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Nutrition-Spinal Cord Injury Manual

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Regional Spinal Cord Injury Center of the Delaware Valley

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Spinal Cord Injury Manual

A publication of the Regional Spinal Cord Injury Center of the Delaware Valley

The Regional Spinal Cord Injury Center of the Delaware Valley provides a comprehensive program of patient care, community education, and research. It is a federally designated program of Thomas Jefferson University and its affiliated institutions of Thomas Jefferson University Hospital and Magee Rehabilitation Hospital.

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Spinal Cord Injury
Patient-Family Teaching Manual

A Publication of the
Regional Spinal Cord Injury Center
of the Delaware Valley

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Dedication

The Handbook Committee of the RSCICDV gratefully acknowledges the assistance and dedication of all who contributed to this manual, and all the others who worked so hard to make this Handbook a reality.

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Nutrition

Nutrition

Introduction — Why Nutrition Matters

Nutrition is important for everyone to maintain good health. After a spinal cord injury, nutrition can be even more important to improve overall wellness, achieve and maintain a healthy weight and help regulate bowel and bladder function. Eating a well balanced diet can help prevent the long term complications associated with SCI such as weight gain, deconditioning and skin breakdown.

A well-balanced diet can provide all of the nutrients that your body needs. Foods high in fiber, along with plenty of water, help regulate bowel function. However, if you eat more than you need, you can gain weight. The goal of a balanced diet is to consume adequate calories to maintain a healthy weight while getting all the nutrients that your body needs. If weight control is a problem, you can learn to decrease your calorie intake without giving up important nutrients, such as protein.

There are several nutrition classes offered at Magee Rehabilitation Hospital to SCI inpatients and their caregivers that review general nutritional needs in SCI. In addition, a registered dietitian is available at Magee to discuss individual nutritional needs. As an inpatient, you can ask your nurse or doctor to see the dietitian. To contact a dietitian after discharge, call 215-587-3059.

Ideal Body Weight in SCI

Energy (calorie) needs and ideal body weight are decreased after SCI due to decreased activity and loss of muscle tissue. Calorie needs and the amount of muscle tissue loss is dependent upon the level of spinal cord injury. The higher the level of injury, the greater the amount of muscle loss and the lower the calorie needs.

In general, a good weight for individuals with paraplegia is 10 to 15 pounds less than their pre-injury weight. A good weight for individuals with tetraplegia is 15 to 20 pounds less than their pre-injury weight. If you were overweight or underweight prior to injury, your ideal body weight can be determined individually with the dietitian. SCI individuals who are overweight or underweight are at risk for many of the complications associated with spinal cord injury such as skin breakdown, bladder and respiratory infections.

Many things affect an individual's calorie needs in addition to the level of spinal injury, such as age, physical activity,

metabolic rate and chronic illness. In general, daily calorie needs for individuals with paraplegia is approximately 13 to 14 calories per pound. Daily calorie needs for individuals with tetraplegia is approximately 10 to 12 calories per pound.

Nutritional Needs in Spinal Cord Injury

A well-balanced nutritious diet is important to provide adequate nutrient intake. Learning to select the proper foods from the 6 Food Groups will provide more variety in your diet. Individuals need to compare their present dietary habits with those they had prior to their injury. Patients with spinal cord injuries may need to change their intake of protein, fiber, fluids or nutrients to help correct any problems, such as, constipation, diarrhea and skin breakdown.

Dietary Guidelines for Individuals with SCI

When designing a diet for an individual with SCI, consider the food preferences, cultural and religious dietary restrictions, financial limitations and their level of independence for food shopping and meal preparation.

Guidelines for a Nutritious Diet

1. Eat unprocessed foods as much as possible.
2. Select foods containing fiber and complex carbohydrates such as fresh fruit, vegetables and whole grains. Choose cereals with at least 8 grams of fiber per serving. **Caution** - many whole grain cereals contain large amounts of added sugar.
3. Small, balanced meals with appropriate portion sizes.
4. Food sources containing omega 3 fatty acids i.e. cold water fish, walnuts. Contact your physician to consider fish oil supplementation.
5. Use limited amounts of olive oil or canola oil for cooking.
6. Drink plenty of water.
7. A high potency multivitamin and mineral supplement.

Foods to Avoid

1. **Avoid** sources of trans-fatty acids (hydrogenated vegetable oil). Consider using products such as Smart Balance ® in place of butter or margarine.

1. **Avoid** foods high in cholesterol, and saturated fats such as processed luncheon meats, egg yolks, red meat, fatty meats and cheeses.

2. **Limit** fat intake by avoiding fried foods, fast food, chips, crackers and "junk food".

3. **Avoid** sources of simple sugar such as juice (especially cranberry juice), soda, baked goods, candy, sweetened cereals, canned fruits in syrup and dried fruits.

4. **Avoid** excessive supplementation with vitamins, minerals, herbs and alternative therapies.

Basic Review of Digestion

The first step in learning about a healthy diet is to understand how your digestive system works. Food is the fuel that runs your body. However, each of the steps of digestion uses energy (from carbohydrates and fat), protein, fiber, water, vitamins and minerals in order to get energy, protein, fiber, water, vitamins and minerals from food.

In the mouth, food is broken down and mixed with saliva. This prepares the food for digestion and makes swallowing easier.

The esophagus is a long muscular tube that pushes the food down to your stomach. The wave-like movement of the muscles pushing the food along the digestive tract is known as *peristalsis*.

The stomach churns the food into a semi-liquid and pushes it into the bowel. The first section of the bowel is called the *small intestine*.

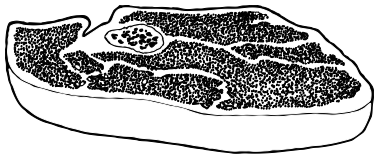
Some nutrients are absorbed in the stomach, but most absorption of nutrients occurs in the small intestine. Tiny blood vessels in the intestine pick up the digested food particles (nutrients) and carry them throughout the body.

Some food particles, such as fiber, cannot be absorbed by the body. These unabsorbed particles move down into the large intestine.

The process of digestion requires a lot of water. In the large intestine, water is reabsorbed by the body and the leftover

waste material is formed into stool. Stool is stored in the large intestine until peristalsis moves it through the rectum and out of the body.

Food Groups



Each day's menu should include at least:

Meat, Fish and Poultry Group

- Two to three servings a day, totaling about five to seven ounces a day.
- Provides protein, zinc and iron.
- Choose lean cuts of meat and remove skin from poultry.
- Bake, boil or roast. Do not cook in fat (oil, butter, margarine, lard, or shortening).

Meats / High Protein Foods

Beef, Veal, Pork, Lamb	Dried Beans
Poultry	Peanut Butter (Natural)
Fish / Seafood	Nuts and Seeds
Eggs, Egg Whites, Egg Beaters ®	Cheese (Low Fat)
Tofu	

Limit high fat meats such as:

Pork Spareribs and Ground Pork

Hard Cheeses (e.g., Cheddar, Monterey Jack, Swiss)

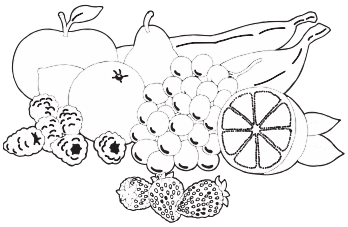
Chopped and formed luncheon meats (e.g., Bologna, Salami, Pimento Loaf)

Sausage (all types)

Hot Dogs (all types)

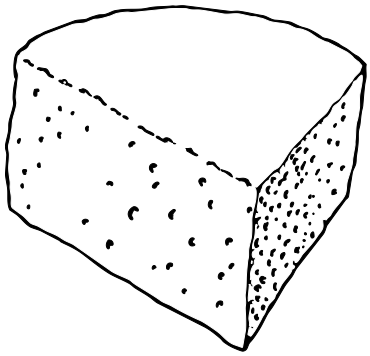
Bacon

Fruit and Vegetable Group



- Two to three servings of fruits and three to four servings of vegetables a day.
- A serving of vegetables is 1/2 cup cooked or one cup raw.
- A serving of fruit is one medium-sized piece such as apples, pears and oranges.
- 1/2 banana or grapefruit
- 3/4 cup of berries
- 1 cup of melon
- 1/2 of fruit juice (best to choose fresh fruit and avoid juice)
- Provides vitamins, minerals and fiber.
- It is best to choose fresh or frozen whenever possible.
- Be sure to include one yellow and green vegetable (Vitamin A) and a food high in Vitamin C such as citrus fruits, strawberries, tomatoes or broccoli every day.

Milk or Dairy Group



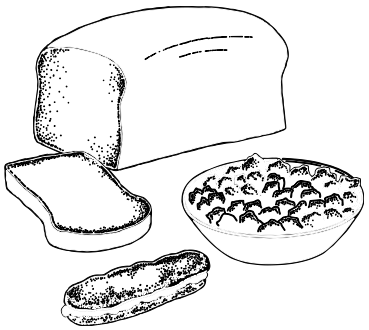
- Two servings a day of milk products or other foods made with milk.
- A serving equals one cup.
- Provides protein, calcium, and vitamins A, B and D. SCI individuals may be concerned about calcium and kidney stones and want to limit or remove dairy products from their diet. This practice is not recommended. High calcium levels are the results of inactivity and the natural process of calcium leaving the bone due to a lack of weight-bearing on the bone. It is important to consume the recommended servings of dairy or high-calcium foods. (Besides dairy products, sardines and canned salmon are good sources of calcium also).
- It is best to choose low fat or skim milk products to keep calories down and limit fat intake.

Milks

Whole Milk	Buttermilk
Ice Cream	1% and 2% Milk
Cheese	Pudding

Skim or Nonfat Milk	Custard / Yogurt

Bread / Cereal Group

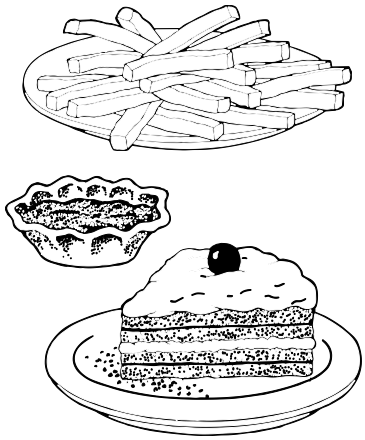


- Four to six servings of bread and cereal products a day.
- Provides B vitamins and fiber.
- Use enriched or whole grain breads and unrefined cereals.

Breads / Starches

Biscuits and Muffins	Pancakes and Waffles
Breads (all types)	Pasta and Noodles
Cereal (hot or cold)	Potatoes
Corn and Cornmeal	Rice and Rice Products
Crackers, Chips and Pretzels	Lima Beans, Dried and baked beans

Fat Group



- Three to four servings a day, where a serving is one teaspoon.
- Provides calories and vitamins A, E, D, and K.
- Solid fats such as butter and margarine are high in saturated fat, which can raise your blood cholesterol. It is best to choose liquid fats such as oil, and limit the total amount of fat you use.

Foods High in Fat

Bacon	Poultry Skin
Avocado	Oil
Butter	Fatback or Salt Pork
*Margarine	Olives
Chitterlings	*Shortening or Lard
*Mayonnaise	*Salad Dressings
*Cream Cheese	*Sour Cream
Nuts and Seeds	Tahini paste
Spreads (Smart Balance ® or Benecal ®)	

* Avoid these items and choose low fat or non-fat products to decrease the amount of fat per serving, especially saturated fat.

Special Highlights

Protein

After a spinal cord injury, your protein needs may be higher. Adequate protein intake is essential to maintain good health and to help prevent skin breakdown and infection.

Here is a brief list to help you measure your protein intake: (Figures are approximate)

Item	Serving Size	Grams of Protein
Meat, Poultry, Fish	3 ounces	21
Egg	1	7
Dried Beans	1 cup	14
Peanut Butter	2 tablespoons	14
Milk	1 cup	8
Cheese	2 ounces or 1/2 cup	14
Bread / Cereals	1 serving	2
Vegetables	1/2 cup	2

High Protein / Low Fat Foods

Egg Beaters ®	Turkey
Skim, 1% and 2% Milk	Roast Beef
Low-Lactose Milk	Flank Steak
Canadian bacon	Baked Fish
Cottage Cheese	Baked Chicken
Yogurt (Regular and Light)	Chick Peas
Tuna & Chicken Salad	Kidney Beans
American Cheese (Alpine Lace ®)	Tofu
Swiss Cheese (Alpine Lace ®)	Frozen Yogurt

Fiber

What Is Fiber?

Fiber is the portion of plants that our bodies can't digest. There are two basic types. Insoluble fibers, the kinds usually referred to as *roughage*, include the woody or structural parts of plants.

Such as fruit and vegetable skins and the outer coating (bran) of wheat kernels. Soluble fibers are substances that dissolve and thicken in water to form gels. Beans, oatmeal, barley, broccoli and citrus fruits all contain soluble fiber. Oat bran is an especially rich source.

Why Is Fiber Good for You?

Insoluble fibers tend to speed the passage of material through the digestive tract, while soluble fibers tend to slow it down. However, since both forms of fiber absorb water, they both combat constipation by softening and enlarging the stool. There is evidence that soluble fiber may be helpful in reducing blood cholesterol levels. Insoluble fiber is helpful in preventing and treating constipation.

What Foods Contain Fiber?

Beans

One of the best sources of both soluble and insoluble fiber. A one-half-cup serving of cooked kidney, navy, pinto or lima beans supplies around four to seven grams of fiber – roughly half of which is soluble.

Bran

Wheat bran is almost entirely insoluble and is excellent for relieving constipation; it's found in whole-wheat products. Oat bran is also very high in fiber — more than half of it soluble.

Fruits

Eaten with the skins intact, fruits are excellent sources of insoluble fiber. In addition, the fiber in apples, peaches, plums, bananas and citrus fruits is more than half soluble.

Whole Grains

Choose whole-grain cereals, breads and crackers when possible. Brown rice or wild rice will add fiber (mostly insoluble) and variety to a meal.

Vegetables

All vegetables add some degree of insoluble fiber to the diet. Broccoli, raw carrots and cabbage are sources high in soluble fiber.

Popcorn

A great high-fiber and (when air-popped and unbuttered) low-calorie snack.

How to Add Fiber to Your Diet

Increase fiber gradually. Too much too fast can cause gas, cramps and diarrhea. Get fiber from a variety of sources. Experiment with different fruits, vegetables and grains to help ensure a variety of nutrients. Drink lots of water. Fiber absorbs large amounts of water. A high-fiber diet can actually constipate if not accompanied by plenty of fluid.

High fiber food choices

Fresh Fruits and Veggies with Skin

Bran or Bran Cereal	Nuts, Seeds and Peanut Butter
Whole Grain Cereals	Dried Fruit
Oatmeal (Whole Oat)	Dried / Canned Beans and Peas
Bran or Whole-Wheat Muffins	Salad
Potatoes with Skin	Whole-Wheat Pasta
Whole-Wheat Bread, Rolls and Crackers	Popcorn Brown Rice

Supplements

High calorie nutritional supplements such as Boost and Ensure are high in sugar and fat. These products can lead to weight gain most of which is fat tissue. Before taking high calorie nutritional supplements, you should check with a registered dietitian who works with individuals with SCI.

Fluids

Fluid needs are increased also after a spinal cord injury, especially when trying to heal a wound. Since all of our healing and maintenance bodily functions require fluid, a lack of fluid will result in a slower healing process.

Make sure that you are drinking at least 10 to 12 cups of caffeine-free beverages every day. If you are on a fluid restriction for any reason you will need to work with your rehabilitation team to figure out what your needs are.

Caffeine-Free Beverage Choices

Calorie- and sugar-free beverages include water, all diet sodas, club soda, seltzer water, sugar-free Hawaiian Punch ®, sugar-free Kool Aid ®, sugar-free iced tea, Crystal Light ®, coffee and tea. Watch out for fidden calories from sugar.

Beverage (8 oz)	Calories	Tsps of Sugar
Water	0	0
Apple juice	112	7.0
Cranapple juice	168	10.5
Cranberry juice cocktail	150	9.4
Grape Juice	125	7.8
Grapefruit Juice (Interacts with medication – best to avoid)	88	5.5
Decaffeinated iced tea (Made with sugar)	87	5.5
Lemonade	138	8.6
Caffeine-free sodas	100	6.1
Caffeine-free diet sodas	0	0
Kool Aid® (made with sugar)	82	5.1

Remember

Drinking beverages with caffeine will cause you to lose fluid. Watch the color of your urine to help determine if you are drinking enough (pale yellow color is ideal). Some foods such as popsicles, ice cream, watermelon, water ice, Jell-O ® and frozen yogurt can count as beverages since their fluid content is so high (1/2 cup serving equals approximately four ounces). During the hot summer months, your fluid needs are even higher since you will be losing fluid by perspiring.

Electrolyte beverages such as Gatorade ® and Powerade ® are not necessary, or even beneficial, unless indicated by your doctor.

For most people, water is still the best beverage choice.

Nutrition Screening and Consultations

Nutrition Screening

All patients receive nutrition screening by a registered dietitian or designee. A nutrition consult is requested based upon the results of the screening.

In general, SCI individuals require two and one-half to three liters of fluid per day. Many people are unaware that beverages such as juice and regular soda contain a substantial amount of both sugar and calories and can easily promote unwanted weight gain if consumed in large amounts. Therefore, the majority of fluid intake for SCI patients should be in the form of water and other non-sugared, non-caffeinated beverages.

Criteria used to identify the need for a nutrition consult:

1. Poor oral intake for any number of reasons, including depression, Dysphagia (dificulty swallowing) or deconditioning.
2. Albumin (measures the amount of protein in your body) less than 3.2 mg/dl.
3. Chewing or swallowing problems.
4. Recent unplanned weight loss.
5. Current weight less that 90 percent or greater than 120 percent of ideal weight for SCI.
6. Need for diet teaching.
7. Tube feeding or TPN (Total Parental Nutrition).
8. Pressure ulcer.

Nutrition Assessments

Any member of the treatment team can recommend or can facilitate obtaining a nutrition consult through the physician. All patients who are ordered a nutrition consult by their physician will receive a full nutrition assessment by the registered dietitian or designee.

The nutrition consult will include:

1. Assessment of current and usual oral intake.
2. Assessment of current and usual weight.
3. Estimate of protein, calorie and fluid needs.

4. Appropriateness of the current diet order or tube feeding with recommendations for changes as indicated.
5. Evaluation of the need for diet teaching and instruction as appropriate.

Diet Orders

Diets are individualized to patient needs to provide adequate nutrition during the rehabilitation process. Modifications in nutrients and textures are ordered for therapeutic reasons as outlined in the Magee-approved Thomas Jefferson University Hospital Diet Manual. These manuals are located at all of the nursing stations, as well as in the Food and Nutrition Services clinical and production offices. Patients are encouraged to be compliant with their individual diet orders.

Nutrition Monitoring

Adequacy of oral intake and tolerance to oral intake and prescribed diet is assessed through regular observation. Calorie counts are suggested by the nurse, registered dietitian or designee as appropriate. The registered nurse records the patient's daily intake, and the registered dietitian or designee calculates and assesses the patient's calorie, protein and fluid intake.

The *SCI Teaching Series* and the *Skintegrity* nutrition classes focus on obtaining adequate nutrition for maintenance of ideal body weight for SCI, while emphasizing the importance of adequate protein intake without excessive fat, cholesterol, caffeine and calorie intake.

Staff Consultation

Nutrition assessments and individual diet teaching are by consult only. The registered dietitian or designee collaborate with both the nursing and medical staff as needed regarding adjustments in nutrition care plans.

Glossary

Calorie	A unit of food energy.
Carbohydrate	Mainly sugars and starches, which together constitute one of the three principal types of nutrients used as energy sources (calories) by the body. Carbohydrates come in simple forms such as sugars and in complex forms such as starches and fiber.
Constipation	Infrequent (and frequently incomplete) bowel movements.
Diarrhea	Unusually frequent or unsually liquid bowel movements. Excessive watery evacuations of fecal material.
Digestive System	The organs that are responsible for getting food into and out of the body and for making use of food to keep the body healthy. These include the mouth, esophagus, stomach, liver, gallbladder, pancreas, small intestine, colon and rectum.
Dysphagia	Difficulty in swallowing.
Fat	With proteins and carbohydrates, fat, also known as lipids, is one of the three types of nutrients used as energy sources by the body.
Fiber	Sources of foods high in fiber are fresh fruits and vegetables, whole-grain breads and cereal grains. Dietary fiber can have many benefits including promoting bowel regularity, lowering the level of cholesterol in the blood and easing conditions such as hemorrhoids. Also known as bulk or roughage.
Large Intestine	The part of the digestive tract that comes after the small intestine. Large because it is wider than the small intestine.
Metabolic Rate	The rate at which an individual burns calories. This rate is affected by an individual's genetics, and to a greater degree, his or her physical activity level.
Nutrients	Any substance in the diet that provides nourishment to the body.
Peristalsis	The rippling motion of muscles in the digestive tract. In the stomach, this motion mixes food with gastric juices, turning it into a thin liquid.
Protein	One of the three types of nutrients used as energy sources by the body, the other two being carbohydrate and fat.

Small Intestine	The part of the digestive tract that extends from the stomach to the large intestine.
Zinc	A mineral essential to the body. Food sources high in zinc include meat (particularly liver and seafood), eggs, nuts and cereal grains.

References

1. Department of Nutrition and Dietetics. Thomas Jefferson University Hospital Nutrition Manual, Aspen Publishers Inc, Gaithersburg, MD, 1993.
2. American Heart Association. American Heart Association Low-Fat, Low Cholesterol Cookbook: Heart-Healthy Easy-To-Make Recipes That Taste Great, 2nd edition, Times Books, New York, NY, January 1998.
3. American Heart Association. The New American Heart Association Cookbook: 25th Anniversary Edition, Times Books, New York, NY, January 1999.
4. American Heart Association. American Heart Association Quick & Easy Cookbook: More Than 200 Healthful Recipes You Can Make in Minutes, Times Books, New York, NY, May 1998.
5. USDA Dietary Guidelines

   www.health.gov/dietaryguidelines/

Comments and Feedback

The staff of the center has recently spent a lot of time and effort in revising this manual. However, we realize that those who are actively reading and using the manual can improve it. As a part of our program of continuous quality improvement, we ask you to help guide our efforts to improve the manual.

In the next section of the chapter are two forms. The first form is an overview by chapter that seeks to identify those areas of the manual that could benefit the most from additional work. We also seek to identify any major areas of concern that have not been addressed.

The second section is a more focused questionnaire that has as its goal the specific items that should be targeted. For example, should an item be added to the glossary or the definition changed. Should a drug be added to the discussion of bowel programs?

The more specific the comments are the more likely that we will be able to make the improvements that form the basis of your idea. By communicating with the Regional Spinal Cord Injury Center of the Delaware Valley, however, users grant us permissionto use any information, suggestions, ideas, drawings or concents communicated for any purpose we choose, commercial, public or otherwise, without compensation or acknowledgement whatsoever.

Thank you for taking the time to assist us in improving this manual.

Sincerely,

SCI Manual Committee

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Feedback Form

Rate each chapter by placing an "X" on the scale underneath the term that best captures your opinion. Using the next page, provide specific comments regarding your ratings. Feel free to make copies of the next page.

	No Opinion	Fair	Satisfactory	Good	Excellent
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Suggestions and Comments

Chapter: _____

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Any terms that need to be added to the glossary? How would you define the terms?

Any section or paragraph that was not clear?

Any drawing or sketch that would help to illustrate the material being covered?

Any additional topic that should be covered?

Any questions you have that you feel should have been answered by the manual?

What is the question?

What is the suggested answer?

Any references that should be added? Any other resources that should be mentioned?

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