Welcome to our Spring/Summer Newsletter!

The ‘Academy of Neurologic Physical Therapy’ elections have concluded, and it is with great enthusiasm we welcome our newest member to the SCI SIG Nominating Committee, *Cathy Larson, PT, PhD*. Cathy hails from the University of Michigan, Flint campus and has worked in neurorehabilitation and studied SCI for many years. Congratulations are also extended to *Meghan Joyce, PT, DPT, NCS* who was elected to a second term as Vice Chair and *Rachel Tappan, PT, DPT, NCS* who has accepted the Chair Elect position. Finally, our sincere gratitude goes out to *Twala Maresh, PT, DPT, NCS, ATP* for agreeing to stay on another year as Nominating Committee Chairperson while Rachel transitions to her new position as Chair Elect. Thank you, everyone, for your generosity of spirit and commitment to our SCI SIG!

Thanks are also in order for *Jeff Kleim, PhD* and *Candy Tefertiller, PT, DPT, NCS* for their excellent presentation at CSM 2016 in Anaheim, CA on the recovery of locomotion after SCI. Turn to page 3 for brief summaries of SCI-related CSM presentations, as well as, from the recent IV STEP conference. Dr. Tefertiller’s handout is posted under the “New and Noteworthy” section of our SCI SIG webpage.

If you are like me and find it challenging to keep up with all the literature that is being published these days, consider ‘reading’ all those journal articles while driving! I haven’t lost my mind, I just recently discovered voice reader apps; *Vbookz* and *NaturalReader* are free apps for the iphone, however, you have to pay a small fee to use them after the trial period ends. *Voice Dream Reader* has great reviews for not being as robotic sounding but costs more (currently $15). And there is *VoxDox* for all you Android users out there. These apps actually read aloud your pdf documents while you……drive, garden, exercise, etc! This is not an invitation to never-stopping-working…..just a potential way to keep up with material that is very interesting and relevant to you clinically, but that you have difficulty finding a time when you can actually look at it otherwise! Some people find that reading and hearing the words at the same time actually helps with comprehension. Try a free download to see if it might be right for you.

Good luck to all who signed up to take the Neurologic Clinical Specialist Certification (NCS) exam. The deadline for registering for the exam is/was July 31st, 2016 but you actually take the test the following February/March. Please see [www.abpts.org/Certification/Neurology](http://www.abpts.org/Certification/Neurology) for more details. There are on-line APTA resources, as well as, study groups developing to help you prepare for this exam.

And lastly, while coordinating this newsletter effort, *Timothy Faw, PT, DPT, NCS*, seeks to continue the conversation on SCI and Aging with a focus on psychological adjustment as someone with SCI ‘ages’. Our expert for this article is *Lauren Stutts, PhD*, who hails from the Medical Humanities Department at Davidson University in North Carolina. Read about “post traumatic growth” and ways that clinicians can help to increase successful aging in persons with SCI. Finally, see our Clinician’s Corner section where *Candy Tefertiller, PT, DPT, NCS* is highlighted. Dr. Tefertiller takes us through her professional journey to becoming a leader in the physical therapy profession and aspiring researcher in SCI populations. We are grateful to all for your contributions to this newsletter!

**Until Next Time….stay cool!**

Karen J. Hutchinson

**SCI SIG Officers:**
- Karen J. Hutchinson, Chair
- Rachel Tappan, Chair Elect
- Meghan Joyce, Vice Chair
- Casey Kandikakis, Secretary
- Twala Maresh, Chair, Nominating Com.
- Timothy Faw, Nominating Com.
- Cathy Larson, Nominating Com.

**Inside this issue:**
- Letter from the Chair
- SCI SIG News and Upcoming Conferences
- CSM 2016 and IV Step Recap
- Psychological Aspects of Aging with SCI
- Clinician’s Corner: Candy Tefertiller, PT, DPT, NCS, ATP

**Next Issue:** Integumentary Concerns post SCI
SIG Awards!

Rachel Tappan, PT, DPT, NCS was awarded the 2016 APTA Neurology Section Award for Clinical Excellence in Neurology. This prestigious award recognizes one individual each year who has demonstrated clinical expertise in neurologic physical therapy, contributed to the overall development of physical therapy as a caring and scientific profession, and shared their clinical expertise by mentoring others.

Timothy Faw, PT, DPT, NCS was awarded a Promotion of Doctoral Studies Level I Scholarship as well as the Patricia Leahy Award from the Foundation for Physical Therapy for his research project entitled “Myelin Plasticity During Motor Learning After Spinal Cord Injury”. PODS awards are designed to support individuals pursuing post-professional doctoral studies. Congratulations, Tim!

If you or someone you know has been acknowledged with an award, please let us know so we can feature them in upcoming newsletters!

Upcoming Educational Conferences

Academy of Spinal Cord Injury Professionals 2016 Educational Conference and Expo
Location: Nashville, TN
Meeting: September 4 - 7, 2016
The Academy of Spinal Cord Injury Professionals (ASCIP) is an interdisciplinary organization dedicated to advancing the care of people with spinal cord injury/disorder (SCI/D). The 2016 Educational Conference will focus on cutting edge and innovative strategies to promote and achieve successful outcomes following SCI/D. It is essential for the professionals working in SCI/D to stay current with recent advances and technology. This conference will provide a venue to promote optimal quality of life as it relates to SCI/D medicine and rehabilitation.

International Spinal Cord Society 2016 Annual Scientific Meeting
Location: Vienna, Austria
Meeting: September 14 - 16, 2016
The ISCoS 2016 Annual Scientific Meeting is being held in Vienna Austria. It promises to be another well organized meeting which all of you will enjoy and appreciate. Interaction between participants and the successful formula of combining the exhibition and poster areas will be key elements for the Meeting, which will be of interest to clinicians, therapists, scientists, nurses, caregivers and people living with spinal cord injury.

American Congress of Rehabilitation Medicine 2016 Annual Conference
Location: Chicago, IL
Meeting: October 30 - November 4, 2016
The ACRM Annual Conference is the largest conference in the world for interdisciplinary rehabilitation research. Attracting leading researchers from more than 60 countries, it is one of the “must-attend” events of the year. ACRM brings together an interdisciplinary mix of rehabilitation professionals from around the world to learn about cutting-edge research and its translation into clinical practice to improve the quality of life experienced by people with disabilities.

Society for Neuroscience — Neuroscience 2016
Location: San Diego, CA
Meeting: November 12 - 16, 2016
Neuroscience 2016 will take place November 12-16 at the San Diego Convention Center. Join more than 30,000 colleagues from more than 80 countries at the world’s largest marketplace of ideas and tools for global neuroscience. SfN’s 46th annual meeting is the premier venue for neuroscientists to present emerging science, learn from experts, collaborate with peers, explore new tools and technologies, and advance careers.
2016 Conference Recaps

Over 11,000 people attended the 2016 Combined Sections Meeting (CSM) of the American Physical Therapy Association, held from February 17-20th at the Anaheim Convention Center in Anaheim, CA. The programming this year offered exceptional educational curriculum spanning the continuum of neurological dysfunction including spinal cord injury and disease. The conference provided a wide array of presentations including preconference workshops, keynote and plenary sessions, over 1000 posters, vendor hall, and tremendous education on key areas of neurologic practice and research. The CSM team is looking forward to another successful educational conference and expo next year in San Antonio, Texas. For more information and/or resources please visit www.apta.org/CSM.

Submitted by Timothy D. Faw, PT, DPT, NCS

Walking Recovery After SCI: Translating Lessons From the Lab Into Clinical Practice

Presented by Jeffrey Kleim, PhD and Candy Tefertiller, PT, DPT, ATP, NCS. The principles of plasticity of the central nervous system were outlined and laid the foundation for the presentation of current interventions as well as emerging interventions that may maximize motor learning, including brain stimulation techniques and pharmacogenetics. Two cases were presented of people with SCI who underwent intensive physical therapy incorporating the principles of neuroplasticity in order to maximize recovery of walking.

Submitted by Rachel Tappan, PT, DPT, NCS

Advanced Roles of Physical Therapy in Spinal Cord Injury: A Model for Lifelong Care

On Thursday, Martin Kilbane, PT, DPT, OCS, used a new Veterans Health Administration model to demonstrate how it is possible to treat people with spinal cord injuries throughout their lifespan as an integral part of the multi-disciplinary team. He discussed physical therapists’ need to be present for each new stage of functional mobility such as wheelchair fitting, sports adaptations and training, and prevention/wellness programs.

Submitted by Alyssa Moore, PT

Optimizing Exercise Effects on Neuroplasticity to Promote Motor Rehabilitation

Neuroplasticity is perhaps the driving factor underlying recovery from neurologic dysfunction. As physical therapists, we structure rehabilitation programs to promote adaptive neuroplasticity in order to ultimately enhance function. Work by Cameron Mang, BPE, MSc, PhD in the Brain Behaviour Lab of Lara Boyd, PT, PhD shows that a single bout of high-intensity aerobic exercise can enhance motor learning when followed immediately by a paired motor skill training. These effects are thought to be the result of a systemic increase of brain-derived neurotrophic factor (BDNF) following high-intensity aerobic exercise that in turn facilitates neuroplasticity. Although this work was performed in healthy individuals, the findings have exciting implications for neurorehabilitation.

Submitted by Timothy D. Faw, PT, DPT, NCS

Linking Remote Lesion Effects to Recovery After SCI

SCI enthusiasts were spell bound by the contributions from animal models of SCI that were presented during this session. Utilizing the contusion model of SCI in rodents, Michele Basso, PT, EdD, Associate Director of the School of Health And Rehabilitation Sciences at The Ohio State University, and doctoral candidate, Timothy Faw, PT, DPT, NCS, presented their data on the cellular mechanisms of inflammation after injury at acute and chronic time points. They studied inflammatory responses (microglial) that occur in the spinal cord up to 10 segments below injury epicenter and showed remarkable video footage of recovery of walking after those immunological responses were modulated. This is an exciting area of research that has direct application to human SCI and is sure to be a key area of investigation of SCI recovery for years to come.

Submitted by Karen Hutchinson, PhD, PT

IV STEP Conference 2016: Focusing on the 4 P’s - Prevention, Prediction, Plasticity, and Participation, IV Step 2016 recently convened at The Ohio State University from 7/14-7/19/2016. Excellent dialogue ensued on the importance of sub-classifying movement system diagnoses in contrast to medical diagnoses, as well as introducing the term ‘at risk’ diagnoses. Here are just a smattering of terms and concepts to peak your curiosity: use a common battery of outcome measures to make better predictions and compare interventions; epidural stimulation, epigenetics, eletrocorticography, and telehealth, are all coming our way! New strategies to combat obesity, the utility of accelerometry measurements, inflammatory markers and “walkability indexes” were discussed; follow-up post PT D/C; more carefully assess ‘non-responders’; high intensity training-differences in UE vs LE outcomes; supporting improved self-efficacy; personally or socially engaging and meaningful participation! And that reflects only SOME of the conversation! It was a fantastic week of substantive and purposeful discussions. In January 2017, JNPT will publish an article on each of the platform sessions. You won’t want to miss it!

Submitted by Karen Hutchinson, PhD, PT
The life expectancy for individuals with spinal cord injuries has increased over the last several decades due to advances in medicine and technology (Middleton, Dayton, Walsh, Rutkowski, Leong, and Duong, 2012). Therefore, the effect of aging on psychological functioning needs to be explored. In the general population, aging has typically been characterized by higher positive affect and lower negative affect (Charles & Piazza, 2009). It is often seen as a time of financial security, retirement, and time spent on leisure activities. However, does aging have those psychological benefits for individuals with spinal cord injury?

Researchers have extensively explored the effect of spinal cord injury on individuals’ emotional functioning around the time of injury. Individuals with spinal cord injury during the acute time of injury typically experience higher negative affect following injury compared to able-bodied peers, but there is typically not a difference in psychological functioning two years post-injury (Kennedy & Rogers, 2000). However, less is known about the psychological adjustment over time with spinal cord injury. The studies that have been conducted have produced contradictory findings. For example, one study found that aging adults with spinal cord injuries did not experience those age-related benefits compared to non-injured aging adults; instead, they found that psychological functioning instead remained the same over time (Piazza, Charles, Luong, & Almeida, 2015). As such, if you were depressed earlier in life with spinal cord injury, you would likely still be depressed later in life. Moreover, research has found that disability in older adults is associated with depression (Barry, Soulos, Murphy, Kasl, & Gill, 2013). Similarly, another study found that quality of life remained stable during the aging process (Charlifue & Gerhart, 1999). However, one study found that injury duration is associated with an increase in life satisfaction (Dowler, Richards, Putzeke, Gordon, & Tate, 2001). Clearly, there is a mixture of negative and positive aspects of aging that need to be explored.

**Negative Aspects of Aging with SCI**

There are many age-related changes that make life more challenging for individuals with spinal cord injuries. Physical, cognitive, and social changes all can negatively affect one psychologically. In general, individuals with physical disabilities are at risk for comorbid conditions such as cardiovascular disease and diabetes (Smith, Molten, and Jensen 2016). Specific to spinal cord injury, individuals experience more wear and tear on their bodies, particularly in their shoulder area, as shoulders are not designed to push a wheelchair for decades (Arnet, van Drongelen, Scheel-Sailer, van der Woude, & Veeger 2001). Individuals may have to undergo shoulder surgery, which often results in a loss of independence for months during the healing process. The individuals may also experience an increase in fractures due to osteoporosis, and/or kidney problems, among other comorbid conditions. All of these medical complications can lead to loss of independence, which can cause a need for psychological adjustment.

Cognitively, aging is associated with a decline in cognitive functions (Park, O’Connell, & Thomson 2003). While intelligence does not change, attention and working memory abilities decrease. Individuals with spinal cord injuries need to engage in daily tasks that require attention and memory (e.g., remember to relieve pressure, take medicines, etc.); therefore, cognitive decline can again reduce independence and require more assistance.

In addition to physical and cognitive changes, aging is associated with a decline in the number of social contacts (Cornwell, Laumann, & Schumm 2008). Individuals are sometimes more restricted to the home due to loss of driving ability. Unfortunately, at home activities such as watching television, listening to the radio, and spending time on the computer are not associated with social connectedness (Toepoel 2013). On the other hand, social support is associated with increased physical and psychological functioning (Muller, Peter, Cieza, & Geyh 2011), and social participation can even predict one’s quality of life with a spinal cord injury (Erosa, Berry, Elliott, Underhill, & Fine 2014). In particular, individuals who are married with spinal cord injury have higher life satisfaction and quality of life than individuals who are not married (Holicky & Charlifue 1999). However, those who have lost spouses during the aging process will be without meaningful support. The overall combination of physical, cognitive, and social changes can require significant psychological distress and adjustment or individuals with spinal cord injury.

**Positive Aspects of Aging with SCI**

Although there are many disadvantages to aging, there are also advantages to note. Over time, comfort level with spinal cord injury largely increases. The body strengthens the muscles it has access to and accustoms to a different means of mobility. Overall, as time passes, individuals’ acceptance of their spinal cord injury also increases (Woodrich & Patterson 1983). Moreover, with advancing time and technology, higher quality medications, and physical aids are typically available which can lead to increased independence and convenience.

Psychologically, individuals can even develop positive feelings about their disability over time. Individuals who are engaged in life, interpret social comparison in a positive way, and accept themselves tend to have a more positive adjustment (Dibb, Ellis-Hill, Donovan-Hall, Burridge, Rushton 2014). Some individuals report experiencing “posttraumatic growth,” which refers to a positive psychological change in response to a challenging experience (Tedeschi & Calhoun 2004). Posttraumatic growth has five main areas in which people typically report positive change: personal growth, spiritual change, appreciation of life, new possibilities, and relating to others. For individuals with spinal cord injuries, it has been found that they often rate personal strength as the highest of those areas (Pollard & Kennedy 2007). This type of positive psychological coping can certainly be effective during the aging process.
Another positive benefit of aging is the increasing comfort level of society with people with disabilities. Since the American Disabilities Act was signed in 1990, individuals with disabilities have received more inclusion and participation in most aspects of life (Gostin 2015). Public spaces are required to be accessible, which allows individuals of all ages and ranges of mobility to participate in society. Moreover, individuals with disabilities are more commonly included in the media; for example, a reality TV show called *Push Girls* highlighted life in a wheelchair across four women with disabilities. Characters with physical disabilities have also been featured on hit shows like *Breaking Bad*, *House*, *Glee*, *Friday Night Lights*, and *Family Guy*. These representations have helped people become exposed to individuals with disabilities as valuable humans in society. This type of positive inclusion will only likely continue to increase as the population of individuals with disability ages.

### How to Increase Successful Aging

While many of the disadvantages of aging cannot be avoided, we can focus on how to help individuals age as optimally as possible. Successful aging has been defined as consisting of three components: low probability of disease and disease-related disability, high cognitive and physical functioning, and active engagement with life (Rowe & Kahn 1997). Those three areas should be of focus for individuals with spinal cord injuries.

Specific recommendations are as follows:

- Be as physically active as possible (e.g., lift weights, go pushing)
- Stay on top of the newest technologies to remain as independent as possible
- Accept and solicit help from others when needed
- Engage in “brain fitness” like crossword puzzles and reading
- Develop & maintain strong relationships with friends & family
- Be involved in the SCI community (e.g., join local support groups, participate in online forums or Facebook groups, subscribe to *New Mobility* magazine
- Work or volunteer to have a sense of purpose
- Focus on the present
- Engage in gratitude exercises (e.g., write 3 good things that happened at the end of each day)

### Conclusion

Aging with spinal cord injury is a challenging area of investigation. It is difficult to separate out what aspects of normal aging lead to psychological distress/happiness versus aspects related to spinal cord injury. Quantifying happiness and quality of life is also wrought with methodological problems and subjective biases. In addition, there is high variability among injuries and human traits that make it impossible to develop a universal solution. That said, there are a number of ways we can focus on optimizing the aging process for individuals by reducing disability as much as possible, increasing functioning, and increasing active engagement in life. Future studies should continue to examine how individuals with spinal cord injury adjust to aging and how clinicians can best work to optimize their quality of life.

### References:

I currently work at Craig Hospital which is a specialty rehabilitation hospital focused on treating individuals with spinal cord injuries and traumatic brain injuries. I'm the director of the physical therapy department which includes both brain injury (BI) and spinal cord injury (SCI) as well as our community fitness and wellness center. I serve as the director of the NRN for Craig Hospital and I've also had the opportunity to be the principle investigator on several research studies at Craig over the last few years.

I first became interested in physical therapy through my experiences as a high school and college athlete. After undergoing a bilateral ACL reconstruction, my interest in sport medicine and rehabilitation peaked. However, just prior to attending PT school, my sister sustained a neurologic injury and I immediately became fascinated by all aspects of the nervous system which continued throughout physical therapy school. I attended East Caroline University for PT school and had really great neuro instructors who also inspired me to want to practice in that setting. I was very fortunate to get a specialty spinal cord injury internship at Cardinal Hill Rehabilitation Hospital in Lexington, KY as my last clinical affiliation. Although I felt overwhelmed and not prepared for the first couple of weeks of that internship, I immediately knew I had found my passion. I had an amazing clinical experience there and upon graduation began looking for a job in the neuro field. However, PT jobs were actually difficult to find in 2000 and I wasn't able to find a job in a neurologic specialty field at that time. So, I took an acute care position in rural South Carolina and spent my first year out of school expanding my knowledge in the acute care setting. After that first year, a full-time position on the rehabilitation team at Roger C Peace Rehabilitation Hospital in Greenville, SC became available and I was offered the position for which I gladly accepted. While at RCP, I was on a SCI team which meant that I saw a variety of diagnosis including SCI, orthopedics, and stroke. I also had the opportunity to learn from a very skilled physical therapy assistant, Shannon Galloway, who served as a mentor and friend to me. She taught me most of what I know about spinal cord injury rehabilitation and taught me that humor and compassion went hand in hand. Shannon inspired me to want to learn more and I knew that Shepherd Center in Atlanta, GA would be an excellent facility to continue my growth.

I began working at Shepherd Center in 2005 and had the opportunity to work in their Day Program and I also had the opportunity to assist with starting an activity-based program there called Beyond Therapy. I was able to spend another 4 years helping to grow that program which spurred my excitement for program development. During those 4 years, I was also exposed to several research opportunities and I became really motivated by the opportunity to begin answering some of my clinical questions focused on restoring mobility after SCI and TBI. I was not only motivated by trying to answer questions about which interventions were most efficacious for which patients along their recovery process, but I also became motivated to fill unmet needs of these special populations, as many individuals who had no opportunity for continued therapy due to financial constraints could potentially benefit from participating in research studies. While at Shepherd Center, Mike Jones, PhD, served as a research mentor to me and gave me the opportunity to get involved in a study that had been funded to evaluate clinical algorithms that I had developed and was utilizing when treating individuals with chronic neurologic conditions who had the goal of returning to upright mobility. That opportunity further fueled my goal to begin answering some of my own clinical questions. To continue my professional development, I received a neurologic clinical specialist (NCS) certification in 2008 and a transitional doctorate degree in physical therapy from Rocky Mountain Health Care University in 2009.

Continued on the next page...
Clinician’s Corner (Cont’d):

I had the opportunity to move to Colorado in 2010 to become the director of physical therapy at Craig Hospital where I have had many great opportunities to be involved in program development and research. Within six months of arriving at Craig, senior administration had raised over 2 million dollars to allow us to start building the PEAK Center (pictured below). The PEAK Center is a fully adapted fitness and wellness center that focuses on promoting recovery and wellness after neurologic injury for inpatients, outpatients and community members in the Denver area. The PEAK is staffed with physical therapists and exercise specialists who are knowledgeable in neurologic rehabilitation and who have the most advanced technologies available to maximize recovery after neurologic insult. The PEAK Center serves ~90 individuals from the community each week who have some form of neurologic insult and promotes a positive environment of health and wellness. The PEAK Center has also supported multiple research studies with future studies planned.

I’m currently pursuing a PhD in Clinical Sciences at the University of Colorado with the support of Craig. I'm naturally a very inquisitive person and I love science so gaining a more solid foundation in research practice is very appealing with the hope of shaping clinical practice and advancing the care provided to individuals with neurologic injuries. Working full-time and getting my PhD is challenging, but I love research and I knew that I needed to have a better understanding of the research process if I was ever going to be able to impact care in a really positive way. I don’t have a lot of free time, but I love my job and I love learning so it’s a good fit for now. I would like to develop a translational research lab at Craig after I finish my PhD so that interventions found beneficial in the lab can make a natural transition to clinical care while also allowing space for true clinical questions to flow over to the lab for investigation. While at Craig, I’ve also had really supportive mentors both from administration as well as the research department who have allowed me to continue growing and learning in many ways. I’m really thankful to Dana Polonsky, PT and vice president of clinical services, who has supported me to develop unique clinical programs and to Cindy Harrison-Felix, PhD, director of research, who has given me the opportunity to be involved in multiple research projects.

My next steps are focused on finishing my PhD with the ultimate goal of building a translational research lab at Craig. I hope that a PhD will allow me to investigate more of my clinical questions while also engaging and mentoring other clinical staff who have the desire to get involved in research with the ultimate goal of providing optimal care to the patients that we serve.

Advice for young clinicians interested in SCI research,

- Be passionate about what you do and continue asking questions about the standard of care being provided.
- Find mentors along the way who will collaborate with you while also challenging you to grow.
- Finally, work for organization who are focused on advancing the clinical standard of care while also making research a priority to help move the field of neurologic recovery forward.