "My father was 21 when he learned he had MS. My parents were dating so they knew early on that they were going to face challenges and then I was born!" Kernea said. "Life has been a whirlwind, but as a family we have never thought, 'We can't do this.'" Clearly the support and example set by her parents, Lori and Sonny, and her older brother, Blake, have had a striking influence on the young woman. "I learned so much from my dad," Kernea said. "He has had a lot of trials but he never complains and has continued to work." Her brother now works with their father in the family business. "We do real estate appraisals. I was very happy that someone else wanted to continue the family business so I was free to go into medicine."

Kernea also credits her parents for her personal work ethic and positive attitude. "My parents never told me I couldn't do something because of my disability," she said. "I realize not everyone has that strong, consistent support. Even my teachers never questioned my dreams. When I was young, I would tell my teachers I was going to be a doctor and they never

Mercer University School of Medicine lab group, Bailey Kernea (center), celebrating the end of anatomy class.

Bailey Kernea (center) with fellow classmates on their first day to wear white coats.

Bailey Kernea (center) with other Mercer School of Medicine students who staffed a summer camp to teach underserved eighth grade students about health care career opportunities.

"AT FIRST I WAS RELUCTANT TO DO THE VIDEO, BUT I REMEMBERED THAT WHEN I WAS LOOKING INTO THE POSSIBILITY OF GETTING INTO A MEDICAL SCHOOL IT WOULD HAVE BEEN VERY HELPFUL TO HAVE THIS TYPE OF INFORMATION, WHEN YOU GOOGLE 'MEDICAL SCHOOL' AND 'WHEELCHAIR' NOT MUCH COMES UP. SO I DECIDED IF I COULD BE THAT ONE SUCCESSFUL GOOGLE SEARCH FOR SOMEONE WHO WANTS TO DO WHAT I'M DOING, THEN I'M OK WITH IT."

told me that I couldn't do it." Kernea admits that in some ways her mother is "super protective," but "she realized that I had big dreams and that she couldn't always be hovering over me. In her own way she taught me not to be afraid to fall either physically and in other ways. Mom put me in every sport that I wanted to try. I grew up on a farm, and we had several horses. Before equine therapy became popular Mom would put me on a horse without a saddle and I followed her around while she did chores."

Kernea now uses a Quickie QM-710 power wheelchair and appreciates the difference it has made in her life. "This chair has all the bells and whistles," she said. "It raises and lowers me to different heights so I can look patients and classmates in the eye. I didn't realize how big of a thing that was until I could be eye-level with someone. It changed first impressions with others and helps me connect with patients. This chair makes it easier to reach things at home, too." She was recently featured in a video (https://www.gearsay.com/feed/api/1816157/bailey-kernea--opening-doors) that follows Kernea as she navigates her first-year as a medical student in her Quickie QM-710 wheelchair. "At first I was reluctant to do the video, but I remembered that when I was looking into the possibility of getting into a medical school it would have been very helpful to have this type of information," Bailey said. "When you google 'medical school' and 'wheelchair' not much comes up. So I decided if I could be that one successful Google search for someone who wants to do what I'm doing, then I'm OK with it."

CONTINUED ON PAGE 8

A LIFELONG DREAM UNFOLDS
(CONTINUED FROM PAGE 7)

When the time came for Kernea to go to college, she and a close friend chose to attend a college close to home so she could continue to live with her family. However, a middle-of-the-night call from the friend led them to a different decision. "We agreed to apply to a college that would require us to move away from home, even though it was only an hour away," Kernea said. "I realized that when I reached my ultimate goal of medical school, my mom couldn't come with me. I needed to do this on my own to prove to myself what I was capable of doing." Two weeks before her first college semester, Kernea applied to Bryan College in Dayton, Tennessee, and was accepted. After a year at Bryan, she transferred to Dalton State for two years and spent her last year of college at Kennesaw State near Atlanta, Georgia, where she graduated in December 2015 with a Bachelor of Science in Biology. "Kennesaw had the pre-med courses that I needed to get on track for medical school," she said. "All of this is to say that sometimes it takes more than one college to get you to where you need to be. However, I wouldn't change my trajectory at all because I met people along the way that I wouldn't have encountered any other way. Each experience taught me a different lesson."

Having finished her undergraduate degree, Kernea then faced the arduous task of taking the required Medical College Admission Test (MCAT), and she began preparing with her usual enthusiasm. "It so happens that the year I was going to take the exam everything changed," Kernea explained. "The questions were different than in the past, what they were testing over was different and the scoring had changed. No one knew what we would be facing or what our scores would mean." In addition to the demanding MCAT preparation, Kernea was also choosing and applying to medical schools. "Completing an application can take months," she said. "You are required to write essays, personal statements, provide letters of recommendation, and it is expensive. Because of my physical condition I knew some schools were going to be hesitant to accept me whether they admitted it or not." However, Kernea made the decision to meet the possible negative reaction to her disability head on. Although it wasn't required that she reveal her disability during the application process, she chose to address her situation in her essays and personal statements. "I included my life story and how my life experiences drew me to a career in medicine. In essence I answered the questions the schools were not allowed to ask."

Lorie and Blake Kernea (back) with Sonny and Bailey Kernea (front) at Bailey's college graduation.

Kernea's first try at the new, revised MCAT didn't yield the score she needed to make her applications as strong as she wanted. She applied to 15 medical schools; made it to the second phase of the application with about half of those schools and was invited to a personal interview at two of the schools. "This was somewhat disappointing to me," she said. "I have always been an 'A' student, and I fully expected the results of this process to reflect the work I put into it. And I knew I had worked very hard."

One of the schools Kernea interviewed with during her first round of applications was Mercer University School of Medicine in Macon, Georgia. "I loved the school!" she said. "After I took the MCAT a second time, I focused on Mercer and applied only to that school." She looks back at her medical school application experience as part of her education. "I learned so much during the process!"

Now that her first year of medical school is behind her and she begins to move through the second year, Kernea feels even stronger that Mercer is the perfect school for her. "We may have lectures once a week to address an especially hard topic, but usually we learn in small groups with a facilitator," she said. "We're given

a case and then we learn the medicine behind the symptoms." She stresses that this isn't always easy. "I've always been a Power Point/lecture student."

Even during the most difficult times, you won't find Kernea questioning her career choice, "On my worst days I never think that I don't want to do this anymore." She and a roommate now live in an apartment a short distance from campus. "We actually found each other on Facebook. Brittany and I enjoy a very similar lifestyle. We love animals and both wanted to live downtown. We're practically sisters, and when I need help she is always there for me." It helps that both young women are immersed in the medical school experience and, along with an extended group of friends, can support each other during this challenging but exhilarating time.

"I used to think that asking for help showed weakness, and I felt I had to do everything on my own," Kernea said. "I'm still very independent but at the same time I'm not ashamed to ask for help. In that regard, Mercer has been exceptional. I haven't required a lot of adaptions, but if something comes up, the school is very responsive."

In an interview for the video featuring Kernea's experience at Mercer University School of Medicine, Dr. Jean R. Sumner, dean of the School of Medicine, said, "We wanted Bailey because she is very well qualified. She has made us a better medical school." Wherever Bailey Kernea brings her positive attitude and determination, she makes it a better place and her future pediatric patients are certainly going to benefit.

"I want to be the doctor to a child that my doctors were for me," Kernea said.

CONTACT

Bailey can be reached at
BAILEY.KERNEA@GMAIL.COM

Bailey Kernea is a consumer advocate who lives in Macon, Georgia.

KELLN SAYS NRRTS EDUCATION OPPORTUNITIES OFFER 'REAL-LIFE' HELP

Written by: **JULIE BARNETT**

Jason Kelln is happy he stumbled across NRRTS a couple of years ago.

Kelln, ATP, CRTS®, the first Canadian NRRTS Registrant, was born and raised in Regina, Saskatchewan, Canada. He attended high school there and then the University of Regina, and he's worked at PrairieHeart Mobility in Regina since 1999. He's now the sales manager leading a team of four that he consults and works with on a daily basis.

Two years ago, Kelln came across NRRTS. "I looked at the designation and decided I wanted to pursue it," he said. "An opportunity to do so came up, I got in contact with Weesie Walker, ATP/SMS, NRRTS executive director, who is fantastic to deal with. I put my application in, and the rest is history."

Kelln says he has been impressed with the educational opportunities NRRTS provides. "I've told therapists here recently about my designation, and they were extremely impressed and proud for me," he said. "It sets me and my company apart."

"One webinar in particular that stood out for me and that therapists have had the most questions about when I've talked to them about it is the NRRTS course on wheelchair travel, which offered hour-long tips and suggestions for traveling," he said. "I've been telling clients and OTs, and they are amazed."

He noted the session on travel wasn't about selling a product. "It was real-life stuff, and I can tell my client about FAA rules when they're on a domestic flight in the U.S., that they can take their wheelchair on the plane with them, not to use ROHO (cushions) in flight. One of the biggest things (NRRTS provides) is education, real-world stuff."

Kelln spends his days planning and discussing logistics with his team, talking and working with occupational therapists, doing assessments and traveling sometimes up to three hours to see clients. After nearly 20 years in the business, he has lots of success stories to share.

"Recently, I'd put a gentleman in an X8 Magic Mobility power chair," he said. "The seat elevated, tilted and reclined. The process for getting the chair took about three months, but we got it in and did a last-minute fitting. He elevated and had a conversation with me eye to eye, literally stopped me mid-sentence–most likely talking Star Trek since we're both Trekkies–and said, 'Wait, do you realize we've just had this conversation eye to eye and you didn't have to bend down?'

"It was such a 'wow' moment," Kelln said. "He was actually verklempt. He was in tears over what we'd helped him do. He now shows me videos of how he went to his granddaughter's soccer game and rode onto the field - he didn't have to watch from 200 or 300 yards away. As we say at the office, that's the reason you keep doing what you're doing."

He also teaches in-service once or twice a month in a rehab facility showcasing different types of equipment, discussing funding programs and answering questions. "Health systems don't have the luxury of being able to send people for education, so we said why don't we do our own mini trade days, have an education symposium? That's a core value of our company, to help educate therapists," he said.

Kelln believes challenges are equal across the industry. "A big issue is

getting proper trial equipment for proper fitting," he said. "If you get them a chair that fits right the first time, they'll never look at a second chair. Now I can show people everything on the market, but they may not have the funding for it." He notes that funding for equipment is different for every province in Canada.

Kelln says the variety in his daily activities is what he loves most about the job. "I can honestly say that it's never the same day twice," he said. "One day, I met a 14-year-old boy who showed me he can text with his lip, literally, but was having trouble driving his chair. I said 'You're pretty good with your iPad and iPhone. What if I showed you a chair that you literally just swipe on a screen?' And the therapist and his mom were like, Yes! Let's try it.

"The next day, I could be delivering a walker. I met a lady with two black eyes who had fallen a couple of times. That walker was just as much mobility and freedom to her as this wheelchair was for this young lad," he continued. "It's not the same old 9 to 5, go in, have a coffee break at 10 and 3. It's always changing. I get to keep up with these amazing things that change people's lives and make things easier for them."

CONTACT
Jason may be reached at
JASON@PHMOBILITY.COM

Jason Kelln, ATP, CRTS®, works for PrairieHeart Mobility in Regina, Saskatchewan, Canada.

THERE ARE NO RECIPES

Written by: **ROSA WALSTON LATIMER**

Kelly Waugh, PT, MAPT, ATP, is on a life-long journey of learning and teaching. "The fact that there are no recipes in our work continues to drive me," she said. "I've been fortunate that I've had a very successful, rewarding career as a physical therapist, but I only worked part time for many years when my youngest child was in high school. That allowed me the time and energy to get involved in additional professional activities such as committee work and presenting at conferences."

Waugh and her husband, Finlay, of 36 years have three children: two daughters ages 32 and 30, and a son, 23. "We're a very close family," she said pointing out that many family members share an affinity for teaching. "My oldest daughter is an engineer, but my youngest daughter is a teacher, and my son, who is finishing up college as a history major, will probably teach also. My mother taught high school as did my grandfather, and my dad was a college professor." The family also shares a love for the sport of Ultimate Frisbee. "My husband and I both played Ultimate Frisbee during and after college. Our kids all love the sport. I actually played in the first-ever world Ultimate Frisbee championship tournament in Sweden in 1983 on the Women's U.S. Team. Finlay started the program at our local high school."

The experienced therapist has now been working full-time for 14 years in the Assistive Technology Partners program, Department of Bioengineering in the College of Engineering and Applied Sciences at the University of Colorado Denver. "I am the clinic coordinator of a free-standing, outpatient assistive technology clinic," Waugh said. "We are part of a very unique program. We're not just a clinic. We also do research, outreach and work on grants and contracts. Our work with the Department of Bioengineering developed from a vision of our director, Dr. Cathy Bodine, who is a speech-language pathologist. She has always felt that a merger with engineering would be a vibrant model, and it is turning out to be just that. Engineers will be designing better products for the people that we as therapists serve." Waugh explained that there are engineering students literally next door to the clinic. "The students can observe in the clinic. If one of our clients has a need that doesn't have a commercial solution, we have a system for channeling the need to the appropriate engineering students who then address possible solutions."

"I BEGAN IN A TIME WHEN THERE WERE VERY FEW PRODUCT OPTIONS FOR PEOPLE WITH COMPLEX NEEDS. BECAUSE THERE WERE NO EASY PRODUCT SOLUTIONS, I NEEDED TO FOLLOW A PROBLEM-SOLVING MODEL TO CREATE A FEATURE LIST, AS WE DID A LOT OF CUSTOM FABRICATION IN THE EARLY 1980s."

Another foundational program and also a source of funding for the Assistive Technology Partners program is a partnership with the Colorado Department of Education. "We provide education and training for all of the Assistive Technology Specialists in the schools in the state and manage a loan bank of assistive technology devices. Any special education teacher or therapist in a school in Colorado can go to our website and check out any assistive technology device to trial with a student. We even have a courier system that brings that device to them."

Her early experience working with a population with significant needs such as severe spinal deformities set her on a path that often focuses on complex postural issues. "I began in a time when there were very few product options for people with complex needs. Because there were no easy product solutions, I needed to follow a problem-solving model to create a feature list, as we did a lot of custom fabrication in the early 1980s." Waugh said. Out of necessity, she also learned the importance of alternate positioning for these individuals. "We are now calling it 24-hour postural care. There aren't many therapists who

do these types of evaluations but the awareness of the need is growing. I've been doing nighttime positioning evaluations, for at least 15 years, and I now see that more physicians are becoming aware of this option instead of immediately thinking about surgery."

Kelly Waugh hiking Boulder Peak July 2018.

Throughout her career, Waugh has been involved with professional organizations such as RESNA, volunteering her time to serve on committees and task groups. She served as chair of an International Organization of Standards (ISO) Wheelchair Seating Standards Working Group that developed an international standard defining measures of wheelchair seated posture and seating support parameters. Waugh authored and published a clinical application guide to this international standard on body and seat measures in 2013. Her work on this project earned Kelly an invitation to present at the First Oceania Seating Symposium in Rotorua, New Zealand in 2017.

During her 35 years as a physical therapist, Waugh has seen many changes in the field. "We have a lot more products now than when I began. There is good in that and also some bad," she said. "The good is we have so many more options for our clients and this choice allows us to find solutions to each unique need. Given the lack of money in this field, there is still a lot of great innovation going on and manufacturers are sincerely listening to clinicians. That's a positive dynamic in our industry and our clients benefit from that."

Kelly Waugh (center) with her daughters, Shannon and Heather.

However, Waugh noted some negative effects of the larger array of product choices. "Unfortunately, I believe that when there are many products to choose from it can become easy to think about the products first and the person second. You tend to think, 'Here's the seat cushions I have to choose from and here's my client' instead of thinking, 'Here's my client, here are the needs and then consider what products have the features to meet those unique needs."

Waugh believes that clients often think a new product will be the answer to their problem. "A new or different technology is not the solution in every case," she said. "It should be chosen as the result of a very thorough problem solving process. Sometimes when there are so many great product choices it is too easy to just choose a different product, without a feature analysis. People forget to think."

Thorough assessment of a problem–or set of problems–takes time and Waugh realizes that another major change in the field of Complex Rehab Technology is a lack of time. "Everything is more expensive and, as funding is cut, we don't always feel we have the time to do a thorough evaluation," she said. "One of my missions before I retire is to try to make changes in the way we get reimbursed for a therapist's time. I know others share this challenge. I have to make sure our clinic can survive financially yet insurance companies won't pay us to do a four-hour wheelchair evaluation with someone with complex needs."

Kelly Waugh with her son, Cameron.

Waugh explained that the work a physical therapist or occupational therapist does in a wheelchair clinic is very different than what a traditional physical or occupational does. The medical billing system is set up to bill for discreet units of service in 15

CONTINUED ON PAGE 14

THERE ARE NO RECIPES
(CONTINUED FROM PAGE 13)

minute increments. In order to save money by preventing overutilization of services, insurance companies provide limits to how much you can bill on a given day, for certain services or even the total amount.

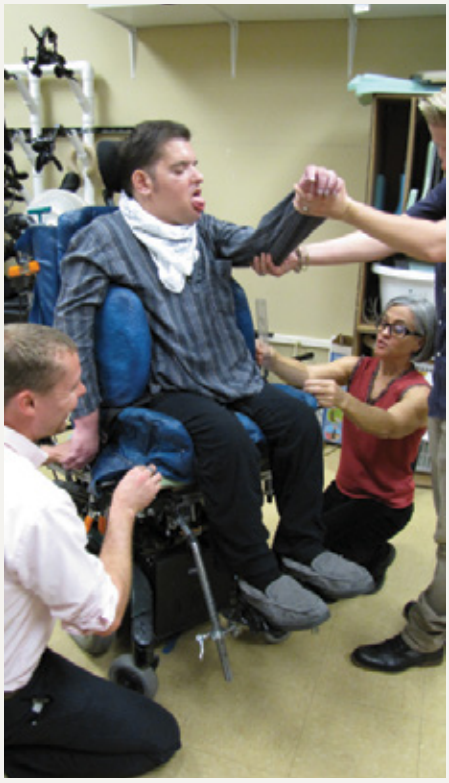
Kelly and Finlay Waugh at a Stanford University reunion.

"Our challenge is providing the services required, especially with clients with complex issues, and be able to bill for our time. We can't do a thorough assessment in 45 minutes especially when it may take 15 minutes to get the Hoyer lift out and transfer the client from his wheelchair. We have had to learn to be creative with our service delivery model so we can bill for our time and get adequately reimbursed."

Waugh recalled attending a conference early in her career led by Barbara Crume where she learned the basics of billing. "I learned so much from Barbara and I have tried to build on what she taught me to create a process that will provide quality, comprehensive services and still have a clinic break even financially." Kelly pointed out that so much of a therapists' work is non billable time including communicating with suppliers and responding to denials. "The documentation demands are huge. We are responsible for providing documentation to the wheelchair supplier to help get a piece of equipment funded, but we also have to document the services we provide to get paid for our time. That's said. "That's my biggest goal–to try to figure out how to continue to provide quality services the most efficient way possible and maximize our reimbursement so we can continue helping people."

With many years of work in this field, the challenge of the job still keeps Waugh engaged. "First and foremost there are very few professions you could have that are as rewarding as this and as challenging," she said. "It is never boring. I am constantly learning. I'll say it again: 'There's no recipe!' Certainly some situations are easier than others, but you learn something new every day. Every client is unique and the work is exhilarating."


Kelly Waugh with a patient in the Assistive Technology Partners clinic, University of Colorado Denver.


Kelly Waugh (seated right) at work in the Assistive Technology Partners clinic.

Waugh admits that some days she feels as if her brain is "going to explode" because of the complicated situations she encounters. "Yet that is what keeps me going because so many of the people that we work with are so appreciative of the time we spend with them. I love how they are creative in coming up with solutions for their own challenges. They inspire me!"

Waugh also acknowledges that she is always inspired by her colleagues. "When therapists attend a conference there's no competition. Everyone wants to share what they have learned or discovered. We all seem to have an open-source mentality and even in an informal setting I can learn something new." In a teaching situation, this experienced instructor recognizes the opportunity she has to learn from her students. "The questions I'm asked make me a better teacher because they enable me to see things from a different perspective and that broadens my horizons."

Looking forward, Waugh believes there is much work still to do. "I'm 61 years old, and there is still so much to be done," she said. "I'm starting to think more about where I want to have an impact. I want to get to the point where I can say of our clinic in terms of quality, efficiency and reimbursement, 'We cannot do it any better than we are right now.' We aren't quite there so I can't retire yet!"

CONTACT
Kelly may be reached at
KELLY.WAUGH@UCDENVER.EDU.

Kelly Waugh, PT, MAPT, ATP, is a senior research instructor and the clinic coordinator at Assistive Technology Partners, a program in the Department of Bioengineering, University of Colorado Denver. Waugh has 35 years of clinical experience as a physical therapist and educator, specializing in wheelchair seating and mobility and nighttime positioning. Ms. Waugh has served on the ISO Wheelchair Seating Standards Committee for 17 years, with a focus on the development of standardized measures of wheelchair seated posture and seating support parameters. She is the primary author of "A Clinical Application Guide to Standardized Wheelchair Seating Measures of the Body and Seating Support Surfaces." Waugh received both her bachelor's degree in human biology and her master's degree in physical therapy from Stanford University in Stanford, California.

MEET YOUR **BOARD** AND **STAFF**

NRRTS BOARD MEMBERS

PRESIDENT – Elaine Stewart, ATP, CRTS®
PRESIDENT-ELECT – Gerry Dickerson, ATP, CRTS®
VICE PRESIDENT – Katie Roberts, MS, ATP, CRTS®
SECRETARY – Carey Britton, ATP/SMS, CRTS®
TREASURER – Mike Osborn, ATP, CRTS®
REVIEW CHAIR, DMAC A – Tom Simon, ATP, CRTS®
REVIEW CHAIR, DMAC B – Doug Crana, ATP, CRTS®
REVIEW CHAIR, DMAC C – Luke Moore, ATP/SMS, CRTS®
REVIEW CHAIR, DMAC D – Andrea Madsen, ATP, CRTS®
AT LARGE DIRECTOR – Keith Jolicouer, ATP, CRTS®
AT LARGE DIRECTOR – David Mancini, ATP, CRTS®
AT LARGE DIRECTOR – Joe McKnight, ATP/SMS, CRTS®
AT LARGE DIRECTOR – Dave Murray, ATP, CRTS®
AT LARGE DIRECTOR – Robert Harry, ATP/SMS, CRTS®
AT LARGE DIRECTOR – Toby Bergantino, ATP, CRTS®

ADVISORY COMMITTEE

MICHELE GUNN, ATP, CRTS® – Past President
JOHN ZONA, ATP, CRTS® – Past President
DENISE HARMON, ATP, CRTS® – Past President
MIKE BARNER, ATP, CRTS® – Past President
MIKE SEIDEL, ATP, CRTS® – Past President

NRRTS STAFF MEMBERS

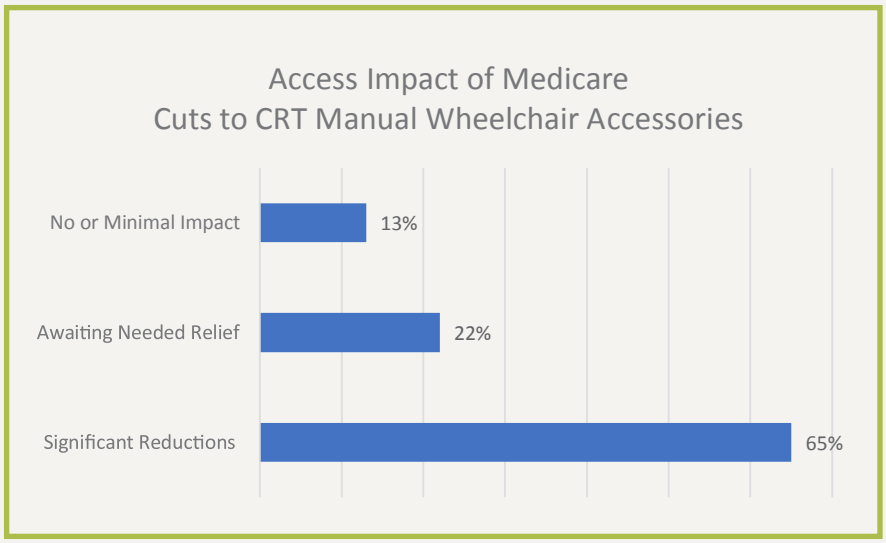
EXECUTIVE DIRECTOR – Weesie Walker, ATP/SMS
DIRECTOR OF MARKETING & OPERATIONS – Amy Odom
CONTINUING EDUCATION ORGANIZER – Annette Hodges
CONTINUING EDUCATION CURRICULUM COORDINATOR – Michelle L. Lange, OTR/L, ABDA, ATP/SMS
CONSUMER RELATIONS & ADVOCACY – Andrew Davis

MEDICARE SURVEY IDENTIFIES MAJOR DROP IN ACCESS TO CRT ACCESSORIES

Written by: **DON CLAYBACK**

Complex Rehab Technology (CRT) stakeholders continue to work with Congress to stop the Centers for Medicare and Medicaid's (CMS) inappropriate use of DME Competitive Bidding Program information to cut Medicare payment rates for accessories (critical components) used with CRT manual wheelchairs.

To evaluate the impact these cuts are having on access for Medicare beneficiaries with significant disabilities, NCART conducted a confidential survey of Medicare CRT suppliers. The July 2018 survey generated responses from 45 companies representing over 400 Medicare supplier locations across the country, and the results are alarming.



The survey responses indicate a major drop in access—65 percent of the locations reported the cuts have "significantly reduced our ability to provide the right wheelchair accessories to Medicare beneficiaries who require Complex Rehab Manual Wheelchairs."

An additional 22 percent of the locations reported they have been holding off on reductions awaiting Congressional action but "if such relief does not come within the next 90 days, we will be forced to reduce the related accessories and services we provide."

That equates to 87 percent of responding Medicare CRT supplier locations indicating that currently, or within the next 90 days, they will not be able to provide the right CRT manual wheelchair systems that Medicare beneficiaries with significant disabilities require.

A copy of the survey report and additional information can be found at http://blog.ncart.us

TIME TO PUSH PASSING CRT MANUAL ACCESSORIES LEGISLATION

The survey results present compelling information that Congress must act on. It underscores the urgent need to pass HR 3730 and S 486 to stop CMS from continuing to inappropriately cut payment rates, which is taking away access to critical CRT manual wheelchair accessories.

As of this writing HR 3730 has 112 cosponsors (52 Republicans and 60 Democrats) and S 486 has 25 cosponsors (11 Republicans and 14 Democrats). These cosponsors provide a solid bipartisan foundation, but our assignment is to translate that support into getting Members of Congress to make this a priority and take action.

As we move ahead, there are two time periods for legislative relief. The first is the month of September as Congress returns from the summer recess. The second is mid-November to mid-December when Congress returns from elections and addresses end-of-year matters.

Now is the time to reach out to your representatives and senators with this new data. This applies even if they have already signed on to cosponsor the bills. You can share the report as an update and explain this shows why we need them to step up and fix this.

To start, take just three minutes to visit www.protectmymobility.org and click on the "Send the Email" link. Supply your information, and an email will

be sent to your Members of Congress detailing the survey results and the need to act this year. This site also has the related position paper that can be shared.

Even better than email, use the guide at the website and make a call to personally communicate your request. Whether an email or call, remember don't stop until you get a commitment. Polite persistence will win the day.

Thanks for acting on this information, and please share the link with others to help us highlight to Congress that people with disabilities need them to step up and resolve this access issue now.

MEDICARE POWER WHEELCHAIR PRIOR AUTHORIZATION IN EFFECT

A reminder that effective September 1 Medicare expanded its nationwide "DME Prior Authorization (PA) Requirement" to include a total of 33 power wheelchair codes. If needed, you can get additional information and see the codes included by visiting http://blog.ncart.us or by searching the CMS website for "Prior Authorization Process for Certain Durable Medical Equipment, Prosthetic, Orthotics, Supplies (DMEPOS) Items."

Based on Medicare PMD supplier experiences under the 19 state PMD Demonstration Project, the PA process has been operating well and the expectation is that will continue. Please let us know should you experience any complications or delays in the processing and approval of PA requests.

CMS PROPOSED RULE-COMPETITIVE BIDDING PROGRAM AND DME PAYMENT RATES

On July 10, CMS released the long-awaited proposed rule (CMS-1691-P) that includes potential changes to the Medicare DME Competitive Bidding Program (CBP) and to DME

CONTINUED ON PAGE 18

MEDICARE SURVEY IDENTIFIES ...
(CONTINUED FROM PAGE 17)

payment rates. There is a great deal of information for review with both short-term and long-term implications.

CMS published this as an initiative to "modernize and drive innovation in DME" and accepted public comments through Sept. 10. Here are some highlights, with the more immediate proposed changes first:

- Current CBP supplier contracts will expire on Dec. 31. Beginning Jan. 1, 2019, and until new CBP contracts are awarded, beneficiaries may receive DME items from any Medicare enrolled DME supplier. Proposed post-December "transitional" payment rates are outlined below and CMS does not provide a time frame for when new CBP contracts would begin.

- Transitional fee schedule amounts are proposed for DME furnished on or after Jan. 1, 2019 depending on the "area:"

  - For current Competitive Bid Areas (CBAs): Items furnished on or after Jan. 1, 2019 will be paid at 2018 Single Payment Amounts (SPAs) for that CBA increased by the net Consumer Price Index update.

  - For non-CBAs that are either rural areas or non-contiguous areas: Items furnished from Jan. 1, 2019, through Dec. 31, 2020, will be paid at the 50/50 payment rates currently in effect for June 1 to Dec. 31, 2018.

  - For all other non-CBAs: Items furnished from Jan. 1, 2019, through Dec. 31, 2020, will be paid at the current payment rates. CMS does ask if payment rates for these areas should also be set at the 50/50 payment rates currently in effect for rural and non-contiguous non-CBAs. This raises the possibility that CBP relief could be extended to these areas. This relief extension is being strongly recommended by NCART and other organizations.

- Proposed changes to the Competitive Bidding Program include: (a) Setting the maximum amount that can be submitted as a bid at the 2015 allowable charge, rather than the current CBP rate; (b) Setting the Single Payment Amount (SPA) at the highest winning bid amount for that product category, rather than the median of all winning bid amounts; (c) Requiring the forfeiture of a surety bond should a winning bidder not sign a CBP contract; (d) Implementing "lead item" bidding to determine winning bid amounts; (e) defining lead item to mean the item in a product category with the highest total nationwide Medicare allowed charges of any item in the product category. There are a variety of other CBP changes that can be viewed in the proposed rule.

NCART assembled a CRT Industry Work Group to analyze the proposed rule and develop comments and recommendations. Our letter was submitted on Aug. 22 and can be viewed at http://blog.ncart.us.

NEW CRT NEWSLETTER

As we know, the CRT industry is fast-paced with a stream of changes and challenges. To help keep stakeholders and advocates informed in a timely manner, we introduced the first issue of "NCART News" in July. The newsletter will be published monthly and will deliver CRT Medicare and Medicaid updates, advocacy opportunities, industry polls, and event information all in one place. If you're not receiving it, just visit www.ncart.us and use the "Sign Up for CRT Updates" button.

CONTACT THE AUTHOR
Don may be reached at DCLAYBACK@NCART.US

Don Clayback is executive director of NCART. NCART is national organization of Complex Rehab Technology (CRT) providers and manufacturers focused on ensuring individuals with disabilities have appropriate access to these products and services. In this role, he has responsibility for monitoring, analyzing, reporting and influencing legislative and regulatory activities. Clayback has 28 years of experience in the CRT and Home Medical Equipment industries as a provider, consultant and advocate. He is actively involved in industry issues and a frequent speaker at state and national conferences.

EasyStand Zing SIZE 2 MPS

Multi-Position Stander

- **Supine to Prone in One Motion**
  - True Multi-Position Stander
- **Multi-Use Tray**
  - Swing-Away, Removable
- **Unique Lift Mechanisms**
  - Gas Spring Lift or Pow'r Up Lift
- **True Hip Pivot Leg Abduction**
  - up to 30˚ on each leg
- **Plenty of Growth**
  - 40"-60", up to 154lbs.
- **Accommodates Contractures**
  - Remarkably Modular, Over 75 Options

SIZE 2 IS HERE!

MPS, Supine, MPS TT, Supine TT, and Prone

800.342.8968
easystand.com

CMS PROPOSES FINAL RULE:

CERTAIN PTs AND OTs TO PARTICIPATE IN MERIT-BASED INCENTIVE PAYMENT PROGRAM OR ADVANCED ALTERNATIVE PAYMENT MODEL IN 2019

Written by: **LAURA COHEN** PT, PHD, ATP/SMS

At the end of July, Centers for Medicare and Medicaid (CMS) published a major proposed rule to address requirements in MACRA's (Medicare Access and CHIP Reauthorization Act of 2015) payment incentive program that rewards clinicians for value over volume; the rule is referred to as the Quality Payment Program (QPP). First implemented in 2017 for physicians and certain non-physician providers, the proposed rule adds physical therapists (PT) and occupational therapists (OT) to the existing list of eligible clinicians required to participate in the QPP via one of two available tracks.

Beginning in 2019, eligible clinicians providing services under Medicare Part B MUST participate in either: 1) an Advanced Alternative Payment Model (APM), or 2) the Merit-Based Incentive Payment Program (MIPS). The proposed rule is expected to primarily impact PTs and OTs in private practice, furnishing Medicare Part B fee-for-service care, who meet, specified low volume threshold criteria.

WHAT ARE ADVANCED / ALTERNATE PAYMENT MODELS (APMs, AAPMs)?

An APM is a payment approach that offers incentive payments for providing high-quality and cost-efficient care. APMs can apply to a specific clinical condition, a care episode or a population. Advanced Alternative Payment Models (AAPMs) are a subset of APMs that let practices earn more rewards in exchange for taking on increased risk related to patient outcomes. Providers may earn a 5 percent incentive for achieving threshold levels of payments or patients. Participation in the AAPM exempts the provider from the MIPS reporting requirements (the other QPP track).

WHAT IS THE MERIT-BASED INCENTIVE PROGRAM (MIPS)?

The Merit-Based Incentive Program (MIPs) was created to consolidate three existing Medicare programs (Physician Quality Reporting System, Medicare Electronic Health Record Incentive Program and Value Based Payment Modifier) into one program where providers could demonstrate that they provided high quality, efficient care supported by technology.

Under MIPS, providers earn a payment adjustment dependent upon evidence-based and practice-specific quality data. The following categories are intended to capture this data: Quality, Improvement Activities, Advancing Care information, and Cost.

It is a CMS required reporting system that tracks four performance categories. Each category is granted performance points to produce an annual MIPS score. That score is used to determine if the providers earn a payment incentive, remain neutral in payment or are subject to a penalty.

At present PTs and OTs are permitted to voluntarily participate in the CMS QPP. If the proposed rule is adopted, the program would require certain PTs and OTs to participate in either a MIPS program or alternatively an AAPM beginning in January 2019. CMS has hinted in the proposed rule that for 2019, PTs and OTs will be assessed only on two categories–quality and clinical improvement activities. Future years may add the remaining two categories–cost and interoperability.

MIPS-ELIGIBLE CLINICIANS

If adopted, MIPS-eligible clinicians would include private practice PTs and OTs that satisfy a specified low volume threshold related to Medicare Part B fee-for-service (not Managed Medicare). While CMS has not proposed anything yet, it remains unclear if or when the MIPS program may be expanded in the future to include facility-based providers, home care providers, etc.

For MIPS required participation, CMS has defined a **low-volume threshold** to identify required clinicians. For PTs and OTs practicing in Complex Rehab Technology (CRT) the MIPS program will not likely involve many practices to start. However, **understanding MIPS performance requirements and building capacity to capture and report required data is recommended.**

The CMS proposed rule specifies that eligible participants have reporting options and can participate as an individual or group. CMS defines the three reporting options as:

- an individual under one NPI and one TIN number,
- a group of two or more clinicians (NPIs) who have reassigned billing rights to a single TIN number, or
- a virtual group of less than 10 eligible clinicians who come together "virtually" (independent of specialty or location) to participate in MIPS for a one-year performance period.

LOW VOLUME THRESHOLD FOR MIPS PARTICIPATION

The proposed MIPS rule is initially expected to involve primarily PTs and OTs in private practice who meet the following low volume threshold:

- Bill more than $90,000 a year in allowed charges for covered services under Medicare Physician Fee Schedule (PFS) **and**
- Furnish covered professional services to more than 200 Medicare beneficiaries a year **and**
- Provide more than 200 covered professional services under the PFS.

For 2019, CMS proposes an optional **Opt-In Policy** for MIPS eligible clinicians (e.g. CRT PTs and OTs) who are excluded from MIPS based on the low-volume threshold determination. MIPS eligible clinicians who meet or exceed one of the low volume threshold criteria may choose to participate in MIPS reporting and corresponding quality payment.

REPORTING AND PAYMENT

Providers earn points in each of four reporting performance categories, producing a total annual MIPS score, which in turn determines whether the providers earn a payment incentive, remain neutral in payment, or are subject to a penalty. Several of the data categories must be reported electronically through certified electronic health records (EHR) vendors or registries.

Corresponding payment adjustments reflecting 2019 data will begin in 2021. The 2019 data reporting period (Jan. 1 to Dec. 31, 2019) will end March 31, 2020, and MIPS payment adjustments will be prospectively applied to each claim beginning Jan. 1, 2021, annual MIPS score performance. Providers exceeding the performance threshold can earn substantial bonuses. The potential maximum adjustment percentage will increase each year from 2019 to 2022 (4, 5, 7, and 9 percent, respectively). In total bonuses and penalties must balance each other as MIPS is established as a budget-neutral program.

IMPACT ON CRT CLINICIANS

While it is unlikely that CRT clinicians typically will meet the low volume threshold requiring MIPS participation in 2019, it is unknown if or when CMS might expand this program to include clinicians in other facility-based settings such as outpatient hospitals or home health agencies.

The good news for CRT clinicians is the CMS rule proposes to eliminate the unpopular and burdensome Functional Limitation Reporting (FLR) requirement of the Physician Quality Reporting System (PQRS) on Jan. 1, 2019. Overwhelmingly, clinicians have agreed that the FLR did not accomplish the intended value-based care goals which included an anticipated payment system based on outcomes rather than services provided.

Clinicians working in CRT have long recognized limitations in available outcome measures sensitive to changes impacted by CRT clinical interventions. While we welcome the elimination of the FLR, we need to continue to develop valid and reliable measures that are sensitive to outcomes impacted by our interventions.

SUMMARY

CMS Administrator Seema Verma and Health Care Payment Learning and Action Network (HCP-LAN) stakeholders continue to signal payment incentive programs that move providers from fee for service to payment programs based on outcomes and value. Steady progress is continuing with this transition and there is no evidence that momentum will slow in the future. In fact, acceleration is more likely to occur.

A survey by the HCP-LAN, representing health care spending data from June to August 2017, accounting for nearly 245.4 million Americans or 84 percent of the covered U.S. population, shows progress with 29 percent of total U.S. health care payments tied to alternative payment models (APMs) in 2016 compared to 23 percent in 2015, a 6-percentage point increase. Activities continue with the intent to increase APM adoption and implementation with a goal of tying 50 percent of U.S. health care payments to APMs by the end of 2018.

CONTINUED ON PAGE 22

CMS PROPOSES FINAL RULE ...
(CONTINUED FROM PAGE 21)

Why is this important? While CMS has not yet required CRT providers to participate in the QPP or related MIPS and APMs, it is recommended that CRT stakeholders keep pace with QPP policy and program requirements. Incrementally, building capacity and preparing for data reporting, collection and transmission needs over time is a more practical and achievable goal.

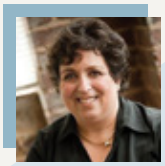
Depending on your Medicare FFS volume and organizational affiliations, it may be feasible for CRT clinicians to consider building alliances to voluntarily opt-in to the MIPS program by partnering with other eligible clinicians and potentially benefiting from the upside quality payment incentives.

As health care payment reform continues, the Clinician Task Force will continue to follow and report on the QPP requirements.

After reading this article, you may have more questions. Please contact me to discuss further.

CONTACT THE AUTHOR
Laura may be reached at
LAURA@REHABTECHCONSULTANTS.COM.

Laura Cohen is the executive director of the Clinician Task Force (CTF), a national group of seating and mobility clinicians working to influence Medicare and Medicaid coding, coverage, and payment policies for complex rehab and assistive technology devices. The CTF provides clinically relevant information about seating and wheeled mobility device assessment and decision making to policymakers to ensure appropriate access for individuals with disabilities.



NRRTS offers library of **CEU Article Reviews!!!!**

REGISTRATION FEES
NRRTS Registrants - $0 • Friends of NRRTS - $20 • All Others - $40

VISIT: WWW.NRRTS.ORG/CEU-ARTICLE-REVIEW

and order the article. Upon passing this exam, you will be sent a CEU certificate. This is just another convenient, inexpensive option to complete continuing education.

ACCREDITED IACET PROVIDER

CEU ARTICLE REVIEW

STANDING OR SITTING TOGETHER

Written by: **ALEXANDRA BENNEWITH,** MPA

> *WIN OR LOSE, SINK OR SWIM*
> *ONE THING IS CERTAIN WE'LL NEVER GIVE IN*
> *SIDE BY SIDE, HAND IN HAND*
> *WE ALL STAND TOGETHER*
> (PAUL MCCARTNEY, "FROG CHORUS" 1983)

"My husband is a 56-year-old paraplegic. His injury occurred in 1998. He has had 15 failed flap surgeries and is left with a stage 4 chronic wound with bone exposure on his left ischial. His last surgeon has told him that he can't help him any longer. I am desperately trying to find a surgeon who can help us. As I'm sure you understand that he is one infection away from death. Can you please point me toward a surgeon who thinks outside the box on flap surgery? We had been seeing someone at [name of hospital], but I need my husband to grow old with me ..."

This is a case from United Spinal Association's Resource Center from earlier this year and, unfortunately, it is by no means unique. I am tired of reading these stories, and I know all of you are. Reading these makes me more determined to try to resolve these issues before they start. There are so many things to focus on in this sector, but an important component is of course seating and standing features in wheelchairs.

United Spinal Association is a steering committee member of the ITEM Coalition, (ITEM stands for Independence through Enhancement of Medicare and Medicaid), along with fellow steering committee members represented by the American Foundation for the Blind, Amputee Coalition, Christopher and Dana Reeve Foundation, National Multiple Sclerosis Society, and Paralyzed Veterans of America. ITEM is devoted to raising awareness and building support for policies that will enhance access to assistive devices, technologies and related services for people with disabilities and chronic conditions. The coalition is consumer-led and includes a diverse set of disability organizations, aging organizations, consumer groups, voluntary health associations and nonprofit provider associations.

The standing feature of a power wheelchair allows an individual to transition from a seated position to a standing position without the need to transfer from the wheelchair. It is typically operated through the wheelchair's controller, which manipulates an electric-powered assist that moves the wheelchair from a sitting position to a full vertical position. Seat elevation assists individuals in transferring from a wheelchair to a commode, bed or other surfaces by elevating or lowering the seat height of the wheelchair allowing for independence in hygiene, grooming, dressing and other mobility-related activities of daily living, which is the standard for coverage under the National Coverage Determination for Mobility Assistance Equipment.

United Spinal and the ITEM Coalition are determined to pursue, along with friends in the clinician, manufacturer, rehab technology and supplier sectors, the necessary advocacy and 'pressure' (pun intended) to right the wrong of individuals in need of customized wheelchair features and components who are unable to obtain medically necessary components due to short-sighted and siloed policy. We have engaged in multiple meetings with the Centers for Medicare and Medicaid Services (CMS) on these issues, and we have recently requested again that CMS reconsider the current coverage policy for standing feature and seat elevation in power wheelchairs. We believe CMS should issue benefit category determinations that standing feature and seat elevation meet the definition of durable medical equipment for purposes of Medicare coverage.

So, let's stand or sit together and get this fixed!

CONTACT THE AUTHOR
Alex may be reached at
ABENNEWITH@UNITEDSPINAL.ORG

Alexandra Bennewith is vice president, government relations for United Spinal Association. Bennewith advocates for legislation and regulations regarding disability and health policy at both the federal and state level. She works closely with a range of stakeholders in the durable medical equipment and supplies, prescription drug, public health and disability communities. She graduated from Brandeis University and received a Master of Public Administration from American University.

SUBSCRIBE to DIRECTIONS

DIRECTIONS is the premiere publication for the CRT industry. Each issue focuses on important clinical issues, individuals who use CRT, and individuals who provide CRT. Consumers share their personal stories of courage in a special section of DIRECTIONS' "Life on Wheels."

SUBSCRIBE TODAY

WWW.NRRTS.ORG/DIRECTIONS/SUBSCRIBE

SHEAR

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

DEFINITION

Shear force is "an action or stress resulting from applied forces which causes or tends to cause two contiguous internal parts of the body to deform in the transverse plane" (NPUAP). In wheelchair seating, shear forces occur when a client moves parallel to the seating surfaces, such as during a transfer or when sliding into a posterior pelvic tilt. External shear is sometimes referred to as friction, and internal shear is sometimes referred to as shear strain (NPUAP). Even if the client appears to maintain a static seated position, shear forces can occur as the body moves slightly in relation to the materials within the cushion and against the resistance of the cushion cover. Shear can also occur during recline, when the seat to back angle opens and disrupts alignment with body surfaces. Much of a power reclining system's design is an attempt to reduce this shear as much as possible.

TISSUE DEFORMATION

Recent research has demonstrated that pressure injuries are not only caused by tissue compression leading to a lack of oxygen (ischemia) but also by soft tissue deformation (This is addressed in the Clinical Perspective article on page 34).

Shear forces can both deform and compress soft tissue, leading to pressure injuries. Deformation, particularly when shear forces are high, can lead to injury in as little as minutes to hours.

Per the National Pressure Ulcer Advisory Panel (NPUAP), "shear is a normal mechanical force with physiological effects." Shear occurs even when lying completely flat. Any change in position will create shear both internally and externally. If pressure remains constant and shear forces increase, tissue deformation will also increase. Unfortunately, shear is very difficult to measure currently and it is unclear exactly how shear damages tissues. As a result, current research does

not inform us as to which clients are at greater risk of shear injury.

GENERAL INTERVENTIONS

So what can we do to reduce shear forces? According to NPUAP, the following can reduce shear:

- A stable posture;
- Reducing sliding in the bed or wheelchair; and
- Lifting, rather than dragging, during transfers.

Although there is much more to learn regarding shear, it is clear that reducing shear is critical in reducing overall pressure injury risk. Shear reduction is essential in assessment, product development and product use. As shear can occur on any surface and during transfers, it is important to assess all potential sources of shear.

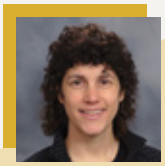
CONTACT THE AUTHOR

Michelle may be reached at MICHELLELANGE1@OUTLOOK.COM.

REFERENCES:

NATIONAL PRESSURE ULCER ADVISORY PANEL (WWW.NPUAP.ORG)

Michelle Lange is an occupational therapist with 30 years of experience and has been in private practice, Access to Independence, for more than 10 years. She is a well-respected lecturer, both nationally and internationally, and has written numerous texts, chapters and articles. She is the co-editor of Seating and Wheeled Mobility: A clinical resource guide; editor of Fundamentals in Assistive Technology, Fourth Edition; NRRTS Continuing Education Curriculum Coordinator and Clinical Editor of DIRECTIONS magazine. Lange is on the teaching faculty of RESNA and is a member of the Clinician Task Force. She is a certified ATP, certified SMS and is a Senior Disability Analyst of the ABDA.



NOW YOU CAN ENJOY ALL OF THE BENEFITS of the patented, award-winning CoolCore® fabric with your ergonomically-designed carbon fiber or aluminum ADI positioning back. As with the seat cushions, the CoolCore fabric of the ADI back cushion wicks moisture away from your body, helping keep you dry and comfortable. The chemical-free fabric makes both the back and seat cushions cool better and last longer—a perfect combination for your busy life. Stay chill with CoolCore and ADI.

Stealth Products
Solutions For Life®

Learn more at **StealthProducts**.com

WANT TO LEARN MORE?

NRRTS CONTINUING EDUCATION PROGRAM: WORTH THE INVESTMENT

NRRTS WEBINARS

ACCREDITED IACET PROVIDER

In a marketplace cluttered with in-person, online and print-based education resources, it is vital to know what programs are worth your time and money before making a commitment. Continuing education units, or CEUs, are awarded by many education and training providers to signify successful completion of noncredit programs and courses intended to improve the knowledge and skills of working adults.

At NRRTS, you can trust our continuing education program's performance and commitment to standards. We seek the most relevant content for your professional needs. Your investment in your own professional and personal development will yield high returns in the future.

Who can participate in NRRTS webinars?

Our webinars are open to anyone whose goal is to improve skills and be on the cutting edge with new and emerging techniques and concepts in Complex Rehab Technology and related fields.

Audience: CRTS®s, RRTS®s, other ATPs and physical and occupational therapists (intermediate to advanced).

All participants must score a 70 percent on the post-test assessment to receive CEU credits.

REGISTRATION FEES
NRRTS REGISTRANTS - $0
FRIENDS OF NRRTS - $20
ALL OTHERS - $40

2018

REGISTER ONLINE AT
WWW.NRRTS.ORG/TELESEMINARS-1/UPCOMING-WEBINARS

TUESDAY, OCTOBER 16, 2018
7 – 8 PM EASTERN TIME
The Benefits of Dynamic Seating for Individuals With Abnormal Tone Patterns
Jill Sparacio, OTR/L, ATP/SMS, ABDA
Sponsored by Seating Dynamics

WEDNESDAY, OCTOBER 17, 2018
11 AM – 12 NOON EASTERN TIME
I'm an Advocate, You're an Advocate—We're all Advocates!!
Weesie Walker, ATP/SMS, NRRTS Executive Director

TUESDAY, NOVEMBER 6, 2018
7 – 8 PM EASTERN TIME
Posterior Pelvic Tilt: Causes, Challenges and Seating Interventions
Becky Breaux, MS, OTR/L, ATP

WEDNESDAY, NOVEMBER 7, 2018
11 AM – 12 NOON EASTERN TIME
Car Seats and Vehicular Transport for Children with Special Needs
Amber Yampolsky, PT, ATP, CPST and Erin Baker, PT, ATP, CPST

THURSDAY, NOVEMBER 8, 2018
7 – 8 PM EASTERN TIME
Wheelchair Seating Clinics: Strategies and Methodologies for Success
Theresa Berner, MOT, OTR/L, ATP

TUESDAY, DECEMBER 4, 2018
7 – 8 PM EASTERN TIME
Pushing for Success
Andrina Sabet, PT, ATP

WEDNESDAY, DECEMBER 5, 2018
11 AM – 12 NOON EASTERN TIME
Providing Power Mobility Training for Children with Multiple Severe Disabilities
Lisa K. Kenyon, PT, DPT, PhD, PCS

THURSDAY, DECEMBER 6, 2018
7 – 8 PM EASTERN TIME
Seating Considerations for Clients with Spinal Cord Injury
Jill Monger, MS, PT, ATP

"I LOVE BUILDING A TEAM"

Written by: **ROSA WALSTON LATIMER**

When Merits Health Products decided to expand their presence in the United States, they turned to Chris Blackmore who had over 20 years' experience in the industry. Now, after a more than 300 percent increase in sales during his three and a half years as vice president of sales and business development, we asked him to give us an overview of this experience, the shift in the company's philosophy and new products recently introduced.

WOULD YOU TELL US A LITTLE ABOUT YOUR BACKGROUND AS WELL AS YOUR RESPONSIBILITIES WITH MERITS?

I have over 20 years in this industry beginning with Pride Mobility Products Quantum Rehab where I worked for 14 years. After a few years with Handicare, I had the opportunity to come to work with Merits Health Products to help rebrand their products for the U.S. market. Kevin Liu is president of Merits and handles all of the operations. I'm responsible for sales and business development and work closely with three national managers who are responsible for each product division: Dave Jones, Avid Rehab (complex rehab); Michael Hughes, Merits line of Group 2 products and Andrew Scothern, Pilot Division (stair lift and home accessibility products); Martin Kidder, national inside sales manager and Elizabeth McKinley, director of marketing. In addition, we have 3 regional managers: Brett Tracy, Eastern Region; Kirk Grau, Central Region; and our newest hire, Joe McKnight, Western Region.

This team has over 170 years of combined experience. They are highly respected and that's why we were able to grow as rapidly as we have in a relatively short period of time. These professionals have been able to connect with the quality relationships they developed over the years and based on a long-standing trust, introduce Merits, the products and customer service we can provide.

Another game changer during this time was the recent hiring of Mike Rozaieski as Merits' director of product development. Mike has over 25 years' experience and will be the effective bridge between our sales team and our owners in Taiwan to be sure we manufacture the products needed for the U.S. market.

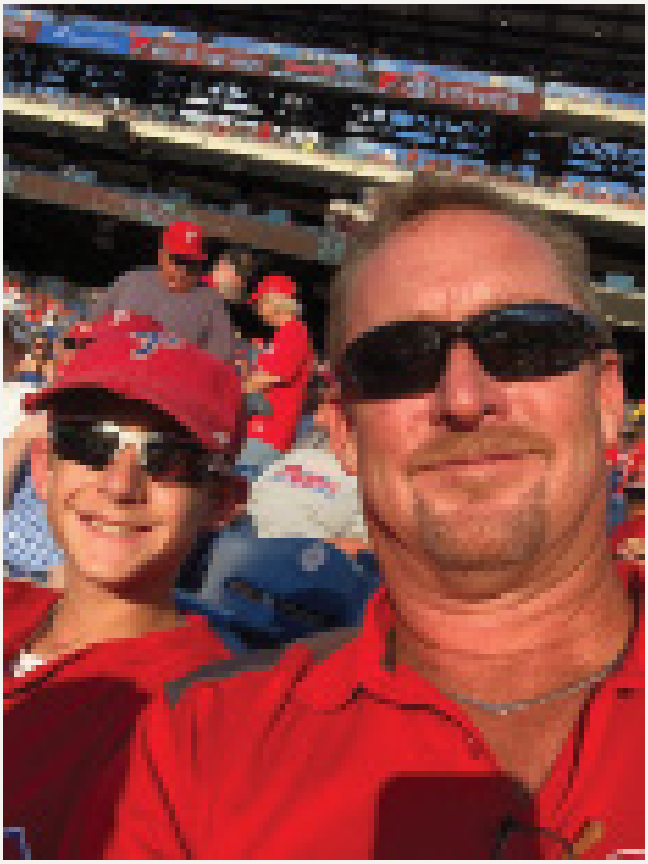
We all work well together and share the same general philosophy relating to customer service. I use basic philosophies such as 'Don't overpromise or under deliver' and 'Don't say no or I can't' to keep us on our toes. We strive to always do what we say we're going to do and make good communication a priority.

TELL US ABOUT SOME OF THE CHANGES THAT HAVE OCCURRED SINCE YOU AND THIS TEAM CAME ON BOARD?

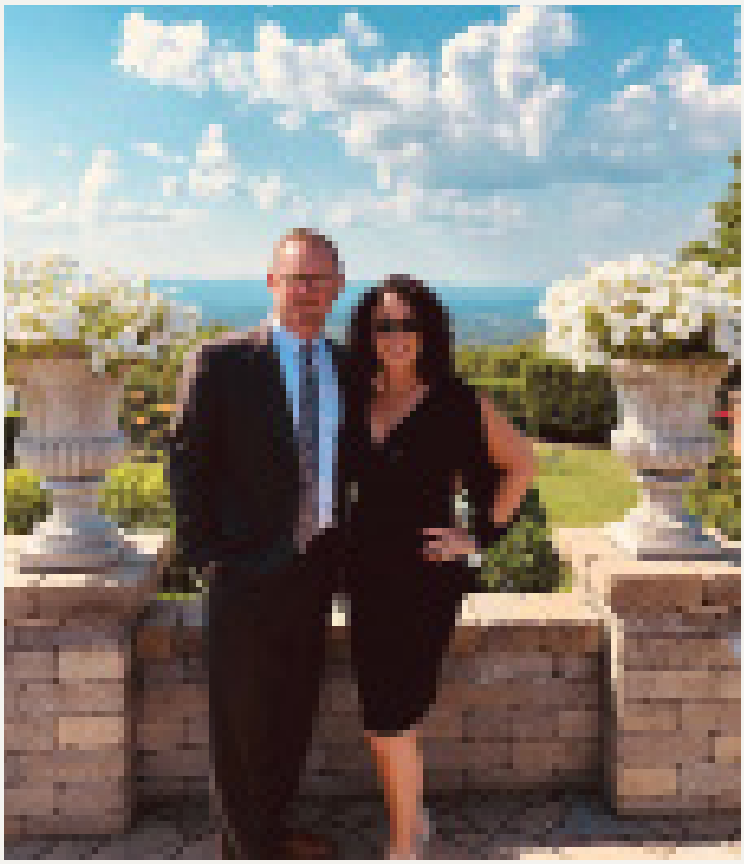
In the past Merits didn't offer any type of complex rehab equipment. Now we have two new divisions that will be the foundation for focused product development. Avid is our newest division for complex rehab Group 3 chairs, and the Pilot division offers a first-class stair lift.

We've also just developed a new power wheelchair called the Vision Ultra that has an option of a tilt through a single power option. This makes us the first company to provide a real choice for someone who can't be diagnosed for a complex rehab chair, but qualifies for a Group 2 wheelchair. We listened to the requests throughout the industry from the top ATPs, and we learned there weren't options to put patients who had experienced a stroke or maybe someone with diabetes or COPD in a chair that fit their needs. The Vision Ultra has been a huge hit. It gives suppliers the opportunity to provide their customers with the right product. Another recent product is the Velocity multifunction rehab chair for patients who qualify for a Group 3 chair.

Merits has also made a priority of being very involved in the industry and having the right people involved in meetings and conferences so we can learn as much as possible as well as provide input. We've expanded our philosophy to make sure we have our ear to the ground regarding industry needs. This translates to active involvement with industry organizations such as NCART and NRRTS. We are also becoming more involved with communities across the country with events such as (Walk to Defeat ALS).



Chris Blackmore and his son, Jake, at a Phillies game.



Chris and Amy Blackmore

In addition, we are moving our U.S. corporate office to Fort Meyers, Florida. We've outgrown our current facility in Cape Coral, Florida, and had originally planned to expand at the current location. The city of Fort Meyers approached us with incentives to move there. We found an existing structure that was perfect for our needs and, if everything goes according to plan, would make it possible for us to move as early as January 2019. The new space is 113,000 square feet, and this move will allow us to be much more efficient in handling the increase in volume we are experiencing. When I first joined Merits, we had 13 employees, now we have over 80 and will probably have over 100 before the end of this year.

WHAT ARE SOME OF THE MOST CHALLENGING PARTS OF YOUR RESPONSIBILITIES WITH MERITS?

The most challenging parts of my job are to stay on track with our growth levels, make sure we maintain a positive image and ensure that our forecasting is done correctly. We've grown 380 percent in three years, and during that time, we've discontinued products, added new products and changed or upgraded products. We've got to make sure that we stay on track and continue to satisfy the needs of our customers. There have been times when Merits had numerous products on back order, and this created an image problem. I'm challenged with the responsibility to be certain that our sales team has the ability to offer products and know that we can deliver in a timely manner. This is a constant, day-to-day balance and with thousands of diversified products including parts, it is a difficult process. However, the bottom line is to make sure we don't let our customers down.

WHAT DO YOU CONSIDER YOUR FAVORITE PART OF YOUR JOB OR THE MOST REWARDING?

The most rewarding part of my jobs has always been the relationships I developed over the years. I'm fortunate to have worked with some of the best people in the industry and to have gained their trust. It is gratifying that individuals who have been in this industry for a long time are willing to be a part of our team at Merits, which is a very small but growing part of this industry in the U.S.

CLEARLY YOU UNDERSTAND THE IMPORTANCE OF WORKING WITH AN EXPERIENCED, QUALIFIED TEAM. WHAT DO YOU BELIEVE HAS MADE IT POSSIBLE FOR YOU TO CULTIVATE QUALITY PROFESSIONAL RELATIONSHIPS?

I don't think it's complicated. I've always tried to be the type of person who does what he says he's going to do. My word has meaning. I'm extremely aggressive making sure that I keep things moving without hesitation. I am confident we are building a reputation,

CONTINUED ON PAGE 32

The Merits USA sales management team at the VVGM Heartland Conference in Iowa.

Kevin Liu, president of Merits USA, and Chris Blackmore in the company's office in Cape Coral, Florida.

"I LOVE BUILDING A TEAM"
(CONTINUED FROM PAGE 31)

so people know if they are working with me in any situation, something is going to get done. I'm a good leader in that way, and I love building a strong team!

Team building and leadership has been an important part of my personal life as well. Until recently I coached my son's basketball, baseball and soccer teams. Unfortunately my business travels prevent me from continuing, and I miss it. Seldom am I in a store shopping that I don't run into a kid that I've coached. I love hearing, 'Hey, Coach Chris!'

My son, Jake, is 13 years old, and we often play golf together, but let's not talk about who wins! In fact, my wife, Amy, is beginning to play golf, too. Our family also enjoys traveling together and has made a Thanksgiving tradition of spending the holiday week at St. Thomas, Virgin Islands.

WOULD YOU WRAP UP THIS INTERVIEW WITH YOUR PERSONAL THOUGHTS ABOUT MERITS USA AND ITS FUTURE IN THE INDUSTRY?

I suppose you could say we're the little guys out there battling to gain credibility, and we are making progress. Merits USA is a small company in this industry especially on the complex rehab side and previously was not well-represented in the United States. We have the challenge of helping suppliers understand that we are a different company now than we were 3 ½ years ago. We're focusing on taking care of our industry share and developing products that will handle as many issues from the patient side as possible. I'm pleased that we've adjusted to this market in ways that we are now a desirable choice for both dealers and patients and we have the representation to provide the assistance needed.

I'm excited along with company president Kevin Liu to influence the opportunity to change the footprint of this company on the expansion Merits is experiencing. We work well together and in spite of the challenges, we're having a good time growing this company.

CONTACT THE AUTHOR

Chris may be reached at CBLACKMORE@MERITSUSA.COM.

Chris Blackmore is as vice president of sales and business development for Merits Health Products.

EDGE 3

Always the best seat in the park.

Optional **12" iLevel®** eliminates craning your neck in conversation.

Provides **comfort and stability** to easily interact with vendors and reach counters.

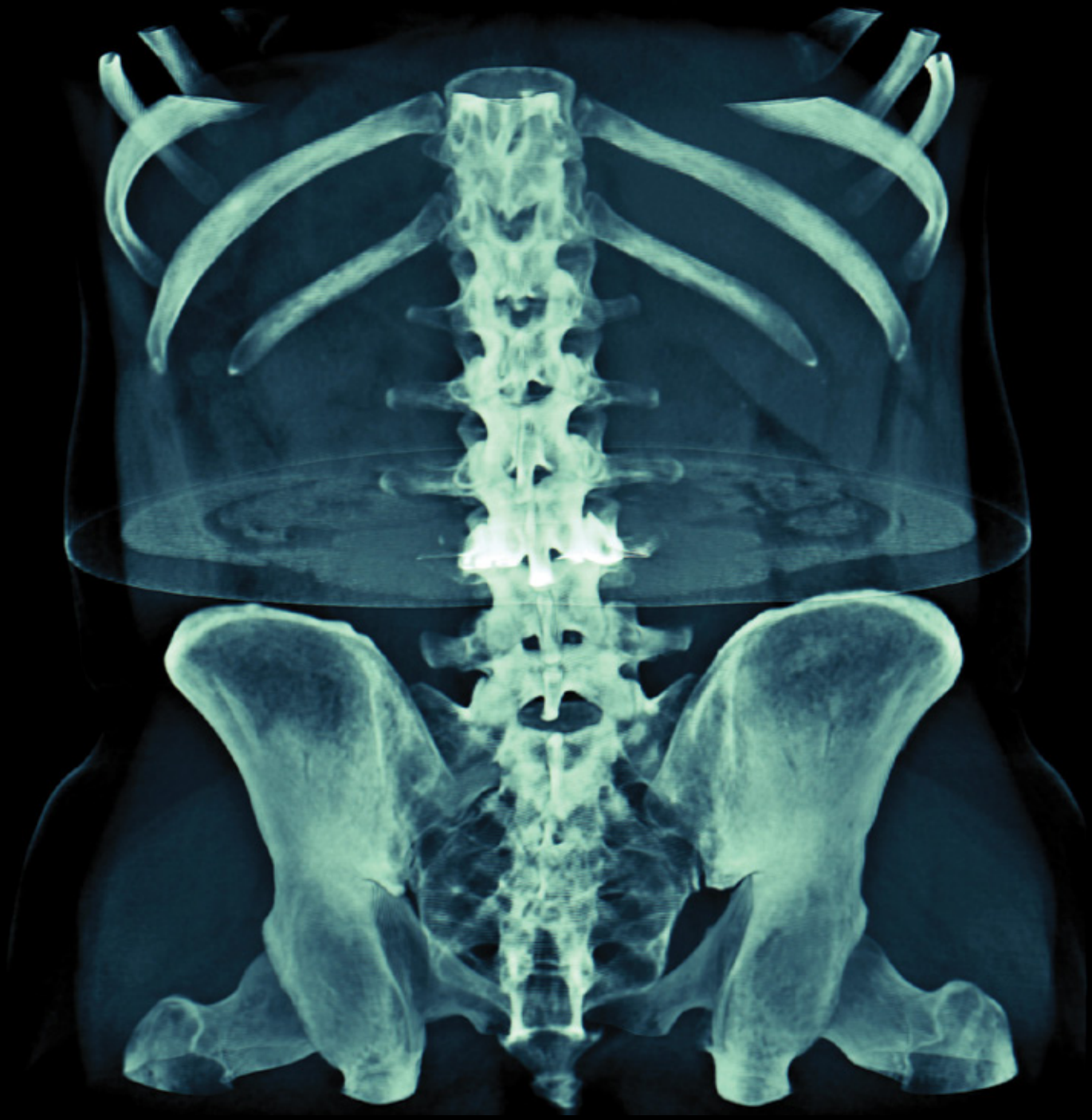
Maintain a clear line of sight at crowded events while driving up to **4.5 mph.**

QUANTUM® **Dedicated to Revolutionizing the Power Chair Experience.**

(US) 866-800-2002 • (CAN) 888-570-1113 • quantumrehab.com •

Research Sheds New Light on What Causes PRESSURE INJURIES

Written by: **DAVID BRIENZA,** PHD



Contemporary evidence suggests that pressure injuries are not solely the consequence of prolonged ischemia but are also caused by soft tissue deformation independent of ischemia.

Not too long ago, the common belief was that pressure injuries (pressure ulcers) were caused by ischemia-related tissue breakdown, occurring when soft tissue was compressed and deformed between bony prominences and supporting surfaces such as seat cushions and mattresses. This understanding resulted in clinical practice guidelines aimed at avoiding long bouts of loading. It was also the impetus for the development of cushions and mattresses that would provide low and even pressure distributions. Contemporary evidence suggests that pressure injuries are not solely the consequence of prolonged ischemia but are also caused by soft tissue deformation independent of ischemia. Clinical practice guidelines must progress as additional sources of tissue damage are identified. As tissue injury can occur from deformation without or prior to the onset of ischemic damage, preventive measures need to consider situations where there is high-loading for shorter periods of time. Practice guidelines should not exclude the possibility of damage that could be caused by bouts of high-loading for a short period of time.

It is important to stress that the new direction of investigation on pressure injury genesis does not negate earlier findings. The ischemia pathway is well known and documented. Nearly 60 years of research has shown ischemia causes tissue breakdown, harking back to Kosiak's study on ischemic ulcers, utilizing dogs as test subjects, that was published in the Archives of Physical Medicine and Rehabilitation[1] in 1959. Confirmatory observations made on human subjects were noted by Reswick and Rogers in the mid-1970's.[2] In their study involving both seated and recumbent patients at Rancho Los Amigos Hospital in California, Reswick and Rogers replicated the etiology of ischemia and pressure injury in human tissue when subjected to load over time (see Figure 1).

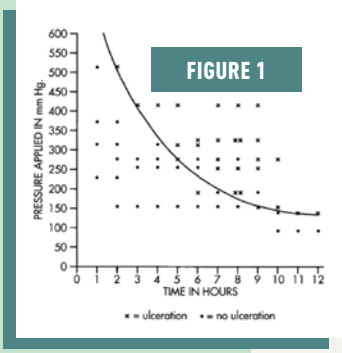


FIGURE 1

CONTINUED ON PAGE 36

CEU ARTICLE | NRRTS is pleased to offer another CEU article. This article is approved by NRRTS, as an accredited IACET provider, for .1 CEU (1 contact hour). After reading the article, please visit http://www.nrrts.org/ceu-article-review to order the article. Upon passing the exam, you will be sent a CEU certificate.

THE ISCHEMIC PATHWAY

Subsequent research in the field has consistently shown that the ischemic pathway to tissue breakdown and ischemic-induced cell death evolves over a relatively long period of time; up to six hours. K. L. McCance explained the fundamentals of the ischemic pathway to tissue breakdown as follows:

- Ischemia is defined as a reduced blood supply to tissue. The process begins with the understanding that adenosine triphosphate (ATP) is the main energy storage and transfer molecule in the cell.

- It has been demonstrated that external forces are the root cause of tissue deformation that can block both blood and lymph vessels.

- The reduced blood and lymphatic flow result in hypoxic conditions within the tissue.

- Lack of an adequate oxygen supply at the cellular level causes a decrease in the mitochondrial phosphorylation, which then causes the supply of ATP to decrease.

- A lack of ATP causes the cell to increase anaerobic metabolism in an attempt to generate sufficient ATP. This also results in an increase in lactate as a byproduct of the ATP conversion process. Once glycogen stores are used up by the cell during anaerobic metabolism, the cell will have insufficient stores of ATP to carry out life-sustaining functions.[3]

This cascading sequence of events continues as the inefficient anaerobic metabolism in the cell causes it to generate waste products that accumulate in areas with impaired lymphatic flow. The subsequent build-up of waste products results in a harmful reduction in pH. Among the most important functions that are disrupted are the sodium/potassium ion pump and the sodium/calcium exchange processes. There is a net flow into the cell of calcium, water and sodium, causing the cell to swell. If the oxygen supply is not restored, these increased concentrations can cause denaturing of essential proteins and DNA. When said conditions persist for an extended period of time (two hours or more), cell injury or death can occur.[3]

Despite knowledge of this repositioning process and adherence to these guidelines, clinical practices such as limiting the amount of time tissue is exposed to deforming forces failed to prevent many pressure injuries and pressure injury incidence and prevalence rates remained high.

This well documented pathway to ischemic breakdown has led to recommendations in clinical guidelines for periodic unloading and guidance on the duration of safe loading. Despite knowledge of this repositioning process and adherence to these guidelines, clinical practices such as limiting the amount of time tissue is exposed to deforming forces failed to prevent many pressure injuries and pressure injury incidence and prevalence rates remained high. In our recent study on pressure injury among newly injured people with traumatic spinal cord injuries, we found that 37.5 percent of patients developed at least one pressure injury during the time they were in acute and inpatient rehabilitation care.[13]

Faced with the reality that avoiding long bouts of ischemia was not solving the pressure injury problem, researchers confronted the question of what else could be at play in the process of tissue necrosis. Since clinical practice guidelines were based on the long ischemic injury process as the source of pressure injury, and the adherence to the guidelines of periodic unloading did not reduce pressure injury incidence as much as expected, new lines of research focused on testing alternate pathways to tissue breakdown. One of those research efforts aimed to test the hypothesis that tissue deformation caused cell death directly.

TISSUE DEFORMATION

This alternate hypothesis that tissue breakdown results from deformation independent of oxygenation spurred an investigation that began in the early 2000s. The deformation pathway to pressure injury research began with cellular-level studies. The tissue-level investigations undertaken by Cees Oomens' group in the Netherlands, Dan Bader in the United Kingdom, and Amit Gefen in Israel are of particular interest.[4]

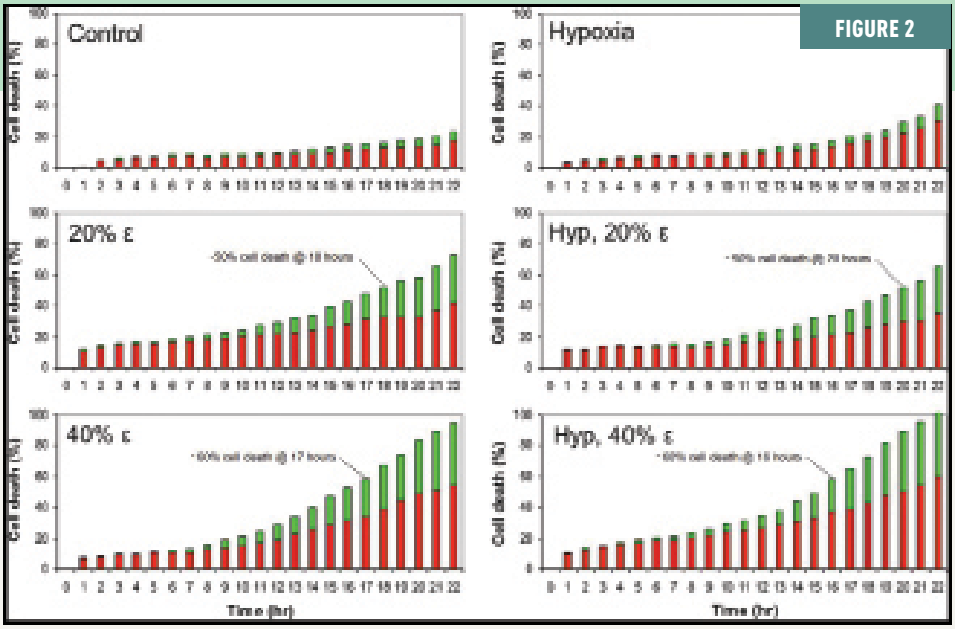


FIGURE 2

One of the questions addressed by Oomens and Bader concerned the interaction of deformation and ischemia with a goal of determining if deformation damage is independent of ischemic damage. An in vitro tissue-level experiment using engineered bio-artificial muscles (BAM) provided initial evidence of veracity to the hypothesis.[4] These BAM consisted of engineered skeletal muscle produced from the culture of murine muscle cells in a collagen gel. The study focused on the assessment of cell viability during compression and ischemia in an in vitro muscle model to determine their relative contributions to damage development.

Oomens and Bader constructed an experimental system on the stage of a microscope to investigate compression at the cellular level.[4] The experiments subjected tissue to three levels of compression — 0, 20 or 40 percent strain — under both hypoxic and normoxic conditions and observed what happened to the cells over time. They monitored cell viability through the use of fluorescent markers for apoptotic and necrotic cell death. The experiments revealed that hypoxia did not result in significant cell death over a 22 hour period but compression could lead to immediate cell death that increased with time. They did not observe any additional effect of hypoxia on cell death.

These data from the study on engineered muscle demonstrated that strain has a greater effect on the rate and extent of cell death compared to hypoxia (see Figure 2). For example, comparing the experimental control condition (see upper left graph in Figure 2) where 'the BAM was provided adequate oxygen (normal oxygen supply condition, normoxic) and was not strained' to the condition where 'the BAM was deprived of oxygen (hypoxic condition) and not strained' demonstrated the potential effects of ischemia. After 22 hours, about twice as many cells died in the hypoxic condition with no strain compared to the normoxic condition (~40 percent versus ~24 percent). The mechanism for the cell death for each 'no strain' condition was largely necrotic. But what was surprising were the results from the conditions where strain was applied to the BAM. For 20 percent strain, (see second row of graphs in Figure 2) the difference between the normoxic condition and the hypoxic condition was relatively small for almost all time points. For example, the mean time to 50 percent cell death was 18 hours for the normoxic condition and a similar 20 hours for the corresponding hypoxic condition. An analogous observation was made for the 40 percent strain conditions (see graphs in row three of Figure 2). In other words, once the artificial muscle was strained, cells die at rates higher than without strain but the results were similar with and without adequate oxygen supply. The implication was clear–when artificial muscles cells were subjected to strain, their survival depended on the amount of strain much more than the oxygen supply. [4]

In an extension of Oomens work and in collaboration with him, Gefen developed an experimental technique to determine the time-dependent, critical compressive strains for necrotic cell death.[5] The goal of such an experiment was to investigate the effects of the various loading parameters, namely strain and time, in order to estimate a critical strain threshold tolerance of muscle cells with a direct correlation to the time it took for cell damage to occur. In the study, BAM were subjected to nonuniform, concentric deformation by means of a half-spherical indenter and observed via confocal microscopy fluorescent

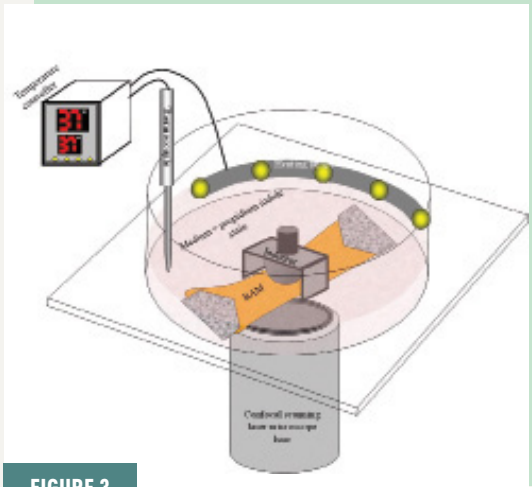


FIGURE 3

CONTINUED ON PAGE 38

images (see Figure 3). Using the half spherical indenter allowed simultaneous observation of multiple strain levels for each measurement time point. With the indenter lowered into and compressing the tissue, tissue under the apex of the indenter was strained more than tissue under other areas. The magnitude of the strain decreased toward the outer edge as a function of the shape of the indenter.

Propidium iodide was used to fluorescently stain the development of necrosis in 15 BAMs subjected to strains of up to 80 percent. The lowest strain causing cell death was determined every 15 minutes. Readings were taken at 15-minute intervals for the duration of the 285-minute-long trials. Cell death was noted from fluorescence images of the damage region. The intent of the experiment was to establish a relationship between muscle tissue strain and time to death whereby a critical time-strain-time threshold could be observed beyond which cell death was likely. That is to say it was intended to determine muscle tissue tolerance to strain for a range of loading times. Such a relationship is analogous to the relationship between pressure and time demonstrated by Kosiak's research. The resulting data successfully demonstrated the relationship between direct deformation damage and time.[5]

Gefen's results were significant, showing artificial muscle's tolerance to strain was limited for short loading periods. In fact, observations from the experiment revealed that artificial muscle could not withstand large compressive strains on the order of 75 percent for even 15 minutes. More moderate levels of strain, 40 percent, could be tolerated for nearly 5 hours.[5]

As a result of these BAM tissue-level experiments and a complementary series of cellular-level experiments, the pathway for direct damage from deformation has been described. This deformation pathway to pressure injury begins with pressure and shear force induced deformation. As a result of high strain, cell membrane diffusion properties are altered. Depending upon the severity of the strain and its duration, deformation can cause damage to the cell cytoskeleton followed by cell death. The deformation damage at a relatively high level of strain was shown to occur in less than 15 minutes or up to two hours. Beyond that time, the effects of high-strain deformation and ischemia began to co-mingle and there was not the means to distinguish these as the source of pressure injury.[5]

LIVING TISSUE RESEARCH

The next logical step for this research was to investigate whether the direct deformation damage results would be replicable in tests on living subjects. This work was the natural extension of the in vitro experiments. Using animal model studies with rats, Gefen's and Oomens' groups were able to differentiate deformation damage from ischemic damage. Experimentation on living creatures is more involved than the in vitro experiments performed in a cell

FIGURE 4

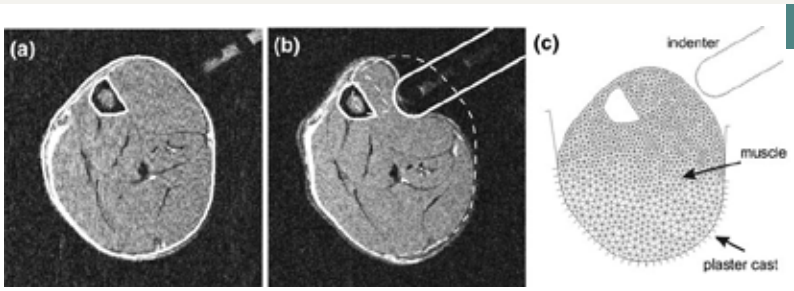


FIGURE 4. (a) Transversal scout image of a cross-section of a rat leg before loading. Contours of leg and tibia were determined (*white lines*) and used for mesh generation. (b) Scout image of the same rat leg during loading. Position of the tibia during loading and angle and depth of indentation were determined (*solid lines*) and used for the essential boundary conditions (contours of leg before loading are shown by *dashed lines*). (c) Resulting FE mesh of the rat leg with indenter and plaster cast modeled as rigid bodies.

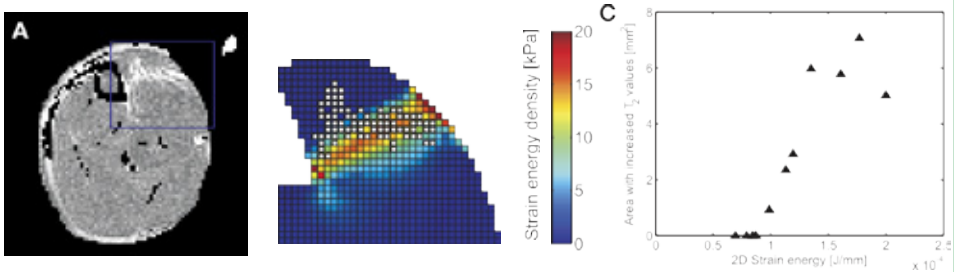


Fig. 1. *A*: T2 map obtained from T2-weighted magnetic resonance images (MRI) of a cross section of a rat leg, indicating that muscle damage [area with increased T2, high-intensity (white) pixels] due to 2-h compression only occurred in a small region of the muscle. *B*: internal strain energy density distribution estimated with finite element (FE) models showed an overlap with the damaged region in the tissue. *C*: total strain energy in the muscle clearly correlated with the amount of tissue damage once a specific threshold value was exceeded [adapted from Loerakker et al. (29)].

FIGURE 5

culture dish and requires different techniques. Loerakker published the results from a seminal study in which magnetic resonance imaging (MRI) was used in combination with finite element modeling (FEM) to monitor the effects of ischemia, deformation and reperfusion on the leg tissue of a live rat.[6] Measures of perfusion and tissue damage were obtained from the MRI while deformation was calculated using FEM. FEM is a mathematical technique for estimating the physical behavior of an object. The method is used extensively in engineering to predict behavior of a physical system when it is subjected to outside influences. By dividing a system into small geometric elements and defining physical characteristics such as their stiffness and interaction with neighboring elements, a virtually unsolvable mathematical problem relating coupled physical relationships can be solved accurately and efficiently. For example, an engineer might use FEM to optimize an airplane wing structure design by changing elements until a satisfactory structure is identified. Loerakker used FEM to calculate stresses and strains in the rat leg muscles so that these parameters could be compared to corresponding MRI observed damage.

Do strains on the order of 40 to 50 percent exist in the clinical situations where a person is sitting on a wheelchair cushion or lying on a mattress? If not, then the forgoing results might not explain observed pressure injury risk. If they do, the forgoing research would add important evidence to the pressure injury risk puzzle.

Figure 4 shows MRI images of the rat leg in the undeformed (see Figure 4a) and deformed (see Figure 4b) states. The corresponding FEM is shown in Figure 4c. Figure 5 shows a result from Loerakker et. al.[5] The MRI image on left, Figure 5a, displays damage in the region where the leg was indented for two hours as high intensity pixels. Figure 5b (center) shows the damage overlapping areas of high strain estimated with the model. As shown in Figure 5c, after a threshold strain was reached, the amount of damaged tissue was proportional to the intensity of strain.

The in vitro and in vivo research described above established that tissue damage can occur for sustained strains on the order of 40 to 50 percent. Do strains on the order of 40-50 percent exist in the clinical situations where a person is sitting on a wheelchair cushion or lying on a mattress? If not, then the forgoing results might not explain observed pressure injury risk. If they do, the forgoing research would add important evidence to the pressure injury risk puzzle. In an effort to answer this question, Linder-Ganz, Gefen, et al., used FEM and MRI to suggest sitting-induced strain does approach the critical levels shown in the earlier experiments.[7] Bone, muscle, fat, and skin properties used in an

CONTINUED ON PAGE 40

DEFINITIONS

Ischemia
impaired blood supply to tissue

Tissue deformation
a change in shape of tissue from one condition to another

Hypoxic
a condition where tissue cells are deprived of an adequate supply of oxygen

Tissue necrosis
premature death of tissue cells

Normoxic
a condition where tissue cells have adequate oxygen supply for life sustaining function

Apoptotic cell death
normal process programmed cell death in tissue

Perfusion / reperfusion
the flow of blood through the circulatory system (perfusion) and the restarting of flow after a period of no flow (reperfusion)

FEM model were obtained from the literature. The researchers took advantage of what was then a recently introduced open MRI system (Fonar Corporation, Melville, New York) that allowed users to sit in the machine during the imaging process to obtain the geometry for the model. Previous attempts to use MRI and FEM for this purpose were hampered by machines that restricted users to lying in the machine's imaging tube.[14]

The Linder-Ganz study used FEM and MRI to show the stresses (forces) and strains (deformations) in deep tissues when sitting. The non-weight-bearing versus weight-bearing MRI illustrated the high internal stress and strain in muscle near the ischial tuberosity in a seated, able-bodied person.[7] The strain magnitudes recorded were in the same range as the levels demonstrated to cause muscle cell death in the in vivo and in vitro experiments. Linder-Ganz, Gefen, et al., were not the first researchers to show that high deformation could lead to cellular damage, but they were able to isolate the incidence to pre-ischemic conditions. This study was important because it demonstrated that the magnitude of deformation shown to cause direct damage may occur in humans in common situations. In real life, people without additional risk factors don't develop pressure injuries due to deformation while they sit on hard surfaces because compensatory mechanisms such as sensation of pain causes deformation relieving movement before permanent damage occurs and its likely healthy tissue will quickly regenerate and recover from small amounts of damage from deformation.

Certain populations, such as persons with spinal cord injuries and those who are frail and elderly, are known to be at much higher risk of developing pressure injuries than the general population. This high risk can now be explained, at least in part, by considering the nature of how soft tissue deforms under load. High deformation magnitudes have been observed and postulated as the cause for pressure injury consistently over time from Reichel[8] back in the 1950's who observed tissue over the sacrum creasing and folding in response to shear forces from raising the head of hospital bed, to the present day in research by Oomens and Bader, et al.,[9] Brienza and Akins, et al.,[10] and Sonenblum and Sprigle, et al.,[11] For a summary of the research that led to the discovery of the pathophysiology of the deformation pathway, see C. W. J. Oomens, D. L. Bader, S. Loerakker, and F. Baaijens, "Pressure induced deep tissue injury explained."[9]

In addition, the research by Anke Stekelenburg, et al., demonstrated a marked difference in the severity of pressure injury in the deformation pathway versus the ischemia pathway alone. The study showed pressure injury from two hours of deformation resulted in irreversible damage, whereas two hours of ischemia resulted in reversible tissue changes.[12] These results imply that tissue subjected to the combined stress and strain of ischemia and deformation is at risk for irreversible muscle damage.

Understanding the risk of possibly irreversible damage that can be done due to direct deformation will hopefully lead researchers and clinicians to enumerate interventions to help prevent periods of high deformation. In Brienza, 2017, we showed that substantial differences in deformation can result from using different seat cushions. For example, for one participant in the study, the difference in deformation under their ischial tuberosity ranged from 41 to 59 percent based solely on the type of cushion used. Deformation under the ischial tuberosities for one of the control participants (no spinal cord injury) varied from 20 to 47 percent, depending on the cushion used. Another interesting observation from this study was that as tissue was loaded during sitting, much of the muscle tissue deformation observed was the result of muscle tissue displacing and not compressing as the FEM models discussed assumed. In fact, the study showed muscle tissue under the ischial tuberosity in the unloaded condition tended to be displaced laterally and posteriorly when sitting loads are applied. This result suggests that alternative models that more closely predict the tissues' response may be needed to more accurately describe and study tissue response and the pressure injury problem.

Understanding the risk of possibly irreversible damage that can be done due to direct deformation will hopefully lead researchers and clinicians to enumerate interventions to help prevent periods of high deformation.

CONCLUSION

... there are two well-defined pathways to tissue damage. The first is via ischemia. In the ischemic pathway, up to six hours is needed to cause cellular damage. The second pathway is via deformation.

The physiology of both ischemic breakdown and deformation breakdown begins with pressure and shear force induced deformation. However, it is acknowledged that these processes do not occur without the interplay of other elements. Other factors shown to have an impact on tissue health are temperature, moisture and a variety of intrinsic factors related to the general well-being of a person including mobility, sensation, age, diseases causing circulatory impairment such as diabetes and smoking.

In summary, there are two well-defined pathways to tissue damage. The first is via ischemia. In the ischemic pathway, up to six hours is needed to cause cellular damage. The second pathway is via deformation. In high-strain situations, damage to cells can occur in minutes to hours. While potentially harmful magnitudes of deformation can occur in typical clinical situations, just as with pressure injuries from ischemia, these forces can be avoided with sufficient preventive measures. Researchers can now combine their knowledge of the ischemic and deformation pathways to tissue damage with clinical observations to develop prevention strategies that specifically address the risk for pressure injuries on both fronts. The goal is to continually advance clinical practice guidelines to reduce the incidence rate of pressure injuries.

CONTACT THE AUTHOR

David may be reached at DBRIENZA@PITT.EDU.

REFERENCES:

1 KOSIAK, M. ETIOLOGY AND PATHOLOGY OF ISCHEMIC ULCERS. ARCHIVES OF PHYSICAL MEDICINE AND REHABILITATION, 1959;40:62–9.

2 RESWICK J, ROGERS JE. EXPERIENCE AT RANCHO LOS AMIGOS HOSPITAL WITH DEVICES AND TECHNIQUES TO PREVENT PRESSURE SORES. IN KENEDI RM, COWDEN JM, SCALES JT (EDS) BEDSORE BIOMECHANICS. MACMILLAN PRESS, 1976, PP. 301–310.

3 MCCANCE KL, HUETHER SE. PATHOPHYSIOLOGY: THE BIOLOGIC BASIS FOR DISEASE IN ADULTS AND CHILDREN. FIFTH ED. 2006, PHILADELPHIA, PA: ELSEVIER MOSBY. 50-56.

4 GAWLITTA D, LI W, OOMENS CWJ, BAAIJENS FPT, BADER DL, BOUTEN CVC. THE RELATIVE CONTRIBUTIONS OF COMPRESSION AND HYPOXIA TO DEVELOPMENT OF MUSCLE TISSUE DAMAGE: AN IN VITRO STUDY. ANNALS OF BIOMEDICAL ENGINEERING, 35(2):273-284, 2007.

5 GEFEN A, NIEROP BV, BADER DL, OOMENS CWJ. STRAIN-TIME CELL-DEATH THRESHOLD FOR SKELETAL MUSCLE IN A TISSUE-ENGINEERED MODEL SYSTEM FOR DEEP TISSUE INJURY. JOURNAL OF BIOMECHANICS, 41:2003–2012, 2008.

6 LOERAKKER S, MANDERS E, STRIJKERS GJ, NICOLAY K, BAAIJENS FPT, BADER DL, OOMENS CWJ. THE EFFECTS OF DEFORMATION, ISCHEMIA, AND REPERFUSION ON THE DEVELOPMENT OF MUSCLE DAMAGE DURING PROLONGED LOADING. JOURNAL OF APPLIED PHYSIOLOGY, 111(4):1168–1177, 2011.

7 LINDER-GANZ E, SHABSHIN N, ITZCHAK Y, GEFEN A. ASSESSMENT OF MECHANICAL CONDITIONS IN SUB-DERMAL TISSUES DURING SITTING: A COMBINED EXPERIMENTAL-MRI AND FINITE ELEMENT APPROACH. JOURNAL OF BIOMECHANICS, 2006. DOI:10.1016/J.JBIOMECH.2006.06.020.

8 REICHEL SM, M.D. SHEARING FORCE AS A FACTOR IN DECUBITUS ULCERS IN PARAPLEGICS. JAMA. FEB. 15, 1958. 1958;166(7):762-763. DOI:10.1001/JAMA.1958.62990070004010A.

9 OOMENS CWJ, BADER DL, LOERAKKER S, BAAIJENS F. PRESSURE INDUCED DEEP TISSUE INJURY EXPLAINED. ANNALS OF BIOMEDICAL ENGINEERING, VOL. 43, NO. 2, FEBRUARY 2015. PP. 297-305.

10 BRIENZA DM, VALLELY J, KARG P, AKINS J, GEFEN A. AN MRI INVESTIGATION OF THE EFFECTS OF USER ANATOMY AND WHEELCHAIR CUSHION TYPE ON TISSUE DEFORMATION. JOURNAL OF TISSUE VIABILITY, 2018 FEB;27(1):42-53. DOI: 10.1016/J.JTV.2017.04.001.

11 SONENBLUM SE, SPRIGLE SH, CATHCART JM, WINDER RJ. 3D ANATOMY AND DEFORMATION OF THE SEATED BUTTOCKS. JOURNAL OF TISSUE VIABILITY, 24 (2) (2015), PP. 51-61.

12 STEKELENBURG A, STRIJKERS GJ, PARUSEL H, D. L. BADER, K. NICOLAY, C. W. OOMENS. ROLE OF ISCHEMIA AND DEFORMATION IN THE ONSET OF COMPRESSION-INDUCED DEEP TISSUE INJURY: MRI-BASED STUDIES IN A RAT MODEL. JOURNAL OF APPLIED PHYSIOLOGY, 102: 2002-2011, 2007; DOI:10.1152/JAPPLPHYSIOL.01115.2006.

13 BRIENZA D, KRISHNAN S, KARG P, SOWA G, ALLEGRETTI AL. (2018) PREDICTORS OF PRESSURE ULCER INCIDENCE FOLLOWING TRAUMATIC SPINAL CORD INJURY: A SECONDARY ANALYSIS OF A PROSPECTIVE LONGITUDINAL STUDY. SPINAL CORD VOLUME 56, PAGES 28–34 (2018) DOI:10.1038/SC.2017.96

14 BETH A. TODD, PHD AND JOHN G. THACKER, PHD. THREE-DIMENSIONAL COMPUTER MODEL OF THE HUMAN BUTTOCKS, IN VIVO. JOURNAL OF REHABILITATION RESEARCH. AND DEVELOPMENT VOL. 31 NO. 2, 1994. PAGES 111—1 19

Dr. Brienza is professor and associate dean for research in the School of Health and Rehabilitation Sciences with additional professorial appointments in the departments of Bioengineering and the McGowan Institute for Regenerative Medicine at the University of Pittsburgh. His research over the past 30 years has been primarily focused on tissue integrity management. Brienza directs the Tissue Integrity Management Lab at Pitt, which is dedicated to pressure injury research including clinical trials, preclinical studies on physiological responses to mechanical and heat loading, developing and validating performance standards for wheelchair seat cushions and mattresses, and development of new technology for pressure injury prevention.

REHAB CASE STUDY

MAXIMIZING PRESSURE RELIEF AND INDEPENDENCE THROUGH POWER SEAT FUNCTIONS

Written by: **ANGELA REGIER,** OTD, OTR/L, ATP/SMS, AND **LAURA MORGAN,** PT, DPT, MSPT, ATP

THIS ARTICLE IS SPONSORED BY PERMOBIL.

Pressure injuries impact approximately 2.5 million individuals per year (Berlowitz et al., 2011), at a cost of approximately $11 billion annually (Russo, Steiner, & Spector, 2008). While these statistics refer to the general population, individuals requiring complex rehab technologies (CRT) are often at greater risk due to impaired mobility and sensation. With such a significant cost to the individual's health and quality of life, as well as costs to the health care system, we must continually evaluate our wheelchair service provision processes. Are we utilizing available research to inform our practice decisions? (See the Clinical Perspectives article on page 34). Are we offering and using available technologies to mitigate pressure injury risk? By obtaining a thorough client history, identifying risk factors (both external and internal) and identifying client goals, a decision can be made regarding the best person/technology match while minimizing the risk of pressure injury.

MEET SARAH

Sarah* is a 29-year-old female with a primary diagnosis of spina bifida. She has been using a manual wheelchair since the age of 4. She is an active young woman and is currently a college student studying to become a teacher. She was unable to provide the exact level of her lesion but presented with upper extremity strength within functional limits, with the exception of weakness in bilateral shoulder flexion (3+/5); full trunk control; and 0/0 strength in bilateral lower extremities. Her range of motion was within functional limits. She was able to balance independently without use of her upper extremities when sitting on the edge of a bed. She presented with significant pain in her right shoulder, reporting onset approximately 12 to 18 months prior. At time of publication, she was scheduled for a consultation to determine the cause of her pain and possible treatment options. Sarah has a history of a Stage 4 pressure injury at her right ischial tuberosity (IT) in 2010. Per her report, the etiology was unknown. She reports the pressure injury was starting to heal, became infected and ultimately required a myocutaneous flap surgery. In addition, she reported multiple Stage 1 and Stage 2 pressure injuries since that time, both at her right IT and elsewhere, which she usually addresses by "staying in bed until the area is healed." When asked how she has been relieving pressure, Sarah stated she "moves around as needed."

**Client name changed for confidentiality*

EVALUATION

Sarah was seen by an ATP and physical therapist for a wheelchair evaluation. At the time of the evaluation, she was using an optimally configured K0005 manual wheelchair with an air-cell based cushion and adjustable tension back support. Sarah presented with several postural asymmetries, including: right pelvic obliquity which was flexible towards neutral, right thoracic convexity, limited hip flexion to approximately 70 degrees bilaterally, excessive lumbar lordosis, redundant tissue at posterior buttocks, and a tendency to sit with bilateral lower extremities in external rotation. Using the International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2001) to guide the evaluation process, the following areas of concern were identified addressing body functions and structures, activities and participation, and the external environment/equipment:

PROBLEM LIST

1. History of multiple pressure injuries – Sarah has experienced multiple pressure injuries, likely in large part due to her limited mobility, impaired sensation and the presence of external risk factors including shear, pressure, friction and microclimate.

2. Significant right shoulder pain – Manual wheelchair propulsion for 25 years in conjunction with transfers and reaching overhead have contributed to repetitive strain injury and severe right shoulder pain.

3. Difficulty with uneven transfers – Due to Sarah's limited mobility and upper extremity pain, she is experiencing increased difficulty with uneven transfers.

4. Unable to reach all surfaces in her environment for completion of activities of daily living (ADLs) and instrumental activities of daily living (IADLs) – Due to upper extremity pain and the seat to floor height required for propulsion of her manual wheelchair, Sarah was unable to access all desired surfaces during daily activities.

5. Unable to independently access all desired environments/terrains due to UE pain and fatigue –Sarah was having trouble navigating desired environments in her manual wheelchair.

GOALS

The following goals of the seating and mobility intervention were identified in conjunction with Sarah:

1. Independent mobility in all desired environments/terrains.

2. Improve access to all aspects of environment for independence in ADLs/IADLs.

3. Reduce strain on upper extremities during mobility and daily activities.

4. Reduce risk of pressure injury.

CONTINUED ON PAGE 44

MAXIMIZING PRESSURE RELIEF ...
(CONTINUED FROM PAGE 43)

INTERVENTION

Based on the identified problem list and goals, it became clear that Sarah's current wheelchair was no longer meeting her needs. While her manual wheelchair allowed for independent mobility on flat surfaces, it did not allow for independence in all desired environments. Furthermore, it did not allow her to change positions throughout the day, both for pressure relief and for reduction of upper extremity strain during completion of daily activities.

For these reasons, it was recommended that Sarah participate in a power wheelchair evaluation. An in-home evaluation was completed by both the ATP and physical therapist to assure that recommended equipment would work within her home environment as well as desired community environments. Given her tight indoor environment, and her experience during the wheelchair evaluation/equipment trial, Sarah selected a midwheel drive base. Due to her outdoor terrain, and desire for improved suspension as well as higher top speed, a Group 4 power wheelchair was identified as being most appropriate. Sarah regularly navigates uneven terrain while accessing her college campus and work. In addition to the power wheelchair base, a positioning back support and skin protection/positioning cushion were recommended due to Sarah's lordosis and history of pressure injury on her sitting surface. Finally, the following power seat functions were recommended:

- Power Tilt (including 20 degrees of anterior tilt) - Due to high risk of pressure injury and difficulty with independent pressure reliefs (inadequate "lift" achieved due to upper extremity pain/fatigue), posterior tilt was recommended. Sarah was also educated on the application of minimal posterior tilt for postural stability when navigating uneven community environments. Anterior tilt was also recommended to achieve more functional reach for completion of ADLs/IADLs, including computer access for her school work.

- Power Recline - To optimize pressure relief and to allow for dynamic postural changes throughout the day for independence and improved sitting tolerance, particularly given her limited hip flexion.

- Power Elevating Legrest - For use in conjunction with power recline for pressure relief. While Sarah's range of motion was within function limits for seating, when using a significant amount of recline, power elevating legrests were required to maintain pelvic position.

- Power Adjustable Seat Height - To achieve even transfers and improve access to environment for ADL/IADL participation.

After the equipment evaluation, results from the therapy evaluation, justification, and face to face physician examination were submitted to Sarah's insurance (Medicaid). At that time, Sarah was educated on the potential for denial of the Group 4 base, as well as the power adjustable seat height. Her insurance did approve all recommended items. Sarah received her Group 4 power wheelchair approximately two months ago and reports improved environmental access, participation in daily activities and completion of pressure reliefs. At time of initial delivery, she declined the use of additional technologies (pre-programmed power seating sequences) to ease pressure management, however, was open to considering these technologies in the future. She reported the power adjustable seat height as the most useful new feature on her power wheelchair. Unfortunately, Sarah chose to remove her head support despite education on the importance of using the head support when completing an adequate pressure relief.

TECHNOLOGIES TO PROMOTE SUCCESSFUL IMPLEMENTATION OF PRESSURE RELIEF ROUTINES

Sarah is an example of how a good person-technology match can result in improved quality of life and health. However, literature tells us individuals do not complete pressure reliefs as recommended (Sonenblum & Sprigle, 2011). A survey completed in 2017 (Wicks, Cerrato, Eaneff, Leire, & Handersson-Svahn, 2017) reported that 89 percent of clients did not complete a pressure relieving routine as prescribed, the most common reason (68 percent) being that they forgot. As individuals involved in the provision of CRT, we must do what we can to apply available technologies to help end-users successfully complete recommended pressure relieving routines. Some available technologies that are often no additional cost include:

- Memory Seating or Independent Repositioning Mode (IRM) – There are clear recommendations regarding amount of tilt and recline required for adequate pressure relief (Dicianno et al., 2015) as well as the order in which power seat functions should be utilized (Kreutz, 1997). Using included power wheelchair features, such as IRM, can make it easy for the client to implement

a successful pressure relieving routine. One push of a button or deflection of the joystick can take the client back into the recommended position, using the correct sequence of actuators - tilt, elevating legs and recline. This eases ability to complete recommended pressure reliefs, helps reduce risk of shear and aids in maintaining pelvic alignment.

• Assignable Buttons – The ability to fully customize the joystick buttons or provide an external switch for easy access to seating functions can be important for some users with limited upper extremity function or cognitive deficits. When used in combination with IRM, this gives the client a direct and easy way to complete the recommended pressure relieving routine.

• Virtual Coaching – When used in conjunction with a clinician, virtual coaching gives the client real time reminders and coaching to his or her optimal position for pressure relief. Feedback on percentages of pressure reliefs completed is also provided, giving the client and clinician objective information on the amount of pressure relieving activity (including seat actuator angles for the clinician) completed throughout the day.

While these technologies are readily available, these options often get overlooked in the delivery process. Application of these technologies can mean the difference between success and failure in the client's pressure relieving routine. As equipment providers and clinicians, we can arm our clients with a variety of strategies and technologies. Ultimately, however, it is they who must take ownership and carry out the recommendation. Let's do what we can to help shape their path to success!

CONTACT THE AUTHORS

Angela may be reached at ANGELA.REGIER@PERMOBIL.COM

Laura may be reached at LAURA@LIFEWHEELSON.COM

REFERENCES:

BERLOWITZ, D., VANDEUSEN LUKAS, C., PARKER, V., NIEDERHAUSER, A., SILVER, J., LOGAN, C.,...ZULKOWSKI, K. (2011). PREVENTING PRESSURE ULCERS IN HOSPITALS: A TOOLKIT FOR IMPROVING QUALITY OF CARE. AGENCY FOR HEALTHCARE RESEARCH AND QUALITY, ROCKVILLE, MD. RETRIEVED FROM HTTP://WWW.AHRQ.GOV/PROFESSIONALS/SYSTEMS/HOSPITAL/PRESSUREULCERTOOLKIT/INDEX.HTML

DICIANNO, B. E., LIEBERMAN, J., SCHMELER, M., SOUZA, A., COOPER, R., LANGE, M., & JAN, Y. K. (2015). RESNA POSITION ON THE APPLICATION OF TILT, RECLINE, AND ELEVATING LEG RESTS FOR WHEELCHAIRS: 2015 CURRENT STATE OF THE LITERATURE. ARLINGTON, VA, USA: RESNA.

KREUTZ, D. (1997). POWER TILT, RECLINE OR BOTH. TEAM REHAB REPORT, MARCH, 29-32.

WICKS, P., CERRATO, D., EANEFF, S., LEIRE, K., & HANDERSSON-SVAHN, H. (2017). MDC-23 'FREED BY A WHEELCHAIR' HOW PATIENTS USE AND EXPERIENCE THEIR POWER WHEELCHAIRS. AMYOTROPHIC LATERAL SCLEROSIS AND FRONTOTEMPORAL DEGENERATION, 18:SUP2, 305-324. DOI:

10.1080/21678421.2017.1374621

RUSSO, A., STEINER, C., & SPECTOR, W. AGENCY FOR HEALTHCARE RESEARCH AND QUALITY. (2008).

HOSPITALIZATIONS RELATED TO PRESSURE ULCERS AMONG ADULTS 18 YEARS AND OLDER, 2006 (STATISTICAL

BRIEF #64). ROCKVILLE, MD. RETRIEVED FROM HTTPS://WWW.HCUP-US.AHRQ.GOV/REPORTS/STATBRIEFS/SB64.PDF.

SONENBLUM, S. E., & SPRIGLE, S. (2011). DISTINCT TILTING BEHAVIOURS WITH POWER TILT-IN-SPACE SYSTEMS. DISABILITY AND REHABILITATION: ASSISTIVE TECHNOLOGY, 6(6), 526-535.

WORLD HEALTH ORGANIZATION. (2001). INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH: ICF.GENEVA: WORLD HEALTH ORGANIZATION.

Angela Regier, OTD, OTR/L, ATP/SMS, received her Doctor of Occupational Therapy from Creighton University in 2007 and is a RESNA-certified Assistive Technology Professional (ATP) and Seating and Mobility Specialist (SMS). Her career has focused on neuro-rehabilitation, both inpatient and outpatient settings, specializing in wheelchair seating and mobility. She is passionate about the importance of clinicians being actively involved in the provision of complex rehab technologies to maximize independent mobility and functional outcomes. Regier is a regional clinical education manager for Permobil.

Laura Morgan, PT, DPT, MSPT, ATP, completed her master's in 2005 and doctorate in 2012 in physical therapy from Boston University. She worked at Roper Rehabilitation Hospital in Charleston, South Carolina from 2005 to 2009 and first learned about wheelchair seating at the MUSC Wheelchair Seating Clinic. This work encouraged her to pursue her Assistive Technology Professional (ATP) certification in 2007 and continue to improve the wheelchair ordering process for clients. Morgan worked for large hospital systems for several years but learned their processes did not always meet the individual needs of the wheelchair user. Physical therapists often were recommending equipment with limited understanding of the patient's home environment. Patients also had difficulty returning for follow up appointments for assessment of fit and training on new equipment. Morgan founded Life Wheels On, PC, in 2012 as a way to solve both these problems by having the wheelchair assessment and training in the client's home environment. She is the owner and lead physical therapist of Life Wheels On from 2012 to the present.

MEDICARE PROVIDES ITS OWN PRESSURE WHEN IT COMES TO SEATING

Written by: **CLAUDIA AMORTEGUI,** PRESIDENT, THE ORION CONSULTING GROUP, INC.

As the years go by, certain conversations never seem to change. When it comes to reimbursement of proper seating and positioning products, many people seem to get "stuck." It's hard to believe that it has been over 14 years since Medicare added the list of specific ICD-9 (now ICD-10) diagnoses codes that would be required for coverage of seat cushions, back cushions and positioning items, such as laterals or thigh supports.

With the amount of time that has passed since the addition of the diagnoses codes, you would think we would all be more comfortable with the policy. Unfortunately, this is not completely the case; there are still too many times when certain clients simply do not qualify because of the lack of a specific code, but everything else clinically supports the true need for the item. Within the past couple of years, a couple of diagnoses codes were added, but this still does not fill the void for a fair number of clients.

The tough cases are when you have a client with what would appear to be a valid diagnosis and also presents with the qualifying conditions, such as unable to perform a functional weight shift and/or diminished sensation in the area of contact with the seat. The issue is that their diagnosis is not on the list, for example inclusion body myositis (G72.41), therefore a specialty cushion will not be covered. This leaves everyone in a lurch. The supplier could "eat" the cost of the skin protection cushion, which is not recommended and should not be done; or the end-user will likely not get the product they truly need, leaving them at risk for pressure wounds. How does any of this sound right?

People always ask, "What can I do?" when clients fall through the cracks of reimbursement. Unfortunately, there are not many options. For those providers that are "nonparticipating" in the Medicare program, they could technically choose to file a claim nonassigned. This means the client would pay the provider's usual and customary charge for the item by the time of delivery. However, the issue is that Medicare does not allow for a claim to be split, meaning if the order is for a full wheelchair system the provider would have to file the entire claim nonassigned. For most end-users, this is not a financial option they can choose. The only other alternative is to provide the proper seating item at a financial loss; meaning, the provider will absorb the lack of Medicare reimbursement. In my opinion, neither of these are valid options.

FOR MOST END-USERS, THIS IS NOT A FINANCIAL OPTION THEY CAN CHOOSE. THE ONLY OTHER ALTERNATIVE IS TO PROVIDE THE PROPER SEATING ITEM AT A FINANCIAL LOSS; MEANING, THE PROVIDER WILL ABSORB THE LACK OF MEDICARE REIMBURSEMENT. IN MY OPINION, NEITHER OF THESE ARE VALID OPTIONS.

To make matters worse, if the client is receiving a power wheelchair with powered seating, they may not qualify for the power wheelchair base code due to the coverage issues with the seat cushion. Medicare policy states that if the client does not qualify for a specialty cushion and only qualifies for a general use cushion, they then will only cover the corresponding power wheelchair base with a captain's seat. Many people out there do not realize that such codes exist for a Group 2 power wheelchair base with single (K0836 and K0838) or Multiple Power Options (K0842) and for Group 3 power wheelchair bases with single power option (K0857 and K0859). Did

I KNOW FOR MANY IT SEEMS LIKE IT WOULD MAKE LIFE EASIER, BUT IN REALITY, THE MEDICAL DOCUMENTATION IS STILL REQUIRED, AND THESE LISTS TEND TO TRAP CERTAIN CLIENTS THAT CLINICALLY PRESENT WITH THE MEDICAL NEED, BUT JUST DO NOT SEEM TO HAVE A "PERFECT" DIAGNOSIS.

you ever feel like you should put a client in a power wheelchair with power tilt or recline that is comprised of a captain's chair? After reading this, do you feel you have had one too many drinks or drifted into an unknown land? Sadly, the policy tells us this is exactly what we should do, but realistically (and thankfully) this is not what will happen. As a provider, please do not be surprised if you receive a denial through the prior authorization process for this very reason. In this scenario, you can provide the proper power wheelchair base and bill the captain's seat version as a free upgrade. Somehow Medicare made the codes with the captain's seat an upgrade to the equivalent base with the sling/solid seating. Unfortunately, the client still will not qualify for the proper seat and/or back cushion due to the diagnosis issue.

If you do go to the Pricing, Coding and Data Analysis (PDAC) website to obtain a list of the wheelchairs with the above Healthcare Common Procedure Coding System (HCPC) codes, do not be surprised when you see numerous products. Most of these products are no longer manufactured. If they do still exist, (less than five for all the listed codes above) the power option is normally just a seat elevator, which we all know is not covered.

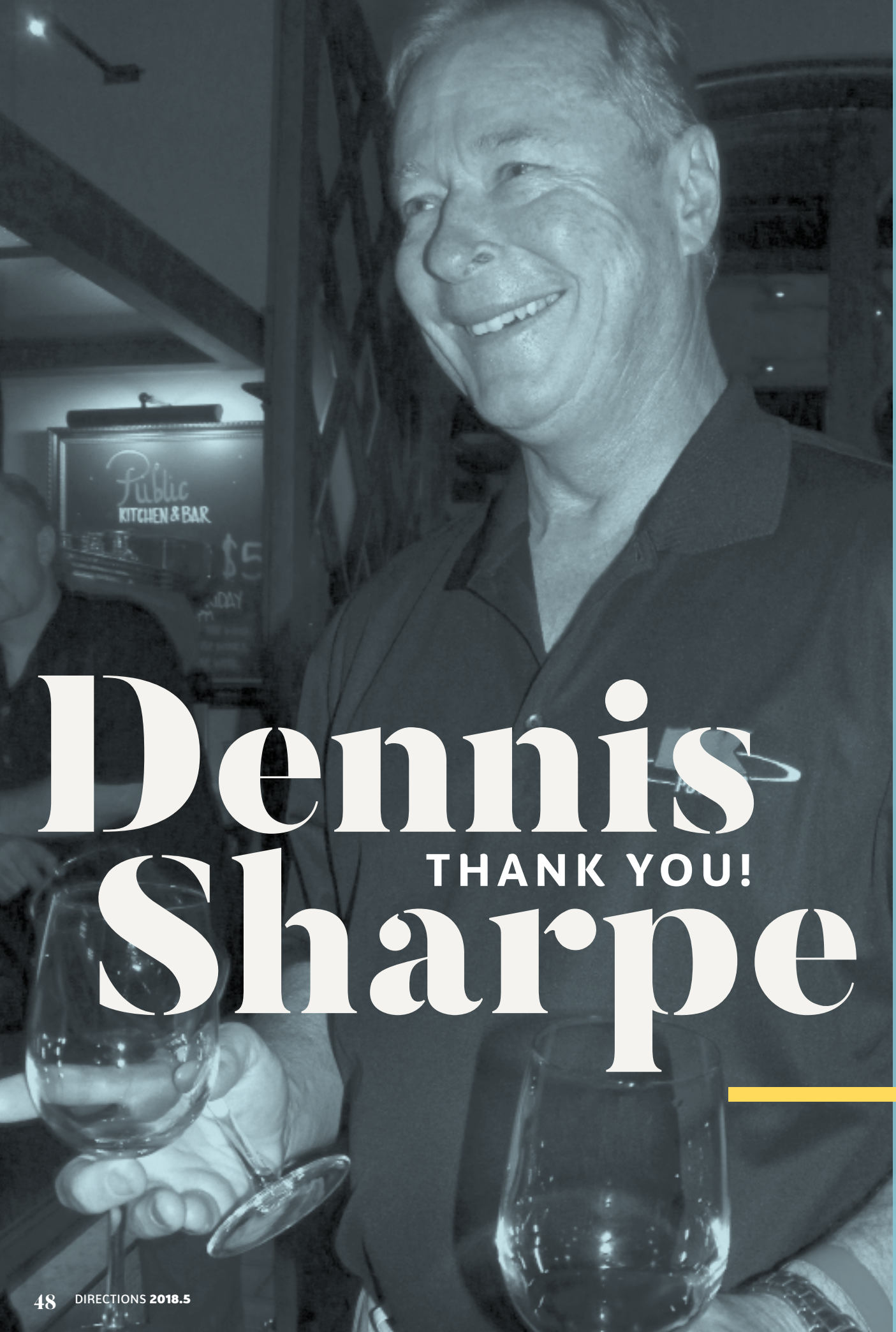
So, is there anything that can be done to add to the list of qualifying diagnoses? Yes, there actually is. A formal Local Coverage Determination (LCD) policy request may be made to the Medicare contractor. This is not necessarily a quick process, but it has been successfully done in the past. The request must contain the reason why the diagnosis should be added. Supporting clinical documentation should also be included. If possible, I strongly recommend that documentation be provided by various clinicians who are experienced in seating and positioning. This type of support should assist in the process to have the diagnosis added to the policy.

Keep in mind that coverage of a specialty seat, back and positioning items are not based on the diagnosis alone. Per policy (LCD), the client must qualify for a manual or power wheelchair, have at least one of the qualifying diagnoses and also meet the additional coverage criteria listed for the specific codes. For example, to qualify for a positioning seat, back and/or positioning items (i.e., laterals), the client must have one of the listed diagnoses for the specific HCPC code and there must be significant postural asymmetries due to that diagnosis documented in the clinical notes. This means that someone who works for the provider must read the clinical notes and understand what it would take to meet the coverage criteria. Be sure to provide the staff with the proper training to be successful in these reviews. You also want to be certain that they understand that coverage for powered seating is not driven by diagnoses codes, therefore your client could qualify for the powered seating but not the specialty seat and/or back.

When I sit back and think through all of this, I can say that I am not a big fan of having a list of diagnoses as a part of the LCD for any piece of durable medical equipment. I know for many it seems like it would make life easier, but in reality, the medical documentation is still required, and these lists tend to trap certain clients that clinically present with the medical need, but just do not seem to have a "perfect" diagnosis. This is something we should all think about as we request specific items when it comes to coverage criteria with the hope of simplifying the process. Our goal should not limit access to the appropriate products.

CONTACT THE AUTHOR
Claudia may be reached at
CLAUDIA@ORIONREIMBURSEMENT.NET

Claudia Amortegui has a Master of Business Administration and more than 20 years of experience in the DMEPOS industry. Her experience comes from having worked on all sides of the industry, including the DMEPOS Medicare contractor, supplier, manufacturer and consultant. For many of these years, Amortegui has focused on the rehab side of the industry. Her work has allowed her to understand the different nuances of complex rehab versus standard durable medical equipment. This rare combination of industry experiences enables Amortegui and her team at The Orion Group to assist ATPs, referrals, reimbursement staff and funding sources in understanding the reimbursement process as it relates to complex rehab.



Dennis Sharpe

THANK YOU!

ONE OF THE INDUSTRY'S FAVORITES RETIRED AUGUST 31, 2018. TO HONOR HIM AND HIS CONTRIBUTION TO THE CRT INDUSTRY, DIRECTIONS PUT THIS PIECE TOGETHER WITH THE HELP OF SOME OF OUR AMAZING INDUSTRY FRIENDS! THANK YOU, DENNIS!!

Dennis, you have been a true and respected leader, peer and friend for most of the 25 years I have been in this industry. You have set the standard for integrity and professionalism. You have shown the rest of us what it means to serve others and "practice what you preach" in driving positive change to this industry we call home. You have made a difference in the lives of many. Pretty awesome legacy to mark your contributions! I look forward to future visits when your travels pass through St. Louis. Best of luck always my friend!

TOM BORCHERDING

CONTINUED ON PAGE 50

In the time I've had the privilege of working with Dennis, I've learned to expect that he'll show up with a smile, an encouraging word, a passion to improve circumstances and possibly a joke or two. Thank you, Dennis, for your consistent support and hard work to better the lives of others. I wish you all the best in your retirement. Don't forget to relax a little! Cheers, my friend!

MICKAE LEE

I have known and worked with Dennis for many years on many projects in our industry. He has always believed in NRRTS and the NRRTS mission. Dennis and MK have always supported NRRTS and our total industry. He has been a leader in our industry for many years. He will be greatly missed. But now he can devote all his time to his other passion, making fine wine! Thanks Dennis for your many years, making our industry better.

JOHN ZONA, ATP, CRTS®

"WHAT COMES TO MIND WHEN I THINK OF DENNIS SHARPE ... SOMEONE WHO HAS BEEN PASSIONATE FOR THE INDUSTRY, A DEDICATED ADVOCATE, ALWAYS THERE AT TRADESHOW, CONFERENCES AND HILL VISITS, AN 'ICON' OF THIS CRAZY FIELD OF WHEELCHAIRS."

What comes to mind when I think of Dennis Sharpe … someone who has been passionate for the industry, a dedicated advocate, always there at tradeshow, conferences and Hill visits, an "icon" of this crazy field of wheelchairs. But most of all, I think of WINE and those amazing Medtrade dinners with MK Battery, where the wine was the star but delicious food came with it! Thank you, Dennis, for your dedication and friendship. You will be greatly missed!

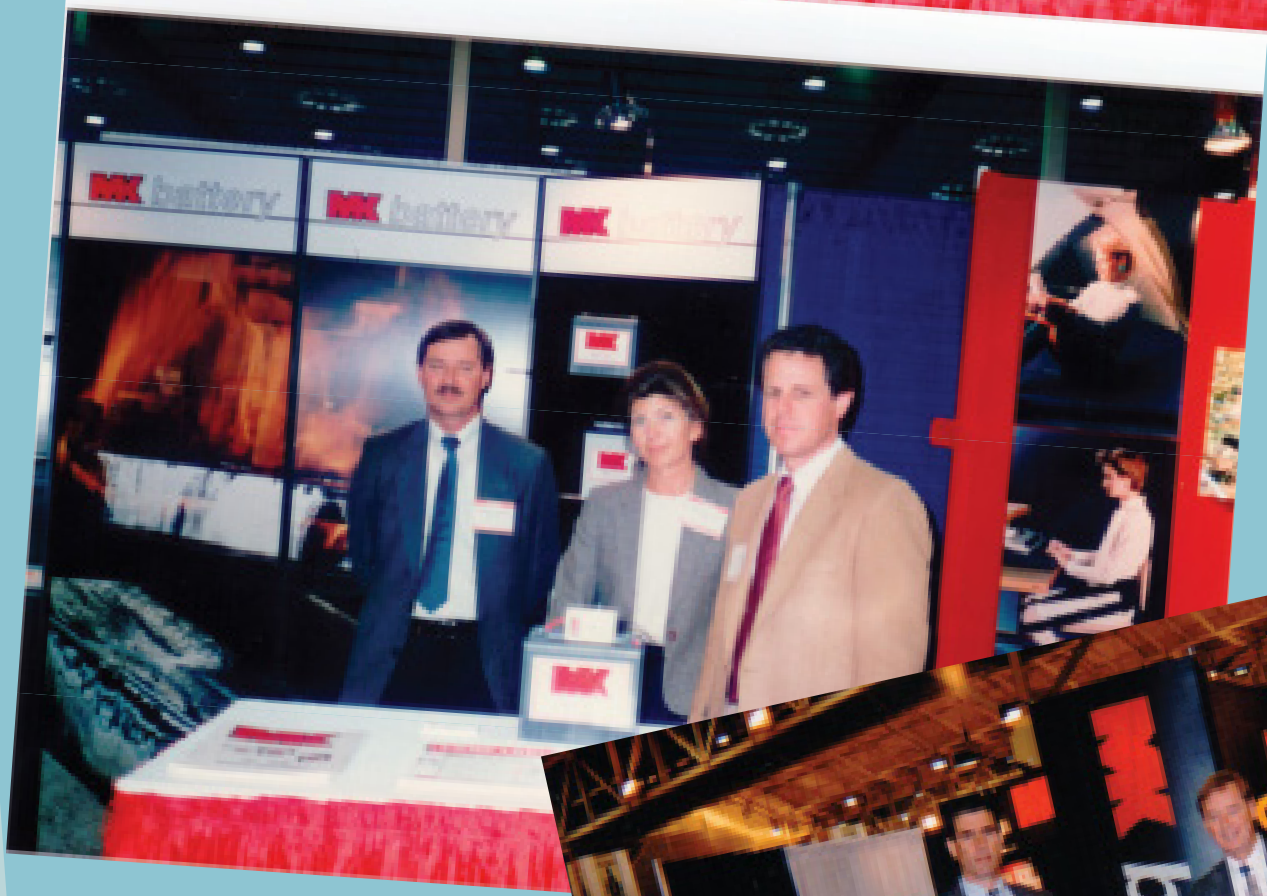
LIZ COLE

I always looked forward to seeing Dennis at our annual Complex Rehab Technology conference in Washington, D.C. I met Dennis about five years ago, and every time we get the chance to catch up we are always talking about sports, specifically his Los Angeles Dodgers and my Colorado Rockies. Dennis is very passionate about the work he does within our industry, and I will truly miss not getting to see him. Good luck, Dennis!

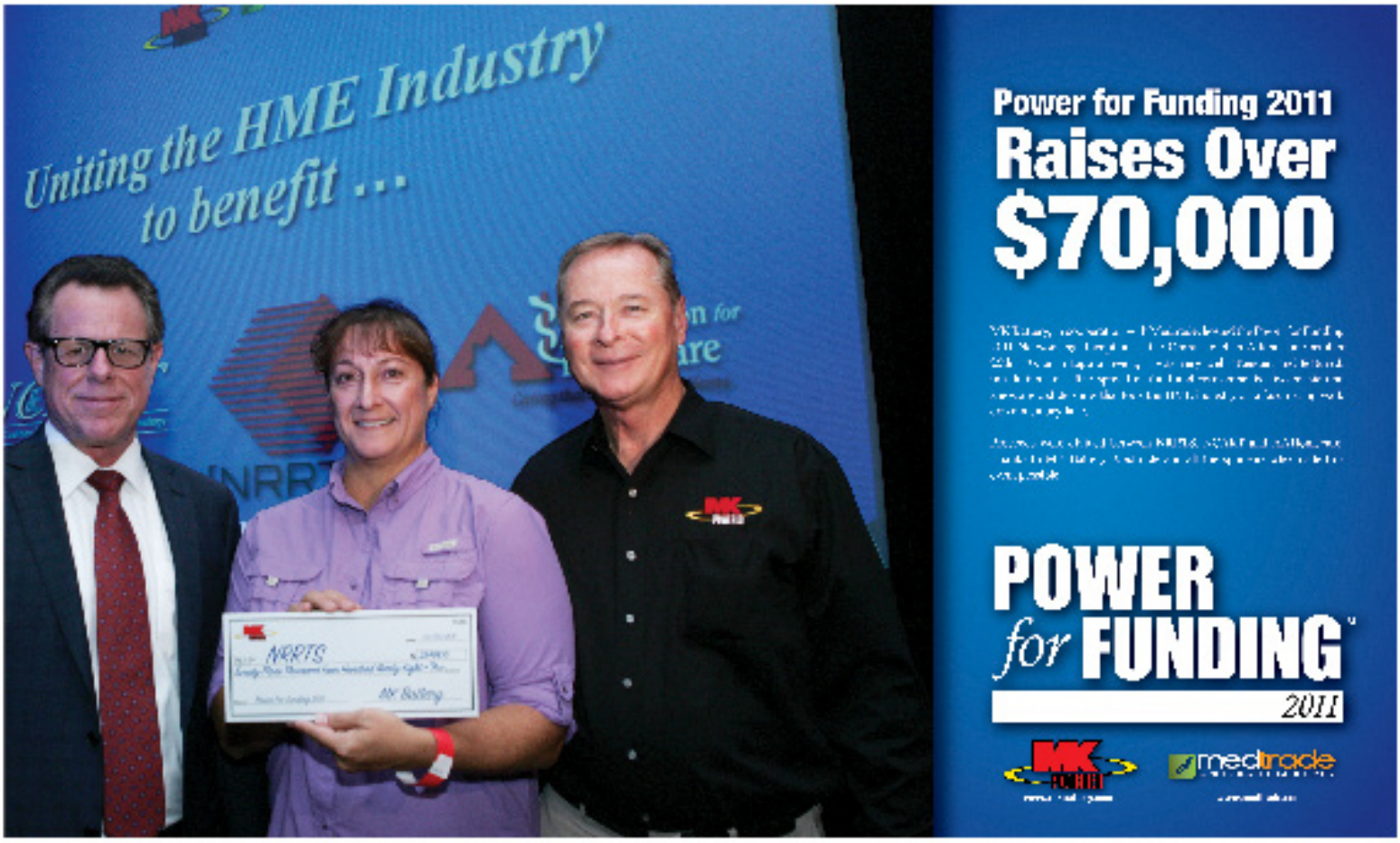
JENNY SIEGEL

CONTINUED ON PAGE 52


MK


MK battery
MK battery
MK battery


MK
MK



Dennis is a great champion for our industry. He is active at lobbying events, tradeshows and industry meetings to always speak on behalf of the consumer. I've enjoyed working with him during the years, and he always has a smile on his face. Enjoy your retirement, Dennis!

JULIE JACKSON

Dennis, after 10 years of friendship and teamwork, we will miss you greatly in Washington, D.C. every year. It won't be same without you. Congratulations on work well done and a retirement well earned.

JERAMY AND MOLLY HALE

Dennis was one of the first of many people I have met over the last 20 years in this industry. Dennis always had the right answer, encouragement and, most importantly, a smile. The wine business just got better with Dennis in their fold!

MIKE MCKILLIP

"DENNIS ALWAYS HAD THE RIGHT ANSWER, ENCOURAGEMENT AND, MOST IMPORTANTLY, A SMILE. THE WINE BUSINESS JUST GOT BETTER WITH DENNIS IN THEIR FOLD!"

Yeah Dennis! Your time has come. You have done so much for so many. I wish you the best in your retirement.

LESLIE RIGG

Dennis is known in the industry as the "Battery Answer Man," and throughout my 35 plus years knowing him he has always been helpful. MK Battery was my go-to battery source throughout my career due to his knowledge and efforts. Enjoy your retirement and your passion for the grape, Dennis.

JOHN WRIGHT

Best boss I ever had! He taught me to be tactful, thoughtful and compassionate about the end-users who used our products.

BRET TRACY, ATP

Dennis, it is beyond a pleasure to know you and call you a friend! Your dedication and accomplishments for our industry have always been outstanding and heartfelt ... you will be dearly missed. We wish you all the happiness in this next chapter of your life and look forward to sipping some fabulous vino together down the road!

Big hugs,

MARY AND BRUCE BOEGEL

Dennis - when I think about my journey within the HME industry, your image is among a select group that most positively impacted that journey. You always offered a smile, great conversation and FRIENDSHIP - and with the utmost INTEGRITY and CHARACTER. I wish you all the best!

JEFF WOODHAM

CONTINUED ON PAGE 54

"YOU ALWAYS OFFERED A SMILE, GREAT CONVERSATION AND FRIENDSHIP - AND WITH THE UTMOST INTEGRITY AND CHARACTER. I WISH YOU ALL THE BEST!

Congrats!

Dennis, congratulations on your retirement! I know you will be missed! Good luck, and please keep in touch!!

MONICA YOUNG

Dennis, congratulations on your retirement!

It is well deserved! You have been a champion of the industry for a long time, and we will all miss you! It will be strange not having three-hour dinners at Medtrade. I guess I'll have to learn to eat faster! Good luck my friend!

TIM HOFFMAN

Dennis has always been a great representative of our Complex Rehab Technology industry. Knowledgeable, dedicated, professional and caring. He's always been personally engaged and supportive of our initiatives to protect access for the people with disabilities who depend on our products and services. The good news is we know he will enjoy his "retirement." C'mon now, how can you not admire a guy who gets to retire to his vineyard and make wine? Best wishes, Dennis!

DONALD E. CLAYBACK

Dennis,

You've been a positive and steady fixture in our industry for a long time. Farewell and best wishes for a long and happy retirement in the vineyard. Thank you for all the kind words and encouragement along the way. Warmest Regards!

CODY VERRETT

It's interesting to look back on our time in the industry and reflect on the friends we made. Don't you find yourself missing some more than others? Dennis Sharpe is one I have missed and that we will all miss as he enters this new phase of his life with class and integrity. It's a great era, Dennis. Enjoy it to the fullest!

DAVID A. MILLER

“HE’S ALWAYS BEEN PERSONALLY ENGAGED AND SUPPORTIVE OF OUR INITIATIVES TO PROTECT ACCESS FOR THE PEOPLE WITH DISABILITIES WHO DEPEND ON OUR PRODUCTS AND SERVICES. THE GOOD NEWS IS WE KNOW HE WILL ENJOY HIS ‘RETIREMENT.’ C’MON NOW, HOW CAN YOU NOT ADMIRE A GUY WHO GETS TO RETIRE TO HIS VINEYARD AND MAKE WINE?”

CONTINUED ON PAGE 56

Dennis- You have been a mainstay of the industry for many years. While the industry and the patients will miss your creative and persistent approach to helping people with disabilities, I will simply miss seeing my friend. Best of luck.

WAYNE GRAU

Dennis - It was a pleasure to work with you over the years. You are part of a small contingent that played an active role in lobbying for access, driving change, "fixing" codes and defining Complex Rehab Technology. I stand with the industry to thank you for your work that made a positive impact to many of us suppliers and thousands of consumers. Now that you may have a bit more time on your hands, I hope to see the Sharpe Vineyard label hit the shelves soon! Thanks Dennis, for your friendship and many contributions. All the best.

PAUL BERGANTINO

Dennis, a true gentleman and friend of NRRTS. A friend to everyone who had the great fortune to know you. Your quiet strength and presence at industry events will be forever missed!

GERALD DICKERSON, ATP, CRTS®

Dennis Sharpe is a business partner that U.S. Rehab could not have had a better relationship with. Dennis is kind and fun to be around as well as a true partner who will help in making things happen. Business becomes easier when you deal with partners like Dennis. MK Battery will miss Dennis. Dennis will always be a friend, and we will stay in touch with him as friends are cherished here at VGM/U.S. Rehab. Please have fun in retirement, and stay in touch my friend.

GREG PACKER

Dennis, over the past three decades, I have always appreciated your knowledge of battery technologies and support of Sunrise Medical. You always have a big smile and genuinely care how your products improve the lives of individuals using power mobility devices. Enjoy your retirement; it is well deserved.

DAN CRITCHFIELD

Dennis proved not just as a champion in CRT, but in the disability community at large, having helped contribute to such life-changing legislation as the Air Carrier Access Act. He will be missed in our industry, but his legacy and life's work will continue serving generations.

MARK E. SMITH, MA

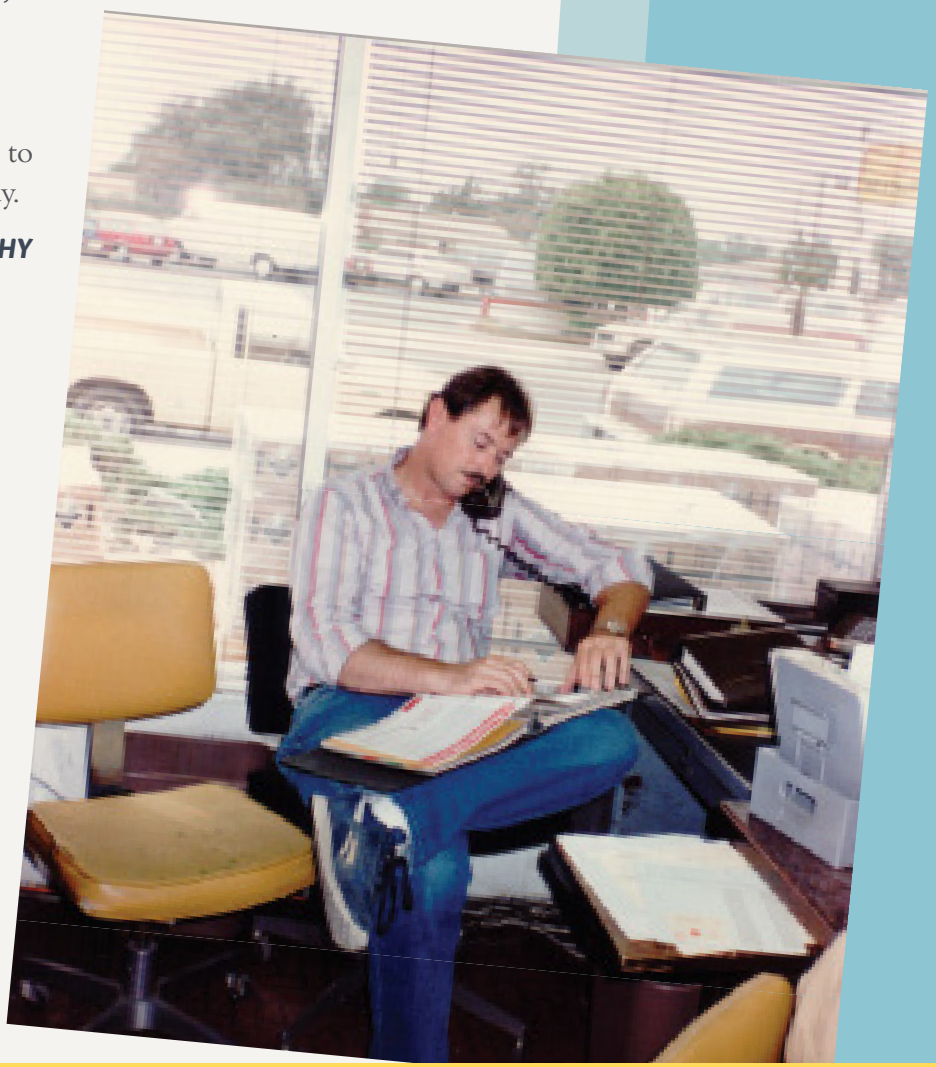
It has been an honor and a privilege to work with you. I'm even more proud and honored to call you mentor and friend. All the best, buddy.

MICHAEL MCCARTHY

When we stop and reflect on "icons in our industry." Individuals who have shown integrity, compassion and support for both the HME Providers, as well as the end-users. When we reflect on those individuals who have experienced tremendous changes over many years. When we think about those individuals who we will miss most when they retire and move on to the next chapter of their life, one person stands out … Dennis Sharpe. We wish you the very best, and thank you for your many years of service to our industry!

TERESA HILL SPARKMAN

CONTINUED ON PAGE 58



"DENNIS! YOU CAN'T RETIRE! THAT WOULD MAKE ME THE OLDEST GUY IN THE INDUSTRY! NO, NO, WAIT, THANK GOD FOR DAVE MURRAY!"

GERALD DICKERSON, ATP, CRTS®

Dennis has always been more than a business partner to those of us at MED. Dennis is a mentor, friend and resource as well as a passionate leader in the health care space. I have learned so much from Dennis about the industry and who I want to be as a person. Dennis-you will be missed more than you know. Thank you and best wishes!!!! Cheers!

RHONDA HINES

Hi Dennis, I would like to thank you for your knowledge, willingness to share it and especially your friendship over the years. I know you will be missed by everyone. We wish you the best in your retirement, and please feel free to visit anytime.

WAYNE GULLETT

Dennis, you will be missed but I hope you go onto great adventures in your retirement. Thank you for your never-ending support and for always doing the right thing.

MICHELE GUNN, ATP, CRTS®

"YOU ARE SUCH A HUMBLE AND GENUINE INDIVIDUAL WHO ALWAYS HANDLES SITUATIONS WITH GRACE AND INTEGRITY. I'VE LEARNED A LOT ABOUT HOW TO TREAT PEOPLE BY WATCHING YOU, AND I'M SO GRATEFUL YOU ARE A VALUED FRIEND AND ADVISOR. THE INDUSTRY WILL MISS YOU, AND THANK YOU FOR YOUR CONTINUED SUPPORT OF NRRTS."

I would like to send my best wishes to Dennis, and my compliments to him for all he has done for the mobility business. Dennis you are a very gracious person who always has a smile. I can only wish you the same in your wine business, which does sound a little more fun. Enjoy and best wishes.

TOBY BERGANTINO, ATP, CRTS®

As Dennis was forging his legacy in the HME business over these last 32 years, he was also developing many close friendships around the industry. I consider myself so very fortunate to be among that group of friends and for the privilege of having had him as a colleague, mentor and trusted advisor. He will forever be a member of the MK family. Best of health and happiness always, Dennis.

WAYNE MERDINGER

Dennis, thank you for all the great memories and your friendship. Best wishes and many great harvests in the future.

P.S. Don't worry! All the photos and evidence has been destroyed or buried deep from the late 80s …

MICHAEL BARNER, ATP, CRTS®

One of the very best things about our industry are the people. There is great deal of compassion and the desire to make things better for everyone involved. Dennis Sharpe is the prime example of dedication to the mission and service that make a difference in so many lives.

Dennis and I met many years ago (I can't remember how many, and I wouldn't tell if I did!). Remember a company called Abbey-Foster? I always looked forward to seeing him at the various conferences, meetings, etc. that brought us together. He has been one of the largest supporters of NRRTS over the years. We could always count on Dennis to give us a candid opinion. He has been instrumental in bringing consumers to the Hill for the CELA conference. Whenever we reached out to him, he was there.

We appreciate Dennis and wish him much happiness as he takes the new path called "retirement."

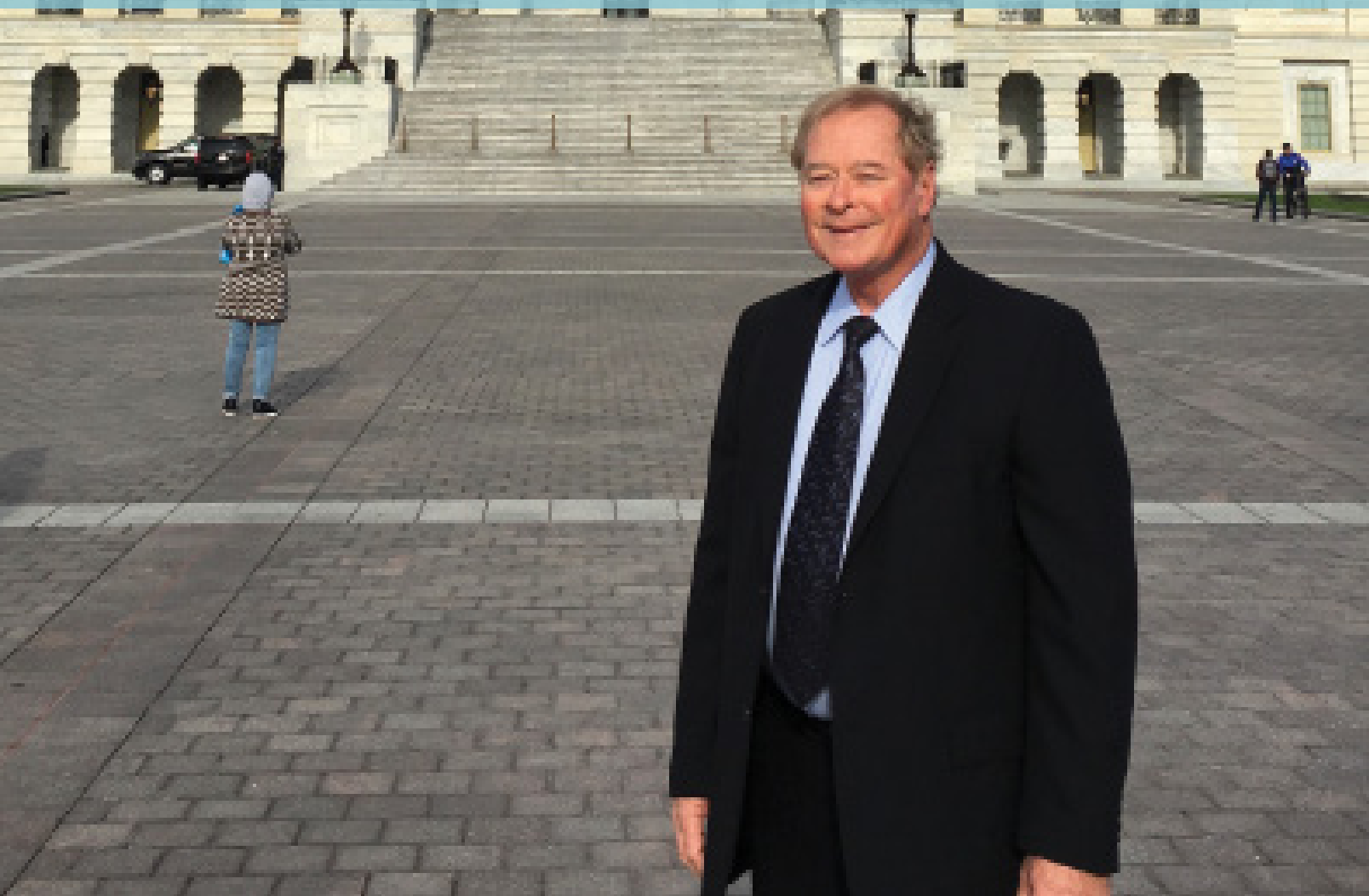
WEESIE WALKER, ATP/SMS

Thanks so much for your friendship the past 20 years. You are such a humble and genuine individual who always handles situations with grace and integrity. I've learned a lot about how to treat people by watching you, and I'm so grateful you are a valued friend and advisor. The industry will miss you, and thank you for your continued support of NRRTS. I'll look forward to seeing you very soon. CONGRATULATIONS!!!!!

AMY ODOM, B.S.

Congrats Dennis

and ***thank you*** for ***all*** that you have done!



KidWalk connections

Like nothing before it – KidWalk encourages key steps through independent hands-free exploration…supporting vital childhood development.

With KidWalk hands free means holding hands…

See where KidWalk can take your child

PRIME ENGINEERING
A Division of Action Industries

KidWalk™
Dynamic Mobility System

ph. 1.800.827.8263 | fax 1.800.800.3355
www.primeengineering.com | info@primeengineering.com

Visit YouTube and type in KidWalk to see our kids developing, learning and going places.

NEW NRRTS REGISTRANTS

Congratulations to the newest NRRTS Registrants. NAMES INCLUDED ARE FROM JULY 6 THROUGH SEPT 4, 2018.

David Anderson, ATP, CRTS®
Anderson's Medical Products
4411 South 7th St
Terre Haute, IN 47802-4392
Telephone: 812-234-6084
Fax: 812-234-5691
Registration Date: 6/5/2018

Lino Castro, RRTS®
Verio Healthcare
2060 Chicago Ave, Ste A1
Riverside, CA 92507
Telephone: 949-445-1100 x.818
Fax: 844-693-1404
Registration Date: 5/31/2018

Nicolas Diaz, RRTS®
Verio Healthcare
2060 Chicago Ave, Ste A1
Riverside, CA 92507
Telephone: 949-445-1100
Fax: 844-693-1404
Registration Date: 5/31/2018

Patrick Frey, ATP, CRTS®
National Seating & Mobility, Inc.
3417 Oakcliff Rd Ste 106
Atlanta, GA 30340
Telephone: 770-452-1450
Fax: 770-452-1398
Registration Date: 6/6/2018

Nickolas Harrison, ATP, CRTS®
National Seating & Mobility, Inc.
510 Incentive Dr
Fort Wayne, IN 46825
Telephone: 260-489-5200
Fax: 260-918-4314
Registration Date: 7/3/2018

Thomas Hedges, ATP, CRTS®
Health Aid of Ohio
5230 Hauserman Rd
Parma, OH 44130
Telephone: 216-252-3900 x.258
Fax: 216-252-4930
Registration Date: 6/13/2018

Jason Lang, ATP, CRTS®
Numotion
500 Campbell Loop, Ste 120
Hattiesburg, MS 39401-3045
Telephone: 601-602-2906
Toll Free: 800-232-6959
Fax: 601-602-2977
Registration Date: 6/6/2018

Carlos Lorenzo, RRTS®
Burbank Medical Supply
4302 W Victory Blvd
Burbank, CA 91505-1334
Telephone: 818-845-2884
Fax: 818-845-3177
Registration Date: 5/17/2018

David Morasso, ATP, CRTS®
National Seating & Mobility, Inc.
1436 E Michigan Ave
Lansing, MI 48912
Telephone: 517-803-2180 x.1126
Fax: 517-507-4743
Registration Date: 6/28/2018

James Rees, ATP, CRTS®
CoxHealth Home Support
2240 W Sunset, Ste 100
Springfield, MO 65807
Telephone: 417-269-0617
Fax: 417-269-0606
Registration Date: 5/21/2018

Keith A. Schwartz, ATP, CRTS®
National Seating & Mobility, Inc.
1190 Dell Ave Ste L
Campbell, CA 95008-6614
Telephone: 510-362-2324
Fax: 855-778-5663
Registration Date: 6/12/2018

Kimberly Vaughn, ATP, CRTS®
CoxHealth Home Support
2240 W Sunset St Ste 100
Springfield, MO 65807-6041
Telephone: 417-269-0978
Fax: 417-269-0606
Registration Date: 7/3/2018

Robert Walker, ATP, CRTS®
National Seating & Mobility, Inc.
3345 Industrial Rd, Ste 14
Santa Rosa, CA 95403-2061
Telephone: 707-575-6188
Fax: 707-575-6198
Registration Date: 7/2/2018

Kenneth White, ATP, CRTS®
CoxHealth Home Support
2240 W Sunset St Ste 100
Springfield, MO 65807-6041
Telephone: 417-269-0616
Fax: 417-269-0606
Registration Date: 7/3/2018

FORMER NRRTS REGISTRANTS

The NRRTS Board determined RRTS® and CRTS® should know who has maintained his/her registration in NRRTS, and who has not.
NAMES INCLUDED ARE FROM JULY 6 THROUGH SEPT 4, 2018.

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

Eric Grieb, OTR/L, ATP, Colorado Springs, CO
James W. Hayes, Jr., ATP, Columbia, SC
James Hutchinson, ATP, Cary, NC
Edward Waymire, ATP, Farmers Branch, TX

CRTS®

Congratulations to NRRTS Registrants recently awarded the CRTS® credential. A CRTS® receives a lapel pin signifying CRTS® or Certified Rehabilitation Technology Supplier® status and guidelines about the correct use of the credential. NAMES INCLUDED ARE FROM JULY 6 THROUGH SEPT 4, 2018.

David Anderson, ATP, CRTS®
Anderson's Medical Products
Terre Haute, IN

Andrew Cantrell, ATP, CRTS®
National Seating & Mobility, Inc.
Augusta, GA

Patrick Frey, ATP, CRTS®
National Seating & Mobility, Inc.
Atlanta, GA

Nickolas Harrison, ATP, CRTS®
National Seating & Mobility, Inc.
Fort Wayne, IN

Thomas Hedges, ATP, CRTS®
Health Aid of Ohio
Parma, OH

Jonathan Hyzak, ATP, CRTS®
ALLUMED Medical
Temple, TX

Jason Lang, ATP, CRTS®
Numotion
Hattiesburg, MS

David Morasso, ATP, CRTS®
National Seating & Mobility, Inc.
Lansing, MI

James Rees, ATP, CRTS®
CoxHealth Home Support
Springfield, MO

Keith A. Schwartz, ATP, CRTS®
National Seating & Mobility, Inc.
Campbell, CA

Kimberly Vaughn, ATP, CRTS®
CoxHealth Home Support
Springfield, MO

Robert Walker, ATP, CRTS®
National Seating & Mobility, Inc.
Santa Rosa, CA

Kenneth White, ATP, CRTS®
CoxHealth Home Support
Springfield, MO

RENEWED NRRTS REGISTRANTS

The following individuals renewed their registry with NRRTS between July 6 through Sept 4, 2018.

PLEASE NOTE **IF YOU RENEWED AFTER SEPT 4,** YOUR NAME WILL APPEAR IN A FUTURE ISSUE OF DIRECTIONS.
IF YOU RENEWED PRIOR TO JULY 6, YOUR NAME IS IN A PREVIOUS ISSUE OF DIRECTIONS.

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

Jonathan C Adams, ATP, CRTS®
David Adcox, ATP, CRTS®
Albert Alvarado, ATP, CRTS®
Phillip Belcher, ATP, CRTS®
Bryan Benton, ATP, CRTS®
Alex Biello, ATP, CRTS®
James Blair, ATP, CRTS®
James C. Bond, ATP, CRTS®
Sharon Frant Brooks, MA, OTR/L, ATP/SMS, CRTS®
Amanda Bult, RRTS®
Andrew Cantrell, ATP, CRTS®
Stephen Clark, ATP, CRTS®
Clayton D. Cole, ATP, CRTS®
Brian Coltman, ATP/SMS, CRTS®
Jason Cook, ATP, CRTS®
K. Brandon Cowart, ATP, CRTS®
Michael T. Crown, ATP, CRTS®
Jeff Cysewski, ATP, CRTS®
Michael A. Deadrick, ATP, CRTS®
Alan Derr, ATP, CRTS®
Nicholas Dodson, ATP, CRTS®
Channing Doeden, ATP, CRTS®
Michael E. Downs, ATP, CRTS®
Zeb Dugan, ATP, CRTS®
Rose Ebner, ATP/SMS, CRTS®
Gerald Erkhart, ATP, CRTS®
Jose Escobedo, ATP, CRTS®
Jesuric R. Federico, RRTS®
Julian C. Fiske, ATP, CRTS®
Kathy Fowler, ATP, CRTS®
Robert Garwood, ATP, CRTS®
Kenneth Gibbons, ATP, CRTS®
Bradley R. Gooch, MBA, ATP, CRTS®
Nancy Greco, ATP, CRTS®
Robin Grider, ATP, CRTS®
Efrain R. Guerrero, QRP, ATP, CRTS®
Lisa Hammock, ATP, CRTS®
Robert Brent Hudson, ATP, CRTS®
Ted L. Hyde, BFA, CO, FAAOP, ATP, CRTS®
Joshua Janiszewski, ATP, RRTS®
Jordan Joslin, ATP, CRTS®
Ian Kingscote, ATP
Jay Krusemark, ATP, CRTS®
Frank A. Lane, ATP, CRTS®
Stacy Lewis, ATP/SMS, CRTS®
Matthew Lippy, ATP, CRTS®
David Lucero, RRTS®
Kristen Maak, OTR/L, ATP, CRTS®
Coleman R. Mansfield, ATP/SMS, CRTS®
Paul McGuckin, ATP/SMS, CRTS®
William C. McKeon, ATP, CRTS®
Kevin J. Mooney, ATP, CRTS®
Walter Myrdal, ATP, CRTS®
Michael S. Nesbit, ATP, CRTS®
Derek W.M. Ng, ATP, CRTS®
Loretta Pender, ATP, CRTS®
Paul V. Pettini, RRTS®
Charles E. Pfeifer, ATP, CRTS®
Gregg M. Platis, ATP, CRTS®
Ryan J. Romero, ATP, CRTS®
Kevin Ross-Jenkinson, ATP, CRTS®
Jim Royan, RRTS®
N. Jose Salazar, ATP, CRTS®
Michael P. Seidel, ATP, CRTS®
Patrick Shea, ATP, CRTS®
Kenny Singleton, RRTS®
Britt Sitzes, ATP, CRTS®
Eric T. Smith, ATP, CRTS®
Jason P. Steiner, ATP, CRTS®
Kirsten M. Stellmaker, ATP, CRTS®
Gregg Stevens, ATP, CRTS®
Tracy Luedtke Sveum, ATP, CRTS®
Phillip D. Swanson, ATP, CRTS®
Michael Thayer, ATP, CRTS®
David C. Vaughan, ATP, CRTS®
Robert E. White, ATP, CRTS®
Michael Witherington, ATP, CRTS®
David Wix, ATP, CRTS®
Joe Wood, RRTS®
Manuel Yzquierdo, ATP, CRTS®

FRIENDS OF NRRTS [FONS]

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

CHARTER CFONS

FREEDOM — Our kids are our passion.™
INVACARE — Yes, you can.
THE MED GROUP — An MHA Company — Connecting Partners, Delivering Results™
MK POWERED
NATIONAL SEATING & MOBILITY
permobil
Convaid | R82
SUNRISE MEDICAL
U.S. REHAB®

CFONS

AEL
merits — With you for life
Avid Rehab — KEEP MOVING
Bodypoint®
EasyStand
FREEDOM Concepts — CREATING A CYCLE OF mobility
Inspired by drive
Ki Mobility — Better by Design
METALCRAFT
MOTION COMPOSITES
Motion Concepts
numotion — Mobility starts here.
PRIME ENGINEERING
PRM — THE POWER OF PRECISION
QUANTUM®
RAZ
RIDE
rifton — Products for life from people who care.™
Stealth Products — Solutions For Life®
50TH Anniversary Therafin Corporation
Thomashilfen — North America
VARILITE

AFONS

Big Sky
Children's
G·A·M·E·S — Georgia Association of Medical Equipment Suppliers
HOMES
MAMES
Midwest Association of Medical Equipment Services
NCART
PAMS
RESNA
TEXAS REHAB PROVIDER'S COUNCIL
United Spinal Association
UCP | Wheels for Humanity


Ready for
take off
TiLite Pilot
Watch your kid soar in the
ultra-lightweight TiLite Pilot.
Finally, a chair that moves
and grows with your child.
permobil
Find out more at permobilus.com/pilot

The National Registry of Rehabilitation Technology Suppliers
5815 82nd Street, Suite 145, Box 317
Lubbock, TX 79424

P > 800.976.7787
F > 888.251.3234

www.nrrts.org

IMPORTANT CHANGE FOR NRRTS APPLICANTS

NRRTS Board has approved awarding the CRTS® designation under the following criteria:

- *Applicant must have documented a minimum of three years of experience providing direct service to CRT Consumers;*
- *Be an ATP in good standing for minimum of three years at time of application; and*
- *Complete the Application for Registry or Renewal to the satisfaction of the review chair within the time frame.*

***Current NRRTS Registrants who meet the criteria will be awarded CRTS®*

For more information, contact
Weesie Walker at **wwalker@nrrts.org**