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# PUSHIN' ON

## Headline News

**June, 2013** - The UAB Spinal Cord Injury Model System (UAB-SCIMS) answered questions about Research for a Cure in Spinal Cord Injury (SCI). During the month of June, people with SCI were invited to ask their questions to be answered by a UAB-SCIMS professional. We could not answer all of the questions, but we did answer those questions most people wanted to know. We answered these questions.

- Why would transplantation of cells into the spinal cord after injury help?
- How far is it from getting a cure through stem cell research?
- How promising are Schwann cells as a cure?
- How far is it from getting a cure?
- If and when a cure is found for paralysis, won't people who are newly injured benefit from the cure more so than people who are years post injury?
- Why aren't more researchers concentrating on chronic injury?
- Is there a governing board that reviews all the work and results to determine if there are protocols that should be adopted at trauma centers or post injury to improve the post injury recovery processes? If so how are those introduced to ensure rapid adoption of discoveries?
- I read where people in other countries have cures, so why can't we do it?

You can read all the answers at <http://www.uab.edu/medicine/sci/research/research-for-cure>

**November, 2013** – The 'Titan Arm' exoskeleton has won the 2013 James Dyson Award. Four mechanical engineering students at the University of Pennsylvania won the technology challenge after building a low-cost upper-body exoskeleton that augments arm strength. The device may offer people with disabilities improved function performing daily activities. The prototype was built for less than \$2000.

Read more and see video of the Titan Arm at <http://www.jamesdysonfoundation.com/james-dyson-award>

**November, 2013** — New rules make flying easier for passengers with disabilities. The United States Department of Transportation (DOT), in its ongoing effort to ensure equal access to air transportation for all travelers, is now requiring airline websites and automated airport kiosks to be accessible to passengers with disabilities. In addition, the DOT will allow airlines to choose between stowing wheelchairs in a cabin compartment on new aircraft or strapping them to a row of seats, an option that will ensure that two manual, folding wheelchairs can be transported at a time.

The new rules are part of DOT's continuing implementation of the Air Carrier Access Act of 1986. Travelers with disabilities can read more about the new rules at <http://www.dot.gov/briefing-room/new-dot-rules-make-flying-easier-passengers-disabilities>

## Participate in SCI Related Research

**The Effects of Virtual Walking on Pain in Spinal Cord Injury Patients** - The University of Alabama at Birmingham Spinal Cord Injury Model System (UAB-SCIMS) seeks participants with spinal cord injury who live in Alabama, are over 18 years old, and have SCI related pain at or below the injury level. \$25 Visa gift cards for each of test days. For information, contact Emily McKinley at 205-934-3345 or [sciresearch@uab.edu](mailto:sciresearch@uab.edu).

Go to [www.uab.edu/sci](http://www.uab.edu/sci) and search the "Research" tab to find more opportunities to participate in research.

# HEALTHY LIVING



## Weight Management and Spinal Cord Injury: Exercise

by Ceren Yarar, PhD

In the last two issues of Pushin' On, you learned the dangers of obesity and how to lose weight by cutting calories. Now you are ready for the next step: exercise! Here are answers to some important questions.

### *What are the health benefits of exercise?*

Most research has focused on the benefits of exercise in the general population. A few of those proven health benefits include:

- reducing risks for premature death and the development of heart disease, high blood pressure, respiratory illness, diabetes and some forms of cancer;
- improving muscle strength, endurance, mobility, self-image, and ability to fall asleep and to sleep well; and
- decreasing feelings of anxiety, loneliness, depression, and stress.

Professionals generally agree that exercise offers people with spinal cord injury (SCI) similar health benefits to that of the general population. However, more research is needed to verify those benefits.

### *What forms of exercise offer most health benefits for people with SCI?*

There are two forms of exercise.

1. Strength exercises target your “voluntary” muscle movement. For most people with SCI, these are your arm and shoulder muscles that you control and likely use every day. Some common exercises include biceps curls and triceps extensions. Strengthening your upper-body muscles helps you maintain the ability to perform activities of daily living and mobility, as well as preventing injury resulted from muscle weakness.
2. Aerobic exercises mainly target your cardiovascular and metabolic health. Your heart is a muscle that needs to be exercised like other

muscles, and cardiovascular exercises help you maintain a healthy heart to live a longer, more active life. Improving your metabolic health will result in healthy blood glucose, insulin and cholesterol levels. This results in a number of health benefits including a low risk for developing metabolic syndrome and Type II diabetes.

Strength exercises for the arms and trunk can build muscle, but this offers limited cardiovascular and metabolic health benefits. For this, you need strength and “assisted” aerobic exercises. Functional Electrical Stimulation (FES) uses electrical currents to assist your paralyzed leg and trunk muscles with various exercises. This combination maximizes your aerobic health benefits.

### *Does exercise help prevent secondary complications of SCI?*

A lot of research still needs to focus on this question. So far, research has shown 4 areas of benefit for people with SCI.

1. Cardiovascular and metabolic health: FES assisted cycling and body-weight supported treadmill training can reduce your chances of having diabetes, heart disease or stroke.
2. Skin health (pressure ulcers): FES assisted cycling and whole body vibration exercise can help to reduce the risk of pressure ulcers by increasing blood flow and oxygen supply within the muscle as well as under the skin.
3. Bone health: FES assisted standing can increase the strength of the bone and reduce the risk for fractures.
4. Respiratory health: FES of the abdominal wall muscles leads to an increase in tidal volume and improved cough peak flow, which may reduce respiratory complications for people with cervical injuries.

### *How does exercise impact my weight?*

You lose weight with a healthy diet that allows you to

burn more calories than you take in (see the previous issue of Pushin' On to learn more about balancing calorie intake). Exercise, however, helps you to maintain a healthy weight more than it helps with weight loss. In fact, less than 3% of weight loss is likely due to exercise alone. The reason is that exercise helps you replace unhealthy fat with healthy muscle.



This picture shows a pound of fat (left) compared to a pound of muscle (right). The pound of muscle is smaller and takes up less space on your body. If you replace the pound of fat with the pound of muscle, you do not lose weight. You get “slimmer.” Slimmer usually means healthier.

*How many calories do I burn with exercise?*

It is pretty simple to count your daily calorie intake. It is not so easy to count the calories you burn.

The Metabolic Equivalent of a Task (MET) is an estimate of the amount of energy a person uses doing any given activity. For example, sitting and reading a book is equal to 1 MET. For weight-loss and health benefits, you should do activities of at least 3 METs in an hour which is enough to burn about 200 calories.

There is a list of activities and the MET for those activities. This list measures the MET used by men with SCI. Although the MET may not be exactly the same for women, the list is the best available list for women with SCI, too. The list is small compared to the list for able-bodied people, but future research will update and expand the list.

The Chart (upper right) lists only a few of those published activities for SCI. The Chart lists activities based on intensity. You burn more calories per minute if more intense effort is needed to do the activity.

*How much exercise do I need?*

You should always talk to your doctor before you start exercising. You may have health concerns that need to be considered when exercising.

A panel of experts offers the following exercise guidelines for adults with a SCI. In general, it is

### Metabolic Equivalent of a Task (MET) for People with Spinal Cord Injury

#### > 3 METs (Light Intensity Activities)

Arm Cranking (16 W)  
Bowling  
Fishing  
Billiards  
Table Tennis  
Bed Making  
Dusting  
Washing Dishes

#### 3 - 6 METs (Moderate Intensity Activities)

Arm Cranking (48 W)  
Wheeling on Carpet  
Wheeling Outside  
Moving Items  
Vacuuming

#### > 6 METs (Vigorous Intensity Activities)

Arm Cranking (96 W)  
Hand Cycling  
Basketball

Source: Collins EG, Gater D, Kiratli J, Butler J, Hanson K, Langbein WE. Energy cost of physical activities in persons with spinal cord injury. *Med Sci Sports Exerc.* 2010 Apr; 42(4):691-700.

recommended that you engage in:

- at least 20 min of moderate to vigorous intensity aerobic exercises two times per week; and
- strength training exercises two times per week, consisting of three sets of 8-10 repetitions of each exercise for each major muscle group.



**Author Bio:** Ceren Yarar has a BS in Physical Therapy and a PhD in Neuromechanics. She is currently a post-doctoral fellow at the University of Alabama at Birmingham Nutrition and Obesity Research Center. Her research interest is to optimize exercise and nutrition strategies for metabolic and cardiovascular disease prevention in individuals with spinal cord injury.

**Note:** The facts stated in this article are taken from multiple research studies with research results published in multiple scientific journals. For references, please contact the editor (see next page).

**Whill** is a new alternative to the standard power wheelchair. The innovated design is in response to feedback and suggestions from hundreds of consumer.

This futuristic looking wheelchair is first about function. It has a top speed of 6 mph and a range of 15 miles, and it is 23.6 inches wide and 32.5 inches long. It offers all-wheel drive for operating on various surfaces such as grass, dirt or gravel. There are wheels as “tires” that actually rotate transversely to maneuver unlike any other power wheelchair, offering a turning radius small enough to be able to rotate in a spot.

The Whill has also focused on fun. There is no boring joystick. Instead, the Whill is designed to allow drivers to take a more active role in by “leaning” into the wheelchair similar to how one rides a skateboard



or bicycle.

The Whill can now be pre-ordered with it available in the US in early 2014.

<http://whill.jp/product/>

# TECHNOLOGY

**SmartThings** is one of the leaders in home automation. How smart is it?

SmartThings notifies you about important things that happen at home when you are home or away. You can turn those dumb things such as lights, fans, and other household items into smart devices that can be instructed to automatically do what you want.

With the push of a button, you can control lights, switches, doors and locks. You can monitor who comes and goes in your home, and you can live more securely with sensors that monitor doors and windows and alerts you of movement.

SmartThings lets these sensors communicate with each other while you control everything from your cell

phone or mobile device.

<http://www.smarthings.com>



The University of Alabama at Birmingham Spinal Cord Injury Model System (UAB-SCIMS) provides Pushin’ On twice annually as an informational resource for people with spinal cord injury (SCI). Pushin’ On is available to subscribers via email and to everyone via the UAB-SCIMS website at [www.uab.edu/sci](http://www.uab.edu/sci). UAB-SCIMS Program Director: Amie B McLain, MD. Editor: Phil Klebine, MA

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WWW.UAB.EDU/SCI