

spinal cord injury

UPDATE

Department of Rehabilitation Medicine

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Working to Walk (W2W) 2008 A Day with SCI Cure Scientists

By Kate Willette

*Kate Willette's husband, Bruce Hanson, sustained a C-6 injury in March, 2001. Both of them are active in the movement for a cure. Kate posted live on the Care Cure Web site (<http://sci.rutgers.edu/>) from the Working to Walk 2008 conference in April. She is the author of a popular memoir about her family's first year following Bruce's injury, *Some Things Are Unbreakable* (available from Amazon.com). She lives in Bellevue, Washington.*

The Beginning

The story of the 4th annual Working to Walk (W2W) Rally for a Cure in Washington, DC, begins on October 10th, 2004, the day Christopher Reeve died. He had been the most famous quadriplegic in the world, and his death devastated the people who had come to depend on him as the public face of SCI and its most passionate voice for a cure. With Chris Reeve gone,

who would speak for people living with spinal cord injury?

In the first weeks after his death a small band of women who had known one another only through the CareCure internet message board came together to pick up where he left off. From their computers around the United States, they created a new entity: a group they called Unite to Fight Paralysis (U2FP). Their first project was a one-day rally in Washington DC, which they pulled off—with a little help from the Christopher Reeve Paralysis Foundation—just six months after Reeve's death. Each year since then they've expanded and strengthened the event. W2W now includes corporate sponsors, big name speakers, a day-long science symposium, tips and tools for meeting with legislators, and most importantly a chance to lift the burden of isolation and helplessness. At W2W, people learn to become advocates.

Researchers + SCI Cure Advocates = Energy

This article is focused on the first day of W2W 2008—an encouraging, demanding day spent learning about the most promising areas of research from the people closest to the action. There was plenty of good news for a community that has heard little but promises. The basic puzzle of repairing the injured spinal cord is well known: when a cord is damaged, it becomes like a pocket of scorched earth. Scar tissue forms a barrier thick as rock. Axon growth inhibitors

and myelin killers appear like tenacious weeds; there are few “seeds” left alive from the original neurons, and the soil itself is barren of the proteins that once nurtured the original cord into being. The strategy for restoring function, say scientists, will require a delicately calibrated combination of attacks aimed at overcoming all of these problems. What we heard at W2W is that the research community is rapidly closing in on that calibration.

Colorado

For example, Dr. Stephen Davies of the University of Colorado is attacking two issues at once: breaking up the rock of scar tissue and seeding the injury site with meticulously differentiated cells that get axons growing. In 2007

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Dr. Hans Keirstead of the Reeve-Irvine Research Center talks about his research at the Working to Walk 2008 conference that took place in Washington, DC, in April.



Working to Walk 2008

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he reported that his lab had succeeded in repairing the cords of lab animals with cells called astrocytes—star-shaped cells that appear at one of the 4th-level divisions of the giant, complex tree of cell development. Nine out of nine animals treated with these cells were back to normal movement within a month. Dr. Davies planned to use the astrocytes in combination with a substance called Decorin (produced, he said, “in bucketfuls” by the human body) that has the power to break up scars in injured spinal cords. His path thus leads to a treatment for both chronic and acute injuries: develop the correct type of astrocytes, combine them with Decorin, and do the trials. Said Davies last year in his brisk British accent: “I’ve been in the field for seventeen years, and the material I showed you today is the first time I’ve been able to say that I’ve really got something.” One year later, his excitement over new findings could be felt across the room.

He had accomplished three important goals since we saw him a year ago. First, he tested his astrocytes to make sure they would not cause neuropathic pain (a common and difficult problem in many cell therapies). The result was just what he had hoped: his astrocytes are pain-free. Second, he tried putting adult sensory neurons right on adult spinal cord myelin and adding Decorin; the neurons grew five times as fast as they would have with no Decorin. The Decorin seemed to be acting as a kind of fertilizer, but what would happen when the neurons-plus-Decorin ran into the “weeds”, the growth inhibitors? The neurons grew 14.5 times faster—almost 3 times as fast as when there were no growth inhibitors. Dr. Davies had shown that it’s possible to create safe, pain-free cells, add them to Decorin, and watch them grow like blazes, even—especially—in the hostile environment of growth inhibitors.

What are the next steps? Develop more efficient ways to make the astrocytes, test them on injured animals in combination, then test them in both acute and chronic injuries. He reminded us that his original work in finding the astrocytes was funded by a NIH grant, and that in the current environment that grant would probably not have been funded. SCI research needs federal support if it’s going to happen.

California

Someone who took an entirely different approach was Dr. Hans Keirstead of the Reeve-Irvine Research Center, who has been partnering with Geron, the company that initially funded the effort to isolate human embryonic stem cells at the University of Wisconsin in the late 1990s. Geron has spent the past ten years working to create a safe, readily available source of embryonic stem cells in what must be described as a hostile political environment. The image that comes to mind when thinking of Geron is that of a small company trying to build the interstate

highway system. They decide the routes, design the bridges, choose the substrate, mix the concrete, pour the asphalt—and they do it all very, very slowly. The inefficiencies of such a process are obvious, which may be why Dr. Keirstead has chosen to “piggyback” his therapies for SCI onto studies involving other patient groups.

One example is the idea of growing motor neurons and using them to repair one muscle group at a time. He holds up his right hand and moves his thumb back and forth to demonstrate: this muscle, maybe. He says that they’ve figured out how to create an inexhaustible supply of motor neurons in the lab. “We can grow one to 10 billion cells a week of these things . . . any one human is going to take a few million.” He plans to run his safety and efficacy trials for this treatment in two kinds of terminal conditions: infantile spinal muscular atrophy (SMA) and adult amyotrophic lateral sclerosis (ALS, sometimes called Lou Gehrig’s disease). Why? Because the FDA would require the study to follow the patients for a lifetime, and the expected lifespan in these diseases is shorter than in SCI. This strategy will speed up the process of getting closer to trials in SCI patients.

What’s Next?

That depends on all of us as much as it does on the men and women in the labs. Here’s how U2FP co-founder Marilyn Smith thinks of it: “It’s our job as advocates to educate the public, to talk with our scientists, to educate ourselves, to communicate with the media, to communicate with our politicians, to spread the word that a cure is possible, and it’s imperative to find it. No one should have to live with paralysis.” She’s right. In a rational universe, people already struggling to live with SCI would not have to take on the task of working to cure it. In the real world, though, we do have to. It is our job. What Marilyn didn’t say was something all of us learned as the hours of W2W flew by: advocating is great fun, especially when you do it with your friends, properly armed with real-time information from credible scientists. If the clinical trials don’t pan out before next April, we’ll be back for W2W 2009. We’ll be stronger and better educated, and there will be a lot more of us.

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“I’ve been in the field for seventeen years, and the material I showed you today is the first time I’ve been able to say that I’ve really got something.”

Dr. Stephen Davies,
University of Colorado

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For more information:

- CareCure Web site: <http://sci.rutgers.edu>.
- Unite to Fight Web site: www.unite2fightparalysis.org/.
- Dr. Stephen Davies of the University of Colorado. New Spinal Cord Cells and Molecules for SCI Repair: <http://sci.rutgers.edu/forum/showpost.php?p=648127&postcount=1>.
- Dr. Hans Keirstead of the Reeve-Irvine Research Center, www.reeve.uci.edu/facilities/rirc.php.

Choosing a Wheelchair

Thoughts from a physical therapist after attending the 2008 International Seating Symposium.

By Debra Glazer, PT, MPH

When I first became a physical therapist 15 years ago, there were very few seating and mobility products to choose from. Things have changed tremendously since then, and this was never more apparent to me than when I walked into the massive convention halls at the International Seating Symposium (ISS) in Vancouver, BC last March. Hundreds of vendors, from large manufacturers to small start-ups, filled three rooms that were each the size of a football field. Thanks to new materials and engineering advances, the choices now are plentiful, and also somewhat overwhelming.

The new consumer

There also has been a parallel shift in the consumer's role in choosing a wheelchair. In the past, the clinician made the choice based on the patient's injury level: C6-C7 and above would get a power wheelchair; T1 or below would get a manual one. Consumers were not consulted in these medical decisions. Today they are active participants in deciding what wheelchair is best for their body and lifestyle; some even invent new products to meet their specific needs.

More wheelchair users today are choosing to "blend" features from both manual and power technologies to develop a chair that enables them to conserve energy, avoid overuse of joints and fit their lifestyle. Some people with low-level tetraplegia choose manual wheelchairs to fit their office environments but make sure they get assistance with transfers at home to protect their shoulders. College students with paraplegia sometimes choose to use power wheelchairs to get around campus and switch to manual chairs for the tighter spaces of the dorm.

Shoulder and wrist pain

According to Kendra Betz, MSPT, ATP, a conference speaker and nationally recognized wheelchair seating expert, there is ample research evidence showing that people who use manual wheelchairs are at risk for shoulder and elbow pathology and repetitive strain injury of the wrist and hand. The reason for these problems,

however, is still being debated. Are they due to improper push technique or to wheelchairs that are incorrectly configured to the client's anatomy? Are therapists too often recommending standard lightweight wheelchairs when ultra-light models might be a better choice? Which does more damage over time, pushing or transferring? Why do only some people get shoulder problems?

Most clinicians would agree that the way an individual propels a wheelchair in clinic is probably very different from the way he or she pushes uphill on a city sidewalk. If a person's lifestyle regularly leads to poor wheelchair technique, a power wheelchair or hybrid device might be a better choice, such as a power-assist or electric manual wheelchair with a small, removable motor. Hybrids are lighter, less expensive and much easier to transport than traditional power wheelchairs. On the other hand, they are heavier than standard manual chairs and harder to push when using manual mode. Another option is the two-gear manual wheel, which allows the user to shift to a lower gear to help with hills.

Considerations

In the end, choosing a wheelchair is usually a trade-off. To make the best choice possible, clinicians and consumers will need to carefully consider all of these factors:

• Self-image and lifestyle

What is the client's attitude about power wheelchairs? Some people don't like the way they look, thinking it will make them look "too disabled." Younger people especially may be concerned about self-image issues.

What about activity level? Does the user love exercise or prefer to do as little activity as possible?

Will fatigue from using a manual chair all day affect energy, productivity or enjoyment?

• SCI severity

Is the injury complete or incomplete? This will make a big difference in functional ability.

Is this a new or long-standing injury?



The first chair is often a "starter" chair because people continue to get return and gain strength during their first year after injury.

• Medical Problems

Are there medical problems that increase the need for a power wheelchair because of weakness, fatigue or skin concerns? Examples:

Diabetes decreases circulation and increases the risk for skin breakdown. If a person is too tired from pushing a manual wheelchair all day to perform adequate pressure relief, a power chair with a tilting system might be the safer choice.

Obesity: Although pushing a manual chair takes more energy than using a power chair, it does not provide sufficient cardiovascular exercise to contribute to weight loss or justify getting a manual chair. For this reason, someone with paraplegia who has good arm strength but is obese may be better off with a power chair to protect the shoulders.

• Transfers status

Independence: How will wheelchair choice affect a person's ability to perform transfers independently?

Safety: A manual wheelchair may enable the user to perform safer transfers with better technique than a power chair because it is more compact and easier to maneuver into a good transferring position.

• Accessibility in multiple environments

Can the wheelchair user self-propel up a ramp into the home? Is the terrain around the home paved, gravel, level, uneven?

Could a power wheelchair fit into the home environment? How wide are the doorframes? Are there tight corners

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Choosing a wheelchair

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to negotiate? What turning radius does the wheelchair need to have? How large is the bathroom?

What about the workplace or school environment? A power chair is easier in large open spaces but more difficult for tight corners around cubicles.

• Transportation from home to school or work.

Does the wheelchair need to fit in the trunk of a car, behind a seat, or in a van with a lift? It is very difficult to disassemble a power wheelchair to fit in a regular car trunk.

Does the user ride public transportation or a school bus?

• Funding Source

Does the consumer's funding source ever consider dual justification for both a manual and a power wheelchair?

What is the equipment allotment under the individual's insurance coverage? Is this an annual allotment? It is very important to make an educated equipment decision. If the wrong equipment is purchased, the funding source usually will not pay for more equipment for another five years or unless the consumer's medical condition changes dramatically.

If insurance will pay for only one chair, consider getting the more expensive power chair first, and then look for other kinds of funding—non-profits, sports organizations or grant options—to help buy a manual chair.

• Hobbies and activities

What activities will the wheelchair user be involved with, such as indoor sports on a smooth floor vs. outdoor uneven terrain activities?

Parting thoughts

I did not find a “right” answer to the manual-versus-power debate, but I did learn about many new options in wheelchair technology that I can pass on to my patients.

The most important take-home message hasn't changed: thinking through everything ahead of time, before buying a wheelchair, will help you make the best choice for your physical and lifestyle needs.

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Names of UW faculty are in **boldface** type.

Weight Management after Spinal Cord Injury

By Suparna Rajan, PhD, Catherine Warms, PhD, ARNP, and Barry Goldstein, MD, PhD

Being overweight is a common problem for people with spinal cord injury (SCI). Some research shows that two out of three people with SCI are overweight. Excess weight gained after SCI is difficult to lose, and it is hard to maintain weight over time and avoid putting on extra pounds. In part this is due to a reduced ability to move freely. The higher the injury, the more difficult it is to move, stay active, and exercise. A person with a cervical SCI will have more difficulty moving compared to someone with SCI in the lower spine. The same is true for the completeness of an injury. A person with an incomplete injury who is able to walk will likely burn more calories than a person who has a complete injury and uses a wheelchair full time.

Body fat basics

Excess fat affects overall health and increases risks for chronic conditions, including high blood pressure, diabetes and sleep apnea. Weight gain can also make it harder to transfer and push a manual wheelchair. Besides total fat, the location of fat in the body in people with SCI may also be important. Body fat is located both under the skin and inside the abdomen (intra-abdominal or visceral fat). As in the general population, some people with SCI carry excess fat in their midsection (abdominal fat), which may further increase risk for many health problems. So, just knowing your weight isn't enough; you need an estimate of body fat.

How is body fat estimated?

- For many years, reference tables showing the ideal weight for a given height have been used in SCI. In general, clinicians and researchers believe that people with SCI should ideally weigh 10% less than people of similar height who do not have SCI. However, this is an estimate. Ideal weight standards have not been developed for people with SCI.

- Body Mass Index (BMI), a measure of weight in relation to height, has been a popular tool to estimate body fat. BMI calculators are available on the Web (www.nhlbisupport.com/bmi/), and anyone with a BMI over 25 is considered to be overweight. Because of the differences in active muscle and body fat distribution after SCI, however, using BMI cut-points established for able-bodied individuals may underestimate body fat.

- Measuring the distance around your waist or neck using a tape measure provides an estimate of fat in the upper body. A waist circumference over 40 inches in men and over 35 inches in women may increase chances of developing health problems and can help gauge the extent of excess body fat in SCI.

In general, measurements developed for the non-disabled public to determine if a person is overweight probably do not apply to persons with SCI. More research is needed.

Weight loss methods for SCI

There is some research evidence that people with SCI can achieve weight loss safely. A 12-week weight loss program using a combination of diet, physical activity and behavior modification techniques in a group of 16 people with SCI resulted in weight loss and improvements in BMI, waist and neck circumference, total fat mass, diet behavior, and measures of psychosocial

and physical functioning (Chen et al., 2006). This was a small study, however, and more studies are needed.

There are other medical and surgical treatments for obesity that have been used in people who do not have SCI. Medications are sometimes prescribed but many side effects, some of which were serious, have been reported. Surgical procedures for treating obesity also have known complications. Research is needed to determine if these strategies are safe and effective for weight loss in persons with SCI.

Currently, little is known about obesity management in SCI. While it is widely assumed that weight management is difficult following SCI, there has been little weight-loss research in this population so far, and health care providers often cite examples of people with SCI who have maintained a healthy weight following SCI or lost weight gained following injury.

What have you tried?

We are interested in learning more about what people with SCI do to lose or maintain weight, and what strategies have or have not worked. To do this, we are conducting a research study asking people with SCI about weight management. Any person with SCI is eligible to participate in this survey. The survey can be completed by yourself or with assistance from others.

Please see the study announcement on the back page.

Resources

Eat Right Home-Based Weight Management Program for Individuals with SCI, a 12-week program from the University of Alabama, includes a video and workbook. Web site: www.spinalcord.uab.edu/show.asp?durki=77527&site=1021&return=2158; phone: 205-934-3283.

National Center on Physical Activity and Disability (NCPAD) is an information center on physical activity for persons with disabilities. Web site: www.ncpad.org; phone: 800-900-8086.

Nutritional Guidelines for Individuals with SCI, UW SCI Forum presentation. Read the report or watch the video at <http://sci.washington.edu/info/forums/reports/nutrition.asp>.

Centers for Disease Control and Prevention (CDC) general information about physical activity and nutrition. Web site: www.cdc.gov/nccdphp/dnpa/physical/; phone: 800-311-3435.

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literature review

The articles previewed below were selected from a recent screening of the National Library of Medicine database for articles on spinal cord injury. In the judgment of the editors, they include potentially useful information on the diagnosis or management of spinal cord injury. You may obtain copies of the complete articles through your local medical library or from UW Health Sciences Library Document Delivery Service (call 206-543-3436 for fee schedule).

BLADDER MANAGEMENT

■ Evaluation of cranberry tablets for the prevention of urinary tract infections in spinal cord injured patients with neurogenic bladder.

Forty-seven men with SCI (ASIA A, B and C; 23 with quadriplegia) and neurogenic bladder completed this randomized, double blind, placebo-controlled trial. Participants were randomized to receive 6 months of cranberry extract tablet or placebo, followed by the alternate preparation for an additional 6 months. The cranberry extract tablet contained concentrated cranberry fruit extract with 500 mg of *Vaccinium macrocarpon* (Cran-Max, Swiss Herbal, Canada). Tablets were taken twice per day during the study periods. During the 6 months of cranberry tablets, there was a significant reduction in both the incidence of UTI and the number of subjects with a UTI. Patients with a glomerular filtration rate received the most benefit. Cranberry extract tablets should be considered for the prevention of UTI in SCI patients with neurogenic bladder. Hess MJ, Hess PE, Sullivan MR, et al.

Spinal Cord. 2008 Apr 8 [Epub ahead of print]

■ Effective treatment of neurogenic detrusor dysfunction by combined high-dosed antimuscarinics without increased side-effects.

This study involved 27 individuals (21 with SCI) who had participated in a previous study using double the usual dose of antimuscarinic drugs to treat neurogenic bladder. Doubling the usual dose of the antimuscarinics did not improve bladder symptoms in these participants but did not worsen side effects. In this study, participants were given an additional antimuscarinic in combination with the double dose of the antimuscarinic they were already taking. At four-week follow-up, incontinence episodes decreased from an average of 7 to 1 per day. Other neurogenic bladder symptoms (bladder capacity, reflex volume, detrusor compliance) also improved. In conclusion, 85% of the participants who were not satisfactorily treated using higher doses of a single antimuscarinic were treated successfully with combined high-dosage antimuscarinic medications. The appearance of side-effects was comparable to that of normal-dosed antimuscarinics.

Amend B, Hennenlotter J, Schafer T, et al.

Eur Urol. 2008 Jan 17 [Epub ahead of print]

CARDIOVASCULAR

■ C-reactive protein in adults with chronic spinal cord injury: increased chronic inflammation in tetraplegia vs paraplegia.

C-reactive protein (CRP), a substance secreted by the liver during inflammation, is known to indicate an increased risk for cardiovascular disease (CVD). Height, weight, waist circumference (WC), blood pressure, percent fat mass and fasting blood parameters (high-sensitivity CRP, lipids, insulin, glucose, insulin resistance by homeostasis model assessment (HOMA)) were measured in 69 individuals with SCI living in the community (32 with tetraplegia; 42 incomplete; 56 male). Average CRP of the group was 3.37, consistent with the American Heart Association (AHA) definition of high risk of CVD. CRP was 74% higher in persons with tetraplegia than those with paraplegia. Participants with high CRP had greater WC, body mass index, percent fat mass and HOMA values than those with lower CRP. There was no difference in risk factors between those with complete and incomplete injuries. Level of lesion and WC are independently associated with CRP in this population, suggesting that those with tetraplegia and larger WC may be at particularly high risk of CVD.

Gibson AE, Buchholz AC, Martin Ginis KA

Spinal Cord. 2008 Apr 15 [Epub ahead of print]

RECOVERY RESEARCH

■ Stem and progenitor cell therapies: recent progress for spinal cord injury repair.

The authors review the current state of research in using stem and progenitor cells for the repair of SCI. The implantation of exogenous cells (from a source outside an organism's body) or the stimulation of endogenous cells (from within the body), to repopulate and replace or to provide a conducive environment for repair, offers a promising therapeutic direction for overcoming the multitude of obstacles facing successful recovery from SCI. Although relatively new to the scene of cell based therapies for reparative medicine, stem cells and their progenitors have been labeled as the 'cell of the future' for revolutionizing the treatment of central nervous system injury and neurodegenerative disorders. This review examines the different types of stem cells and their progenitors and their usefulness in experimental models of SCI, and explores the outstanding issues that still need to be addressed before they can be used in treatments for humans with SCI.

Louro J, Pearse DD

Neurol Res. 2008 Jan;30(1):5-16

■ Clinical studies in spinal cord injury: moving towards successful trials.

Despite many laboratory and clinical trials conducted over the past few decades, there is still no cure or clinically relevant therapeutic intervention for SCI. Most of the therapeutic strategies for SCI aim to promote regeneration by creating a more permissive environment for cell regeneration, either by minimizing inhibitory effects, neuroprotection or cell transplantation. Most studies are preliminary and lack control groups, but provisional results can be attractive to clinicians and patients who are faced without an alternative. This review discusses previous clinical studies, strategies that are presently being translated into clinical studies, and guidelines for future trials.

Knafo S, Choi D

Br J Neurosurg. 2008 Feb;22(1):3-12.

■ Adaptive changes in the injured spinal cord and their role in promoting functional recovery.

Although axons in the injured spinal cord are unable to regenerate, a modest spontaneous recovery can often be found in both patients and animal models, suggesting that the potential for "repair" must exist somewhere. One possible mechanism behind this recovery involves rearrangements in the brain and spinal cord, often referred to as plasticity. In this review, the authors discuss plasticity throughout the entire central nervous system induced by SCIs, with an emphasis on sprouting of descending spinal tracts. Because this sprouting occurs spontaneously, it not only lends itself as a recovery mechanism, but also opens potential treatment avenues to promote further functional recovery. As such, various recent examples of approaches to pharmacologically promote plasticity within the spinal cord are discussed.

Fouad K, Tse A.

Neurol Res. 2008 Feb;30(1):17-27.

ACUTE SCI TREATMENT

■ Methylprednisolone for acute spinal cord injury: 5-year practice reversal.

Forty-two surgeons and 21 residents in Canada directly involved in the acute management of SCI completed a questionnaire about their practice of methylprednisolone (MP) administration for acute SCI. Answers were compared to a similar questionnaire administered five

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years earlier. The large majority of spinal surgeons (76%) no longer prescribe MP for acute SCI compared to 76% who prescribed it five years ago. Eighty percent of surgeons now feel comfortable with the pertinent published literature compared to 30% previously. Of the 24% of orthopedic surgeons and neurosurgeons who continue to recommend MP for SCI, the majority do so because they believe it effective, not because of fear of litigation. Peer-reviewed independent interpretation of published results, guidelines formulation by parent organizations, and dissemination at specialty meetings are powerful tools for influencing practice patterns.

Hurlbert RJ, Hamilton MG.

Can J Neurol Sci. 2008 Mar;35(1):41-5.

BONE MINERAL DENSITY

■ Training and detraining of a tetraplegic subject: high-volume fes cycle training.

A 31-year-old man with a C6-level SCI (ASIA B), 3 years after injury, performed one year of high-volume functional electrical stimulated (FES) cycle training (5 times per week, 1 hour per session, maximal sustainable power output) at home. Depending on the training compliance, which varied from 22.9% to 82.9%, maximal power output and peak oxygen uptake increased by 113% and 103%, respectively. During times when the subject could not maintain the training regimen, these improvements declined. Bone mineral density of the distal femoral epiphysis showed an increase of 3.9% after 12 months of cycle training. While it is possible to increase maximal power output, cardio-pulmonary fitness, and bone density of the paralyzed limbs in tetraplegia by high-volume cycle training, these improvements are lost if training is not maintained. In tetraplegic subjects, it may be difficult to maintain the high level of training required to achieve benefits.

Kakebeke TH, Hofer PJ, Frotzler A, et al.

Am J Phys Med Rehabil. 2008 Jan;87(1):56-64.

MALE SEXUAL FUNCTION

■ Vardenafil improves ejaculation success rates and self-confidence in men with erectile dysfunction due to spinal cord injury.

A high proportion of men with SCI cannot ejaculate during sexual intercourse, and this is often the reason for male infertility. Sexual dysfunction after SCI can also affect men's self-confidence. In this 12-week study, 418 men age 18 years or older with erectile dysfunction due to SCI and lasting longer than 6 months were randomized to receive 10 mg vardenafil or placebo for 4 weeks, then maintained or adjusted to 5 mg or 20 mg at weeks 4 and 8. The per patient ejaculation success rates were significantly greater with vardenafil than placebo over 12 weeks of treatment. Sixteen percent of men receiving vardenafil and 8% receiving placebo felt orgasm "almost always" or "always" at weeks 8-12, compared with 4% and 6%, respectively, at the beginning of the study. Significant improvements in confidence scores were observed with vardenafil compared with placebo. There were no differences in quality-of-life measures between the two groups, but these had been in the normal range at baseline. Vardenafil significantly improved ejaculation and self-confidence in men with erectile dysfunction due to SCI.

Giuliano F, Rubio-Aurioles E, Kennelly M, et al.

Spine. 2008 Apr 1;33(7):709-15.

TESTOSTERONE REPLACEMENT

■ Testosterone replacement therapy and motor function in men with spinal cord injury: a retrospective analysis.

Individuals with SCI experience changes in body composition over time—namely, loss of muscle mass. They also have a decline in the secretion of the androgenic hormone testosterone, required for the maintenance of lean body mass and strength. This retrospective investigation tested the hypothesis that men with SCI given testosterone replacement therapy (TRT) would demonstrate greater improvement in motor function compared with an untreated comparison group. Fifty men with SCI admitted to an inpatient rehabilitation facility and were found to have low serum total testosterone levels received TRT. They were compared to 480 men with SCI admitted to different rehab facilities in the same period who had not been screened and were not receiving TRT. All subjects had injuries of one year or less. Among subjects with ASIA C and D impairments, motor scores at discharge were significantly better for the TRT group compared to the control group. There were no differences between the two groups for men with complete injuries. These findings suggest that TRT may improve motor function in men with incomplete SCI and provide a rationale for future prospective trials.

Clark MJ, Petroski GF, Mazurek MO, et al.

Am J Phys Med Rehabil. 2008 Apr;87(4):281-4.

SPASTICITY

■ The use of botulinum toxin for spasticity after spinal cord injury.

The authors conducted a medical chart review of 28 adults with SCI who had received botulinum toxin (BTX) type A injections for spasticity. Dosages ranged from 10 to 119 units per muscle. Improvement was noted for 56% in ambulation and 71% in positioning. Overall, upper-extremity function improved in 78%, hygiene improved in 66.6%, and pain decreased in 83.3%. Early use of BTX injections (less than a year after onset of symptoms) vs. late use of BTX injections did not influence effectiveness. BTX seems to be an effective treatment for spasticity and for reducing disability in persons with SCI. Randomized trials are needed to confirm the value of this treatment in this population.

Marciniak C, Rader L, Gagnon C.

Am J Phys Med Rehabil. 2008 Apr;87(4):312-7

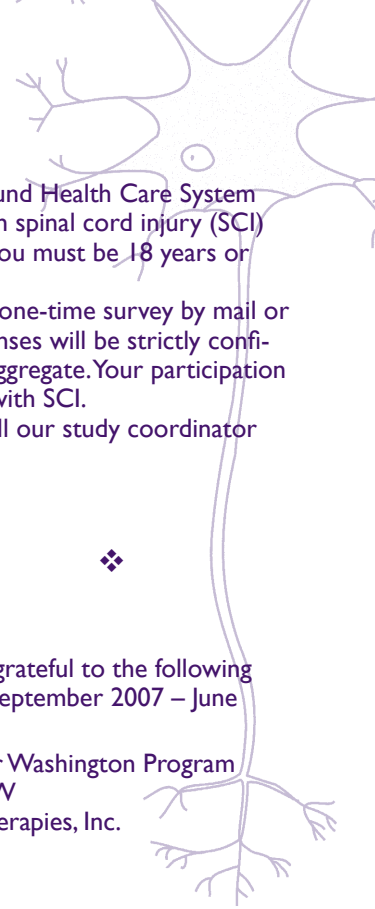
RESPIRATORY

■ Mechanical ventilation or phrenic nerve stimulation for treatment of spinal cord injury-induced respiratory insufficiency.

This was a prospective, 20-year study of 64 patients with respiratory device-dependent (RDD) SCI. Thirty-two subjects with functioning phrenic nerves and diaphragm muscles were treated with an implanted phrenic nerve stimulation (PNS) device and 32 with destroyed nerves were treated with mechanical ventilation (MV) through tracheostomy. Incidence of respiratory infections (RI) prior to the study was equal in both groups, but at the end of the study was significantly reduced in patients with PNS. Quality of speech was significantly better with PNS. Quality of life was reported as higher for the PNS group than for those using MV. The higher initial cost of PNS was paid off after about three years because of savings in equipment, nursing time, and the cost of RI treatments.

Hirschfeld S, Exner G, Luukkaala T, Baer GA.

Spinal Cord. 2008 May 13. [Epub ahead of print]



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SCI Weight Management Study

Researchers at the University of Washington and VA Puget Sound Health Care System invite you to participate in a study examining how individuals with spinal cord injury (SCI) lose weight or keep off the weight they have lost. To participate you must be 18 years or older and have SCI, but it does not matter what your weight is.

Participation in this study will involve completing a 30-minute one-time survey by mail or online. You will be compensated for your time. Your survey responses will be strictly confidential and data from this research will be reported only in the aggregate. Your participation may help to shape weight management programs for individuals with SCI.

If you wish to participate or need more information, please call our study coordinator at 800-781-5857.

See related article on page 5.



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