



## Background Information:

The good news is that thanks to improvements in medical and rehabilitation care, people with spinal cord injury (SCI) are living longer. The bad news is that evidence shows that people with SCI may be more likely to develop chronic diseases such as heart disease and diabetes, and at a younger age than the general population. For people more than 30 years post-injury and/or over the age of 60, heart disease is now the leading cause of death.

This increased risk of heart disease could be due to changes in the body after a spinal cord injury. A spinal cord injury, for example, often results in a loss of muscle and an increase in fat. Also, many people with SCI are less active than they were before their injury, causing them to be out of shape. These changes may make it easier for them to gain weight. It is very important that people with SCI be aware of changes in their body and their level of physical activity because both increased body fat and inactivity are linked to heart disease and type 2 diabetes.

According to the American Diabetes Association, before people develop type 2 diabetes, many have a condition called “pre-diabetes.” Pre-diabetes is when the blood sugar level is higher than normal but not yet high enough to be diagnosed as diabetes. The American Diabetes Association defines this as between 100 and 125 mg/dL. Pre-diabetes has been shown to occur more often in persons with SCI than in the nondisabled population; and it appears more often in persons with higher-level injuries.

Being overweight or obese also may increase the risk of high blood pressure, which is found in 20%-35% of people with SCI. All of these factors contribute to heart disease risk. Therefore, it is important to understand the risk factors and do everything possible to reduce risk. For persons with SCI, as in the general population, diet and exercise can help lower the risk of developing heart disease, diabetes and other chronic diseases.

# Research Study Design:

In 2008, 73 people with SCI took part in a research study<sup>1</sup> examining diet and body mass. Comparisons were made between men and women with SCI, and between people with different levels of injury (paraplegia versus tetraplegia). The researchers also wanted to find out if people with SCI in this study were getting too little or too much fat, carbohydrates and protein, and link eating habits with body mass. Findings from this study could be used by people with SCI and their doctors to help identify better diet and nutritional practices.



Participants were split into 3 groups: (1) paraplegic males, (2) paraplegic females, (3) tetraplegic males.

Only one tetraplegic female participated in the study, and was excluded from these comparisons. Participants in the study were asked to keep a log of the food they ate over a 4-day period. Protein, carbohydrate and fat intakes were calculated for each group, and then compared to guidelines for the general population, as well as to each other in order to see if there were differences. Also, the body mass index (BMI) was calculated for each participant to determine how each group compared to the general population. BMI is a measure of someone's weight in relation to height. It is a person's weight in kilograms divided by their height in meters squared.

## Results:

The following results were found after comparing the diets of the three groups:

- ◆ There were actually no differences between paraplegics and tetraplegics in nutritional intake.
- ◆ No difference in nutritional intake was found between male tetraplegics and male paraplegics.
- ◆ The number of calories eaten was much greater for men than women, and men ate more fat than women did.
- ◆ All participants were eating the recommended amounts of protein, but were eating high levels of fat and carbohydrates. This is what is seen in the typical U.S. diet.
- ◆ For all groups, the amount of saturated fat eaten was higher than the highest amount recommended by the American Heart Association.
- ◆ Intake of saturated fat was highest for the male tetraplegia group, followed by the male paraplegia group, then the female paraplegia group. Total calories eaten was a little less than population averages, however as we'll see on the next page, it may still be too high.



## Conclusions:

When a person with SCI has a fat mass above what is recommended for good health, they are at risk for developing chronic diseases such as heart disease and diabetes. However, some amount of fat and muscle is needed to protect from other problems, such as pressure ulcers. In this study, all of the participants were eating the recommended amounts of protein, but were eating high levels of fat and carbohydrates. This is what is seen in the typical U.S. diet. The amount of saturated fat eaten was higher than the highest amount recommended by the American Heart Association. When using a modified BMI for people with SCI, 74% of the participants in this study would be classified as overweight or obese with an increased risk of disease. To be sure of achieving their healthiest body weight, people with SCI should eat a well-balanced diet containing fewer calories as compared to the diets of people who weigh the same but have greater mobility.



## Recommendations:

People with SCI need to consume fewer calories than their nondisabled counterparts as a means to reduce the high risk of overweight/obesity. A person with SCI may find it difficult to eat a diet low in calories and still get all of the vitamins and minerals they need to be healthy. Most of us have a general idea about what makes up a healthy diet, but the best source of information is a nutritionist who can recommend the most nutritious eating plan for a person with SCI. Even without a nutritionist's help, a person can begin to make changes. Increasing the amount of fruit and vegetables eaten can lead to less fat and carbohydrates consumed and increase fiber, vitamin and mineral intake (especially vitamin D and calcium). Increased physical activity will also help prevent secondary conditions. It's important to talk to your doctor about finding the right activities for you.

## References:

For more information on the research study this overview is based on, please see the following articles:

1. Groah SL, Nash MS, Ljungberg IH, Libin A, Hamm LF, Ward E, Burns PA, Enfield G. Nutrient intake and body habitus after spinal cord injury: An analysis by sex and level of injury. *J Spinal Cord Med.* 2008; 32:17-25.
2. Spungen AM, Adkins RH, Stewart CA, et al. Factors influencing body composition in persons with spinal cord injury: a cross-sectional study. *J Appl Physiol.* 2003;95:2398-2407.

For additional information on spinal cord injury or the RRTC on SCI, please visit our web site at [www.sci-health.org](http://www.sci-health.org)