

spinal cord injury

UPDATE

Department of Rehabilitation Medicine

Volume 15, Issue 1 • Winter 2006

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Accessible & Affordable Housing

Is it out there?

Finding housing that is both accessible and affordable is a challenge many people with SCI encounter soon after injury. In frantic housing markets like Puget Sound, high demand and high cost of living have combined with the continued low interest rates to produce skyrocketing home and rental prices. This limited, expensive housing picture is even bleaker for individuals with disabilities.

Accessibility

All too soon after injury, people with SCI are forced to confront the accessible housing problem. Upon discharge from rehab—which may be only a few weeks after sustaining a life-altering injury—they

must go somewhere, but the home they were living in is rarely accessible to them without some modifications.

Multilevel houses with stairs, narrow halls and small bathrooms that are typical of homes in this area will likely need extensive work. Families, with the guidance of rehabilitation based Physical and Occupational Therapists, often scramble to get the home ready for a family member now ambulating with a wheelchair. Since inpatient rehab stays are usually briefer than the time needed to renovate, the patient may need to go to a nursing facility until modifications are completed. Often such extensive renovations are required that the

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Leadership Change at NWRSCIS

Readers of this newsletter know Dr. Diana Cardenas as the long-time director of the Northwest Regional Spinal Cord Injury System (NWRSCIS), the founder of the monthly SCI Forums at the UW Medical Center, and a nationally recognized leader in the field of spinal cord injury medicine. After 25 years at the University of Washington, Cardenas is leaving her position here to become Professor and Chair of the Department of Physical Medicine and Rehabilitation at the University of Miami.

Cardenas' numerous scientific accomplishments include research on all aspects of SCI care, especially in the areas of UTI, bladder management and pain. She has lectured nationally and internationally and published more than 100 articles, chapters and books, mostly on the topic of SCI. Cardenas joined the UW faculty in 1981, became clinical director of the

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Bidding farewell to Dr. Diana Cardenas (holding flowers) are SCI Consumer Advisory Board Members (seated, left to right) Kirk Hennig, Chris Garbaccio, Tammy Wilber and (standing behind Dr. Cardenas) Jill Price, and UW staff Laneta Nauman, Dr. Charles Bombardier, Debra Glazer, Norma Cole, Cathy Warms and Cynthia Salzman.



Housing

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individual, or the entire family, has to relocate. But finding an accessible home to buy is also difficult and will probably still require some structural changes to meet the specific needs of the individual.

Those who were renting at the time of their injury will most likely need to find a new situation since rental units cannot usually be renovated. Again, a temporary stay in a nursing home may be necessary while family or discharge personnel search for an accessible situation.

The **National Accessible Apartment Clearinghouse** (NAAC) (800-421-1221; www.accessibleapartments.org, clearinghouse@naahq.org) maintains the only national database of apartments with features for people with disabilities, listing more than 60,000 units in 47 states. NAAC is sponsored by the National Apartment Association and Clearinghouse services are free to all.

The **Easter Seals Society** (www.easterseals.com) can also help with housing questions and recommendations. In Washington State, contact them at 800-678-5708 (Seattle: 206-281-5700; Spokane: 509-326-8292).

Affordability

After an SCI, many people need to consider low income, accessible public housing. This is often a good alternative for individuals whose financial situations have changed drastically since their injury.

The **Seattle Housing Authority** (206-615-3300; www.seattlehousing.org/Housing/programs.html) accepts applications for accessible housing, although the wait for an accessible unit can be as long as two years.

The **King County Housing Authority** (206-574-1100; www.kcha.org/lookingforhousing/lookingforhousing.aspx) provides an array of affordable housing options as well.

Washington State office of Housing and Urban Development (HUD) (www.hud.gov/local/index.cfm?state=wa; 206-220-5101; 877-741-3281) provides affordable housing options throughout the state.

Caregivers

Individuals needing a live-in caregiver after injury will require a larger home or apartment, which adds to the cost. If the caregiver does not need to live in but must commute regularly, location will be important. Moving to a more remote, rural area might reduce housing costs, but there may be fewer caregivers available to hire or willing to travel significant distances to come to the home. Furthermore, the longer the commute, the more likely traffic and weather will interfere with maintaining a reliable caregiver schedule.

Searching for solutions

Rehab facilities throughout the United States report that it is becoming increasingly difficult to find appropriate, affordable, accessible, and safe housing for newly injured persons with SCI. This is attributed to a number of factors, including increased housing costs and a decrease in governmental funding programs for people with disabilities. Many individuals, especially those who do not own their homes or do not have family

nearby, are limited to adult family homes or skilled nursing facilities when they are discharged from the hospital. This is usually the least preferable outcome but reflects the reality of the housing and funding situation faced by today's disabled population. With enough support, persistence and luck, however, creative solutions are possible, as in the case of Seattle residents Aditya and Kees.

Kees is a 25-year-old male who sustained a C 3-4 injury over 4 years ago and after rehab returned home to his mother and stepfather's house. Kees is fortunate that his mother, father, stepfather and stepmother all worked together to get him home after his injury. The family purchased their current home after Kees' injury because it had a lower-level apartment that would be accessible to Kees and maximize his independence.

Aditya is a 22-year-old male with a C-5 injury. His choices were limited when he was discharged from Rehab less than two years ago, and he went to a series of adult family homes before meeting up with Kees and his family.

Aditya and Kees met through a mutual friend who knew about both their situations. When Kees' family purchased their new home, they thought that at some point they would like to rent one of the rooms to another individual with SCI. The lower apartment accommodates a shared living situation with three bedrooms, one each for Aditya and Kees and another for a live-in caregiver.

Aditya is a student at the University of Washington and Kees telecommutes from home working as a computer animator. Both men pay rent. Since they have very different schedules, a shared daytime caregiver didn't work for them, so each has his own weekday caregiver 40 hours per week. The live-in caregiver does not pay rent but fills in with care giving and performs varied chore duties.

Both Aditya and Kees have a safe, accessible and affordable place to live and feel it is a win-win situation. "There really are no cons in my opinion to this living situation, only pros," Aditya said. "By having a roommate who is also spinal cord injured we can socialize, share ideas and concerns, and obviously just hang out with someone who is a similar age".

Kees' mother, Suzanne, agrees this is a great situation for her son, her family, and Aditya. It has decreased Kees' dependence on his family because he and Aditya problem-solve issues on their own, and Aditya, who has more hand function than Kees, can push buttons and do other tasks that Suzanne assisted with in the past. Suzanne knows that other parents are sometimes hesitant to get full-time attendants or allow someone else to live in their home, but she feels this situation has benefited everyone involved.

What can you do?

While Aditya and Kees's living situation is unusual, it's a reminder that creative solutions are worth thinking about. Getting the word out through family, friends and healthcare providers that you are looking for an alternative living situation can open doors and create new opportunities. Attending events such as the monthly SCI Forums held at the University of Washington Medical Center can also be a good tool for networking with more people who might have advice, information or connections to help you find a housing alternative that works for you.

Research Report: The Prevalence and Implications of Sleep Apnea in Acute, Traumatic Tetraplegia

Principal Investigator: Stephen P. Burns, MD

The Northwest Regional Spinal Cord Injury System (NWRSCIS) receives funding from the National Institute on Disability and Rehabilitation Research to conduct research in different areas of SCI diagnosis and treatment. This study was conducted during the most recent 2000-2005 funding cycle.

Sleep apnea: Why it is a concern in SCI?

Sleep apnea syndrome is a disorder characterized by frequent, brief pauses in breathing during sleep that reduces oxygen flow to the brain and can cause daytime sleepiness, problems with mental functioning, and depression. While it afflicts about 3% of the general population, it is 10 times more common in the SCI population. Studies of chronically injured individuals estimate that up to 40% of persons with tetraplegia (quadriplegia) have sleep apnea.^{1,2} But few sleep apnea studies have focused on the acute, or newly injured, SCI patient.

Dr. Stephen Burns, UW associate professor of rehabilitation medicine, believes it is especially important to understand this problem in acute SCI patients because lack of restful sleep due to apnea can negatively impact a patient's ability to participate in rehab and learn new mobility and self care skills. It can also interfere with the individual's adjustment to disability, emotional health and quality of life.

Burns warns that untreated sleep apnea in this population may have other, more devastating consequences as well. "Blood oxygen saturation may drop to 70% or 60% of normal with each pause in breathing. Such episodic oxygen desaturation is not trivial," because it can impair skin integrity, inhibit wound healing, and may be a factor in the high rate of sudden death seen in SCI patients within the first year after injury.

"We know there are a lot of these so-called non-ischemic cardiac deaths (not due to coronary artery disease) in the SCI population, in which the patient dies suddenly without any other identified cause sometime in the first year after injury," Burns explains. A rare cause of death in the general population, "It's actually the second most common cause of death (12.2% of all deaths) after SCI." It is 10-22 times more common in patients with tetraplegia than in the general population, and three times more common among patients with paraplegia.³

Study objectives and methods

The goal of Burns' study was to better understand the frequency of sleep apnea in acute SCI and its effect on rehabilitation. Burns recruited patients who had been admitted to Harborview with acute tetraplegia and were undergoing their initial inpatient rehabilitation. Patients were excluded from the study if they had severe traumatic brain injury, a pre-injury diagnosis of sleep apnea, a tracheostomy, or were ventilator-dependent.

Study participants completed a sleep questionnaire and rehabilitation staff rated the patient's sleepiness. Subjects underwent full polysomnography in their rooms, and if sleep apnea was found, were prescribed treatment by the attending physician.

Findings

During 19 months of enrollment, 58 patients with acute tetraplegia were admitted to Harborview. Two-thirds of these had to be excluded from the study, primarily because they were on a ventilator. Twelve patients were enrolled, nine completed testing, and eight of these were diagnosed with sleep apnea. Staff ratings showed that several patients had at least mild interference with rehab due to excessive sleepiness.

The standard treatment for sleep apnea is CPAP (continuous positive airway pressure), a device that delivers air through a mask strapped onto the face during the night. CPAP was offered to all eight subjects with apnea, but only half tried it, and none of these could tolerate it. "A lot of people on rehab feel, 'I'm breathing on my own, I'm off the vent, there's so much else going on, I don't want to have to deal with (CPAP),' " Burns explains. Those who try it often report a feeling of claustrophobia, especially if they have limited hand function and cannot easily adjust the face mask. According to Burns, a treatment called BiPAP, which delivers alternating higher and lower positive pressures timed with the breathing cycle, may be a better choice for this population because it tends to make the higher pressures more tolerable.

Based on a review of records after discharge, half the patients who had been excluded from the study were considered to be at high risk for sleep apnea because of high injury levels and severe weakness of respiratory muscles. "Although (patients like these) will eventually develop sleep apnea, it will not occur during initial rehabilitation, so there is less opportunity to diagnose it," Burns warns. "They need to be followed and tested soon after discharge."

An Australian study published in June 2005 found high rates (60%-70%) of sleep apnea during the first year after injury.⁴ Based on this and his own previous study,¹ Burns believes the high rate of sleep apnea in this population may warrant testing everyone for it, even if no other symptoms are present.

The best way to diagnose sleep apnea in this study would be full bedside polysomnography, but this requires special equipment and staff training that are unavailable on most inpatient units today. A simpler alternative may be sufficient, says Burns: "Because sleep apnea and the resulting blood oxygen desaturation are so severe in this population, just measuring blood oxygen levels overnight (using a pulse oximeter designed specifically for sleep studies) may be enough to diagnose it."

Although it had a small number of subjects, Burns' study is the first to examine the effects of sleep apnea on initial SCI rehabilitation participation. Burns recommends that future studies investigate the effectiveness and acceptability of other treatments, such as BiPAP and dental appliances, and should include a larger number of subjects from multiple centers. Meanwhile, at the Puget Sound VA in Seattle, Burns and his colleagues will soon start testing most newly injured SCI patients for sleep apnea and training them to use BiPAP early during the rehabilitation process.

PLEASE SEE REFERENCES ON BACK PAGE.

forum report

The SCI Forum is an evening presentation and discussion series on topics of interest to persons with spinal cord injury and their family members, friends, and caregivers, held monthly at the University of Washington Medical Center during the fall, winter and spring. To learn about upcoming SCI Forums or read reports of past forums, consult our Web site at <http://depts.washington.edu/rehab/sci/forum.html>. Contact Cynthia Salzman (email: csalzman@u.washington.edu; phone: 206-685-3999) if you wish to be added to the SCI Forum mailing list.

Relaxation & Hypnosis for SCI Pain

October 11, 2005—"As everyone in this room probably knows, pain is a problem for many people with SCI," said Katherine Raichle, PhD, a psychologist and postdoctoral fellow in the UW Department of Rehabilitation Medicine. Over and over, studies reveal high rates of pain in the SCI population, and for many the pain is severe and disabling.

"Pain in SCI can occur above, at or below the level of injury and can have different causes," Raichle continued. "We used to believe that you couldn't experience pain below the level of injury, similar to how we once believed people with amputations couldn't feel phantom limb pain. We know now that's not true."

"A common kind of pain in SCI is neuropathic pain, which is caused by damage to the central nervous system (brain or spinal cord) or peripheral nervous system (legs and arms). Neuropathic pain is often difficult to treat effectively."

Persons with SCI also experience other kinds of pain, such as musculoskeletal pain from overuse injuries due to years of wheelchair propulsion and/or the use of other assistive devices. Regardless of the cause, pain that lasts longer than three months is considered chronic pain. In contrast, acute pain goes away after healing takes place.

It's very important to treat chronic pain, Raichle said, because it can negatively affect many areas of people's lives, contribute to depression and stress, and cause functional limitations above and beyond the impact of the SCI itself. "If we treat pain effectively, we can have a huge impact on quality of life."

"Significant pain problems in SCI don't tend to go away on their own over time," she went on. "Often people try many different types of medications, and there does not yet appear to be a treatment that tends to help everybody." For this reason, researchers at the UW and elsewhere are looking for new treatments and new approaches.

Raichle and her colleague Travis Osborne, PhD, are working on a number of studies at the UW looking at non-medication-based treatments for pain in persons with chronic illnesses and injuries. One of these is a study investigating the effectiveness of relaxation treatments for SCI pain that involve hypnotic components.

What is hypnosis?

"Hypnosis has a lengthy history of use within the medical field, especially for pain," Osborne said. "It's interesting because when most people think of hypnosis they don't usually think of treatment but of something from the entertainment industry. As a result, people often think hypnosis is something that is used to make people do embarrassing things." Osborne reviewed some common myths about hypnosis.



*You cannot be
hypnotized against your
will or get "stuck" in a
hypnotized state.*



Common myths

♦ **Hypnosis is like being asleep.** **FALSE.** Stage hypnosis looks like sleep, but sleep is a state in which you're actually unconscious and unaware of what's going on around you. A hypnotic state is in fact a state in which your mind is quite active and your attention is focused and absorbed in a particular image or series of suggestions, and you're completely conscious. "If you're asleep, it's not hypnosis," Osborne said.

♦ **You don't remember what happens during hypnosis.** **FALSE.**

Because they are awake and conscious during hypnosis, most people have a fairly good memory of what happens to them in a hypnotic state. But this can vary depending on how deeply relaxed a person is during hypnosis. "If you don't remember everything that happens," Osborne said, "it may be because you're focusing on one thing in particular and not paying attention to anything else."

♦ **During hypnosis, the therapist controls you, and you are giving up your free will.** **FALSE.**

In the treatment setting the role of the therapist is to act as a facilitator or guide to help you achieve this state. The patient is the one who's doing the focusing. While in a relaxed state, people tend to respond only to suggestions that are consistent with their personal values.

♦ **You are passive during hypnosis.** **False.**

You cannot be hypnotized against your will. Entering into a hypnotic or very relaxed state requires the individual to be a very active participant, to actively focus his or her attention.

♦ **You can be hypnotized without your consent.** **FALSE.** Again, you are directing where your attention is going. No one else can force you to do that.

♦ **You can remain stuck in a hypnotized state.** **FALSE.** Although you may feel groggy or take a while to become alert after hypnosis—like waking from a nap—you cannot become stuck in this state.

Hypnosis defined

According to Joseph Barber, PhD, a psychologist who specializes in hypnotherapy and hypnosis research, and who trained Raichle and Osborne, hypnosis is "an altered condition or state of consciousness characterized by marked increased receptivity to suggestion, the capacity for modification of perception

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and memory, and the potential for systematic control of a variety of usually involuntary physiological functions (such as glandular activity, vasomotor activity, etc.).”¹ The actual mechanisms behind how it works, however, are not fully understood.

In a hypnotic state, a person becomes increasingly absorbed in one thing. Raichle noted that this is actually a very common, natural process. “We all experience hypnotic states to some degree in our everyday lives, times when we are so absorbed in something that we are unaware of what’s going on around us.” In these trance-like states we do things “on autopilot”—without paying attention to what we are doing, tuning out everything else. Raichle admitted this often happens on her drive home if she’s been listening to an absorbing radio program. “I literally can’t remember how I got home.”

How easily a person can be hypnotized depends somewhat on one’s ability to focus his or her attention and become absorbed in his or her experiences. “It’s a skill,” Raichle said, “and as with all skills, some people are naturally better at it than others. Practicing can improve your skill.” Other variables, such as rapport between the therapist and the client, can also have an effect on the experience.

In treatment sessions, the therapist uses suggestions to help the individual achieve a hypnotic state and attain a desired outcome, such as reduced pain or anxiety. “We try different types of suggestions to see what works with each person,” Raichle said, such as prompting the person to imagine the pain is diminishing or changing in some way that might make it more tolerable.

Research on hypnosis for pain

Most of the clinical trials on hypnosis so far have focused on acute pain caused by tissue damage (such as burns or surgery), painful medical procedures, or childbirth. “These are all acutely painful situations with a clear beginning and clear end,” Raichle noted. “Hypnosis has clearly been shown to be helpful in these studies.” In several controlled studies (studies that compare treatments by randomly assigning patients to receive different types of treatment), hypnosis was found to be more effective than no treatment or standard care and

as or more effective than other non-medication forms of treatment such as relaxation or cognitive-behavioral therapy.²

Unlike acute pain, chronic pain persists well after healing is complete. In the controlled studies that have been conducted that have focused on chronic pain, “hypnosis was generally superior to a variety of control conditions (e.g., no treatment, standard care) and comparable to other viable treatments (e.g., relaxation training, autogenic training),” Raichle reported. It is important to note that these studies focused on chronic pain associated with conditions other than SCI (i.e., cancer, fibromyalgia, headaches, back pain)². More controlled trials are needed for a variety of chronic pain conditions, including chronic pain related to SCI.

UWMC Research Study

Raichle and Osborne are part of a research group at the UW’s Department of Rehabilitation Medicine conducting a 5-year NIH-funded clinical trial of relaxation treatments for SCI pain. The study, conducted by Mark Jensen, PhD, is currently in its 4th year and is accepting new participants.

Study participants are randomly assigned to one of two treatment conditions, both of which include hypnotic and relaxation components. One method uses verbal suggestions for relaxation and the other incorporates biofeedback for relaxation training. The study objective is to see if either or both are effective in managing or reducing SCI pain. Participants receive free treatments and payment for completing interviews associated with the study.

Sessions can be conducted at the UW Medical Center or the subject’s home, depending on how far from the medical center an individual lives.

To be eligible for the study, subjects must be 18 or older and injured for at least 6 months, and have ongoing pain that interferes with daily life. Participation takes place over 12 months and includes the following phases:

- ◆ Screening phase—telephone screening interview and in-person consent session.

- ◆ Baseline phase—medical exam; 8 weeks of daily pain ratings.

- ◆ Treatment phase—ten treatment sessions typically spaced over 3-5 weeks, though the treatment schedule varies from person to person depending on scheduling needs

- ◆ Follow-up—in-depth interviews at 3, 6, 9, and 12 months; brief interviews on alternate months.

“The study focuses on skill development so people can continue to use the skills after the treatment sessions,” Osborne said. “We provide people with audiotapes of the sessions so they can practice on their own. Like any other skill, the more people practice these methods for pain management, the more benefits they typically experience.”

For information about this study, call 206-616-9058 or 800-377-9707 or email painstudy@u.washington.edu.

References

1. Barber, J. (1996). Hypnosis and suggestion in the treatment of pain: A clinical guide. New York: W W Norton & Company.
2. Patterson, D. R. & Jensen, M. P. (2003). Hypnosis and clinical pain. *Psychological Bulletin*, 129, 495-521.

Staying Healthy after a Spinal Cord Injury

Staying Healthy after a Spinal Cord Injury is a series of patient pamphlets, published by the Northwest Regional SCI System, on the following topics: Maintaining Healthy Skin, Taking Care of Pressure Sores, Bladder Management, Urinary Tract Infections, Taking Care of Your Bowels, Pain and SCI, and Depression and SCI. These pamphlets have been revised and are available to read or download at <http://depts.washington.edu/rehab/scil/pamphlets.html>.

For more information, contact Cynthia Salzman at 206-685-3999 or csalzman@u.washington.edu.

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).

COMPLICATIONS

Transcutaneous electrical nerve stimulation versus baclofen in spasticity: clinical and electrophysiologic comparison.

This randomized controlled trial included 21 adult patients with SCI and painful and/or ADL-limiting spasticity. Ten patients were randomized to receive oral baclofen treatment (gradually increased from 5 mg to 80 mg over 8 weeks) and 11 to transcutaneous electrical nerve stimulation (TENS) treatment (applied to the tibial nerve in 15-minute sessions over 15 days at a frequency of 100 Hz). Posttreatment evaluation was made 24 hrs after the 15th session in the TENS group. Clinical and electrophysiologic evaluations of the lower limb and functional evaluations were carried out in both groups before and after treatment. Significant improvement was detected in lower limb Ashworth score, spasm frequency scale, deep tendon reflex score, functional disability score, and FIM in the baclofen and TENS groups. Decrease in H-reflex maximum amplitude was significant in the TENS group. The percentage change in clinical, electrophysiologic, and functional variables caused by baclofen was not different from that caused by repeated applications of TENS in the short- and long-term evaluations. TENS is a noninvasive method that has few side effects and no drug interactions or toxicity, can be self-administered, and is less costly than baclofen. It may be helpful as a supplement to medication in the treatment of spasticity.

Aydin G, Tomruk S, Keles I, et al.

Am J Phys Med Rehabil. 2005 Aug;84(8):584-92.

Fitness, inflammation, and the metabolic syndrome in men with paraplegia.

Twenty-two men (T2-L2; average age 39; average duration of injury 17 years) with complete paraplegia were tested for peak aerobic capacity, physical activity, functional ability, and presence of metabolic syndrome (characterized by high-density lipoprotein cholesterol [HDL-C], triglycerides [TG], glucose, insulin, abdominal obesity, high blood pressure), and inflammatory factors (interleukin-6 [IL-6], C-reactive protein [CRP]). Participants did not have diabetes, coronary heart disease or any acute infections. On average, participants were overweight, had low HDL-C levels, and had higher IL-6 and CRP values (42% and 62% higher, respectively) than healthy non-disabled men, suggesting the presence of chronic low-grade infection. Lower peak aerobic capacities were associated with lower HDL-C and lower physical activity levels, which in turn were associated with higher fasting glucose, lower HDL-C level, and larger abdomen girth. Larger abdomen was associated with higher fasting glucose, higher fasting and post load insulin, lower HDL-C, higher TG, and higher CRP levels. These findings suggest that metabolic syndrome is common in SCI; diet and exercise trials are needed to determine the benefit of lifestyle interventions aimed at slowing the progression of the metabolic syndrome in this population.

Manns PJ, McCubbin JA, Williams DP.

Arch Phys Med Rehabil. 2005 Jun;86(6):1176-81.

Depression following traumatic spinal cord injury.

This was a retrospective record of 201 individuals who sustained SCI between April 1994 and March 1996 and were followed for up to six years. During the follow-up period (mean 4.79 years), 58 (28.9%) individuals were treated for depression, 34 (58.6%) of these during their initial hospitalization (acute and rehab); 6 (10.3%) during the remainder of their first post-injury year; 10 (17.2%) in year two; four (6.9%) each in years three and four. Individuals at highest risk were those with a pre-injury history of depression, a history of substance abuse, or permanent neurological deficit. Because depression occurs commonly and early in persons with SCI, a detailed psychiatric history should be completed for all SCI patients, and those with a history of depression should be offered focused assessment and psychological care both during inpatient stay and post-discharge.

Dryden DM, Saunders LD, Rowe BH, et al.

Neuroepidemiology. 2005;25(2):55-61. Epub 2005 Jun 8.

The effects of lower-extremity functional electric stimulation on the orthostatic responses of people with tetraplegia.

Orthostatic hypotension (blood pressure drops when assuming an erect posture) is a common problem for persons with cervical or high thoracic SCI and can restrict active participation in rehabilitation and potentially hasten the development of undesirable secondary complications related to immobilization. Sixteen acute and chronic subjects with motor complete tetraplegia (C3-7) were tested on a progressive head-up tilting maneuver with and without the application of functional electric stimulation (FES) to the lower extremities. When the tilt angle was increased (at angles of 0°, 15°, 30°, 45°, 60°, 75°, and 90° continuously for up to 1 hour), blood pressure tended to decrease while heart rate increased. The application of FES during the tilting maneuver lessened the drop in blood pressure and reduced the compensatory increase in heart rate. This application allows people with tetraplegia to stand up more frequently and for longer durations.

Chao CY, Cheing GL

Arch Phys Med Rehabil. 2005 Jul;86(7):1427-33.

Plasma glutamine concentration in spinal cord injured patients.

Reduction in plasma concentration of the amino acid glutamine is related to loss of immune function. Glutamine is largely produced by the skeletal muscles, which are severely compromised in persons with SCI, and this may be an important contributor to immunosuppression seen in SCI patients. In this clinical trial, blood was collected from seven subjects with complete SCI and 11 non-injured, sedentary controls before and after a treadmill exercise session. Samples were analyzed for plasma glutamine and glutamate concentrations and cytokine production by peripheral blood mononuclear cells. SCI subjects had 54% less plasma glutamine concentration than controls, as well as a decrease in the production of TNF and IL-1 by peripheral blood mononuclear cells cultivated for 48 hours.

Rogeri PS, Costa Rosa LF.

Life Sci. 2005 Sep 23;77(19):2351-60.

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GENITOURINARY**Successful pregnancy achieved by intracytoplasmic sperm injection using cryopreserved electroejaculate sperm in a couple both with spinal cord injury: a case report.**

A couple in which both the man and woman had SCI achieved pregnancy after intracytoplasmic sperm injection (ICSI) with cryopreserved electroejaculate sperm. The 33-year-old husband (T10 complete) had low sperm motility and quality. Sperm were collected from two electroejaculations and cryopreserved. The 30-year-old wife had L2 paraplegia with cauda equina syndrome, regular menstrual cycles, and normal hormone levels, uterus and ovaries. After controlled ovarian hyperstimulation, 10 oocytes were retrieved. Eight mature oocytes were injected using thawed sperm, resulting in 5 normal zygotes. Four embryos were transferred into the uterus. Pregnancy was achieved, and a healthy female baby was delivered vaginally at 39 weeks of gestation. The use of cryopreserved electroejaculated sperm for ICSI can avoid the inconvenience or cost to the patient of repeated electroejaculations.

Chen SU, Shieh JY, Wang YH, et al.

Arch Phys Med Rehabil. 2005 Sep;86(9):1884-6.

Abdominal electric stimulation facilitates penile vibratory stimulation for ejaculation after spinal cord injury: a single-subject trial.

A 37-year-old male with complete T3 SCI, 18 years post-injury, underwent penile vibratory stimulation (PVS) alone and PVS with abdominal electric stimulation (AES). Stimulation was presented to the frenulum using a Ferti Care Personal vibrator set at maximal settings. AES was applied to the abdomen using a commercially available muscle stimulator at maximal stimulus intensity and duration settings. Single-subject trials were randomized to PVS only or PVS plus AES. Ejaculates were produced in 4 of 30 trials (13.3%) with PVS alone but in 31 of 34 trials (91%) with PVS plus AES. There were no significant differences in time to ejaculation between the two techniques. AES significantly increased the success rate for ejaculation with the use of PVS compared to PVS alone.

Goetz LL, Stiens SA.

Arch Phys Med Rehabil. 2005 Sep;86(9):1879-83.

Botulinum toxin type a is a safe and effective treatment for neurogenic urinary incontinence: results of a single treatment, randomized, placebo controlled 6-month study.

Fifty-nine patients (53 with SCI; 6 with MS) with urinary incontinence caused by neurogenic detrusor overactivity and using clean intermittent self-catheterization were randomized to receive a single dose into the detrusor of BTX-A (200 U or 300 U) or placebo. Urodynamic assessments to measure maximum cystometric capacity, reflex detrusor volume and maximum detrusor pressure during bladder contraction were performed at baseline, 2, 6 and 24 weeks. Changes in daily frequency of urinary incontinence episodes were monitored via a patient bladder diary over 24 weeks, and quality of life was assessed using the Incontinence Quality of Life questionnaire. Incontinence episodes decreased significantly from baseline, and there were significant improvements in bladder function and patient quality of life in the two BTX-A treatment groups but not in the placebo group. Benefits were observed from the first evaluation at week 2 to the end of the 24-week study. No safety concerns or adverse events were raised. No clear dose difference between the 220 U and 300 U groups were found.

Schurch B, de Seze M, Denys P, et al

J Urol. 2005 Jul;174(1):196-200.

RESPIRATORY**Long-term treatment of sleep apnea in persons with spinal cord injury.**

Postal surveys were sent to 72 SCI patients with sleep apnea. Forty individuals responded (54%), most (92%) had tetraplegia, and the average time since diagnosis of sleep apnea was 4 years. Continuous positive airway pressure (CPAP) had been tried by 80%, which 63% continued to use at the time of the survey for an average of 6.5 nights per week and 6.9 hrs per night. CPAP was rated as beneficial in comparison with its side effects. The most common side effects were nasal congestion and mask discomfort. Many SCI individuals with sleep apnea become long-term users of CPAP and perceive a subjective benefit from the treatment.

Burns SP, Rad MY, Bryant S, Kapur V.

Am J Phys Med Rehabil. 2005 Aug;84(8):620-6.

Combined intercostal and diaphragm pacing to provide artificial ventilation in patients with tetraplegia.

Four ventilator-dependent subjects with SCI and only unilateral phrenic nerve function received a surgical procedure in which a multipolar epidural disk electrode was positioned on the ventral surface of the upper-thoracic spinal cord via a hemilaminectomy to activate the inspiratory intercostal muscles. A phrenic nerve electrode was implanted unilaterally via the thoracic approach. After two weeks of recovery followed by muscle reconditioning, all subjects were able to significantly increase their respiratory capacity and achieved substantial independence (16 to 24 hours per day) from mechanical ventilatory support. Subjects reported improved sense of smell, mobility, quality of speech and overall sense of well-being. One subject became employable as a result. This combined intercostal and diaphragm pacing technique allows ventilator-dependent individuals who are not candidates for conventional phrenic pacing alone to breathe more normally, eliminating many of the disadvantages of mechanical ventilation.

DiMarco AF, Takaoka Y, Kowalski KE.

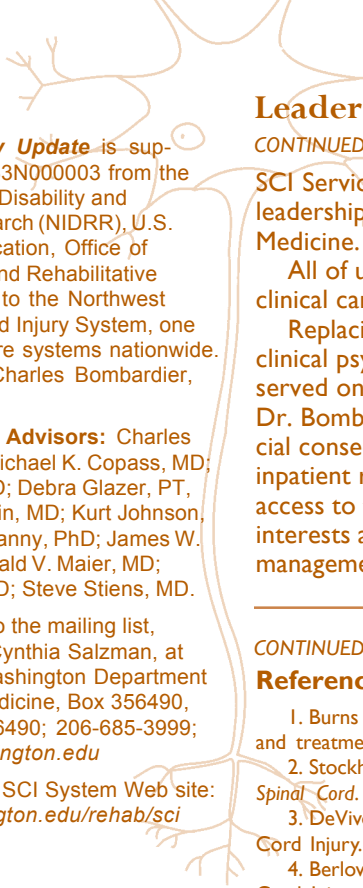
Arch Phys Med Rehabil. 2005 Jun;86(6):1200-7.

OTHER**Lidocaine anal block limits autonomic dysreflexia during anorectal procedures in spinal cord injury: a randomized, double-blind, placebo-controlled trial.**

In this double-blind study, 26 patients with SCI at or above T6 who were already scheduled to undergo anorectal procedures (flexible sigmoidoscopy and/or anoscopic hemorrhoid ligation) were randomized to receive either intersphincteric anal block with 1 percent lidocaine (12 subjects) or normal saline (placebo) (13 subjects) before the procedure. Blood pressure was measured before, during, and after the block and procedure. The mean maximal systolic blood pressure increase for the lidocaine group was significantly lower than the placebo group, demonstrating that lidocaine anal block significantly limits the autonomic dysreflexia response in susceptible patients undergoing anorectal procedures, which are common in this population.

Dis Colon Rectum. 2005 Aug;48(8):1556-61.

Cosman BC, Vu TT.



Leadership Change

CONTINUED FROM PAGE 1

Spinal Cord Injury Update is supported by grant H133N000003 from the National Institute of Disability and Rehabilitation Research (NIDRR), U.S. Department of Education, Office of Special Education and Rehabilitative Services (OSERS), to the Northwest Regional Spinal Cord Injury System, one of 16 model SCI care systems nationwide. **Project Director:** Charles Bombardier, PhD.

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Northwest Regional SCI System Web site: <http://depts.washington.edu/rehab/sci>

SCI Service in 1987 and director of the SCI Clinic in 1990. She has held many national leadership positions in her field and in 2004 was elected to the prestigious Institute of Medicine.

All of us at the UW and the NWRSCIS thank her for her exceptional leadership and clinical care, and wish her well in her new professional home.

Replacing Cardenas as the new director of the NWRSCIS is Charles Bombardier, PhD, clinical psychologist and professor in the Department of Rehabilitation Medicine, who has served on the grant since 1990 and has been co-director with Dr. Cardenas since 2000. Dr. Bombardier has extensive clinical and research experience in the domain of psychosocial consequences of SCI. For 16 years he has been the attending psychologist on the inpatient rehabilitation unit at Harborview Medical Center. He has published in the areas of access to the environment, substance abuse and depression after SCI. His current research interests are in the areas of exercise/activity promotion, lifestyle change, depression, pain management and prevention of rehospitalization and recurrent pressure ulcers after SCI.

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Also published online at <http://depts.washington.edu/rehab/sci/update.html>



6-1-2541

Spinal Cord Injury Update
Winter 2006 • Volume 15, Number 1
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