spinal cord injury UPDATE

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INSIDE:

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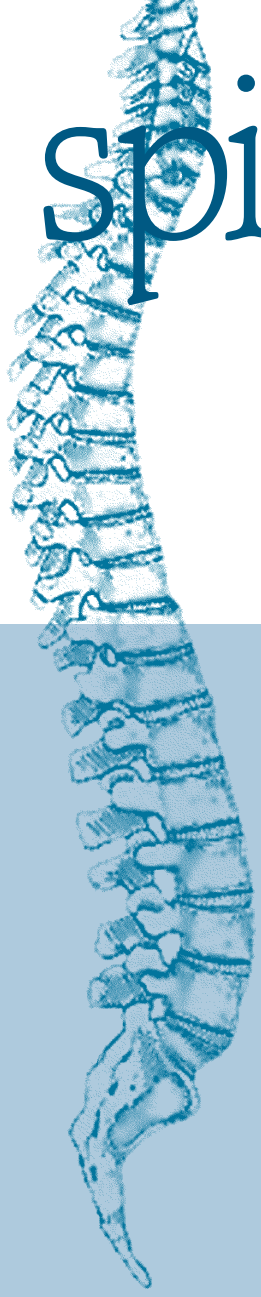

Osteoporosis and Bone Fractures in SCI

By Jelena Svircev, MD, Assistant Professor at the University of Washington in the Department of Rehabilitation Medicine and staff physician in the Spinal Cord Injury Service at the Veterans Affairs Puget Sound Health Care System.

What is osteoporosis?

Osteoporosis, or porous bone, is a disease in which the bones lose density, become weak and brittle, and can easily break. If you have a spinal cord injury, you are probably aware that you have a high risk of developing this disease and possibly breaking a bone. Understanding why this happens and what you can do about it can help you avoid fractures and their life-disrupting, painful and costly consequences.

We tend to think of bone as a hard, non-changing thing, but bones are dynamic, living organs that continuously replace cells, just like our other organs. Osteoporosis occurs when the normal process of creating new

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"I Saw It On the Internet!"

Finding Reliable Health Information Online

Like most people with SCI, you probably use the Internet to find health information. How do you know if what you find is accurate, trustworthy and up-to-date?

Why should you be careful about information you find on the Internet?

- Anyone can create an official-looking website and post information.
- Search engine results are selected by computer software and not by human experts, and the search results that come out on top are not necessarily the best websites.
- Websites may be sponsored by companies that are selling products or looking for clients, so their information may be biased, inaccurate and/or incomplete.
- Medical science is continually learning new information through research and practice. It is important to use the most up-to-date information to make your health care decisions.

How to find health information you can trust

Is the source of information respected, credible and unbiased?

- Websites sponsored by government, educational institutions, or credible professional organizations like the National

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Tips from the *Wheel World*

...wisdom and ideas for making life with SCI a little better, from individuals living with spinal cord injuries.

This installment comes from **Aditya Ganapathiraju**, a man with C5 incomplete tetraplegia and a member of our SCI Consumer Advisory Board.

Shoes & Pressure Ulcers

Problem:

Finding shoes that protect your feet, keep you comfortable and meet your fashion standards.

Since my injury 12 years ago, I have been wearing oversized shoes because they are more comfortable, easier to put on, and provide room for swelling. Usually I purchase some kind of lightweight running or athletic shoe (I refuse to wear ugly comfort or orthotic shoes).

But the extra inch or two of shoe sticking out in front caused me to bump into things and made turning in small spaces difficult. And in spite of the extra room, I still occasionally developed serious skin breakdown on my heel.

Note: Open-back shoes like clogs do not work for me because they slip off when I have leg spasms.

Solution:

Relieve the pressure by modifying the heel of the shoe.

Since the backs of my shoes aren't visible anyway, I decided to have a cobbler cut them off and replace them with a wide strip of elastic. This was better, but I still developed mild skin problems on my heels, especially when my ankles swelled up. I needed something more adjustable than the elastic.

The answer was some inexpensive pieces of Velcro and stretchy neoprene. A cobbler attached Velcro strips to the exposed edges of the shoe heel (Figure 1). I cut a piece of neoprene to size and *voila*!—instant comfort and no more skin problems (Figure 2).

Figure 1: Lightweight running shoe with back cut out and Velcro strips sewn on by a cobbler. Unattached neoprene strip can be stuck to Velcro strips and adjusted as necessary.

Supplies & costs:

The Velcro and neoprene can easily be found at fabric and/or craft supply stores. I was able to buy enough for two pairs of shoes for under $20. A cobbler charges about $10 - $20 for cutting and/or sewing the Velcro strips onto the shoes.

Figure 2: Modified shoe closed in back by sticking neoprene to the Velcro strips.

See all our tips and submit your own at http://sci.washington.edu/tips

HEALTH INFORMATION

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Spinal Cord Injury Association are more likely to provide unbiased information than commercial websites.

- Look at the web address (also called URL) to see what type of organization is sponsoring the website.
  - .gov = U.S. government
  - .edu = educational institution
  - .org = professional or not-for-profit organization
  - .com = commercial website (be cautious)
- Reliable websites make it easy for you to identify the purpose and owner of the site. If you can't find this information, the site may not be trustworthy.
- Do not rely on personal websites for your information.
- If the purpose of the site is to promote commercial products or services, the health information provided may be biased.
- Be cautious of information presented if there are advertisements on the website. If there are ads, they should be separate from health information.
- Contact information should be provided so you can reach the website owner easily.
- Be careful with links. If a link on a trusted website directs you to an entirely new website, do not assume that this new website also has trustworthy information.

Is the information up-to-date?

- Look for posting dates or the phrase 'last updated' on the web pages to see if the information is current.
- Look for other indications that the website is not up-to-date, such as an outdated events or news page.
- If links on a website do not work, the website may not be updated regularly.

Is the information presented based on facts?

- Does it sound too good to be true? Be skeptical of health information that contains claims of a "miracle cure."
- Look for indications that the information on the web page is based on research or expert review and not just opinion.
  - Are research articles or other original sources of information provided?
  - Is there a clear statement of where the information presented comes from or how it is evaluated?
- Compare the information you find on one credible website with information on other websites to see if it is consistent.
- Verify health claims that are based on personal testimony by checking trustworthy sources or experts. Online support groups, forums or blogs are a great way to share experiences and information but should not be considered a trusted source of medical advice.
- Evaluate the strength of the health claims presented. A health claim based on one small study is not as reliable as a health claim based on the findings of many large-scale studies.

How to avoid scams and viruses

- Be careful if the website says you have to register or sign up in order to access the information or if it offers to send you free products or information in the mail.
- Review the privacy policy to make sure the website will not share your information with a third party.
- Avoid websites that have pop-ups.
- Do not download files from a website unless you know it is trustworthy.

Using search engines

- Combine terms in order to focus your search. For example, to find information on dealing with pain for people with SCI, enter "pain AND spinal cord injury."
- Use double quotes to find an exact phrase ("assistive technology").
- Use OR to search for both words or phrases (exercise OR "physical activity").

Talk to your health care provider

Check with your health care provider about information you have read about on the Internet before trying something new. To make the most out of your time with your health care provider:

- Share only health information that comes from several credible websites.
- Don't share complete documents but make a brief list of your questions.
- Ask your health care provider to suggest some websites that might be useful to you.

Trustworthy websites to get you started

- MedlinePlus, National Library of Medicine. *www.medlineplus.gov*
- Centers for Disease Control and Prevention, US Department of Health and Human Services. *www.cdc.gov*

Learn more

- Evaluating Internet Health Information: A Tutorial from the National Library of Medicine. *www.nlm.nih.gov/medlineplus/webeval/webeval_start.html*
- Evaluating Health Information. MedLine Plus, National Library of Medicine. *www.nlm.nih.gov/medlineplus/evaluatinghealthinformation.html*
- "Top Ten" Most Useful Consumer Health websites. Medical Library Association. *www.mlanet.org/resources/userguide#5*

Adapted from *Getting Trustworthy Information from the Internet.* by Kathryn Yorkston, Multiple Sclerosis Rehabilitation Research and Training Center. NIDRR/U.S. D.O.E. Grant #H133B080025. University of Washington (2012). http://msrrtc.washington.edu/info/factsheets/internet.

OSTEOPOROSIS

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cells and absorbing old ones in the bones becomes imbalanced, leading to a gradual thinning of bone tissue. Osteopenia is an intermediate condition in which bone has lost density and strength but has not reached the more fragile state of osteoporosis. (See Figure 1, below.)

Why do people with SCI get osteoporosis?

In the general population, bone mineral density declines with age, and osteoporosis is most commonly found among post-menopausal women over age 65.

Different forces are at work in people with SCI, and osteoporosis is likely due to many factors, including:

- Disuse: lack of mechanical loading on the bone inhibits the stimulation of bone-building cells.
- Disordered vasoregulation: sluggish blood flow to limbs may contribute to a decrease in bone mass.
- Poor nutritional status: inadequate consumption of a healthy, well balanced diet.
- Hormonal changes (testosterone, parathyroid hormone, glucocorticoids, calcitonin) that happen as a result of SCI and play a role in the maintenance of bone formation.
- Metabolic disturbances in metabolites and acidity of the blood can change the balance of bony formation and reabsorption.
- Autonomic nervous system disregulation caused by the injury leads to poor circulation and altered gas and nutrient exchange at the bone.

Osteoporosis in SCI

- In the SCI population, osteoporosis has been seen on x-ray as early as six weeks after injury. This decrease in bone mineral density typically levels off around two years after injury. The bone density at that point is about the same as that of a 70-year-old female without SCI.
- About 80% of individuals with chronic spinal cord injury have either osteopenia or osteoporosis.
- Bone loss occurs below the level of injury.
- Studies vary, but generally there is about 30% to 40% decrease in bone density in the legs after SCI.
- The lumbar spine maintains normal or higher bone mineral density after SCI. Substantial weight-loading that comes from sitting in a wheelchair may stimulate bone-building activity enough to maintain the bone mineral density in the spine. The non-weight-bearing lower extremities do not have this stimulation and therefore lose bone mineral density.
- Individuals with tetraplegia (quadriplegia), complete injury, and injury of longer duration tend to have more bone loss.
- Spasticity may help maintain bone mass after SCI due to muscle pulling on the bone, similar to the effect of weight-bearing.

Screening & diagnosing osteoporosis

Bone mineral density is measured using dual-energy x-ray absorptiometry, also known as DXA scanning. The scan gives a score that is compared to that of a healthy person in their 20s. A diagnosis of osteopenia or osteoporosis is based on how far below that ideal a score falls.

The goal of screening tests is mainly to identify "silent" disease or risk factors and sort out the people with and without a certain disease. Screening tests should only be done if care is going to change as a result of the screening. In the able-bodied population, women do not usually start getting bone scans until well after menopause.

SCI is different. We already know that most people with SCI have bone loss, and the exposure to radiation that comes from periodic scans over many years may pose an unnecessary risk. Since the rate of osteoporosis after SCI is so high, it may be safer to assume that everyone with SCI has the disease and treat them accordingly, rather than doing a screening study just to confirm something that we already suspect. It's important talk through the pros and cons of DXA scanning with your physician.

Treating osteoporosis

What can be done? While there is no treatment to prevent or cure osteoporosis at this time, many different approaches are under study.

Pharmacological (drug)

- **Calcium and Vitamin** D are usually recommended since deficiencies can make osteoporosis worse. Talk to your provider to make sure you get the proper doses.
- **Bisphosphonates** (Fosamax, Actonel and Boniva) keep bone from breaking down, but studies show mixed results in people with SCI. Any improvements reverse when the drug is stopped, and possible negative side-effects can cause safety concerns after long-term use.
- **Teriparatide** (Forteo) is a synthetic hormone that has been studied in one very small SCI trial with inconclusive results.

Non-pharmacological

- **Standing**
  Standing places loading on the bones. Some studies have shown that using a standing frame can maintain bone density after SCI; other studies showed no benefit.

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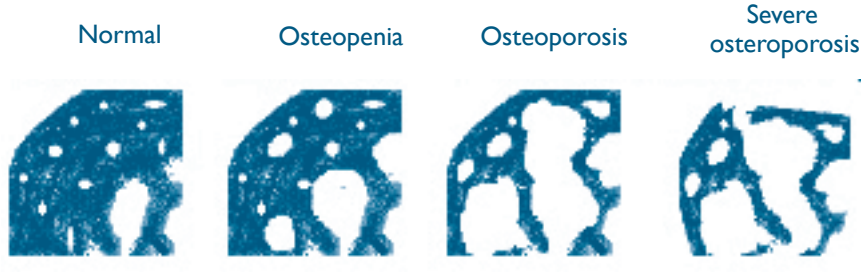
Figure 1: Stages of Osteoporosis



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- **Functional Electrical Stimulation (FES)**
  Electrodes are applied to the muscles to produce muscle contraction, causing the muscles to load or pull on the bones. More studies are needed in people with SCI to see how much FES is needed and for how long.
- **Low intensity vibration**
  Transmission of low magnitude mechanical signals are delivered by an oscillating platform. This needs to be used with a standing frame to put full body weight on it. It has been found to maintain bone density in animals and some human studies, and a few studies are underway in people with SCI.

Preventing osteoporosis & fractures

While there are no methods for preventing osteoporosis in persons with SCI who do not walk, there are things you can do to improve the severity of osteoporosis and avoid fractures.

- Consume a healthy diet
- Quit smoking
- Limit alcohol and caffeine intake
- Stay physically and mentally active
- Avoid falls
  - ⇨Make sure your wheelchair fits and is properly positioned.
  - ⇨Make sure your transfers are safe.
  - ⇨Use appropriate equipment and keep it well-maintained.
  - ⇨Make sure your environment (bathroom, bedroom, car, entry ways, etc.) is as safe as possible to avoid falls.

When fractures happen

Each year, about 2–4% of the SCI population fractures a bone. After a fracture heals, there is an increased risk of fracturing the bone in the same place. A broken bone, even when it is healed, is never as strong as it was before the fracture.

Only minimal force is required to break a bone after SCI, such as falling from a wheelchair or shower chair, turning in bed, or doing range of motion exercises. Sometimes the person doesn't remember anything happening but notices a leg suddenly becoming swollen.

Even if a person doesn't walk, it's still important to make sure a broken bone heals properly. A bone that doesn't heal correctly can end up deformed. This can lead to medical complications or a loss of independence.

Surgery vs. conservative management

Surgery is the best management in displaced, unstable or hip fractures. It is not recommended if the bone is too fragile for surgical fixation or if there is an infection present anywhere. Fractures can be stabilized with orthotics (splints, braces or casts), but patients with SCI have unique concerns, such as spasticity and skin issues, that can cause problems with off-the-shelf splints. SCI patients may need to have custom-fit devices made for them.

Goals of fracture management

- Heal the fracture with minimal risk of complications.
- Deformities are never or rarely acceptable.
- Consider the reality of the brace (how it will affect daily life).
- Assess all equipment and activities of daily living during and after fracture healing.
- GOAL: Maintain pre-fracture functional status.

References

Brauer CA, Coca-Perraillon M, Cutler DM, Rosen AB. Incidence and Mortality of Hip Fractures in the United States. JAMA. 2009 Oct 14;302(14):1573-9.

Koot VC, Peeters PH, de Jong JR, Clevers GJ, van der Werken C. Functional results after treatment of hip fracture: a multicentre prospective study in 215 patients. Eur J Surg. 2000 Jun;166(6):480-5.

World Health Organization. Assessment of Fracture Risk and its Application to Screening for Postmenopausal Osteoporosis. WHO Technical Report Series 843. Geneva: World Health Organization, 1994.

Bauman WA, et al. An effective oral vitamin D replacement therapy in persons with spinal cord injury. J Spinal Cord Med. 2011 September; 34(5): 455–460.

Shane E, et al. Atypical subtrochanteric and diaphyseal femoral fractures: Report of a task force of the American Society for Bone and Mineral Research. JBMR. Vol 25 (11). Nov 2010. PP 2267-2294.

Frotzler A et al. High-volume FES-cycling partially reverses bone loss in people with chronic spinal cord injury. Bone. 2008 Jul;43(1):169-76.

Clark JM et al. Physiological effects of lower extremity functional electrical stimulation in early spinal cord injury: lack of efficacy to prevent bone loss. Spinal Cord. 2007 Jan;45(1):78-85.

Frotzler A, et al. Effect of detraining on bone and muscle tissue in subjects with chronic spinal cord injury after a period of electrically-stimulated cycling: a small cohort study. J Rehabil Med. 2009 Mar;41(4):282-5.

Freehafer AA, Mast WA. Lower extremity fractures in patients with spinal cord injury. J Bone and Joint Surg. 1965 June;47A-4:683-694.

Ragnarsson KT, Sell GH. Lower extremity fractures after spinal cord injury: A retrospective study. Arch Phys Med Rehabil. Sept 1981;62:418-423.

Nelson A, Ahmed S, Harrow J, Fitzgerald S, Sanchez-Anguiano A, Gavin-Dreschnack D. Fall-related fractures in persons with spinal cord impairment: A descriptive analysis. SCI Nursing. 2003;20(1):30-37.

Canale, ST: Campbell's Operative Orthopaedics 2003. Mosby. Philadelphia, PA.

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This report is adapted from the SCI Forum presentation on November 13, 2012.

Read the original report and watch the video at:

http://sci.washington.edu/osteoporosis

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Watch all 38 SCI Forum videos at http://sci.washington.edu/videos

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 Service (http://www.lib.washington.edu/ill).

BLADDER MANAGEMENT

■ Use of botulinum toxin in individuals with neurogenic detrusor overactivity: State of the art review.

Botulinum neurotoxin (BoNT) injection into the bladder wall has been shown to be an effective alternative to anticholinergic medications and more invasive surgery in persons with SCI and MS who have neurogenic bladder overactivity and urinary incontinence. In August 2011, Botox received Food and Drug Administration (FDA) approval for this use. Clinically, injection of BoNT into the bladder has been found to decrease urinary incontinence, improve quality of life, increase bladder capacity and decrease bladder pressures. The most common side effects are urinary tract infections and urinary retention. BoNT has gained popularity because of its effectiveness and long duration of action, relative ease of administration, easy learning curve, reproducibility of results on repeated administration, and low incidence of complications. This paper provides a review of the structure and function, mechanisms of action, clinical and urodynamic studies, injection technique, potential beneficial and adverse effects, and potential areas of research of BoNT.
Linsenmeyer TA.
J Spinal Cord Med. 2013 Sep;36(5):402-19.

FES CYCLING

■ Pilot study of the effect of low-cadence functional electrical stimulation cycling after spinal cord injury on thigh girth and strength.

Eight individuals with chronic SCI underwent six weeks of training three times per week on an isokinetic FES cycle ergometer. For each subject, one leg cycled at 10 revolutions per minute (rpm) (LOW) and the other at 50rpm (HIGH). Each leg performed 30 minutes of FES cycling while the other leg was moved passively at the same cadence. Thigh girth and electrically evoked thigh muscle torque were recorded before and after training. After six weeks of FES cycle training, thigh girth in both LOW and HIGH groups increased significantly. LOW cadence training resulted in larger girth at mid-thigh and greater gains in electrically evoked isometric torque than HIGH training. These results suggest that lower pedaling cadence cycling enhances the potential of FES cycling to build muscle. It is likely that fatigue develops more slowly during FES cycling at lower pedal cadences, allowing greater muscle forces to be maintained. Maximizing leg muscle mass in persons with paralysis is important for health outcomes and quality of life. Greater muscle size may help improve blood flow, reduce the incidence of pressure sores, and improve blood glycemic control and metabolism in the SCI population.
Fornusek C, Davis GM, Russold MF.
Arch Phys Med Rehabil. 2013 May;94(5):990-3.

WALKING

■ Vertical ground reaction force-based analysis of powered exoskeleton-assisted walking in persons with motor-complete paraplegia.

Six persons with thoracic motor-complete SCI (T1-T11 AIS A/B) were trained to walk over ground using powered exoskeleton-assisted walking (ReWalk). Vertical ground reaction force (vGRF) was recorded using the F-Scan system (TekScan). Results were compared to a control group of three age-, height-, weight- and gender-matched able-bodied volunteers. Participants with motor-complete SCI, ambulating independently with a ReWalk, had mechanical loading (weight bearing) similar to able-bodied gait. Powered exoskeleton-assisted walking may provide a way for persons with SCI to achieve mechanical loading to the lower extremities. vGRF profile can be used to examine both magnitude of loading and gait mechanics of powered exoskeleton-assisted walking among participants of different weight, gait speed, and level of assist.
Fineberg DB, Asselin P, Harel NY, et al.
J Spinal Cord Med. 2013 Jul;36(4):313-21.

■ Operation of a brain-computer interface walking simulator for individuals with spinal cord injury.

Five participants with paraplegia or tetraplegia due to SCI underwent a 10-min training session in which they alternated between kinesthetic motor imagery (KMI) of idling and walking while their electroencephalograms (EEGs) were recorded. Participants then performed a goal-oriented online task using KMI to control the walking of an avatar while making stops at designated points within the VRE. Multiple online trials were performed in a single day, and this procedure was repeated across 5 experimental days. All participants maintained control throughout the study, and their online performances improved over time. The results show that participants with SCI can operate a self-paced brain-computer interface (BCI) walking simulator to complete a goal-oriented ambulation task. The BCI system requires short training, is intuitive, and is robust against participant-to-participant and day-to-day neurophysiological variations. These findings indicate that BCI-controlled lower extremity prostheses for gait rehabilitation or restoration after SCI may be feasible in the future.
King CE, Wang PT, Chui LA, et al.
J Neuroeng Rehabil. 2013 Jul 17;10:77.

TRANSFERS

■ The impact of transfer setup on the performance of independent wheelchair transfers.

This study aimed to investigate three key criteria currently present in the Americans with Disabilities Act Accessibility Guidelines (ADAAG): vertical heights, clear space, and grab bar heights. A second aim was to evaluate two additional factors, gaps and obstacles, which are not presently included in the standards but were thought to be important for establishing new criteria. There were 120 participants (54 with SCI) who used wheeled mobility devices (WMDs) in this study. Each performed transfers using a modular transfer station that consisted of a height-adjustable platform with a lateral grab bar, optional obstacle to the transfer, and an optional height-adjustable front grab bar. Maximum and minimum vertical heights of the transfer surface, maximum gap distance between the WMD and transfer surface, grab bar use, and WMD space needs were recorded. Results showed that revisions to the ADAAG regarding transfer heights, gaps, clear spaces, and grab bar heights are necessary to make transfers more accessible to WMD users. The data will be used to revise the guidelines related to transfers and help designers and engineers create an environment that is more accessible.
Toro ML, Koontz AM, Cooper RA.
Hum Factors. 2013 Jun;55(3):567-80.

EMPLOYMENT

■ Participation in organized sports is positively associated with employment in adults with spinal cord injury.

In this study of 149 adults with chronic SCI, information about demographics, employment, level of education, body mass index, duration of injury, participation in individually planned exercise, and participation in organized sports was collected using a standardized questionnaire. Motor level and completeness of injury were confirmed by physical examination. Analysis of these data found that employment was associated with younger age and a higher level of education, whereas

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obesity decreased the likelihood of employment. After adjusting for age, education, and body mass index, participation in organized sports was significantly associated with employment, but sex, duration of injury, wheelchair use, and participation in individually planned exercise were not. Further studies are necessary to determine how various factors related to sports participation contribute to its association with employment.
Blauwet C, Sudhakar S, Doherty AL, et al.
Am J Phys Med Rehabil. 2013 May;92(5):393-401.

PAIN

■ **Patterns of pain across the acute SCI rehabilitation stay: evidence from hourly ratings.**
Data were collected from the medical records of acute rehab inpatients with new SCI. A total of 11,001 hourly pain ratings on 1709 inpatient days were collected from 56 inpatients. Pain intensity and variability decreased during the inpatient stay. Compared with those with non-traumatic injuries, those with traumatic injuries had significantly higher pain; those with American Spinal Injury Association Impairment Score (AIS) A scores had a slower decline of pain, while those with AIS D scores had a sharper decline. Pain increased from morning to evening during the latter days of the inpatient stay whereas pain was relatively stable during the early days in the inpatient stay. Those not using a ventilator at admission were significantly less likely to receive a pain medication than those who were, despite no significant differences in pain levels. Since pain changes that occur during acute rehabilitation depend on a variety of injury characteristics, pain management should be individualized as well as sensitive to change over the entire acute hospital stay.
Kalpakjian CZ, Khoury PE, Chiodo AE, Kratz AL.
Spinal Cord. 2013 Apr;51(4):289-94.

■ **Pain and its impact on inpatient rehabilitation for acute traumatic spinal cord injury: analysis of observational data collected in the SCIRehab study.**
Self-reported pain ratings were collected from 1,357 individuals with SCI undergoing acute rehab at six inpatient facilities. The vast majority of patients (97%) reported pain at least once during the rehabilitation stay. Average pain intensity over the stay was severe for 30% of patients, moderate for 42%, and mild for 25%. Most (79%) of the 177 participants who did not have pain at admission reported pain at least once later in the rehabilitation stay. Patients with severe pain spent fewer days in rehabilitation, received less rehabilitation treatment time, and had more treatment sessions altered in objective or content because of pain than those with lower pain levels. Pain is a common problem for persons receiving inpatient rehabilitation for traumatic SCI and adversely impacts delivery of therapy services.
Zanca JM, Dijkers MP, Hammond FM, Horn SD.
Arch Phys Med Rehabil. 2013 Apr;94(4 Suppl):S137-44.

ORAL HEALTH

■ **Predictors of oral health after spinal cord injury.**
Ninety-two people with SCI (44% with cervical injuries) injured at least 6 months completed questionnaires and underwent oral examination. Most participants were able to bring at least one hand to the mouth (82%) and brush teeth independently (65%). Regarding daily oral habits, 84% reported brushing teeth, 48% rinsing mouth, 14% flossing, 33% tobacco use and 13% mouthstick use. Only 32% had teeth cleaned within the past year. Oral examination revealed three decayed and eight missing teeth on average, and 64% had periodontal disease. Employment before SCI and more risky oral habits were significant predictors of worse oral health score. Older age was the only predictor of worse decayed, missing and filled teeth score.
Sullivan AL, Bailey JH, Stokic DS.
Spinal Cord. 2013 Apr;51(4):300-5.

FALLS

■ **Falls in independent ambulatory patients with spinal cord injury: incidence, associated factors and levels of ability.**
Seventy-seven independent ambulatory participants with SCI reported on their history of falls during the 6 months before participating in the study. They were also assessed for their functional ability using the timed up-and-go-test and the 6-minute walk test. Twenty-six subjects (34%) reported falls during 6 months (range 1-6 times). After falls, two subjects required medical attention due to wrist joint fracture and back pain. Walking without a walking device significantly increased the risk of fall, whereas using a walker significantly reduced the risk of fall. Moreover, those who had fallen showed better functional ability than those who had not. Therefore, apart from emphasizing the ability to walk independently, rehabilitation professionals may need to seek strategies that help ambulatory SCI patients to improve balance and safety.
Phonthee S, Saengsuwan J, Amatachaya S.
Spinal Cord. 2013 May;51(5):365-8.

FRACTURES

■ **Soft-plastic brace for lower limb fractures in patients with spinal cord injury.**
Fifteen wheelchair users with spinal cord injuries in a National Rehabilitation Center in Japan (male, n=10; female, n=5; average age, 52.7 years) with 19 fractures of the femur or tibia were treated with a newly developed hinged, soft-plastic brace. All the fractures were caused by relatively low-energy impact. The average time taken for fracture union was 80.1 (37-189) days, and the average amount of time spent wearing orthotics was 77.9 (42-197) days. On final X-ray imaging, the average femorotibial angle was 176.9°, and a 15° of misalignment in the sagittal plane occurred in one patient. Results showed that a hinged, soft-plastic brace is a useful option as a conservative approach for treating fractures of the lower extremities in patients with spinal cord injuries.
Uehara K, Akai M, Kubo T, et al.
Spinal Cord. 2013 Apr;51(4):327-30.

DEPRESSION

■ **Depression Treatment Preferences After Acute Traumatic Spinal Cord Injury.**
A total of 183 individuals with SCI undergoing inpatient rehabilitation participated in this survey study. Fifty-one (28%) of participants had a Patient Health Questionnaire (PHQ-9) score of 10 or more, indicating probable major depression. Overall, 49 (96%) of depressed individuals and 121 (92%) of nondepressed individuals expressed a willingness to participate in at least 1 treatment modality. Depressed participants reported exercise and antidepressants prescribed by a primary care provider as the most favorable options, and group counseling was the least favorable option. For the nondepressed participants, exercise was the most favorable option followed by individual counseling in a medical or rehabilitation clinic and antidepressants prescribed by a primary care provider. Individual telephone counseling was the least favorable option. In general, more individuals preferred treatment in medical or rehabilitation settings than mental health settings. Those who had been diagnosed with depression in the past were more willing to take an antidepressant for treatment of depression than those who had not previously been diagnosed with depression. Treatment preferences and patient education are important factors when choosing a depression treatment modality for patients with SCI. The results suggest that antidepressants, counseling, and exercise may be promising components of depression treatment in this population, particularly if they are integrated into medical or rehabilitation care. Age ≥40 years was a significant predictor of willingness to receive individual counseling.
Fann JR, Crane DA, Graves DE, et al.
Arch Phys Med Rehabil. 2013 Jul 16.

Spinal Cord Injury Update is supported by grant H133N110009 from the National Institute on 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 (NWRSCIS), one of 14 model SCI care systems nationwide. Project Director: Charles Bombardier, PhD.

To add your name to the mailing list, contact the editor, Cynthia Salzman, at the University of Washington, Department of Rehabilitation Medicine, Box 356490, Seattle WA 98195-6490; 206-685-3999; *csalzman@uw.edu.*

Visit the NWRSCIS at *http://sci.washington.edu.*

SCI studies at the UW now recruiting…

SCI-CARE Study

The Northwest Regional SCI System is seeking participants for a study designed to improve care for people with SCI who are dealing with pain, low mood, or being less physically active than they want to be. You may qualify for this study if you have a traumatic SCI, are at least 18 years old, and receive care at either Harborview or UW Medical Center Rehabilitation Clinics.

Participants will be randomly assigned (50/50 chance) to receive either usual medical care or usual care plus a health assistant who will:

- Strengthen the connection between you and your doctor or nurse practitioner.
- Monitor your progress and assist with any problems that keep you from reaching your goals.
- Relay information to and from your health care provider in between appointments.
- Offer help with non-medical alternatives to pain, mood, or becoming more active.

Study participation will take place over four months. Most study activities will take place over the phone or at regularly scheduled clinic visits so extra trips to Harborview or UW will not be necessary. Participants will complete three questionnaires by phone. There is payment of up to $50 for participation.

Learn more about this study and find out if you qualify by calling Missy at 206-744-3608 (Toll Free 866-495-7015) or send an email to *scicare@uw.edu*. (Note: we cannot guarantee confidentiality of information sent via email.)

Read the newsletter online at *http://sci.washington.edu/info/newsletters*

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