

# spinal cord injury

UPDATE

Department of Rehabilitation Medicine

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**UW Medicine**  
SCHOOL OF MEDICINE

## An Interesting Life



*Aditya Ganapathiraju, age 25, has C-5 tetraplegia (quadriplegia) and is a full-time student at the University of Washington, a reporter for the school newspaper, and a member of the Student Senate, among other activities.*

Aditya Ganapathiraju uses the word “interesting” to describe his life so far. Born in southeastern India, he was two when his father died, six when he immigrated with his mother to the U.S., 17 when his mother was killed in a car accident, and 18 when he sustained a traumatic C-5 spinal cord injury. Despite this chronicle of loss and hardship, Aditya, now age 25, radiates an upbeat, optimistic attitude about life and expresses genuine appreciation for how fortunate he is.

Aditya lives in Seattle now but had been living in New York for almost a decade prior to his injury. His mother had a PhD from India and held a research position at a university hospital on Long Island, where Aditya attended school. He was a high school senior when his mother died. Without other family in the area, he moved in with friends, finished high school and went on to Nassau Community College.

On September 12, 2002, soon after starting his second year of college, Aditya was involved in a motorcycle accident blocks from his house as he was returning from school. He has no memory of the event, or the day, or the couple of weeks afterward, but he vividly remembers his rocky rehab experience. After trauma and ICU care at a county hospital, he transferred to Mount Sinai’s rehab program, where his lung collapsed, sending him into the ICU for three more weeks. He was unhappy in the rehab

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## Choosing a Cell Phone That Works for You

For people with limited hand function due to SCI, choosing the right cell phone is an important and sometimes complicated process. Unfortunately, there is no simple formula that can tell you what phone you should get based on your level or completeness of injury. Everyone’s needs and preferences are unique and depend on a combination of physical requirements and lifestyle factors.

Choosing a phone that works for you involves:

1. Determining what you need, both in a phone and a service plan, and
2. Trying out or “test-driving” different phones before buying.

### What do you need?

Do you need a hands-free headset? One-touch speed dialing? Flat or clam-

shell design? What about text messaging, Internet access and voice notes? The choices are overwhelming. And what do some of these terms even mean?

Start with “**Your Guide to Choosing a Cell Phone**,” a guideline from Wireless RERC (Rehabilitation Engineering Research Center). (See the “Re-

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## An Interesting Life

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program, partly because, on top of adjusting to his injury, he had no family in the area. As soon as he could be transferred, his uncle and aunt flew him to Seattle, where they were living for a year during his uncle's sabbatical, and Aditya spent the next five months at the University of Washington Medical Center.

Looking back at that first year or two after injury, Aditya remembers being deeply despondent. "I was pretty down and feeling sorry for myself. I didn't want to leave my room in the hospital, and that didn't change much after discharge." His uncle and aunt had moved back home to Georgia, and when Aditya was discharged he started living in a series of adult group homes in Seattle.

Aditya describes his time in those homes as "dormant. I felt isolated, without peers to talk to, and spent most of my time watching TV. I had lost all motivation to do anything productive, like reading."

"You set up mental obstacles for yourself," he says now. "You say, 'I don't think I can do that,' and you close the door before you try." He wanted to go back to school, but didn't know how to make that happen. Formerly a highly-motivated, positive and self-disciplined young man, he struggled to figure out how to remake himself and feel hopeful about the future.

"When you find yourself suddenly unable to do even the most basic things for yourself, it's tough to just say, 'well, that's okay,' and move on with life," he admits.

It takes time, and it happens gradually. In March 2005 things began to turn around. He needed to leave the group home he was in, and through connections he had made in rehab and some lucky timing, he was able to move into a private home, newly remodeled for accessibility, with a family whose son was also recently injured with quadriplegia.

Over time, with the steadfast support and encouragement of friends, family, University of Washington (UW) therapists and nurses and the example of others with SCI, Aditya began to take the steps necessary to move forward with his life. He enrolled as a UW student in 2005, taking only one class at first. UW rehabilitation counselor Curt Johnson helped him go through the process of getting disability accommodations such as note takers, electronic text books and voice-activated software.

Although he owns a van, Aditya prefers to commute to the UW by bus. "It works for me," he insists. "I'm a bit of an environmental nut, so I don't like cars anymore anyway." His bus ride to school is about 30-40 minutes and allows him to "catch up on reading."

Aditya describes his life now as busy and satisfying. In addition to taking a full class load, he writes regular editorials and a column for the UW's student newspaper, *The Daily*. He is active with the campus Student Disability Commission and represents this group on the UW's Student Senate, attending weekly Senate meetings. He serves as a peer mentor for newly injured SCI patients at the UW and has also been a volunteer at Children's

Hospital and Regional Medical Center. Last year he joined the Northwest Regional SCI System's Consumer Advisory Board. On top of all this, he maintains the typical college student's busy social life, hanging out with friends, dating, and so on.

Aditya is quick to credit others for much of his success in adjusting to SCI and getting back into a full, productive life. "It would be wrong for me to take credit for how I'm doing today and say, 'well, it was all a lot of hard work on my part,' or 'you just have to make yourself suck it up and move on,' because I had lots of help along the way. Without that help, without people pushing me, I wouldn't have been able to push myself to where I am now."

A significant underpinning of Aditya's positive attitude about life is his genuine appreciation of the good things he has going for him compared to many others in the world. "So in Ghana, for example, people with disabilities are relegated to the role of beggar just to survive. I think we're very fortunate in this country, and it helps to be reminded of that. Sometimes you don't want to hear it, but I'm glad I'm in a mental and emotional place where it's meaningful to me now."

Aditya finds inspiration in the words of the eminent physician and Holocaust survivor, Viktor Frankl, whose loved ones perished in the concentration camps and who wrote in his renowned book, *Man's Search for Meaning*: "Most people in a concentration camp believed that the real opportunities of life had passed. Yet, in reality, here was an opportunity and a challenge. One could make a victory of those experiences, turning life into an inner triumph, or one could ignore the challenge and simply vegetate."

Frankl also wrote about meeting a man with quadriplegia who made this statement: "I broke my neck, it didn't break me." "That's the attitude I hope to live up to," says Aditya.

Another favorite quote comes from acclaimed Russian novelist Fyodor Dostoevsky, who wrote, "There is only one thing that I dread: Not to be worthy of my sufferings."

"This is helpful to me," Aditya says now. "I don't think about my injury in the same way anymore. It's so miniscule in terms of the suffering that so many others have had to face and continue to experience."

"I wish I had read these words right after I was injured. Although, given my state of mind, I don't know how much good it would have done at the time."

"Making the world a little bit better is what gives my life meaning," he continues. "It's what motivates me. I can't help the people who helped me after my injury, but I try to do my part to give back, effect social change through various means—right now it's student government, writing for the paper, volunteering. Tomorrow will hopefully be something better. The opportunities are out there; life's waiting for you."

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*There is only one thing  
that I dread:  
Not to be worthy  
of my sufferings.  
—Fyodor Dostoevsky*

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## Choosing a Cell Phone

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sources” box, below.) This user-friendly resource includes:

- A checklist of cell phone needs and preferences; fill it out and bring it to a retail store for consultation with a sales associate.
- Descriptions of different cell phone features.
- Step-by-step guidelines for “test driving” a cell phone in the store to see if it really works for you and to compare different models.

### What are others with SCI using?

#### • Kirk, C-6

Kirk has no finger function but has enough dexterity to push some buttons with his knuckles, sticks held in his fingers, or a finger braced with the other hand. He uses a home phone by pressing the keys with the edge of his little finger.

Shopping for a new phone last year, his first consideration was getting a carrier with reliable coverage both in his Seattle home and his parents’ home over the mountains in Eastern Washington. Then he looked at phone choices based on his physical limitations, what he needed the phone to do, what he wanted the phone to do, and durability, since he knew the phone would be tossed around in his backpack and dropped occasionally.

After extensive online research, he visited stores to check out the phones in person, which sometimes presented difficulties since phones were often tethered to displays as a theft deterrent. In-person

testing allowed him to quickly narrow his options. Bar phone buttons were too small. Sliders were too challenging to hold and manipulate. The display had to be large enough to read without glasses in case of emergency situations like falling in the dark and needing to telephone for help. He wanted buttons that could be pressed easily without slipping or accidentally pressing nearby keys.

Despite careful research and planning, Kirk couldn’t get everything he wanted in the end. The Samsung flip phone he finally bought fulfills many of his requirements, but he still has to improvise. The phone was difficult to open quickly until he purchased a leather case that not only increased friction and improved handling but kept the phone slightly ajar. The case has a little plastic knob, intended for a belt clip attachment, which he grasps with his teeth to help him open the phone when a call comes in.

Kirk didn’t think to test the charger cord before buying and found out too late that he has to push two tiny buttons to connect and disconnect the charger—a very frustrating and challenging task. The speakerphone is also difficult to use because it requires pressing two keys in sequence within one second. Text messaging is possible but time-consuming—it would be easier if his phone had the ability to predict and complete words from initial letters. The “push-to-talk” key is easily pressed unintentionally, but the feature cannot be disabled. He disconnected his email service because it often launched accidentally when opening the phone. Kirk’s advice: “Investigate thoroughly before buying.”

#### • Aditya, C-5

Aditya, who has C-5 quadriplegia, uses a flat style phone (Samsung Trace). To make calls and text message, he pushes the buttons using either his finger or a splint with pen attachment. A small semi-permanent plastic clip stuck to the back of his phone allows him to attach a lanyard. “This has come in handy during the many times my phone has dropped from my chair, enabling me to just pull it up again using the lanyard,” he says.

#### • Todd, C-4

With a C-4 complete injury, Todd requires a totally hands-free system. He uses a chin-driver to operate all his mobility and technology equipment. A committed technophile who keeps abreast of assistive technology developments, Todd has determined that a Samsung phone with Verizon service make the best combination for mobility-impaired users. His Bluetooth Motorola Speakerphone from SAJE Technology allows him to use a micro switch for chin use. He uses VoiceSignal speech recognition software. There are still glitches in his current system, such as not being able to dial from a missed call. Todd informs manufacturers about accessibility problems he encounters and suggests improvements. Meanwhile, he develops his own “work around” solutions as he waits for the technology to catch up.

*UW staffers Gaby de Jongh and Curt Johnson contributed to this article.*



## Resources

**Wireless RERC** (Rehabilitation Engineering Research Center) has several consumer-friendly online resources on cell phones and other wireless technologies on their Web site at [www.wirelessrerc.org](http://www.wirelessrerc.org):

- **Your Guide to Choosing a Cell Phone** — [www.wirelessrerc.org/for-consumers/your-guide-to-choosing-a-cell-phone-page-1-of-2.html](http://www.wirelessrerc.org/for-consumers/your-guide-to-choosing-a-cell-phone-page-1-of-2.html). Helpful guidelines and checklists.
- **Online discussion forums at My Wireless Review** — [www.mywirelessreview.com/feature-forum](http://www.mywirelessreview.com/feature-forum). Benefit from the experience of others with disabilities using wireless technologies and keep up with the latest products in any of eight forums covering different wireless features, such as handset design and voice communication.

To request hard copies of the guidelines in the mail, or if you have other questions for Wireless RERC, call Lynzee Head at 404-367-1288.

# 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, caregivers and health care providers, held monthly at the University of Washington Medical Center. To learn about upcoming SCI Forums, read reports of past forums, or view forum videos, consult our Web site at <http://sci.washington.edu/inf/forums>. Contact Cynthia Salzman (email: [csalzman@u.washington.edu](mailto:csalzman@u.washington.edu); phone: 206-685-3999) if you wish to be added to the SCI Forum mailing list.

## Using Hypnosis for SCI Pain Management

By Shelley Wiechman Askay, PhD, Clinical psychologist at Harborview Medical Center and assistant professor, Rehabilitation Medicine, University of Washington

This article is adapted from Dr. Wiechman Askay's SCI Forum presentation on September 11, 2007. Read the complete report or view the streaming video on our Web site at [http://sci.washington.edu/inf/forums/reports/hypnosis\\_for\\_sci\\_pain.asp](http://sci.washington.edu/inf/forums/reports/hypnosis_for_sci_pain.asp).

There are many myths and misconceptions about hypnosis. Hypnosis used in a therapeutic setting bears little resemblance to the images of hypnosis we see in popular culture. We don't swing a watch back and forth in front of you. You won't be forced to do anything you don't want to do. That's not how hypnosis works when we're talking about hypnosis for pain control. The steps of hypnosis are:

**1. Rapport.** Hypnosis is a partnership between the therapist and the patient. It's not mind control. For hypnosis to work, you really need to be comfortable and relaxed with the therapist.

**2. Deep breathing and relaxation** are key components of hypnosis, helping you focus your attention and let go of defenses or inhibitions.

**3. Deepening** is an altered state of consciousness that helps you tune out everything around you so you can really focus on what the therapist is saying.

**4. Suggestions for change.** The state of deep relaxation and focus of attention makes you more open to suggestions for change or new ideas. The therapist gives suggestions, not demands, and they aren't things that you don't want to do. You are still in control.

**5. Alerting.** The therapist guides you to gradually bring your focus of attention back to the environment around you, open your eyes and become alert.

Hypnosis is no longer seen as a fringe or alternative type of therapy; rather, the scientific community is taking it seriously and exciting new research is going on in this area for acute and chronic pain.

Research using brain imaging has shown that changes in activation areas in the brain occur when a person is under hypnosis. Hypnotizability—or how easily someone can be hypnotized—varies a great deal from person to person and can actually be measured by a clinical psychologist.

Rarely does hypnosis completely take the place of standard sedation or medication. Researchers at UW's Harborview Medical Center have studied the use of hypnosis during burn debridement, the excruciatingly painful removal of dead tissue that burn patients must endure once or twice a day to promote healing and avoid infection. Standard narcotics often aren't enough to make the pain manageable during debridement, but we can't put them under anesthesia once or twice a day either. We're now finding that the need for the standard narcotics actually decreases if hypnosis is added.<sup>1,2</sup>

### Hypnosis for chronic pain

Chronic pain in persons with SCI tends to exist at multiple body sites and generally does not improve with time. It can interfere significantly with normal activities such as work and social life, and perhaps for that reason is associated with depression.

Few medications are consistently helpful. Narcotics might provide some relief, but many people can't function day to day on doses of narcotics required to manage the pain. More non-pharmacological interventions like hypnosis, relaxation, imagery, meditation and autogenic training are needed to treat these pain syndromes; medications alone aren't going to be the answer.

A study here at the University of Washington found that hypnosis was effective in reducing chronic pain levels in SCI.<sup>3</sup> The 34 participants, who reported an average pain level of six (on a 10-point scale) at the beginning of the study, received 10 sessions of hypnosis with a therapist, as well as self-hypnosis training so they could continue the treatment at home. At the end of the 10 sessions, average pain levels dropped to five—a small but nonetheless important improvement for people with chronic pain. This reduced level of pain was main-

tained three and six months later. Sleep also improved as a result of the hypnosis. These findings are very promising.

### Virtual reality hypnosis

Virtual reality (VR) is a technology that enables a person to interact with a computer-simulated environment. It has been used in a variety of training settings, such as medicine and the military, as well as in the gaming industry. It typically involves donning a special helmet that enfolds the wearer in a virtual world of sight and sound and can be manipulated with manual controls, such as a joystick.

Dr. David Patterson, clinical psychologist in the UW Department of Rehabilitation Medicine, worked with Hunter Hoffman in the UW's pioneering Human Interface Technology (HIT) Lab to use VR to help induce hypnosis in hospital patients with severe acute pain, specifically burn patients who are often too sedated from pain medications to be able to focus their attention and benefit from hypnosis. VR can make hypnosis less effortful because it frees the patient from having to come up with the image of something relaxing or comforting to focus on; all they have to do is open their eyes and they are immersed in another world. Hoffman first published on the therapeutic use of VR in *Scientific American* in 2004.<sup>4</sup>

With burn patients in mind, Hoffman created SnowWorld, a virtual cool, snowy canyon where patients glide along and can shoot snowballs at snowmen and penguins to make them disappear in a puff of powder. Unlike conventional video games, all peripheral vision is sealed off from outside distractions. In comparison studies, virtual reality was far more successful than Nintendo for reducing pain during burn care.<sup>5</sup>

A version of SnowWorld was used in a single case study of a patient with SCI who had recurrent severe neuropathic

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pain for many years.<sup>6</sup> Her pain did not respond to pain medications, and hypnosis alone was not beneficial. After several VR hypnosis sessions, her average pain rating went from a seven (out of 10) to a five—not a huge drop, but significant for someone experiencing ongoing pain.

## Finding a qualified therapist

It is very important to work with someone who is qualified to use hypnosis in a therapeutic setting. Pain is a very complex issue and should be treated by a psychologist, social worker, nurse or counselor who has training in hypnosis

and can use it in a broader context of a multi-disciplinary approach to pain management. Do not go to someone who advertises as a “hypnotist,” where hypnosis is all they are trained to do. Shop around until you find someone with whom you have good rapport. If you don’t feel comfortable with someone, the hypnosis is unlikely to work.

### References

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2. Patterson, DR; Ptacek, JT (1997). Baseline pain as a moderator of hypnotic analgesia for burn injury treatment. *J Consult Clin Psychol.* Feb;65(1):60-7.

3. Molton IR, Graham C, Stoelb BL, Jensen MP. (2007). Current psychological approaches to the management of chronic pain. *Curr Opin Anaesthesiol.* Oct;20(5):485-9.

4. Hoffman, Hunter G., Virtual-Reality Therapy. *Scientific American*, Aug 2004, Vol. 291, Issue 2, p58-65.)

5. Hoffman HG, Doctor JN, Patterson DR, Carrougher GJ, Furness TA 3rd. (2000). Virtual reality as an adjunctive pain control during burn wound care in adolescent patients. *Pain.* 2000 Mar;85(1-2):305-9.

6. Oneal BJ, Patterson DR, Soltani M, Teeley A, Jensen MP. Virtual reality hypnosis in the treatment of chronic neuropathic pain: A case report. *International Journal of Clinical and Experimental Hypnosis.* in press.

## Emergency Preparedness: Quick Tips

This article is adapted from a SCI Forum presentation on April 10, 2007. To read the full report or view the streaming video, go to [http://sci.washington.edu/infoforums/reports/l/worst\\_case.asp](http://sci.washington.edu/infoforums/reports/l/worst_case.asp).

“If you look around this room, around your neighborhood, your place of work—the people you see are the first responders in a disaster,” says Tracy Connelly, Emergency Preparedness Training Specialist with the City of Seattle. “The professionals will be dealing with the big crises; individual crises will not be a priority.”

For many people, the idea of getting prepared for emergencies is so daunting that they just don’t get started. “They think, ‘I’ve got to buy this and I’ve got to do that and it’s going to take a lot of time,’” she says. “But preparedness can be taken one little step at a time, and every step makes you better off.”

### Consequences of a disaster

The biggest impact of a disaster such as an earthquake comes from disruption to infrastructure: Utilities (water, electricity, sewer); road ways and bridges; and telephone.

Emergency Response Agencies will be overwhelmed immediately following a moderate to major disaster. Some fire, police, and other emergency personnel will be unable to report to duty (which happened in New Orleans after the levees broke). Those who can be mobilized will be dealing with large scale priorities. For these reasons, individuals will need to rely on themselves and each other in the early days after a major disaster.

### Create a Personal Support Network

- Identify people at home, work, and in your neighborhood who could help in a disaster.
- Identify three people at each location.
- Explain how you may need help and the appropriate ways they can help.
- Exchange important information and keys.

### Get Ready: Stock Supplies

Store a minimum three-day supply of the following items for you and your family. Remember to keep a smaller version of your supply kit at work and in your car.

### Basic supply kit:

- Water—one gallon per person per day. Stored tap water should be replaced every six months, and bottled water yearly. Use bleach to sanitize water if necessary, not iodine.
- Radio and batteries, or hand-crank radio, are critical for monitoring the situation and getting information about road conditions, evacuation plans and utility breakdowns. Check with your local office of emergency management for your designated emergency radio station (KIRO 710 AM in King County, Wash.).
- Prescription medications—minimum 7-10 day supply.
- Back-up medical equipment.
- Critical medical information.
- Food—lower on the list because we can go a little while without food, Connelly says. Do we want to? Probably not. Store food you like. A little comfort food is a good idea.
- Flashlight and glow sticks are the approved lighting supplies. Candles are too dangerous and a major cause of house fires.
- Eye glasses (Note: contacts may be uncomfortable with smoke or debris.)
- Sturdy shoes or gloves to protect against broken glass or other debris. Keep them under your bed, along with a flashlight, so you can grab them in the middle of the night.
- Whistle—reduces rescue time.
- Extra Catheters.
- Wheelchair repair supplies.

### Create a safe environment.

- Fire evacuation planning—two exits from every room. (Your personal support network at work & home needs to be involved!) Practice!
- Know the basics of First Aid.
- Know how and when to control utilities.
- Reduce earthquake hazards by securing or moving anything that could break or fall and hurt someone or block an exit.

### Have a plan

- Communications plan. After a disaster, stay off all phones for a minimum of 4 hours. Long Distance phone lines are more reliable than local lines. Have an out-of-state family member or

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# literature review

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

## SHOULDER PAIN

### ■ Arm crank ergometry and shoulder pain in persons with spinal cord injury.

Twenty-three individuals with SCI of a year or more participated in a fitness study that consisted of exercising with an arm crank ergometer (exercise machine in which arms are used to “pedal”) three times a week for 12 weeks. The researchers measured the participants’ shoulder pain using the Wheelchair User’s Shoulder Pain Index (WUSPI) at baseline (before starting the exercise program) and again at the end of the 12 weeks. There was no significant difference between the baseline and 12-week scores. This showed that a primary fitness program using arm crank ergometry does not increase shoulder pain in people with SCI who use wheelchairs. Larger studies are needed.

Dyson-Hudson TA, Sisto SA, Bond Q, Emmons R, Kirshblum SC.  
*Arch Phys Med Rehabil.* 2007 Dec;88(12):1727-9.

### ■ Acupuncture for chronic shoulder pain in persons with spinal cord injury: a small-scale clinical trial.

Seventeen manual wheelchair-using individuals with chronic SCI and chronic musculoskeletal shoulder pain were randomly assigned to receive 10 treatments of either acupuncture or a “sham” or placebo procedure (light needling of areas on the body that are not acupuncture points). Changes in shoulder pain intensity were measured using the Wheelchair User’s Shoulder Pain Index. Comparisons between the two groups (treatment and placebo) found that shoulder pain decreased significantly in both, with decreases of 66% with acupuncture and 43% with placebo. This difference was not significant, however; a larger randomized controlled trial is warranted.

Dyson-Hudson TA, Kadar P, LaFontaine M, et al.  
*Arch Phys Med Rehabil.* 2007 Oct;88(10):1276-83.

### ■ Effect of 2-speed geared manual wheelchair propulsion on shoulder pain and function.

Seventeen full-time manual wheelchair users with shoulder pain participated in a five-month study using two-gear drive wheels (MAGIC-Wheels). Pain and function measures (Wheelchair Users Shoulder Pain Index, Wheelchair Users Functional Assessment (WUFA), and timed hill climb test with rating of perceived exertion (RPE)), were administered at baseline (before starting the study) and at periodic intervals. Shoulder pain decreased significantly at weeks two through 16, and again at week 20. The WUFA scores did not change. Hill climb time was longer when using the 2-gear wheel, but there was no difference in RPE. The pain reductions after 2 weeks is a rapid response to the intervention and suggests good potential for shoulder pain reduction users with this technology, even in highly functional manual wheelchair users.

Finley MA, Rodgers MM.  
*Arch Phys Med Rehabil.* 2007 Dec;88(12):1622-7.

## NEUROPATHIC PAIN

### ■ Comparison of the effectiveness of amitriptyline and gabapentin on chronic neuropathic pain in persons with spinal cord injury.

This was a randomized, controlled, double-blind trial involving 38 adults with SCI living in the community. Participants received amitriptyline, gabapentin, and an active placebo (diphenhydramine) separately for eight weeks each. Pain intensity and depressive symptoms were measured in each participant before and after each eight week trial using standardized scales. Contrary to previous studies, this study found amitriptyline be effective in relieving pain and more effective than gabapentin. This effect was greatest in participants who had many depressive symptoms at baseline. Most participants had a clinically meaningful decrease in

pain when taking amitriptyline. Amitriptyline is also far less costly than gabapentin. Pain was not completely eliminated, however, and amitriptyline has considerable side effects, so more effective treatments are still needed. When treating persons with SCI for pain, assessment and treatment of depression should be part of the standard of care.

Rintala DH, Holmes SA, Courtade D, et al.  
*Arch Phys Med Rehabil.* 2007 Dec;88(12):1547-60.

### ■ Pregabalin in the management of central neuropathic pain.

Central neuropathic pain is often severe and threatens a person’s quality of life and ability to perform even the most basic of tasks. Despite this high level of suffering there are relatively few studies investigating the management of central neuropathic pain. This review of the literature found two recent randomized placebo-controlled studies demonstrating the effectiveness of pregabalin in reducing central neuropathic pain due to SCI and central poststroke pain. Pregabalin, an anticonvulsant, has been shown to be effective in the management of peripheral neuropathic pain of various causes and now may have a role to play in central neuropathic pain.

Gray P.  
*Expert Opin Pharmacother.* 2007 Dec;8(17):3035-41.

## WOMEN & SCI

### ■ Spinal cord injury rehabilitation: the experience of women.

Ten women with SCI were interviewed about their rehabilitation experience. Vulnerability was their biggest psychosocial problem, and it was compounded by lack of privacy within the rehabilitation center, by negative staff interactions (associated with perceived lack of control and lack of respect) and by women’s minority status in the rehabilitation setting, which at times left women feeling marginalized and inferior. Feelings of vulnerability were lessened by: increasing privacy and space; receiving support and encouragement from staff, other patients and family; and adopting a positive attitude. The SCI rehabilitation environment and interactions have a significant influence on women’s feelings and behaviors as they begin to develop a revised identity as a disabled person. More research will lead to a better understanding of women’s needs and concerns and better clinical practice for this population.

Samuel VM, Moses J, North N, et al.  
*Spinal Cord.* 2007 Dec;45(12):758-64.

## RECOVERY RESEARCH

### ■ Transplanted neural progenitor cells survive and differentiate but achieve limited functional recovery in the lesioned adult rat spinal cord.

To determine how spinal cord neural progenitor cells (SCNPCs) may contribute to spinal cord repair, SCNPCs isolated from rat fetal spinal cord were transplanted into the adult rat spinal cord after a dorsal column crush lesion. Transplanted cells survived 24 hours and 1, 2 and 6 weeks after injury and maintained their ability to differentiate: 40% differentiating into cells with a glial morphology, and 8% displaying a neural morphology. SCNPCs failed to promote significant functional recovery, and had small improvements in sensory function. Tracing of the corticospinal tract and ascending dorsal column pathway revealed no regeneration of the axons beyond the lesion site. Although transplanted SCNPCs show good survival in the SCI environment, combination with other treatment strategies will probably be necessary for these cells to be fully therapeutic.

Webber DJ, Bradbury EJ, McMahon SB, Minger SL.  
*Regen Med.* 2007 Nov;2(6):929-45.

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■ **Structural differentiation of skeletal muscle fibers in the absence of innervation in humans.**

After SCI, lack of innervation (nerve signals) to the muscles causes severe muscle atrophy (shrinking) and changes in muscle fiber properties. Complete inactivity and immobilization of the limbs causes poor blood supply below the injury level and secondary complications (osteoporosis, pressure sores, etc.). Muscle biopsies from SCI patients given functional electrical stimulation (FES) for prolonged periods (2.4-9.3 years), showed recovery of muscle structure, mass, and force. This was true even in patients whose muscles had been denervated (without nerve signals) for up to 2 years before starting FES and had lost most muscle-specific internal organization. In 4 of 5 patients, muscle force improved enough to allow for supported standing up, standing, and taking a few steps.

Boncompagni S, Kern H, Rossini K, et al.

*Proc Natl Acad Sci U S A.* 2007 Dec 4;104(49):19339-44.

■ **Electrical stimulation of spared corticospinal axons augments connections with ipsilateral spinal motor circuits after injury.**

To study whether activity would enhance sprouting and strengthen connections with spinal motor circuits after injury, the researchers electrically stimulated corticospinal (CS) tract axons in the medullary pyramid of rat spinal cords. Both stimulation and injury alone strengthened CS connectivity and increased outgrowth into the ipsilateral gray matter. CS terminations were densest within the ventral motor territories of the cord, and connections in these animals were significantly stronger than after injury alone, indicating that activity augments injury-induced plasticity. The study shows that activity promotes plasticity in the mature CS system and that the interplay between activity and injury preferentially promotes connections with ventral spinal motor circuits.

Brus-Ramer M, Carmel JB, Chakrabarty S, Martin JH.

*J Neurosci.* 2007 Dec 12;27(50):13793-801.

## BLADDER

■ **Chronic suprapubic catheterization in the management of patients with spinal cord injuries: analysis of upper and lower urinary tract complications.**

Of 149 patients with SCI who used suprapubic catheterization (SPC) for an average of six years, 49% had no complications from this method of bladder management. Most complications were minor (urinary tract infection 27%, bladder stones 22%) and easily managed. Only 20 patients had upper urinary tract complications. Nine patients had renal scarring and 14, all quadriplegic, had upper tract calculi (kidney stones). One patient developed well-differentiated superficial transitional cell bladder cancer. Patients with SCI often prefer SPC than other methods offered to them because of quality-of-life issues. With a commitment to careful follow-up and surveillance, SPC can be a safe option for carefully selected patients.

Sugimura T, Arnold E, English S, Moore J.

*BJU Int.* 2008 Jan 8

## SYRINGOMYELIA

■ **Minimally invasive insertion of syringosubarachnoid shunt for posttraumatic syringomyelia: technical case report.**

This is the first report of syringosubarachnoid shunting (SSAS) inserted in a minimally invasive fashion through a tubular retractor for treatment of posttraumatic syringomyelia (cyst in the spinal cord). Four years after injury, a 27-year-old woman with C6-7 incomplete SCI had increasing pain and spasticity below the midthoracic region, and magnetic resonance imaging (MRI) scan revealed a midthoracic syrinx. SSAS was inserted using a minimally invasive technique, a hemilami-

notomy was performed, and a midline durotomy and myelotomy were opened for SSAS insertion under microscopic visualization. Intraoperative ultrasonography revealed successful syrinx decompression after SSAS insertion. The patient was discharged 38.5 hours after surgery with resolution of her preoperative symptoms. Postoperative MRI scan revealed excellent decompression of the syrinx, and one year later, the patient has had no recurrence of her syrinx-related symptoms. This technique appears to be a safe and effective means of implanting an SSAS in these patients.

O'Toole JE, Eichholz KM, Fessler RG.

*Neurosurgery.* 2007 Nov;61(5 Suppl 2):E331-2.

## CARDIOVASCULAR

■ **Clinical significance of abnormal electrocardiographic findings in individuals aging with spinal injury and abnormal lipid profiles.**

Cardiovascular risk factors are common in SCI, and their prevalence increases with age. In this study of 43 outpatients with SCI and abnormal lipid (blood fat) profiles. Electrocardiogram (ECG) abnormalities were found in 60.5%. Evidence of previous myocardial infarction (heart attack) was present in 7% of all individuals and in 12% of those with ECG abnormalities. Patients were mostly male, average age 43 and duration of injury 16.6 years. Number of years since injury was the sole predictor of abnormal ECGs. Although age is an important risk factor for cardiovascular disease (CVD) in persons without disabilities, injury duration is at least as important as age in those with SCI. Individuals with SCI and abnormal lipids should be screened for CVD regardless of age.

Szlachcic Y, Carrothers L, Adkins R, Waters R.

*J Spinal Cord Med.* 2007;30(5):473-6.

■ **Open-heart operations in patients with a spinal cord injury.**

In eight patients with chronic SCI (levels from T3 to L2, mean age 62) who had open-heart surgery between 1994 and 2006, seven had coronary artery bypass operations and two had aortic valve replacements. The mean cardiac ejection fraction was 44%. Seventy-five percent of the patients were extubated within 24 hours of the operation. The acute hospital stay averaged 14 days. One patient died from multiorgan failure on postoperative day 13, giving an in-hospital 30-day mortality of 12.5%. The 5-year survival was 75% with a mean follow-up of 67 months. This shows that open-heart operations in patients with SCI can be performed safely with acceptable early and late outcomes.

Chu D, Bakaen FG, Shenaq SA, et al.

*Am J Surg.* 2007 Nov;194(5):663-7.

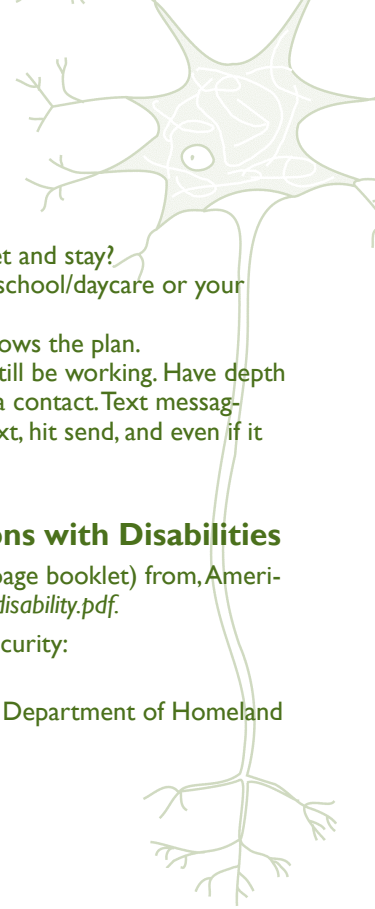
## MALE SEXUAL FUNCTION

■ **Midodrine improves ejaculation in spinal cord injured men.**

A total of 185 men with SCI who reported no ejaculation during sexual intercourse and no response to penile vibratory stimulation were treated with midodrine 30 – 120 minutes before a new stimulation. The procedure was repeated weekly, increasing doses by 7.5 mg to a maximum of 30 mg. Ejaculation was achieved in 102 men (64.6%) and was more common in patients with complete injuries and upper motor neuron injuries above T10. Midodrine induced a significant but moderate increase (maximum 10 mm Hg) in mean arterial pressure in all patients. The highest systolic blood pressure (more than 200 mm Hg) was seen in patients with quadriplegia. No other significant side effect was recorded. The average dose of midodrine required for ejaculation was 18.7 mg. Midodrine is a safe and efficient addition to penile vibratory stimulation in this population.

Soler JM, Previnaire JG, Plante P, et al.

*J Urol.* 2007 Nov;178(5):2082-6. Epub 2007 Sep 17.



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friend be the contact for relaying information to each other.

- Reunion Plan. If you can't get home, where would you meet and stay?
- Ask questions about the disaster plans for your children's school/daycare or your parents' retirement community.
- Make sure everyone in your personal support network knows the plan.
- Even when the phones crash, email and the Internet may still be working. Have depth to your plan by including the email address of your out-of-area contact. Text messaging on cell phones is good for emergencies because you can text, hit send, and even if it doesn't go through right away, it keeps trying until it's sent.

### Emergency Preparedness Resources for Persons with Disabilities

- Disaster Preparedness for Persons with Disabilities (free 48-page booklet) from American Red Cross Disaster Services: [www.prepare.org/disabilities/disability.pdf](http://www.prepare.org/disabilities/disability.pdf).
- Disability Preparedness.gov, U.S. Department of Homeland Security: [www.disabilitypreparedness.gov/](http://www.disabilitypreparedness.gov/).
- Disaster Preparedness for People with Disabilities, Ready.gov, Department of Homeland Security: [www.ready.gov/america/getakit/disabled.html](http://www.ready.gov/america/getakit/disabled.html).



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