

spinal cord injury

UPDATE

Department of Rehabilitation Medicine

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UW Medicine
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Arm and Shoulder Pain in SCI *Seeking Solutions*

Many people with SCI who use manual wheelchairs develop chronic, disabling arm, shoulder or hand pain that interferes with daily life. Studies have found that between 31%–73% of persons in the SCI population have shoulder pain, and 49%–73% have painful carpal tunnel syndrome.

Despite the frequency of these syndromes, little is known about their specific causes or how to prevent them, and treatments are not always effective.

In order to unravel this mystery, the Northwest Regional SCI System at the UW Department of Rehabilitation Medicine is collaborating with two other SCI centers (University of Pittsburgh and the Kessler Institute) on a study of wheelchair propulsion and transfer techniques in the SCI population. “These two wheelchair techniques involve signifi-

cant repetitive loading on upper limbs and most likely are the primary reasons for injury,” says **Michael Chang, MD, PhD**, UW associate professor of rehabilitation medicine and principal investigator for the Seattle arm of the study.

With funding from the National Institute on Disability and Rehabilitation Research (grant H133A011107), the 5-year study, called “Collaborative Upper Limb Pain,” began in 2002 and will eventually enroll 225 participants from the three centers.

Chang and his UW colleagues are recruiting persons with SCI below T1 who use a manual wheelchair and have been injured more than 12 months. Participation involves coming to the UW for an interview; a nerve conduction study, brief physical exam, and imaging studies (MRI and ultrasound) to assess abnormalities in the shoulder and arm; and biomechanical studies that record how participants use their arms during wheelchair propulsion and transfer. These study activities are scheduled for the convenience of participants and can all be done in one visit. Subjects are paid \$100 for participating; parking is free. The subject is asked to complete a brief follow-up telephone questionnaire about upper limb pain twice-yearly for the remainder of the study period.

A unique aspect of the study is the biomechanical testing conducted by research scientist Bob Price in the UW’s state-of-the-art Human Motion Analysis Lab, using sophisticated technology that was refined and in some cases developed specifically for this project. Price starts by switching one of the participant’s wheels for a “SmartWheel” that measures the amount of force the subject applies on the push rim. Next, Price and research assistant Zachary Ashwell help the subject roll onto a platform and secure the wheelchair

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Bob Price, rehabilitation medicine research scientist for the study of upper limb pain in persons with SCI, places reflective markers on study participant Tammy Wilber, whose wheelchair has been secured onto a treadmill-like platform. While Wilber pushes her wheels, infrared cameras capture and digitize information from the markers, employing the same technology used to create the creature Gollum’s movements in the movie Lord of the Rings. Participants receive \$100 for completing the study.



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UPDATE

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so the rear wheels are in contact with two metal cylinders that allow the wheels to turn without moving forward. "It's basically a treadmill for wheelchairs," Price explained. (See photo on front page.)

Reflective markers are placed at strategic locations on the subject's head, shoulder, neck, wrist, elbow, and on the hub and rim of the wheel.

While the subject pushes the wheels, information from the markers is captured by five infrared cameras placed around the room and transmitted

to a computer. Software developed by Price quantifies the parameters of the markers and joint angles, reconstructs the positions in 3-D space, and superimposes pushrim force data from the SmartWheel.

"This is the same technology used to create Gollum's movements in the *Lord of the Rings* movie and the Tom Hanks character in *Polar Express*," Price said. On the computer screen, the markers show up dramatically as little points of light—like stars in a constellation—in motion against a black background.

Subjects perform this activity for 30-60 seconds at three different speeds. They also are asked to carry out acceleration, braking and transferring activities while data are recorded.

These data, along with information about upper limb pain and disability from questionnaires, MRIs, etc., are sent to the study's coordinating center in Pittsburg for analysis.

"We're trying to correlate evidence of injury to the way people are using their wheelchairs," Price said. "Eventually we want to see what variables are related to injury and abnormalities. If we understand the injury mechanism, hopefully we can improve propulsion techniques and wheelchair designs to prevent these kinds of injuries." The researchers need a large number of subjects in order to get a reliable and complete picture of what's causing these problems.

While participants don't get any direct personal benefit from taking part in the study (aside from \$100), contributing toward a worthy research effort has other rewards. "Research is really important," said Tammy Wilber (seen in photo), who participated in the study and recommends others give it a try. "If you can give a few hours to benefit the lives of people with SCI, it's worth it. Plus, it's fascinating! When I watched (the documentary about) how they made Gollum in the movie, I could say, 'Hey, I did that!'"

For more information about participating in this study, please contact **Zachary Ashwell at 206-543-3720**.

See more photos in the online version of this article at: http://depts.washington.edu/rehab/sciupdates/05_spring.html

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*This is the same technology used
to create the Gollum character's movements
in the movie Lord of the Rings.*
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Spinal Cord Injury Care In Turkey

Bilge Yilmaz, MD, (see photo) is spending a year at the University of Washington as a rehabilitation medicine fellow with Dr. Diana Cardenas. Yilmaz is a rehabilitation medicine physician in the SCI Unit of the Turkish Armed Forces Rehabilitation Center (www.rehab.gata.edu.tr) in Ankara, Turkey.

We asked him to tell us about himself and SCI care in Turkey.

The Turkish Armed Forces Rehabilitation Center (TAFRC) where I work is a modern facility serving persons with disabilities from all over Turkey and neighboring countries. It is the largest rehab facility in the country—a state-of-the-art center that is probably among the most comprehensive in the world. It includes a wide range of services, from gait analysis and cardiopulmonary exercise testing laboratories to bone densitometer and a hyperbaric chamber. There are two gymnasiums, five exercise rooms dedicated to orthopedic rehab, neurologic rehab, hand therapy, outpatient therapy and pediatric rehab;

two large and two small aquatic rehabilitation pools; vocational, occupational and recreational therapy units; speech and cognitive therapy; as well as hydrotherapy and electrotherapy.

TAFRC serves 400 SCI patients per year and houses 200 active patient beds, 50 nursing home beds, and a 50-bed patient hotel. In addition to an acute care unit, TAFRC has separate rehabilitation units for patients with SCI, brain injury, stroke, amputation, and rheumatology.



The annual incidence of SCI in Turkey is about 12.7 cases per million population, significantly lower than the U.S. rate of 40 per million. Approximately 71% percent of injuries in Turkey occur among males, compared to 78.2% among males in the U.S. The average age

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at injury is 35.7 years, (38 years in the U.S.), and like the U.S., the most common causes of injury in Turkey are motor vehicle accidents, followed by falls, violence and sports-related injuries. The most common level of injury in both countries is C5.

The total length of hospital stay (acute and rehab) for SCI patients in Turkey is longer than in the U.S. (95 versus 55, respectively), mainly because PT and OT services in Turkey are primarily available only in the hospital setting.

Patients at our center can take vocational and recreational courses such as computer sciences, marbling, wood and metal works, painting and sculpture. These are provided by the Turkish Ministry of Education. The center has a wheelchair basketball team, an amputee soccer team, an archery team and a goal-ball team (a sport for people with visual impairments); many of these teams

represent our country in the Paralympics.

Turkey's health care system consists of both public and private entities. About 85% of the citizenry has some kind of health insurance coverage, either through federal programs like the Social Insurance Organization and the Retirement Fund, or through private insurance. Most health facilities (63%) are operated by the Ministry of Health, 19% are private, 10% are run by the Social Insurance Organization, and the remainder are operated by the military and other public institutions.

In Turkey, we have a lifelong follow-up program for patients with SCI and invite those people to come back at least once a year for overall check-ups. Reproductive services such as *in vitro* fertilization are offered to SCI patients through the Department of Gynecology and Obstetrics at Gulhane Military Medical School in Ankara.

This is my first visit to the United States. TAFRC sent me here to improve my clinical skills in SCI rehabilitation, learn more about the U.S. health care system, observe the strategies used to reintegrate people with SCI into the community, and to open wide a door for collaborative studies. I chose Seattle because of the distinguished reputations of Dr. Cardenas and her colleagues in the UW Department of Rehabilitation Medicine. Right away I saw that I made the right decision in choosing the UW and that I am lucky to have the chance to live in such a beautiful city.

My special research interests are in bone mineral metabolism and the prevention and treatment of osteoporosis in SCI. While in Seattle, I am helping Dr. Cardenas with her UTI prevention research study and together we are developing an osteoporosis study.

—Bilge Yilmaz, MD

See photos from Turkey in the online version of this article at: http://depts.washington.edu/rehab/sci/updates/05_spring.html

Recent SCI-related publications by UW faculty

- **Bombardier CH**, Stroud MW, **Esselman PC**, Rimmele CT. Do preinjury alcohol problems predict poorer rehabilitation progress in persons with spinal cord injury? *Arch Phys Med Rehabil* 2004; 85(9):1488-1492.
- **Bombardier CH**, Richards JS, Krause JS, Tulsy D, Tate DG. Symptoms of major depression in people with spinal cord injury: implications for screening. *Arch Phys Med Rehabil* 2004; 85(11):1749-1756.
- **Burns SP**, Weaver FM, Parada JP, Evans CT, Chang H, Hampton RY, Kapur V. Management of community-acquired pneumonia in persons with spinal cord injury. *Spinal Cord*. 2004 Aug;42(8):450-8.
- **Cardenas DD**, **Hoffman JM**, Kirshblum S, McKinley W. Etiology and incidence of rehospitalization after traumatic spinal cord injury: a multicenter analysis. *Arch Phys Med Rehabil* 2004; 85(11):1757-1763.
- **Cardenas DD**, Bryce TN, Shem K, Richards JS, Elhefni H. Gender and minority differences in the pain experience of people with spinal cord injury. *Arch Phys Med Rehabil* 2004; 85(11):1774-1781.
- Vaccaro AR, Kim DH, Brodke DS, Harris M, **Chapman JR**, Schildhauer T, et al. Diagnosis and management of sacral spine fractures. *Instr Course Lect* 2004; 53:375-385.
- **Deyo RA**, Nachemson A, **Mirza SK**. Spinal-fusion surgery - the case for restraint. *N Engl J Med* 2004; 350(7):722-726.
- Hastings J, **Goldstein B**. Paraplegia and the shoulder. *Phys Med Rehabil Clin N Am* 2004; 15(3):vii, 699-vii, 718.
- Panagos A, **Jensen M**, **Cardenas DD**. Treatment of Myofascial Shoulder Pain in the Spinal Cord Injured Population Using Static Magnetic Fields: A Case Series. *J Spinal Cord Med* 27(2):138-142, 2004.
- **Jensen MP**, Hanley MA., **Turner JA**, **Cardenas DD**. Pain and other sensations in persons with spinal cord injury: Frequency and association with depression and pain interference. *Psychologica* 37:129-143, 2004.
- Masedo AI, Hanley M, **Jensen MP**, **Ehde D**, **Cardenas DD**. Reliability and Validity of a Self-Report Functional Independence Measure (FIM-SR) in Persons with Amputation or Spinal Cord Injury and Chronic Pain. *Am J Phys Med Rehabil* 84:167-176, 2004.
- **Little JW**, Ditunno JF, Jr. Soleus H-reflex in spastic spinal cord injury patients. *Arch Phys Med Rehabil* 2004; 85(12):2070-2071.
- Ditunno JF, **Little JW**, Tessler A, Burns AS. Spinal shock revisited: a four-phase model. *Spinal Cord*. 2004 Jul;42(7):383-95.
- Han JJ, **Massagli TL**, **Jaffe KM**. Fibrocartilaginous embolism—an uncommon cause of spinal cord infarction: a case report and review of the literature. *Arch Phys Med Rehabil* 2004; 85(1):153-157.
- Bryden AM, Kilgore KL, Lind BB, **Yu DT**. Triceps Denervation as a Predictor of Elbow Flexion Contractures in C5 and C6 Tetraplegia. *Arch Phys Med Rehabil* 2004; 85(11): 1880-1885.

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.

Common Respiratory Problems in SCI

What You Need to Know

October 12, 2004—Respiratory problems that aren't usually severe in the general population can be quite serious or even life-threatening in persons with SCI, according to **Stephen Burns, MD**, assistant professor in the UW Department of Rehabilitation Medicine.

"Respiratory infections, especially pneumonia, are the leading cause of death (about 20%) in SCI," said Burns, but account for less than 3% of deaths in the general population. Sleep apnea—pauses in breathing while sleeping—is another problem that is more common and more severe in the SCI population. These problems are preventable and treatable, Burns added, but many health care providers aren't aware they can be more severe and require different treatments in people with SCI.

Pneumonia—why is it so common and severe in SCI?

Part of the answer lies in an understanding of the way SCI affects breathing muscles. Breathing is a two-step process: inspiration (breathing in) and expiration (breathing out). While inspiration is affected mainly in those at C5 and above, expiration is a problem with all injury levels down to T12.

"People with injuries down to T12 may have sufficient ability to move air in and out during regular breathing, but a profound weakness in their ability to cough," Burns said. "If you can't cough well, you can't bring up phlegm (mucus) from your lungs, and it starts pooling there." It's harder to treat respiratory infections in SCI patients because they can't clear their own secretions adequately. In time, breathing becomes harder as lungs fill with more secretions. This can lead to pneumonia.

When the cough ability is weak, secretions have to be mobilized (removed) in some other way, such as suctioning or quad coughing. These methods clear some but not all secretions.

A better method is the Mechanical insufflator-exsufflator (MI-E). "This is essentially a very expensive (\$4,000) reversible shop-vac," Burns said. It inflates the lung, then simulates a cough when the flow is reversed. "The air flow is similar in velocity to a cough, so it's very effective in pulling secretions out of the lungs. Not surprisingly, it's strongly preferred by patients over suctioning."

Treatment and prevention of pneumonia

Pneumonia in SCI patients should be treated aggressively with strong intravenous antibiotics that are effective against the highly resistant bacteria *Pseudomonas*—rare in the general population, but more widespread in SCI. Because of the severity of pneumonia in the SCI population, Burns believes that "anybody with a complete cervical injury or anyone with a motor incomplete injury but a weak cough should be hospitalized" if they get pneumonia.

"Some pneumonias are probably preventable with the vaccine *Pneumovax*," Burns said. "Everybody with SCI should receive it once," and possibly again after age 65 if more than 5 years have elapsed since the last vaccination.

Prevention strategies include daily clearing and inflating lungs. "These methods need to be stepped up if a patient develops a cold, bronchitis, or some sort of upper respiratory infection, to keep it from developing into a pneumonia," Burns said.

Influenza vaccines

"The flu can make you just as sick (as pneumonia), and people can die from the flu," Burns stated. "Even if you consider yourself healthy, people with SCI are considered a priority group, and we recommend that they receive flu vaccine yearly."

Sleep Apnea

Sleep apnea is defined as pauses that occur in the breathing at night, along with severe snoring and/or excessive daytime sleepiness, Burns said. "Your sleep is disrupted, sometimes hundreds of times a night, and you're not getting



*Sleep apnea in SCI
can cause depression,
high blood pressure,
poor wound healing, and
even sudden death.*



restful sleep because your brain is having to wake up to tell your body to keep breathing." People usually have no awareness that they are waking up.

Sleep apnea causes excessive daytime sleepiness, cognitive dysfunction (trouble thinking and concentrating), high blood pressure, cardiac and pulmonary disease, and motor vehicle accidents. "If someone has high blood pressure that doesn't respond to the usual medications, there's a very good chance the person has sleep apnea," Burns noted.

While sleep apnea occurs in about 3% of the general population, it is ten times more common in the SCI population. Up to 40% of persons with tetraplegia (quadriplegia) have sleep apnea.

Sleep apnea in the SCI population causes all the problems of the general population, but also has the arguably more serious consequences of interfering with learning and improvement during the rehabilitation period; depression and difficulty with emotional

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adjustment; ulcer formation and poor wound healing due to low oxygen at night; and even sudden death.

The harm caused by sleep apnea depends on its severity, namely, “how frequently your breathing stops, how long it stops, how low your oxygen level goes,” Burns said. “For some people it’s mild; for others, it’s going to shorten their lives.”

Sleep apnea can be diagnosed with a sophisticated sleep study called a polysomnography, or at a minimum, a sleep test that records your oxygen levels at night.

The most common treatment is Continuous Positive Airway Pressure (CPAP) therapy, which consists of a bedside unit and hose that keeps the airway open by delivering pressurized air into the lungs through a mask worn over the mouth and nose. Since persons with limited hand function may not tolerate this treatment well because of the inability to reposition the mask independently during the night, an occupational therapist can work with patients to modify the mask with a hook or ring so the user can make adjustments independently.

Burns reported that once CPAP treatment begins, patients usually notice a benefit right away and “don’t want to be without (the CPAP equipment) or to travel without it. They feel more alert. That’s the main thing people perceive. Heart problems like high blood pressure are more likely to creep up on people.”

Issues to discuss with your health care provider

- Everyone with SCI has a high risk for pneumonia and influenza and should request immunization from their physician or medical center.
- It makes sense for people with cervical injuries to get baseline pulmonary function testing so clinicians know what their oxygen levels and breathing are normally like. “Then if someone gets sick (with a respiratory infection), we know what we’re shooting for to get them back to their baseline,” Burns said.
- Patients with symptoms of sleep apnea—excessive sleepiness during the day or loud snoring at night—may need a referral to a sleep specialist. “Keep in mind that in medical school, sleep gets one hour to cover everything—abnormal sleep, normal sleep, dreaming, insomnia, narcolepsy,” Burns noted. “So most physicians know almost nothing about sleep apnea unless they specialize in sleep medicine or see a patient population with a lot of sleep apnea.”

An expanded version of this report is available online at http://depts.washington.edu/rehab/sci/common_respiratory.html.

More SCI Forum reports are archived on our Web site at http://depts.washington.edu/rehab/sci/forum_reports.html.



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If you would like to learn about becoming a sponsor for next season’s SCI Forum program (October 2005 - June 2006), please contact Debra Glazer at 206-685-3880 or dglaze@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).

ASSISTIVE TECHNOLOGY

■ Effect of a pushrim-activated power-assist wheelchair on the functional capabilities of persons with tetraplegia.

Fifteen full-time manual wheelchair users with tetraplegia participated in trials that involved propelling both their own manual wheelchairs and a pushrim-activated power-assisted wheelchair (PAPAW) three times each (six trials total) over an ADL-simulation course with 18 obstacles. Each participant's heart rate was monitored throughout testing, and participants were surveyed with a visual analog scale to determine the ease of completing each obstacle and their ergonomic preferences between the two wheelchairs. Four obstacles (carpet, dimple strips, up a ramp, up a curb cut) were rated as being significantly easier to complete when using the PAPAW. There was a significant decrease in mean heart rate in all trials with the PAPAW. Amount of assistance needed, responses to ergonomic questions, and overall time to complete course did not differ significantly between the two wheelchairs. For subjects with tetraplegia, PAPAWs have the potential to improve functional capabilities, especially when propelling up ramps, over uneven surfaces, and over thick carpet.

Algood SD, Cooper RA, Fitzgerald SG, et al.

Arch Phys Med Rehabil. 2005 Mar;86(3):380-6.

■ Demographic and socioeconomic factors associated with disparity in wheelchair customizability among people with traumatic spinal cord injury.

Assistive technology information on 412 people with SCI who use wheelchairs more than 40 hours a week was collected by 13 Model SCI Systems via interviews. Information included age, race, education, level of injury, and wheelchair funding source. Ninety-seven percent of manual wheelchair users and 54% of power wheelchair users had customizable wheelchairs. No power wheelchair user received a wheelchair without programmable controls. Minorities with low socioeconomic backgrounds (low income, Medicaid/Medicare recipients, less educated) were more likely to receive standard wheelchairs than the more appropriate customizable wheelchairs. This survey found that the standard of care for manual wheelchair users with SCI is a lightweight and customizable wheelchair; for power wheelchair users, programmable controls and customizable features are recommended. Unfortunately, socioeconomically disadvantaged people were less likely to receive customizable wheelchairs.

Hunt PC, Boninger ML, Cooper RA, et al.

Arch Phys Med Rehabil. 2004 Nov;85(11):1859-64.

COMPLICATIONS

■ Microbiology of the urethra and perineum and its relationship to bacteriuria in community-residing men with spinal cord injury.

To understand the relationship between bacterial colonization of the urethra and perineum and bacteriuria, cultures of the urine, urethra, and perineum were obtained from 70 men with SCI. Urine colony count was 0 in 16 (22.9%) men, and 54 (77.1%) men were culture-positive for various uropathogens. In 40 (74.1%) men with bacteriuria, at least one bacterial species present in the urine was also found in the urethra and/or perineum. Differences in the occurrence of uropathogens in men with and without bacteriuria were statistically significant, and organisms were

present in higher numbers in men with bacteriuria. Men with SCI who have bacteriuria are significantly more likely to be colonized in the distal urethra and perineum with uropathogens that are often present in the urine in comparison with men without bacteriuria. Additional studies are necessary to determine why some persons with SCI are able to re-establish normal skin flora.

Waites KB, Canupp KC, DeVivo MJ.

J Spinal Cord Med. 2004;27(5):448-52.

■ Factors associated with risk for subsequent injuries after traumatic spinal cord injury.

Health assessments and risk measures were mailed to 1328 persons over age 18 with traumatic SCI of at least 12 months' duration; 72% responded. Subjects were asked about the number of injuries that were severe enough to require treatment or hospitalization in the past year. Nineteen percent of participants reported at least one injury within the past year. Twenty-seven percent of those with at least one injury reported one or more injury-related hospitalizations in the past year. Risk factors are consistent with those leading to the initial SCI: youth, sensation seeking, alcohol misuse, and use of psychotropic prescription medication. Results suggest a need for more aggressive injury prevention interventions and more research to identify the costs, severity, and circumstances surrounding injury to design prevention programs that target risk behaviors.

Krause JS.

Arch Phys Med Rehabil. 2004 Sep;85(9):1503-8.

■ Exacerbation of chronic pain following spinal cord injury.

Of 120 persons with SCI and chronic pain who completed a postal survey, over 50% indicated that prolonged sitting, infections, fatigue, muscle spasms, cold weather, and sudden movements exacerbated their pain. Five sets of factors were found to magnify pain: negative mood, prolonged afferent activity (bowel, bladder, somatic), weather, voluntary physical activity, and transient somatic afferent activity (muscle spasms, sudden movements, touch). A combination of decreased activity levels due to pain, pain located in the frontal aspects of torso (including genitals), "burning" or "electric" pain, and a limited perception of life control was significantly associated with a high extent of pain aggravation. People who suffer from these difficult pain syndromes can benefit from knowledge about factors that may amplify pain.

Widerstrom-Noga EG, Turk DC.

J Neurotrauma. 2004 Oct;21(10):1384-95.

PEDIATRIC SCI

■ Effect of bracing on paralytic scoliosis secondary to spinal cord injury.

A review of patient records from 1996-2001 at a Shriners Children's Hospital found 125 patients who sustained SCI prior to skeletal maturity. At final follow-up (average 7.7 years after injury), 117 (95%) developed scoliosis. Forty-two patients presented with a curve <10°, 29 of whom were braced, and 13 who were not. Of the braced group, 13 (45%) went on to surgery, compared to 10 (77%) of the nonbraced group. Average time to surgery was 8.5 years for patients who were initially braced and 4.2 years for those who were not braced. A similar trend was seen in the patients who presented with an initial curve between 11° and 20°. There was no significant difference between

time to surgery for the braced and nonbraced patient groups at higher ($>20^\circ$) initial curve presentations. Bracing of children with SCI before significant curve formation ($< 20^\circ$) delays the time to surgical correction of the deformity as it progresses. At smaller curves ($< 10^\circ$), bracing may even prevent the need for surgery. As curve size increases ($\geq 20^\circ$), bracing seems to play a limited role. Mehta S, Betz RR, Mulcahey MJ, et al.

J Spinal Cord Med. 2004;27 Suppl 1:S88-92.

■ A survey of chronic pain in the pediatric spinal cord injury population.

To assess the incidence and type of chronic pain in the pediatric SCI population and to evaluate the resulting impact on activities of daily living (ADLs), 31 patients with pediatric-onset SCI were evaluated using standardized assessments of pain and function (Adolescent Pediatric Pain Tool and the Lansky Play Performance Scale), as well as a questionnaire about types of pain. Twenty (65%) reported chronic pain, classified as either nociceptive (48%) or neuropathic (19%). Interference with ADLs and play was present in only one participant. Nociceptive pain (either visceral or musculoskeletal) was more common than neuropathic pain.

These data suggest that although common, chronic pain associated with childhood SCI has a significantly smaller impact on daily activities than that reported in the literature for adult-onset SCI.

Jan FK, Wilson PE.

J Spinal Cord Med. 2004;27 Suppl 1:S50-3.

PSYCHOSOCIAL

■ Patterns of alcohol and substance use and abuse in persons with spinal cord injury: risk factors and correlates.

This was a retrospective cross-sectional study using Model SCI System research data on 3,041 participants (age 18 and older) who were injured between 1975-2002 and interviewed between November 2000 and March 2003. Using several measures of alcohol consumption, substance use, life satisfaction, and pain, data showed that 14% of the subjects were classified as likely to have an alcohol abuse issue and 11% reported using illegal drugs or prescription medications for non-medical reasons. At-risk drinkers and substance users tended to be younger, single, male, and less educated. Subjects with alcohol dependency problems and substance users reported more pain and lower satisfaction with life. Persons who drank without indication of problem drinking had better occupation outcomes than abusers or abstainers. Pressure ulcers were associated with substance use.

Tate DG, Forchheimer MB, Krause JS, et al.

Arch Phys Med Rehabil. 2004 Nov;85(11):1837-47.

■ Symptoms of major depression in people with spinal cord injury: implications for screening.

This cross-sectional study was based on data collected during the one-year follow-up assessment of 849 persons from 16 Model SCI Systems, using the Patient Health Questionnaire-9 (PHQ-9), a measure of major depressive disorder (MDD). Exactly 11.4% of participants met criteria for probable MDD, which was associated with poorer subjective health, lower satisfaction with life, and more difficulty in daily role functioning. Probable MDD was not related to most demographic or injury-related variables. Both somatic and psychologic symptoms predicted probable MDD. The authors conclude that the PHQ-9 has promise as a tool with which to identify probable MDD in people with SCI. Somatic symptoms should be counted toward the diagnosis and should alert health care providers to the likelihood of MDD. More efficient screening is only one of the quality improvement efforts needed to enhance management of MDD.

Bombardier CH, Richards JS, Krause JS, et al.

Arch Phys Med Rehabil. 2004 Nov;85(11):1749-56

OTHER

■ Targeting recovery: priorities of the spinal cord-injured population.

A total of 681 persons with SCI (51% with tetraplegia) completed a survey on areas of functional recovery that are most important to the SCI population and ranked seven functions in order of importance to their quality of life. Regaining arm and hand function was most important to persons with tetraplegia, while regaining sexual function was the highest priority for those with paraplegia. Regaining walking movement was the highest priority only to 7.8% of subjects with tetraplegia and 15.9% of those with paraplegia. Most participants indicated that exercise was important to functional recovery, yet more than half could not exercise due to lack of access to facilities. Understanding the priorities of the SCI population is necessary in order to improve the relevance of research in this area.

Anderson KD.

J Neurotrauma. 2004 Oct;21(10):1371-83.

■ A demographic profile of new traumatic spinal cord injuries: change and stability over 30 years.

Demographic and injury severity data were collected on 30,532 persons admitted to Model SCI System facilities within one year of injury between 1973 and 2003. Over time, the male/female ratio remained fairly stable at 4:1, but the percentage of women increased slightly, especially from motor vehicle collisions (MVCs). The mean age at injury increased significantly from 28.9 years in the 1970s to 38 years in 2000-03. The majority of cases occurred in whites (66.1%), but that percentage is declining, paralleling the changing composition of the U.S. population. Tetraplegia (54.1%) and complete injuries (55.6%) occurred more than paraplegia and incomplete injuries, respectively. MVCs (45.6%) remained the most common etiology. Falls (19.6%) held the second position over violence (17.8%), except for the 1990-1999 period when the positions were reversed. There were significant increases in percentages of new injuries due to automobile, motorcycle, bicycle, and all-terrain vehicle crashes; blunt object attacks; snow skiing; and medical and surgical mishaps. There has been a significant increase in the percentage of ventilator dependent cases, from 2.3% in the 1970s to 6.8% in 2000-03. Demographic and injury trends should be carefully considered in planning for future prevention programs and rehabilitation services.

Jackson AB, Dijkers M, Devivo MJ, et al.

Arch Phys Med Rehabil. 2004 Nov;85(11):1740-8.

■ Aging with a spinal cord injury: factors associated with the need for more help with activities of daily living.

In an international, cross-sectional survey of 352 persons with SCI for more than 20 years who had been younger than age 55 at the time of injury, 32.1% reported increased need for help with activities of daily living (ADLs) during the last 3 years. At least one medical complication was reported by 85%. Constipation (47.9%), diarrhea/bowel accidents (41.8%), and pressure ulcers (38.7%) were common. Constipation and pressure ulcers were associated with a 97% and a 76% increase, respectively, in the likelihood of needing more help with ADLs. Female gender was associated with a 96% increased odds of needing more help. There was a 42% increased odds of needing more help with ADLs per decade after SCI. People aging with SCI are vulnerable to medical complications that may result in an increased need for additional assistance with ADLs.

Liem NR, McColl MA, King W, Smith KM.

Arch Phys Med Rehabil. 2004 Oct;85(10):1567-77.



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

NWRSCIS Recreation Therapist Wins Award

Regan Ward, a recreation therapist at the UW Medical Center and member of the Northwest Regional SCI System (NWRSCIS) Consumer Advisory Board, received special recognition from the American Therapeutic Recreation Association (ATRA) in March as Advocate of the Year.

Ward was recognized by the ATRA Board of Directors for her role as the RT Medicare Project state contact for Washington and her exceptional contributions in advocating for recreational therapy. She was also honored for her work in organizing and implementing ATRA's highly successful "Day on the Hill" event, helping recreational therapists from all across the country spend a day visiting with congressional representatives to educate them about the practice of recreational therapy and the vital need to support these services for our nation's health care consumers.

Recreational therapists are health care providers who use recreational therapy interventions to improve functioning of individuals with illness or disabling conditions.

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