

# SPINAL CORD MEDICINE

## HANDBOOK FOR PATIENT AND FAMILY



### MOBILITY



**Frazier Rehab Institute**

A service of Jewish Hospital & St. Mary's HealthCare

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## **THE PATIENT AND FAMILY HANDBOOK**

This Handbook is designed to give you the information to better understand spinal cord injury and the tools needed to manage your health care needs successfully. Information is intended for you and your family because, those who love you, will often be involved in assisting you with your care needs while in the hospital, and in the home environment. As you read through the Handbook, your rehab team at Frazier is available to address your questions and provide you more information pertinent to your needs.

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## **A BRIEF NOTE ABOUT THE FOUNDER OF FRAZIER REHAB INSTITUTE**

In her early 20's, Amelia Brown of Louisville sustained a spinal injury in a car accident in the 1940's. With no rehabilitation services in Louisville, she traveled to New York for treatment. After returning to Louisville, she married a physician, Dr. Harry Frazier. Believing Louisville needed its own rehabilitation facility, Mrs. Frazier founded the Frazier Institute of Physical Medicine and Rehabilitation in the early 1950s. Her son, Owsley Brown Frazier, served as Chairman of the Fund Raising Committee for Frazier's new building, named the Frazier Rehab and Neuroscience Center, which opened in 2006.

## **DISCLAIMER**

The information contained herein is intended to be used in accordance with the treatment plan prescribed by your physician and with the prior approval of your physician. You should not begin using any of the methods described in this publication until you have consulted your physician. Jewish Hospital & St. Mary's HealthCare, Inc. D.B.A. Frazier Rehab Institute, its affiliates, associates, successors and assigns, as well as its trustees, officers, directors, agents and employees are not liable for any damages resulting from the use of this publication.

NOTE: Words *italicized* in the text below are defined in the Glossary at the end of this Chapter.

## MOBILITY

### RANGE OF MOTION

Range of motion is the amount of movement you have at a particular joint.

Range of motion exercises should be done every day to:

- Prevent joints from getting stuck
- Improve posture, balance and transfers
- Improve ability to perform daily activities (dressing, grooming, hygiene)
- Prevent pressure ulcers

Your therapist will instruct you in the most appropriate exercises for your needs.

*Range of motion* (ROM) exercises are movements of a joint through the available amount of movement. These exercises are important to do each day to prevent *contractures*. Contractures occur when muscles become stuck in one position and/or does not allow the joint to move through the full movement that it should normally be able to do. Because you are unable to move like you used to, your joints can become stiff and not bend or straighten as they did before. If this occurs, it can make activities of daily living very difficult to do such as dressing, grooming and eating.

*Range of motion exercises* can be performed at different levels. *Passive range of motion* (PROM) is performed when you are unable to move a body part for yourself. A therapist or caregiver can move the body part for you. It is also possible for you to do your own passive range of motion exercises (*self ROM*) by using body parts that work to move other body parts. *Active assistive range of motion* (AAROM) is performed when you are able to partially move a body part, but are unable to move it through the full range of motion. In this case, the therapist or a caregiver can help you complete the movement. *Active range of motion* (AROM) is performed when you are able to move a body part independently through full range. It is important to understand that these exercises will not make paralyzed muscles work again. They will, however, help to make daily activities easier to accomplish. Your therapist will instruct you in the most appropriate exercises and will teach your family how to help as needed.

Here are some key things to remember when doing range of motion exercises:

- You should be relaxed and comfortable before starting your exercises.
- The room should be quiet, with as few distractions as possible.
- Perform each movement slowly to prevent *spasticity* (involuntary tightening or twitching of the muscles).

- Avoid jerky or bouncing movements.
- Do not hold your breath during exercises. Holding your breath can cause muscles to tense up.
- Do not go beyond the point of pain or resistance.
- If *spasms* (involuntary tightening or twitching of the muscles) interfere with the movement, do not fight them. Allow the limb to relax and begin the motion again slowly.
- Watch for changes in range of motion of a joint. If it decreases, you may need to spend more time exercising that joint. If it continues to decrease or if you notice more motion than usual, call your physician.
- Watch for any area of redness, hardness or hotness over a joint. If this occurs, it could indicate the beginning of a medical condition called *heterotopic ossification* (HO). You should report these symptoms to your physician immediately. See Chapter on Medical Concerns for more on HO.

You may be thinking to yourself “I have never been flexible, so why do I need to be now?” The answer to that is normal flexibility helped you to do functional activities before your spinal cord impairment. Now, increased flexibility and increased range of may be needed in some parts of body to sit up, dress or transferring. Your therapist will teach you which parts of your body need added flexibility. You will also learn which parts of your body not to overstretch.

## **NECK AND TRUNK**

When doing *range of motion* exercises, it is important to avoid over-stretching the muscles and ligaments on the back of your neck and trunk. Over-stretching can lead to a bent over posture that can make you unbalanced and decrease your ability to breathe. By keeping the muscles of your neck and trunk somewhat shortened, your *transfers, bed mobility*, and positioning will likely be accomplished more easily. One key thing you can do to prevent over-stretching is to avoid sleeping with multiple pillows under your head. Instead, use one thin pillow or a towel rolled under your head to keep your neck in a neutral position.

## **UPPER EXTREMITY (ARM)**

Special attention should be given to the shoulder, arm, and hand to maintain a full range of motion for participation in a wide variety of activities. Proper technique should be followed during all exercises to avoid painful movements and to prevent injury. Individuals with tetraplegia will be instructed on specific stretches and exercises to promote optimal hand function. Splints and positioning devices may be issued to assist with stretching. The occupational therapist will give specific instructions regarding upper extremity exercise programs.

## **LOWER EXTREMITY (LEG)**

More than normal movement is necessary in your hamstring muscles following a spinal cord injury. The hamstring muscles are located on the back of your thigh and are attached to the pelvis and just below the knee. Their purpose is to straighten the hip and to bend the knee. Having at least 110 degrees of hamstring flexibility when doing the straight leg raise stretch



will allow you to sit with your legs straight out in front of you (*long sit*) when dressing, to move in bed without over-stretching your lower back muscles and to complete transfers from the floor.

Your therapists at Frazier will develop a personalized program of range of motion exercises designed for you to use at home. It is very important to take responsibility to perform *self ROM* exercises or direct someone else to perform ROM exercises for you in order to maximize your independence. ROM exercises need to be done daily.

## PRESSURE RELIEF

- Pressure relief is taking weight off a part of your body that has had a pressure on it for a long period of time
- It should be done every 30 minutes while seated and every two hours while you are lying down
- It is necessary to prevent pressure ulcers, especially over bony areas
- You may want to get a watch with a timer that will beep every 30 minutes to remind you to perform pressure relief

After experiencing a spinal cord injury, it is very important for you to take good care of your skin. Because you are unable to move like you used to, you may spend more time lying or sitting which puts a lot of pressure on your skin. Pressure pushes blood out of the tiny blood vessels that nourish the skin and underlying tissue. If this pressure is not released, your skin will not get adequate nourishment, and the skin cells may die. This can cause *decubitus ulcers*, sometimes called *pressure sores* or bed sores.

Any area of skin that you cannot feel normally is at a higher risk for developing decubitus ulcers especially those that are over bony areas such as the shoulder blades, elbows, hips, knees, ankles, heels and buttocks. If you cannot feel a certain part of your body, you will not feel warning signs to help you prevent burns, bruises and skin damage that could lead to skin breakdown. To prevent skin damage and pressure ulcers, it is important to perform pressure relief regularly. Pressure relief should be performed every 20-30 minutes while you are sitting and every two hours while you are lying down. At first, you may not be able to do

pressure relief on your own. In this case, you need to learn to instruct a therapist, nurse, or caregiver to help you to relieve pressure.

Below are descriptions of different types of pressure relief. Remember that not everyone will be able to do each type. Your therapists will teach you the most appropriate technique for pressure relief.

**Reclining Pressure Relief.** This is usually the first method of pressure relief introduced to you when you are able to sit up in a wheelchair. Another person will be needed to help you perform this type of pressure relief.

- Lock the brakes on the wheelchair.
- Recline the wheelchair back as far as it can go or as far back as you can tolerate.
- Lift the right leg so that weight is taken completely off the buttock and hold for 30 seconds. Repeat on the left leg.
- Return the chair to the upright position.
- If you have slipped forward in the chair, ask someone to assist with repositioning.

**Lateral Lean Pressure Relief.** This is usually done when you have fair to good trunk balance. A person with *paraplegia* and some with *tetraplegia* can perform this type of pressure relief independently.



- Lock the brakes on the wheelchair.
- Remove one armrest.
- If someone is helping you, he or she should stand in front of you and help you to lean over onto a sturdy table or locked bed surface.
- If you are doing it on your own, lean over the side of the chair and hold either the wheel or lock one arm around the push handle of the chair.
- Make sure weight is completely off one side of your buttock. Crossing your leg will relieve even more pressure from your buttock.
- Hold this position 30 seconds, then repeat on the other side.

**Wheelchair Push Up Pressure Relief.** This type is done if you are able to push up with your arms and hold your weight up off the chair surface for at least 30 seconds. Someone with strong *triceps* can usually do this pressure relief.



- Lock the brakes on the wheelchair.
- Place your hands on either the armrests or wheels of the chair.
- Push down and straighten your arms until your buttock is completely off the seat surface.
- Hold this position at least 30 seconds while maintaining clearance beneath your buttock.
- Return slowly to a seated position.

**Forward Lean Pressure Relief.** This technique sometimes requires that loops are added to the push handles on the back of the wheelchair. An individual with either *tetraplegia* or *paraplegia* can perform this technique if he or she has adequate balance and arm strength.



- Lock the brakes on the wheelchair.
- Place your hands on your knees and slowly move them down your leg toward your feet.
- Check to make sure weight is off your tailbone. If it is not, you may need to lean further forward.
- Hold this position at least 30 seconds.
- Return to a seated position by either pushing up on your legs or hooking your arms into the loops added to the push handles and pulling yourself up.

**Pressure Relief in Bed.** This type of pressure relief will be necessary any time you are lying down. You may have a mattress that provides pressure relief but it is NOT a substitution for changing positions.



- Every two hours you need to change positions in bed and maintain the new position for two hours.
- If you are unable to roll on your own, you will need a therapist, nurse, or caregiver to assist you with the position changes.
- You will need to move from right side lying for two hours, to lying on your back for two hours, to left side lying for two hours and repeat the

process for the entire time you spend lying down. Once you are medically stable and your skin is strong and healthy, your doctor may instruct you to go longer than two hours before turning in bed. Talk to your doctor before doing so.

**When you are lying on your side**, place a pillow between your knees and ankles to reduce the risk of skin breakdown from the pressure of one leg lying on top of the other. You may need to place a pillow behind your back as well to prevent you from rolling onto your back before it is time to change positions. If you are unable to place the pillows yourself, have your caregiver or nurse assist you.



**When you are lying on your back**, place one pillow under your knees and one under your heels to reduce the risk of skin breakdown. You should have only one thin pillow under your head to prevent overstretching of your neck muscles.

If you can lie on your stomach, you do not have to do pressure relief. You need approval from your physician before getting into this position.

The cushion you sit on in the wheelchair is also an important part of pressure relief. Cushions are made to distribute the weight of your body so there is less pressure on bony areas and more pressure on padded areas. Even if you have a great wheelchair cushion, you can still get skin breakdown if you don't do pressure relief every 20-30 minutes. See Chapter on Skin Care for more information.

## TRANSFERS

- Transfers may be used to help you get from bed to wheelchair or one place to another.
- Before attempting a transfer yourself, it is important to learn to do transfers safely.
- Your therapist will teach you the best type of transfer for you to use.

*Transfers* are how you move from one surface to another. They allow you to get in and out of bed and/or wheelchair, as well as any other surface on which you want to sit or lie. There are a number of different types of transfers. Your therapist will teach you the most appropriate and safest transfers for you to perform.

### GUIDELINES FOR PERFORMING SAFE TRANSFERS

- You want the least amount of distance or space as possible between the two surfaces you are moving to/from.
- The height of the two surfaces should be as even or level as possible.
- Lock brakes and stabilize all surfaces including a bed prior to transferring.
- If the wheelchair is on a tile surface, you may want to put a non-skid pad or heavy object under the wheels to prevent sliding.
- Remove arm rests, leg rests, seat belt, *chest straps*, *lateral supports* and brake extensions prior to transferring to reduce the risk of injury to your skin. These items also may interfere with the transfer.
- Wear non-skid footwear.
- Make sure catheter lines or any other external lines will not get caught on anything during the transfer.
- To reduce the risk of skin breakdown, try not to scrape your skin or shear your bottom over the wheel, brakes, leg rests or any other surface during the transfer.
- Before doing a car transfer, position the car seat back as far as it will go and slightly recline the seat. Take off all interfering parts of the chair prior to positioning next to the car. During the transfer, try not to hit your head on the door or pull on the door. You may be instructed to sit on your wheelchair cushion when you are sitting in a car seat. Regardless, when you sit in a car, you still need to do *pressure relief* every 20-30 minutes to prevent skin breakdown. Once you are in the car remember to put on your seatbelt.
- A *transfer board* may need to be used during a transfer if the surfaces are far apart or if you need to take rest breaks during the transfer. Make sure the board is positioned under your buttock/hip and firmly on the surface to which you are transferring. Sliding across the board can cause shearing and skin breakdown. Instead, make sure your buttock is not touching the board when you are transferring.

- If transferring in or out of a power wheelchair make sure it is turned off during the transfer.
- If transferring to a *bedside commode* have the commode up against a wall or other sturdy surface so it will not tip over. Make sure you have adjusted the commode height to provide a level surface transfer but to also have your feet on the floor.
- Before transferring into a *tub chair* adjust the height to provide a level surface transfer but to also have your feet on the floor.
- Make sure you maintain your balance before, during and after the transfer.
- When possible, transfer to your stronger side.

If you are unable to maintain your balance or stability during the transfer, or if you do not have the strength to complete a transfer, you will need to have a caregiver, nurse, or therapist help you.

- Explain to the helper how you want to transfer, giving detailed instructions as to how to assist you.
- Instruct the helper to bend his/her knees and keep his/her back straight throughout the transfer.
- Instruct the helper to lift with his/her legs throughout the transfer.
- If you have a *halo*, or any other bracing, make sure the caregiver does not pull, tug or hold onto the bracing or *halo* at any time during the transfer.
- It is recommended that a therapist train you and your caregiver prior to attempting any transfers.
- There are also mechanical lift devices that may be used to assist with transfers. There are portable lifts that involve using a harness to support the hips and trunk in order to allow a caregiver or therapist to move you from one surface to another. There are also lift systems that having tracks built into the ceiling so that a caregiver or you can operate a remote that will lift you up inside of a harness and move you to the wheelchair or into the bathroom to the shower or commode. Lift devices replace the need for heavy lifting by a person and can also increase independence with transfers.

## REFERENCES AND RESOURCES

Duesterhaus Minor, MA and Duesterhaus S. *Patient Care Skills*. 4<sup>th</sup> ed. Stamford, CT: Appleton and Lange; 1999.

<http://www.spinalcordcenter.org/manual/index.html> - Mobility

## GLOSSARY

**ACTIVE ASSISTIVE RANGE OF MOTION** - Movement of a joint through partial range of movement performed by the patient. The remaining range of movement is performed by a caregiver.

**ACTIVE RANGE OF MOTION** - Movement of a joint through the full range of movement voluntarily performed by the patient.

**BED MOBILITY** - Movement of the body in the bed. Includes rolling and transitioning from sitting edge of bed to lying down.

**BEDSIDE COMMODE** - Portable commode with armrests that can be used next to the bed or over the toilet.

**CONTRACTURE** - Muscle or joint that “gets stuck” in one position and cannot be moved. Happens when the muscle or joint is not used for a long period of time.

**HALO** - Type of brace used to stabilize the cervical spine (neck) and prevent any movement while healing following surgery. It is embedded into the skull with screws, and a set of rods connects to a body jacket.

**TRANSFER BOARD** - (also known as a sliding board) A plastic or wooden board used to bridge the gap between two surfaces to make a transfer safer and easier.

**TUB CHAIR** - Placed into tub or shower to provide a seated surface while bathing.

**TRANSFER** - Technique used to move from one surface to another.

**CHEST STRAP** - A strap that goes around the chest to keep the body upright in the wheelchair.

**LATERAL SUPPORTS** - Supports placed on the side of the chair to keep the trunk upright while sitting in the wheelchair.

**HETEROTOPIC OSSIFICATION** - Growth of bone tissue in locations where it should not be found. This condition can cause joints to become stiff and limit movement.

**LONG SITTING** - Sitting with the legs positioned straight out in front.

**PARAPLEGIA** - Loss of motor and/or sensory function in the trunk, abdomen and/or legs caused by injury to the thoracic or lumbar (trunk or low back) segments of the spinal cord.

**PASSIVE RANGE OF MOTION** - Movement of a joint through the full range of movement performed by a caregiver.

**PRESSURE RELIEF** - The act of taking weight off a part of the body that has had pressure on it for a long period of time.

**PRESSURE SORE** - A breakdown in the skin that starts as a red spot on the skin and can grow into a hole in the body that can extend down to the bone if not properly cared for.

**PRESSURE ULCER** - (see pressure sore)

**RANGE OF MOTION** - Amount of movement possible at a joint when limb is moved.

**SELF RANGE OF MOTION** - Movement of a joint or body part through the full range of movement performed by the patient. Can be active, active assistive, or passive (See definitions). Often requires the use of fully functioning body parts to move impaired body parts.

**SPASM** - An involuntary contraction of a muscle.

**SPASTICITY** - A state of increased muscle tone and excessive response often occurring when a muscle is stretched. It can cause an arm or leg to feel tight and be difficult to move.

**TETRAPLEGIA** - (formerly quadriplegia) Loss of motor and/or sensory function in the arms, trunk, and legs caused by injury or disease to the cervical (neck) segments of the spinal cord.

**TRANSFER** - Technique used to move from one surface to another.

**TRICEPS** - Group of muscles located on the back of the upper arm that act to straighten out the elbow.