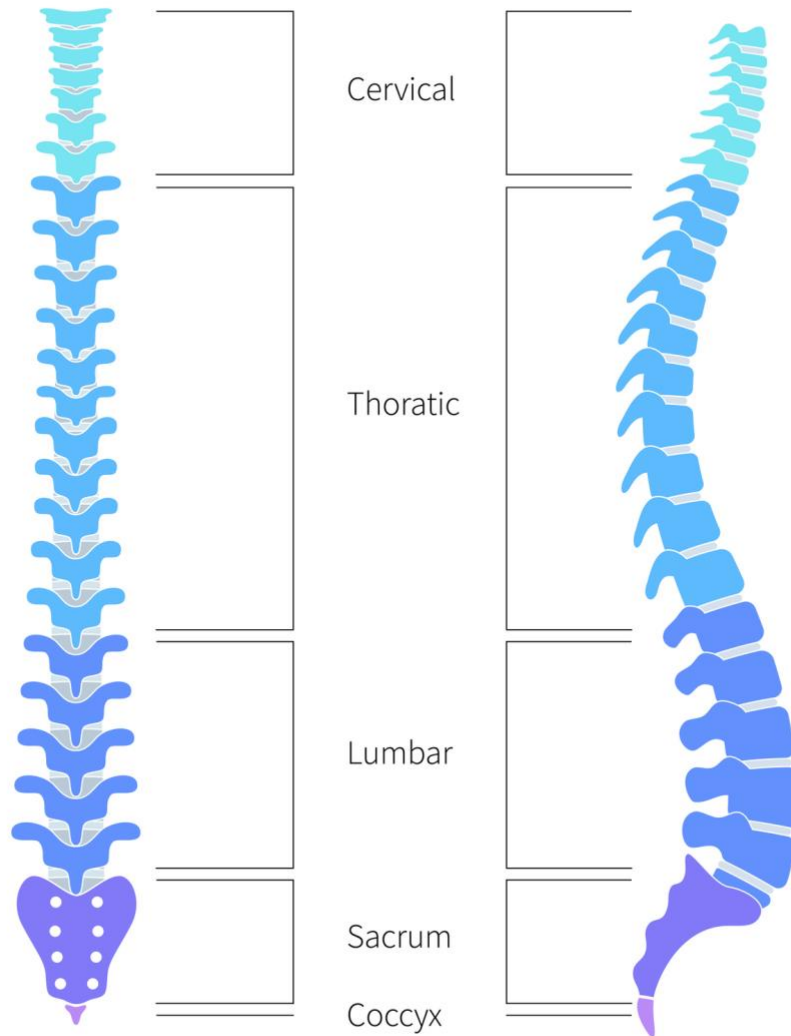


Cone Rehab Spinal Cord Injury Patient Education

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What is Spinal Cord Injury?



What is SCI?

Spinal Cord Injury (SCI) results when the nerves in the spinal cord are bruised, cut, or damaged. Nerves send messages back and forth from your brain down to muscle and do not fully work after an injury. The areas of your body below where the injury happened are left with a partial or full loss of muscle control (paralyzed) and loss of feeling (sensation).

About half of the 15,000 to 20,000 spine injuries that happen in the US each year are caused by car accidents. Sports injuries cause most of the other spine injuries.

What are the Main Types of Spinal Cord Injury?

The higher the injury is on the spine, the greater the disability. People with SCI are classified as having either quadriplegia/tetraplegia or paraplegia.

Quadriplegia or tetraplegia (quad/tetra) happens when the injury is in the neck area. This can affect your lungs, arms, and legs.

Paraplegia happens when the injury is at the upper back level or lower. This can affect the abdomen and legs.

What are the Two Main Types of SCI?

There are two main types of SCI: complete and incomplete.

Complete injuries are when there is a total loss of all feelings and muscle use below the level of injury.

Incomplete injuries are when there are some voluntary (on purpose) movements or feelings below the level of the injury.

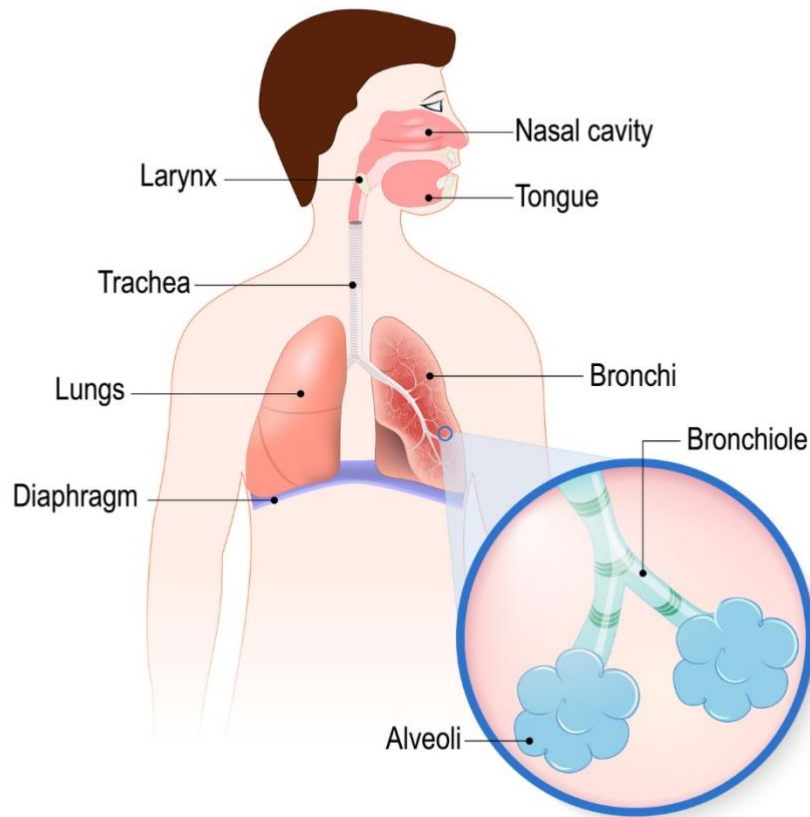
What are Other Issues with Spinal Cord Injury?

People who have spinal cord injuries have a higher risk of blood clots, urinary tract infections (UTIs), pneumonia, and pressure ulcers. You may also have bowel and bladder dysfunction (difficulty going to the bathroom), muscle spasticity (stiff muscles), low blood pressure, low heart rate and breathing issues.

Breathing and Respiratory Care

Your respiratory system is the organs, muscles, tissues, and structures that help you breathe. It also brings oxygen to body tissues and removes waste products (carbon dioxide).

RESPIRATORY SYSTEM



Your respiratory system has two major muscles which help you to breathe and cough well:

1. The **Diaphragm** is a dome shaped muscle between your chest and abdomen that helps you breathe. It is the main muscle that helps you inhale. The phrenic nerve causes the diaphragm muscle to work.
2. The **Intercostal** muscles are between the rib muscles. They help you take a deep breath and cough well. The spinal nerves at the T₁ through T₁₁ level of your spinal cord cause the intercostal muscles to work.

After a spinal cord injury, the way your diaphragm and intercostals muscles work can change. This can make it harder to cough or take a deep breath. When you cannot cough well, fluid or secretions gather in your lungs causing congestion, which may lead to pneumonia.

How will Respiratory Muscles Work after Spinal Cord Injury?

Level of Injury

Results

C₃₋₄ and above

- diaphragm will not work normally

Below C₄

- diaphragm may be weak or strong

- diaphragm may work partially or normally

T₆₋₇ and above

- weak intercostals

- cannot cough or breathe deeply

We strongly suggest getting your flu, pneumonia, and Covid-19 vaccines because people with spinal cord injuries have a much higher risk of respiratory (chest) sickness and pneumonia.

Assisted Quad Cough

Assisted quad cough is used to help clear the lungs if you are unable to cough well due to weakness. Here are the steps for an assisted quad cough:

1. The person who helps you places his/her hands side by side on your body midway between the breastbone and belly button.
2. Take a deep breath in. As you breathe out the person gives a sharp push inward and upward under your ribcage.
3. Do not let this person place his/her hands on your ribs because it could bruise your chest or break your ribs.
4. If you have had abdominal pain/injury or chest injury, ask your nurse or doctor if assisted quad cough is safe for you.

*****If you have an inferior vena cava (IVC) filter then quad cough cannot be performed. An IVC filter is a device placed surgically to stop blood clots from moving to the heart and lungs *****

Choking First Aid

Make sure the people around you know how to help if you start to choke. Go over these steps with them:

1. If you start choking, someone should ask you if you can speak.
2. If you can speak, someone should do the “assisted quad cough” (see steps above) to help clear your throat.
3. If you cannot speak, someone should:
 - a. Do an “assisted quad cough” (see steps above) 8 times.
 - b. After 8 times, stop and see if you have cleared your throat.

- c. If you are still choking, repeat steps a and b one more time.
- d. If you are still choking, someone needs to call EMS in your area. Keep this number posted by the phone or saved in your cell phone.

Respiratory Maintenance

Breathing increases the amount of oxygen in the body and keeps mucus from clogging your airways. Take a good deep breath a few times every hour while you are awake.

If your doctor has prescribed a flutter valve or an incentive spirometer (pictured below), please use it as your medical team taught you.



Respiratory Self-Care

If you get lung congestion, follow these steps to help:

1. Take in more fluids to help thin out the mucus to make it easier to cough it up.
2. Increase your turning times so your mucus moves around and does not get stuck in one area.
3. If you smoke, cut down or try to stop.
4. Use a humidifier or place a dish of hot water on a radiator to add moisture to the air if you have a dry cough.
5. Keep doing your deep breathing exercises.
6. Check your temperature because a fever could mean you have pneumonia.
7. If you are still congested and/or have a fever higher than 101 F, call your doctor or nurse.

Spinal Shock/Spinal Shock Syndrome

This occurs after spinal cord injury and results in a loss of muscle tension (tone) and spinal reflexes below the level of injury. It is also associated with low blood pressure. After the period of spinal shock ends, muscle tone increases, and there may be muscle tightness or spasticity.

The syndrome can result in incontinence, which is a loss of control of bladder and bowel function.

Autonomic Dysreflexia (AD)

Autonomic dysreflexia is a **life-threatening medical emergency**. If you are unable to relieve the symptoms, go to the emergency department or your doctor as blood pressure can rise as high as 300 systolic (top number) and 160 diastolic (bottom number), which could result in brain bleeding or stroke. It also may cause extremely low HR.

It often occurs in individuals with spinal cord injury above T6 when the body is trying to respond to a painful stimulus that an individual cannot feel. Removal of the stimulus dramatically relieves the situation. Eighty percent of causes of AD are related to bowel and bladder issues. If removal of cause does not work, medication may need to be given to help blood pressure either in pill form or through an IV. BP medications are only used if they cannot find the source of the problem because these medications can significantly lower BP leading to hospital admission. It is important to monitor blood pressure during the use of these drugs. **Please inform medical personnel if you use traditional BP medications (nitroglycerin or nitro paste)**

Always carry an AD wallet card with you to inform other health care workers of your condition.

Further information may be obtained from the medical staff at Moses Cone Rehabilitation (336-832-4000).

Signs and symptoms

1. Headache (sudden occurrence, persistent, or pounding)
2. Reddish splotching of the skin of the face and/or neck (frequently the skin below the neck becomes very pale)
3. Sweating of face and neck
4. Goosebumps
5. Stuffy nose
6. Difficulty breathing
7. Elevated blood pressure > 20 mmHg above **YOUR** normal BP
8. Pulse may be too fast or too slow.
9. Extremely itchy scalp

All of these may or may not be present, but typically a headache with increased blood pressure is found.

Causes of Dysreflexia

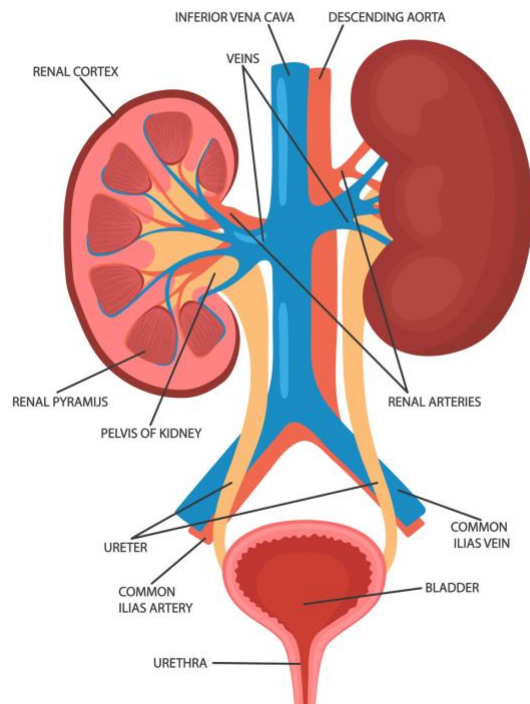
1. Full bladder
2. If foley or suprapubic catheter is blocked with sediment
3. Constipation or fecal impaction
4. Skin problems (pressure ulcers, cuts, bruises, ingrown toenails, etc.)
5. Muscle or bone problems
6. Tight belts, clothing, or external urinary collector (condom catheter) etc.
7. Cramps around the time of menstrual period.
8. Sex
9. Unusual positions

What to do when symptoms occur

1. Sit up- this well helps lower your blood pressure.
2. Find and remove the cause if possible.
 - a. Empty your bladder
 - b. Be sure your condom catheter is not too tight.
 - c. Be sure tubing is not kinked/clogged or catheter bag is too full
3. Loosen any tight clothing.
4. Check rectum for impaction and if found use lidocaine to remove
5. Check skin for any problems, (ex. Ingrown toenails)
6. ***If the above doesn't relieve symptoms, seek medical attention immediately.***

Bladder Care

ANATOMY OF THE URINARY SYSTEM



Because your spinal injury has affected your urinary system (bladder and kidneys), it is important to understand how it works.

Kidneys	Organ that removes waste/toxins from the blood and makes urine.
Bladder	A hollow, sac-like organ partially covered in muscle that collects urine until ready to urinate.
Ureters	Tube that carries urine from kidneys to bladder.
Urethra	Tube that allows urine to be removed from the body (longer in males).

Bladder Function After Spinal Cord Injury

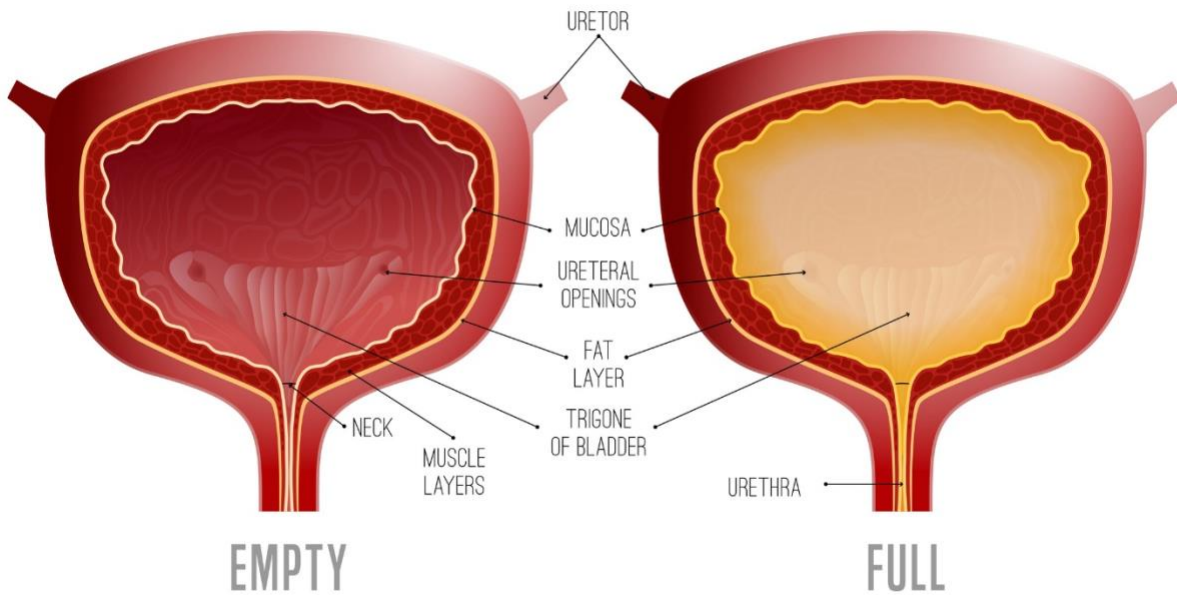
Flaccid (Non-Reflex) Bladder

This is usually found in injuries below T12. The recovery time for a flaccid bladder can be anywhere from a few days to a few months. Depending on your level of injury, your bladder may still be flaccid after your spinal cord has recovered from spinal shock. Due to loss of muscle activity, the bladder cannot empty on its own. You will need to use a catheter (a small tube placed into the bladder) to help you release urine.

Spastic (Reflex) Bladder

A reflex bladder is usually found in injuries above T12. This is caused by a loss of connection between the bladder and the brain that controls the bladder to empty on its own. The detrusor (bladder muscle) fights against the bladder valves, which causes the bladder not to fully empty. As a result, some urine is left behind. This can put you at higher risk for a urinary tract infection, which is more serious in patients with spinal cord injuries. This is usually managed by catheterization.

HUMAN BLADDER ANATOMY



How to Empty Your Bladder?

There are several ways to empty a spastic (reflex) bladder and a flaccid (non-reflex bladder). The one that is best for you depends on the level of your injury as well as your preference. Suprapubic tapping (tapping right over the bladder) and medications may make it easier for you to urinate. There are medications that may also help you empty your bladder on your own. If you have questions about your medications, please talk with your doctor.

Intermittent Catheterization	Flexible catheter tube is put into the bladder to empty urine and removed when bladder is empty.
Indwelling Catheter (Example: Foley)	Catheter tube is left in the bladder and drains continuously (changed about every 4 weeks usually)
Suprapubic Indwelling Catheter	Drains urine continuously from hole made from lower abdomen to bladder and is usually done as an outpatient (after leaving the hospital).



The Basics of Clean Intermittent Catheterization (IC) Technique

A clean technique is used outside the hospital and sterile technique is used in the hospital.



Needed Equipment

- Paper or cloth towels
- Soap and water
- Females will need 14 French Catheter, and males will need 14-16 French Catheter
- Lubricant
- Container to collect urine

Clean container to store catheter

Mirror

Steps

1. Wash vaginal area or penis head with soap and water
2. Wash your hands with soap and water. Carefully clean around rings and under nails
 - a. If caregiver performing for you, have them perform good hand washing or wear clean gloves
 - b. If more than one caregiver is helping, all caregivers need to wear gloves
3. Lubricate tip of the catheter about 2 inches down and place on a clean towel
 - a. Only use water-soluble lubricant (KY Jelly or Surgi Lube)
 - b. Do not use Vaseline because it is oil based
4. Insert the catheter until urine comes out and ask your nurse how deep the catheter needs to be
 - a. Females: Open the folds of skin outside the vaginal area and gently insert catheter into the urethra
 - i. Ask your occupational therapist about using a mirror to see this area more clearly
 - b. Males: Hold the penis up (on the sides to not pinch or close opening) and pull a little to stretch it. Insert catheter gently while pulling on penis. Use gentle but firm pressure to push the catheter into the bladder and when you reach a point where the catheter may want to stop continue to push gently. Ask your nurse how deep the catheter needs to be
 - i. If erection occurs, wait until it goes away before insertion because it makes it difficult to slide the catheter
 - c. If urine does not come out easily, push down on the lower abdomen from the top of bladder downward, otherwise known as Crede Method
5. Pull out the catheter slowly when urine stops coming out
 - a. If urine begins to come as catheter is pulled out, stop until all urine is drained
6. Coil catheter in hand, holding tip up to prevent soiling of clothing
7. Wash the catheter with soapy water if using red rubber catheter and allow inside of catheter to air dry before placing it in a closed clean container for storage or dispose of as directed if using disposable catheter
 - a. Storage options for red rubber catheters are covered cups, plastic bags, or towels.
 - i. If prone to bladder infections or if caregiver is performing catheterization, store the catheters in a betadine soaking solution
8. Wash hands

Intermittent Catheterization Reminders

- If you should drop a catheter, start over, and use a clean catheter.
- If you have a spasm while doing your catheterization program or have difficulty passing the catheter, use gentle pressure to hold it in place as you wait for sphincter valve to relax before continuing.
- If you encounter resistance when passing the catheter do not force it. Notify your doctor or nurse if you notice any bleeding or encounter resistance with catheter placement for a few days.
- The number of times you will need to cath depends on your cath volume and fluid intake.
- Never allow your cath volumes amount to exceed 600 cc's and never allow urine to remain in the bladder for more than 6 – 7 hours.
- **If you catheterize every 6 hours and your volumes begin to increase to 500 cc's or greater, increase your cath schedule to every 4 hours.**

Urinary Tract Infections (UTI)

Causes

1. Overstretching the bladder.
2. Leaving large amounts of urine in the bladder.
3. Allowing urine to stay in the bladder for long periods of time.
4. Spreading germs due to not cleaning equipment or having poor clean technique/hygiene (example: not washing your hands).
5. Having a spinal cord injury with neurogenic bladder increases risk of UTI.

Signs

1. Foul smelling urine. (+/-)
2. Bloody urine.
3. Lack of appetite and/or increased/decreased energy.
4. Increased spasticity over a short period of time.
5. Chills and/or fever.
6. Sediment (sand-like material) in the urine. (+/-)
7. Sedation.
8. Confusion/not acting like themselves.
9. Any or all of the above.

*(+/-): may or may not have

Cloudy, bad odor, and dark urine is also a sign of dehydration and not an indicator of a UTI in individuals with a spinal cord injury.

What You Can Do

1. Preventing Urinary Tract Infections
 - a. Practice good daily hygiene.
 - b. Practice good hand washing before and after each catheterization.
 - c. Make sure to always use clean equipment and supplies.
 - d. Maintain a good fluid intake (usually 2-3 L/day unless on dialysis, diagnosis of congestive heart failure, or other medical issues).
 - e. Keep bladder emptied according to schedule.
 - f. Eat a well-balanced diet. You can lower the risk of infection by avoiding beverages such as soft drinks and cranberry juice.
2. If symptoms last for more than 24 hours or worsen, call your local doctor or nurse. Go to the ER if you become confused or have a fever over 101.5 F.
3. It is important to prevent UTI's because they can lead to:
 - a. Kidney damage
 - b. Bladder damage
 - c. Bladder/kidney stones
 - d. Autonomic dysreflexia
 - e. Dialysis/end stage kidney disease

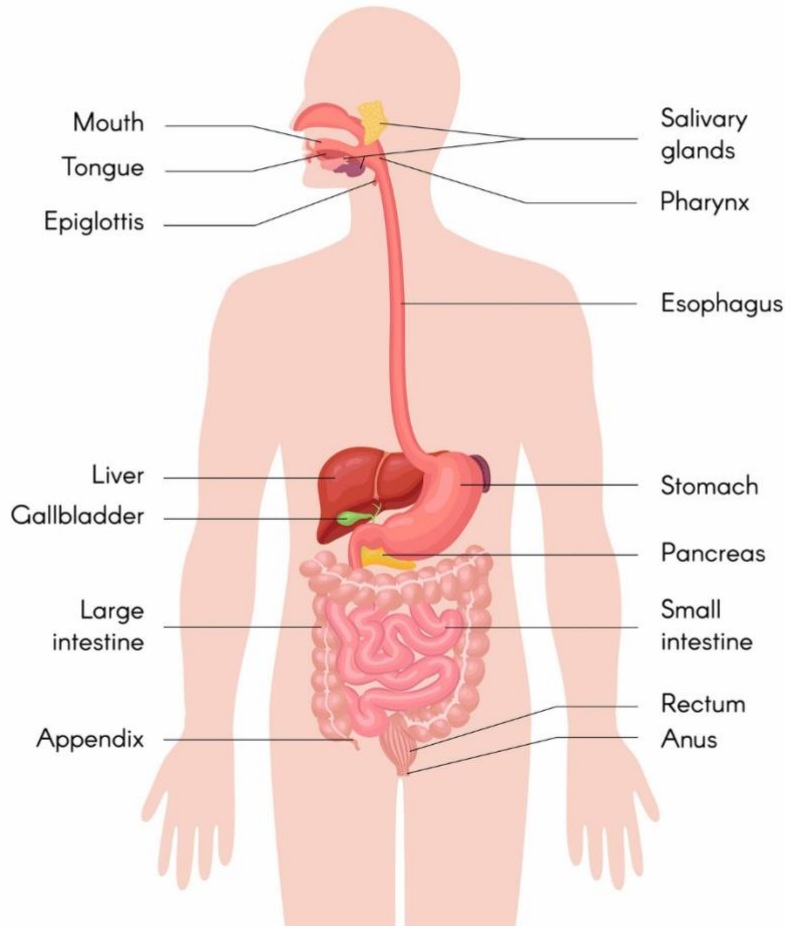
Colonization

- Differs from UTI
- Happens around 30 days (about 4.5 weeks) after SCI due to increase in germs/bacteria
- Colonization symptoms can be like UTI symptoms, except fever, spasticity, and confusion
- Associated with dark and cloudy urine with sediment.

*****Only treat UTI when an individual is sick to decrease resistance to antibiotics**

Bowel Care

HUMAN DIGESTIVE SYSTEM



Because your spinal injury has affected your digestive system and your bowels, it is important to understand how they work. This will help you understand your bowel program.

Bowel	Part of the body where solid waste passes through small intestine and large intestine (colon)
Rectum	Lowest part of the large intestine
Anus	Opening at end of large intestine where waste exits body
Stool	Waste
Peristalsis	Wave-like muscle contractions that move waste through bowel

Bowel Function After Spinal Cord Injury

After a spinal cord injury, you are unable to have a bowel movement like you did before your injury. Damage to the spinal cord will prevent the messages about needing a bowel movement from reaching your brain, which will cause a change or loss of voluntary control. This along with slow gut speed can cause constipation, unpredictable bowel movements and impaction.

Impaction occurs when stool hardens and keeps waste from leaving your body.

Managing Your Bowel Program

There are several things that you can do to promote a successful bowel program.

SELF

Schedule	Perform bowel program at the same time each day and make sure it fits with your schedule. The scheduled time will be decided during rehab admission. Stick to your program to prevent constipation and/or incontinence (uncontrolled leakage of stool).
Exercise	Activity will help prevent slowness of gut and keep stool moving through the system.
Liquids	Liquid intake is needed to soften stool and help reflex activity. You should drink 2-3 liters of liquid each day (most of this should be water). You can adjust this amount according to your specific bowel program. If you are on an intermittent cath program, you must be careful not to overstretch your bladder. If you are constipated or if the stool is hard and you feel that you must drink more, then it is important that you catheterize more frequently.
Foods	A well-balanced diet is necessary to keep your bowels moving. Remind yourself of foods that caused bowel issues prior to your injury (ex: lactose intolerance) and understand these types of foods are likely to cause more bowel issues now. Over time you will learn which foods are most likely to help your program and which foods should be

avoided. Ask to speak with dietary services during your rehab stay to help you create a well-balanced diet.

Foods that will firm up stool	Foods that will loosen stool
Meat	Fruits (grapes)
Eggs	Green leafy vegetables
Dairy	Nuts
	Prunes
	Grain bread and cereals
	Spicy foods



Procedures for Bowel Programs

If you take bowel medications by mouth, your bowel program should be performed 8-12 hours after you have taken your medications.

You need to perform your bowel program within an hour of eating a meal.

Insertion of Rectal Suppository

Purpose: Encourage the bowel to empty

Equipment:

- Soap and water
- Towel
- Gloves
- Toilet paper
- Lubricant
- Suppository or mini enema
- Disposable pads
- Plastic bag to dispose of waste

Method:

1. Lie on your left side if in bed and place a pad under your buttocks or sit on an elevated toilet seat or bedside commode.
2. Put on gloves.
3. Place a small amount of lubricant on the suppository or mini enema.
4. Insert the suppository into the rectum and push it against the rectal wall (do not push suppository into stool).
5. The suppository should take 10-20 minutes to dissolve (do not remove it from the rectum).
6. If possible, transfer to a padded commode chair/tub transfer bench and try to push down or take deep breaths. Also, lean forward if possible. These measures help to push out the stool.
7. If needed, follow with digital stimulation.

8. After the bowel movement, cleanse yourself and dry thoroughly or use a bidet.

Digital Stimulation

Purpose: To increase bowel peristalsis and relaxation of anal sphincter to empty the bowel.

Equipment:

Soap and water
Towel
Lubricant (water soluble)
Toilet paper
Plastic bag (to dispose of waste)
Disposable pad (to place under buttocks)

Method:

1. Lie on the left side or sit on a raised toilet seat or commode chair.
2. If in bed, place a pad under your buttocks.
3. Put on gloves and lubricate index finger.
4. Gently insert finger into rectum and rotate in a circular motion to relax the anal sphincter.

(Insert to 2nd knuckle for 30 seconds)
5. When the stool begins to empty, gently pull the rectum to one side and allow the stool to pass.
6. Repeat process until bowel is empty (takes 30-60 minutes to empty if digital stimulation is done every 10 minutes).
7. When finished, wipe the area with toilet paper and wash with soap and water or use bidet, then dry with towel.
8. Place used items in plastic bags and dispose of them properly.

Combine insertion of suppository and digital stimulation. Perform digital stimulation every 10-15 minutes to help increase speed and amount of emptying of bowel.

Common Bowel Problems

Constipation

Constipation is the 2nd most common cause of autonomic dysreflexia (AD) and is when your stool is hard, or you have infrequent bowel movements. If constipation is causing you to experience autonomic dysreflexia you need to use **lidocaine** during your bowel program

Signs

1. Two missed bowel times.
2. A hard or bloated abdomen.
3. Loss of appetite.
4. Small amount of very hard stool.
5. Very loose, watery stool leaking around hard stool.
6. Pain or discomfort in the stomach or side.
7. Signs of autonomic dysreflexia (AD)

Causes

1. Poor fluid and/or food intake
2. Change in bowel schedule or skipping bowel program days
3. Too little activity
4. Too little bowel medication

What You Can Do

1. Re-adjust your bowel program to fix the cause(s).
2. Repeat bowel program the following day if no results occur or if poor results occur.
3. Increase your fluid intake and/or try drinking prune juice or other warm liquids such as coffee or tea.
4. Stay as active as possible.
5. Start taking a stool softener. If already on a stool softener, increase the number taken per day, but do not exceed more than 3 in a 24-hour period. Contact primary care physician or spinal cord injury doctor if need more stool softeners.
6. Take a mild laxative such as MiraLAX or Senna. If you perform your bowel program in the AM, take it before bed. If you perform your bowel program in the PM, take it before lunch. If you are experiencing AD due to constipation, go ahead and take the laxative. You can take additional MiraLAX up to 3x/day or take half to a full bottle of mag citrate (cherry tastes better)

7. Call your primary care physician or spinal cord injury doctor if you continue to be constipated after trying all the above.

Impaction/Stool Ball: large amount of hardened stool blocks rectum and prevents full emptying

Signs

1. Same as constipation.
2. Frequent oozing of stool because liquid stool is leaking out around the impaction

Causes

Same as constipation

What You Can Do

1. Take medication by mouth such as (mag citrate) or high dose (3 x dose) MiraLAX
2. Perform enema
3. Remove stool blockage manually (see steps below)

Removal of a Stool Impaction:

Equipment:

Soap and water
Towel
Gloves
Lubricant (water soluble)
Bag to dispose of waste
Disposable pad to place under hips/buttocks

Method:

1. Lie on left side and place pad under buttocks or sit on padded tub bench.
2. Put on gloves and lubricate index finger.
3. Insert lubricated finger into rectum.
4. Gently remove hardened stool and place on a disposable pad or in the toilet.
5. After removal, perform digital stimulation.
6. Stop if pain or signs of AD occur.
7. Clean buttocks and surrounding area.

Diarrhea

Signs

1. Large amounts of loose and/or watery stool.
2. Abdominal cramps.

Causes

1. Possible impaction.
2. Medical illness (flu)
3. Poor dietary intake of foods that harden stool or eating greasy and/or spicy foods.
4. Taking too many stool softeners or laxatives.
5. Excessive alcohol intake.

What You Can Do

1. Check for impaction and follow steps to remove if present.
2. Readjust medication/stool softeners to firm stool.
3. For occasional diarrhea, Kaopectate or low-dose Imodium can be bought without a doctor's prescription.
4. If diarrhea persists for more than 24 hours call your doctor because you may become dehydrated due to loss of too much body fluid.
5. Change to bland diet or increase eating of foods low in fiber. If diarrhea is severe, change to a clear liquid diet such as broth and Sprite. Alcohol and fruits should be avoided.

Rectal Bleeding

Signs

1. Blood during digital stimulation.

Causes

1. Rectal impaction
2. Hemorrhoids
3. Rectal trauma or rough digital stimulation
4. Constipation

What You Can Do

1. Stop digital stimulation if there is large or continuous oozing of blood.
2. Always use water soluble lubricant to avoid trauma to rectum.
3. Apply hemorrhoidal medication if indicated.
4. Attempt to resume bowel program if symptoms have gone away.

5. Notify your doctor if bleeding or hemorrhoids are affecting your bowel program.

Skin Care

Your skin needs a great deal of care. Problems with your skin may occur after spinal cord injury because of absent or decreased feeling and body movement. Skin issues may arise from sitting or lying in one spot too long. If you cannot feel, you will not be able to sense the warning signals that prevent bruises, burns and/ or skin breakdown from increased pressure.

Key to healthy skin:

- eat healthy and well-balanced diet
- good blood circulation and supply
- clean hygiene
- pressure relief
- skin checks

Responsibility

You are responsible for your skin after you have been taught good skin care techniques. If your level of injury is too high to prevent you from checking your skin yourself, you are still responsible for teaching others how to care for your skin.

Safety Tips in Preventing Skin Problems

- | | |
|---------|---|
| Bathing | Always test the temperature of the water you bathe or shower in to prevent burns. Water should be slightly warmer than lukewarm. Test it with part of your arm above your level of injury, preferably the back of your hand. If you are unable to test the water have your caregiver test it with the back of their hand. |
| Smoking | Be sure that matches or ashes don't fall on your clothes. Do not rest a thin, metal ash tray on your lap and <u>never</u> smoke in bed. |
| Cooking | Don't try to lift boiling pots from the stove or sit hot liquids down where they might spill on you. Use your lapboard when moving hot liquids from one place to another. |

Clothing Tight clothing may pinch the skin. Wash new jeans until they soften before wearing them. Always remove the rivets from back pockets because they can cause pressure marks. When putting on socks pull the end of the sock away from the toes to help prevent ingrown toenails. Don't wear new shoes all day without checking for pressure problems. Never keep your wallet or any other items in your back pocket.

Heaters While riding in a car, be careful that your feet are not too close to the car heater and always wear shoes or place a pad on the floor of the car to protect your feet from the heat. If you use a space heater at home stay 6 feet away to prevent injury.

Heating Pads **Do not use a continuous heat source, even car seat warmers. You can use temporary/short-acting heating pads (example: pad that you microwave that eventually cools down).**

Foot Care Cuts, calluses, and poor toenail care can lead to skin and infection problems. You should perform daily skin checks, clean and dry feet especially area between your toes, and trim toenails straight across. Puffy or reddened areas around the edge of the nail may be a sign of ingrown toenails. If you have feet problems consult podiatry.

Pressure relief should be performed every 20 minutes for 1-2 minutes, unless you already have a pressure ulcer, if so, perform every 15-20 minutes.



Occupational Therapy Expectations

An Occupational Therapist (OT) will evaluate and provide therapy for:

- Strength and coordination in your upper body, arm, and hands
- Your ability to feel things on your skin
- Tightness in your upper body joints
- Balance
- Getting in and out of bed
- Assistive technology
- Activities of daily living (ADL's)
- Adaptive equipment

What are Activities of Daily Living?

Grooming (oral hygiene, hair care, shaving, make-up)
Bathing
Dressing
Eating
Technology use
Writing
Cooking
Cleaning
Home management
Working
Driving

It is important to remember that many muscles are used to perform the above activities. Doing ADL's help strengthen muscles and improve coordination and balance. ADLs are exercise and should be performed daily. You may need special equipment or may use a different method to complete the same task you did before your injury.

Occupational Therapy Equipment

ADL Equipment:

- Hand brace or splint
- Grooming and bathing equipment (universal cuff, C-cuff, long handle sponge)
- Dressing equipment (button hook, dressing loop, dressing stick, zipper pull)
- Communication equipment (phone holder, a writing device, typing stick)
- Feeding equipment (plate guard, universal cuff, long straw, cup holder, curved spoon)
- Bathroom equipment (such as drop arm commode chair, tub bench, or shower chair)
- Bowel & bladder equipment (such as leg bag, clamps and straps, suppository inserter, digital stimulator)

Computers and Environmental Control Units:

The Occupational Therapist (OT) decides which equipment is helpful to complete many parts of everyday life. This also includes working, going to school and being able to control things in your home. Computers and environmental control units are devices available to increase your independence. OT and Recreational Therapists work together to determine the best assistive devices for you to use.

Range of Motion (ROM)

OT will perform and instruct you and/or your caregiver on stretching exercises. These exercises are called range of motion. If joints remain loose, you can continue to perform ADL's. If your joints get tight you may have pain when you move or when others move you. You will also have difficulty positioning and re-positioning yourself in bed and wheelchair. It is important to do ROM exercises daily to prevent stiffness

Points to remember while Range of Motion is performed:

1. Range of Motion (ROM) should be done at least 2-3x/day.
2. Each motion should be performed 5-10 times.
3. You should perform in a safe position.
4. Be careful not to bend your joints too far. This can happen because your muscles are weak or absent. For example, you could bend your fingers further back than they would normally bend.
5. ROM should be performed slowly. This is also important if you experience muscle spasms.
6. All joints should be moved through their full range of motion. If you are unsure how far a joint should be moved, observe someone performing the movement.
7. NEVER FORCE ANY MOVEMENT. Only range the joint to the point of strong resistance. This resistance may be due to tightness or bony changes.
8. Be careful as ROM can be harmful if done wrong and can result in damage to muscles, tendons, joints, nerves and blood vessels.

Remember that it is up to you to use skills that you learn in OT to encourage progress.

Physical Therapy Expectations

A Physical Therapist (PT) will help improve your strength, ability to stretch tight joints, endurance, and mobility. This will be done through exercises and instruction for transfer techniques and wheelchair (W/C) mobility. A PT will also recommend ways to change your home to make it easier for you to get around. They will choose the right equipment for you to use every day.

What equipment will I need?

The equipment you may need will depend on your level of injury. Such equipment might include a W/C, a cushion, a transfer board, a Hoyer lift, leg loops and a hospital bed.

Your wheelchair:

The PT will help you choose a W/C to best fit your needs and will teach you about how your chair works. It is very important that you take care of your W/C since you will need to use it every day. Use the following safety techniques with your wheelchair:

- 1) Make sure both wheel locks are on before getting in or out of your W/C
- 2) Make sure anti-tippers are down so you will not tip over backwards in W/C
- 3) Make sure front casters face forward when getting in or out of W/C to prevent the W/C from tipping over.

Your cushion:

There are many kinds of cushions available for your W/C and the PT will help you choose one that is right for you. Some are made of foam, while others are filled with air or gel-like substances. Cushions will protect your bottom and help prevent you from getting pressure sores, provide a comfortable surface to sit on, and help keep you in a good posture while sitting in your W/C.

How to care for your cushion:

You need to clean your cushion and its cover at least once a week. The cushions need to be washed by hand, while the covers can be machine washed and line dried. Here are some care tips to remember:

- 1) If you have a cushion filled with gel, you need to check for holes or leaks every day. If you find a leak, call your vendor so they can repair or replace it. In the meantime, you must borrow one from the vendor. This type of cushion normally wears out in 3-5 years.
- 2) If you have a foam cushion, you need to clean it with a foam disinfectant spray. This cushion normally wears out in 3 years.
- 3) If you have a cushion filled with air, you need to make sure it gets dry between the cells and check the air pressure every day by making sure you have at least one finger width between the seat of your W/C and the bones you sit on. If you think your cushion is leaking air, you need to return it to your vendor to get your cushion fixed or replaced. Again, you will need to borrow one until you get a new one. This type of cushion normally wears out in 3-5 years.

Transfer equipment:

Transfer equipment may safely help you and/or your caregiver get you from one place such as your bed to another as in your W/C. This equipment may be a transfer board, walker, leg loops, or a Hoyer lift depending on your level of injury.

How do I take care of my manual wheelchair?

It is important to do regular check-ups on your W/C so that it will last longer and be more reliable.

Pneumatic tires:

Pneumatic tires are filled with air. You can use a bicycle pump with a pressure gauge to pump and measure the amount of air pressure in your tires. The tires should list the exact amount of pressure needed. The right amount of air in your tires will make it easier to push the chair as well as allow the wheel locks to better hold your chair in place. These tires should be replaced when the tread wears thin or cracks because this will cause the tires to lose their ability to provide traction and the wheel locks to give.

Wheel locks:

Wheel locks keep your W/C tires from turning and your chair from moving. Wheel locks can slip if they are not locked, if the tread on the tires is worn, or if the tire pressure is low.

Spokes:

Spokes are designed to keep your W/C balanced for a smooth ride. If you have a broken spoke, you need to get it replaced immediately. Take your W/C to a bike shop so they can tighten or adjust your spokes.

Hand rims:

If your hand rims become loose, you need to tighten the screws. If your hand rims have sharp edges, you can use a metal file to smooth the rough edges.

Caster forks:

Caster forks attach the caster wheels to your W/C. You want to make sure the caster forks swing freely when you tip your W/C backwards. If your caster forks do not swing freely, your ride will not be smooth, and your W/C will be harder to move. The caster fork can be changed by taking off the dust cap on top of the fork and either tightening or loosening the screw. If your front casters wiggle, you can tighten the screw by turning it to the right. If your W/C is hard to push or pulls to one side, then you need to loosen the screw of the caster on the side of the chair that is pulling towards.

Castor wheels:

Caster wheels are the small front wheels on your W/C. These wheels should also swing freely when your W/C is tipped backwards. Every now and then, you will need to clean the casters of anything that stops them from turning freely.

How do I take care of my power wheelchair?

This type of W/C has more frequent check-ups because of the battery, motor, and drive systems. Power wheelchairs should last 5 – 7 years.

To charge the batteries, you need to make sure the power switch on your W/C is turned off. Then you place the charger to the W/C and plug it into the outlet on the wall. When the needle on the charger points to zero, the battery is fully charged. Remove the charger from the wall outlet and then from the W/C.

Make sure you or someone checks for loose screw or bolts, frayed or loose wires, tired tread, tire pressure, tension on belts and wire connections.

Wheelchair mobility:

The way you move your wheelchair depends on the type of chair you have: a standard wheelchair, wheelchair with peg rims, or an electric wheelchair. Wheelchair mobility also includes moving on even or uneven surfaces or around obstacles: ramps, curbs, and stairs.



Will my home be okay for me to return home to?

Your physical and occupational therapist may give you a home measurement sheet to decide if changes should happen to your home environment to help with movement.

How valuable are range of motion exercises?

These exercises stretch your muscles and keep them flexible, as well as stop your joints from getting stiff. Your physical therapist will teach you and your family how to do them. If these exercises are not done, your muscles and joints will get stiff and make it harder for you to move yourself in bed, move from one place to another, position yourself in your W/C, balance yourself, and do activities of daily living.



Movement Tips

Here are a few ways you can move your body easier after a spinal cord injury:

1) **Head-Hips Relationship**

You can move your hips more easily by moving your head and shoulders in the other direction. Example: If you want to move your hips to the right, place your head and shoulders to the left to make it easier.

2) **Unweighting**

To move a body part, you must take your weight off that part first.

3) **Substitution of Muscles**

If a certain muscle is no longer working, another muscle can do the same movement.

4) Using Gravity

Gravity can help movements happen even if you lack strength. For example, if you raise and turn out your shoulder while sitting, your elbow will straighten without use of muscles.

5) Tension of Passive Structures

Shortened or tight muscles that cross more than one joint can allow movement or increase stability.

Example 1: Tightness of hand muscles can make it easy to grasp objects

Example 2: Tight back muscles can help your stability and balance when sitting up if your core is weak.

6) Using “Fixation” of the End of the arm or leg

Placing the end of your arm or leg on something helps the upper muscles of the arm or leg to move the middle part.

Example: If you place your hand on an object, you can use your shoulder muscles to straighten your elbow.

7) Momentum

Once something starts moving, it will continue to move in that way until it stops.

Recreational Therapy: What to Expect

This therapy will teach you to use what you have learned in all your other therapies to continue to enjoy your life. Recreation Therapy will help you learn:

1. How to get around in public places in a wheelchair or with assistive devices (walker or cane)
2. What types of adaptive equipment to use to help you take part in activities that bring you joy
4. How to manage your free time
5. Where to go for help and information in your community

Recreational activities were an important part of your life before your spinal cord injury and will remain important. You may need to change activities to safely complete. This section will help answer your questions about these changes.



Precautions to activities:

Physical Activity is a major part of life, but it is key to make sure that you are safe and healthy during these activities. Keep these things in mind when taking part in various activities.

- 1. Always use a cushion and allow pressure relief every 15-20 minutes during activities to protect your skin!**
2. Make sure your skin stays clean and dry. Take a shower as soon as you can after activities where your skin contacts chemicals like chlorine.
3. Wear shoes, socks, and long pants if needed to protect your skin from scrapes, cuts, bruising, or burns.
4. Keep your bowel and bladder program in mind when planning outdoor or all-day activities. Make sure you bring enough clean items. If you need to do your bowel program while you are out, will accessible bathrooms be open?
5. Autonomic Dysreflexia could be a dangerous condition which may happen during recreational activities. Refer to the Autonomic Dysreflexia (AD) of this booklet to learn more about this condition and how to stop it.
6. Make sure to check your skin frequently to prevent skin breakdown.

Planning

The ADA (Americans with Disabilities Act) requires all public buildings to be accessible to those with disabilities. If you are going to be visiting a new restaurant or movie theater, and you have questions about their accessibility, the best thing to do is call ahead and ask. The more experience you gain in the community, the better it will be for you to know what type of questions you will need to ask. Here is a basic list of questions to think and ask about when planning your outing.

-Is the parking lot accessible?

- How many handicapped parking spaces does the lot have?
- Is the lot paved or is it gravel?
- Is there a ramp or curb cut to access the sidewalk?
- Do you have electric doors?
- Is there a ramp to enter the front door?
- Do you have a “wheelchair accessible” bathroom stall? Are there raised toilet seats? Are there grab bars?
- What is the height of the tables? (Restaurants)
- How wide are the aisle ways? (Big box stores often close off aisles with end caps and merchandise)
- Are there any indoor stairs?
- How wide are the elevators?
- Do you offer able-bodied seats with wheelchair seating? How many? (For movie theaters or sporting venues)
- Are paths/trails paved or gravel? (Parks/outdoor recreations areas)
- Are fire exits wheelchair accessible?

ACCESS NC

A vacation and travel book for people with accessibility needs, **ACCESS NC**, is available online.

<https://www.ncdhhs.gov/divisions/vocational-rehabilitation-services/independent-living-people-disabilities/access-north-carolina-vacation-and-travel-guide-people-disabilities>

This book lists different parks, historical sites and recreational areas throughout the state of North Carolina. The book also rates each site on how accessible it is for people with disabilities. This will make planning some outings and vacations easy!

Wheelchair accessible Electronic Apps:

On Wheels

Facebook Groups:

Misa On Wheels

The World is Accessible

Travel Considerations:

Air travel can be an enjoyable and stressful experience. Being organized when traveling can make a big difference. Here are a few tips to make air travel enjoyable:

- Make reservations early and notify the airline if you are a wheelchair user.
- Non-stop flights are better.

- Pack an emergency kit to take with you on the plane and have enough supplies (catheters) in case of a layover or your luggage is delayed.
- Come early to the check-in counter.
- Make sure you have a tag on your chair and ask that your chair be gate checked.
- Ask for a boarding chair because most wheelchairs do not fit on small plane aisles.
- Take your cushion with you and place it in your seat.
- Do pressure relief while you are in the air.
- Tell the flight attendant to call 30 minutes before landing to make any necessary arrangements. Let them know your wheelchair was checked at the gate.
- United Airlines (airlines disability discount provides 50% off economy tickets) and Delta Airlines has accessible travel.

If your flight is longer than 2 hours non-stop or if you are driving longer than 4 hours you are at higher risk for blood clots in the legs (DVT).

When traveling by train, most Amtrak stations are accessible by ramps and/or wheelchair lifts. Most trains have accessible seating and sleeping. It is a good idea to give early notice to make arrangements for help. You can find more information at www.amtrak.com/accessible-travel-services or call 1-800-USA-RAIL.

Locating Resources in Your Community:

Help and information are always offered in your community, if you know where to ask! Below is a list of common community resources which may be offered to you. You may find local phone numbers for these organizations in your phone book or online. In addition to this list, please read the resources section of this booklet.

- County or State Recreation Departments
- Schools
- Churches
- Libraries
- Hospitals
- Newspapers/magazines
- Service Organizations
- Local Chapter of United Way, Easter Seals, or Red Cross
- Internet
- Word of mouth!

Assistive Technology Resources:

www.ncdhhs.gov

North Carolina Assistive Technology Center (Winston Salem)
131 Miller St.
Winston Salem, NC 27103
336-716-8030

North Carolina Assistive Technology Center (Greensboro)
3401 West Wendover Ave.
Greensboro, NC 27407
336-487-0550

North Carolina Assistive Technology Project
Whitaker Rehabilitation Center
3333 Silas Creek Parkway
Winston-Salem, NC 27103

<https://www.ncdhhs.gov/divisions/vocational-rehabilitation-services/north-carolina-assistive-technology-program>

Web Resources

<http://www.spinalcord.uab.edu/>

<http://www.erols.com/nscia>

[Premier Spinal Cord Injury Program | Shepherd Center](#)

<http://www.blvd.com/>

<http://www.charweb.org/health/rehab/index.html>

<http://www.users.sgi.net/ozzy/scilinks.htm>

<http://www.charweb.org/health/rehab/scin.html>

<http://disability.com/>

<http://www.cureparalysis.org>

<http://www.curbcut.com>

<http://www.eskimo.com/~jlubin/disabled.html>

<http://asel.udel.edu/at-online/>

<http://bart.wral-tv.vom/~bje/ncwa.htm>

<http://www.dsusa.org/~dsusa/>